Utah Transit Authority

Board of Trustees

REGULAR MEETING AGENDA

669 West 200 South
Salt Lake City, UT 84101

Wednesday, April 14, 2021 **9:00 AM** **Frontlines Headquarters**

NOTICE OF SPECIAL MEETING CIRCUMSTANCES DUE TO COVID-19 PANDEMIC:

In accordance with the Utah Open and Public Meetings Act, (Utah Code § 52-4-207.4), the UTA Board of Trustees will make the following adjustments to our normal meeting procedures.

- All members of the Board of Trustees and meeting presenters will participate electronically.
- Meeting proceedings may be viewed remotely through the WebEx meeting platform (see below) or by following the instructions and link on the UTA Board Meetings page - https://www.rideuta.com/Board-of-Trustees/Meetings
- Public Comment may be given live during the meeting. See instructions below.
  - Use this WebEx link and follow the instructions to register for the meeting (you will need to provide your name and email address)
    https://rideuta.webex.com/rideuta/onstage/g.php?MTID=e079fbe42d37748ab8ebd549a899ac9a1
  - Sign on to the WebEx meeting portal through the "join event" link provided in your email following approval of your registration.
  - Sign on 5 minutes prior to the meeting start time
  - Comments are limited to 3 minutes per commenter.
- Public Comment may also be given through alternate means. See instructions below.
  - Comment online at https://www.rideuta.com/Board-of-Trustees
  - Comment via email at boardoftrustees@rideuta.com
  - Comment by telephone at 801-743-3882 option 5 (801-RideUTA option 5) – specify that your comment is for the board meeting.
  - Comments submitted before 2:00 p.m. on Tuesday, April 13th will be distributed to board members prior to the meeting.
- Special Accommodation: Information related to this meeting is available in alternate format upon request by contacting calldredge@rideuta.com or (801) 287-3536. Request for accommodations should be made at least two business days in advance of the scheduled meeting.

1.	**Call to Order & Opening Remarks**	Chair Carlton Christensen
2.	**Safety First Minute**	Sheldon Shaw
3.	**Public Comment**	Chair Carlton Christensen

4.	**Consent**		Chair Carlton Christensen
	a.	Approval of March 24, 2021 Board Meeting Minutes	
5.	**Reports**		
	a.	Agency Report	Carolyn Gonot
	b.	Financial Report - February 2021	Bill Greene Brad Armstrong
6.	**Resolutions**		
	a.	Resolution R2021-04-01 Granting Contact and Expenditure Authority	Troy Bingham
7.	**Contracts, Disbursements and Grants**		
	a.	Contract: Battery Electric Buses and Associated Charging Equipment (Gillig LLC)	Eddy Cumins Kyle Stockley
	b.	Contract: Program Management Services (HNTB)	Mary DeLoretto Manjeet Ranu
	c.	Change Order: Program Management Services Contract Extension (WSP)	Mary DeLoretto Manjeet Ranu
	d.	Change Order: On-Call Infrastructure Maintenance - Task Order #10 - Redwood Road Trax Grade Crossing Replacement (Stacy and Witbeck Inc.)	Eddy Cumins Kyle Stockley
	e.	Pre-Procurement: - Motorola Integrated Digital Enhanced Network (IDEN) Support - Multiple Buildings Roof Replacement - 3300 S. Bus Stop Design and Property Acquisition	Todd Mills

8. Service and Fare Approvals

a. Complimentary Fare: Art in Transit Complimentary Passes — Kensey Kunkel, Megan Waters

9. Discussion Items

a. UTA Policy UTA.05.02 - Paid Time Off - Administrative Employees — Kim Ulibarri

Board may make a motion on this item.

10. Other Business — Chair Carlton Christensen

- Next Meeting: Wednesday, April 28th, 2021 at 9:00 a.m

11. Closed Session — Chair Carlton Christensen

a. Strategy session to discuss pending or reasonably imminent litigation

12. Adjourn — Chair Carlton Christensen

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

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UTAH TRANSIT AUTHORITY
ELECTRONIC BOARD MEETING DETERMINATION

Consistent with the Utah Open and Public Meetings Act, (UTAH CODE § 52-4-207 [4]), as the Chair of the Board of Trustees ("Board") of the Utah Transit Authority ("UTA"), I hereby make the following written determinations in support of my decision to hold electronic meetings of the UTA Board without a physical anchor location:

1. Due to the ongoing COVID -19 pandemic, conducting Board and Board Committee meetings with an anchor location presents a substantial risk to the health and safety of those who may be present at the anchor location.
2. Federal, state, and local health authorities continue to encourage institutions and individuals to limit in-person interactions.

This written determination takes effect on April 12, 2021, and is effective until midnight on May 11, 2021 and may be re-issued by future written determinations as deemed appropriate.

Dated this 2nd day of April 2021.

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Carlton Christensen, Chair of the Board of Trustees

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Jana Ostler, Board Manager
FROM: Jana Ostler, Board Manager

TITLE:

Approval of March 24, 2021 Board Meeting Minutes

AGENDA ITEM TYPE:	Minutes
RECOMMENDATION:	Approve the minutes of the March 24, 2021 Board of Trustees meeting
BACKGROUND:	A regular meeting of the UTA Board of Trustees was held electronically and broadcast live on YouTube on Wednesday, March 24, 2021 at 9:00 a.m. Minutes from the meeting document the actions of the Board and summarize the discussion that took place in the meeting. A full audio recording of the meeting is available on the Utah Public Notice Website <https://www.utah.gov/pmn/sitemap/notice/665285.html> and video feed is available on You Tube at https://www.youtube.com/UTAride
ATTACHMENTS:	1) 2021-03-24_BOT_Minutes_unapproved

Minutes of the Meeting
of the
Board of Trustees of the Utah Transit Authority (UTA)
held remotely via phone or video conference
and broadcast live for the public via YouTube
March 24, 2021

Board Members Participating:

Carlton Christensen, Chair
Beth Holbrook
Jeff Acerson

Also participating were UTA staff members.

Call to Order and Opening Remarks. Chair Christensen welcomed attendees and called the meeting to order at 9:00 a.m. He then yielded the floor to Jana Ostler, UTA Board Manager, who read the electronic board meeting determination statement into the record as required by statute. The complete electronic board meeting determination statement is included as Appendix A to these minutes.

Chair Christensen mentioned today's meeting would be held in memory of Doug Oldham, a UTA employee who recently passed away due to complications from COVID-19. He yielded the floor to Grace Torres, UTA Operations Supervisor, who shared some memories of and sentiments about Mr. Oldham.

Safety First Minute. Sheldon Shaw, UTA Director of Safety & Security, provided a brief safety message.

Public Comment. Chair Christensen noted members of the public were invited to attend and comment during the live portion of the meeting; however, no live public comment was given. No online public comment was received for the meeting.

Consent Agenda. The consent agenda was comprised of:

a. Approval of March 10, 2021 Board Meeting Minutes
b. UTA Policy UTA.01.04 – Disadvantaged Business Enterprise
c. UTA Policy UTA.03.02 – Employee and Public Safety
d. UTA Policy UTA.04.01 – Interactions with At Risk and Minor Passengers

A motion to approve the consent agenda was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Agency Report.

Ogden-Weber State University Bus Rapid Transit Groundbreaking. Carolyn Gonot, UTA Executive Director, mentioned the groundbreaking for the Ogden-Weber State University BRT, which is scheduled on Tuesday, April 13 at 2:00 p.m. at the Weber State University Browning Center.

COVID-19 Recovery Taskforce Update. Ms. Gonot was joined by Lorin Simpson, UTA Regional General Manager – Salt Lake Business Unit. Mr. Simpson spoke about the recovery taskforce composition, goals, and initiatives. He then said the team is transitioning its focus from COVID-19 recovery to ridership recovery.

Ms. Gonot recognized staff that participated in UTA's emergency operations center (EOC), which was activated during the pandemic, initially holding daily and then weekly meetings. She also recognized the information technology staff for quickly adapting and supporting staff working from home.

Discussion ensued. The board commended Ms. Gonot for her leadership through and thanked staff for their response to the COVID-19 crisis.

S-Line: 100% Renewable Energy. Ms. Gonot was joined by Hal Johnson, UTA Manager – Project Development & Systems Planning. Mr. Johnson spoke about the focus areas of UTA's energy action plan and partnership agreement with Rocky Mountain Power. He then outlined opportunities on the S-Line to decrease emissions by moving to a 100 percent renewable energy program.

Discussion ensued. Questions on communicating the program to Salt Lake City and Rocky Mountain Power's renewable energy sources were posed by the board and answered by Mr. Johnson.

Resolutions.

R2021-03-01 Resolution Redesignating the Trustee and Administrator of the Authority's 457 Deferred Compensation Plan. Kim Ulibarri, UTA Chief People Officer,

explained the resolution, which partially rescinds board resolution R2019-01-03, removes the pension committee as a 457 deferred compensation plan trustee, appoints the UTA board as a plan trustee, and appoints the executive director or designee as the plan administrator.

Discussion ensued. A question on 457 plan investment determinations was posed by the board and answered by Ms. Ulibarri.

A motion to approve R2021-03-01 was made by Trustee Acerson and seconded by Trustee Holbrook. The motion carried unanimously with aye votes from Trustee Acerson, Trustee Holbrook, and Chair Christensen.

Contracts, Disbursements, and Grants.

Contract: FrontRunner Paint Booth Construction (Paulsen Construction LLC) and Technical Budget Adjustment. Mary DeLoretto, UTA Chief Service Development Officer, was joined by Andrea Pullos, UTA Project Manager III. Ms. Pullos said the cost of the contract for paint booth construction is higher than the engineer's estimate due to an increase in metal prices, necessitating a project budget adjustment of $429,500. The total contract value with the adjustment is $1,305,766.

Discussion ensued. Questions on the need for a paint booth and contractual accommodations for cost volatility were posed by the board and answered by staff.

A motion to approve the contract and technical budget adjustment was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Change Order: On-Call Infrastructure Maintenance – Task Order #05 – 7500 South TRAX Grade Crossing Replacement (Stacy and Witbeck, Inc.). David Hancock, UTA Director of Asset Management, requested the board approve a change order to the contract with Stacy and Witbeck in the amount of $217,160 for replacement of the 7500 South crossing on the TRAX Blue Line. The total contract, including the change order, is $1,420,792.

Discussion ensued. It was noted this will be the first replacement of this grade crossing since the Blue Line opened.

A motion to approve the change order was made by Trustee Acerson and seconded by Trustee Holbrook. The motion carried unanimously.

Change Order: On-Call Systems Maintenance – Task Order #1 – Contractor Full-Time Staff Support (Rocky Mountain Systems Services). Mr. Hancock was joined by Jared Scarbrough, UTA Manager of Systems Engineering. Mr. Scarbrough asked the board to approve a change order to the contract with Rocky Mountain Systems Services (RMSS) in the amount of $749,625 to provide three full-time subject matter experts to assist in project planning, management, project engineering, and field engineering.

Discussion ensued. A question on the need to contract this work was posed by the board and answered by staff.

A motion to approve the change order was made by Trustee Holbrook and seconded by Trustee Acerson. The motion carried unanimously.

Change Order: On-Call Systems Maintenance – Task Order #2 – 700 South TRAX OCS Auto-Tensioning (Rocky Mountain Systems Services). Mr. Hancock was joined by Mr. Scarbrough. Mr. Scarbrough requested the board approve a change order to the contract with RMSS in the amount of $293,621 for the 700 South overhead catenary system (OCS) auto-tension project. The total contract value, including the change order, is $1,043,246.

Discussion ensued. Questions on the tension measurement of the system wire and life span of the upgrade were posed by the board and answered by staff.

A motion to approve the change order was made by Trustee Acerson and seconded by Trustee Holbrook. The motion carried unanimously.

Other Business.

Next Meeting. The next meeting of the board will take place on April 14, 2021 at 9:00 a.m. The meeting scheduled for April 7, 2021 has been canceled.

Adjournment. The meeting was adjourned by motion in memory of Doug Oldham at 10:04 a.m.

Transcribed by Cathie Griffiths
Executive Assistant to the Board Chair
Utah Transit Authority
cgriffiths@rideuta.com
801.237.1945

This document is not intended to serve as a full transcript as additional discussion may have taken place; please refer to the meeting materials, audio, or video located at https://www.utah.gov/pmn/sitemap/notice/665285.html for entire content.

This document along with the digital recording constitute the official minutes of this meeting.

Approved Date:

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Carlton J. Christensen
Chair, Board of Trustees

Appendix A

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UTAH TRANSIT AUTHORITY
ELECTRONIC BOARD MEETING DETERMINATION

Consistent with the Utah Open and Public Meetings Act, (UTAH CODE § 52-4-207 [4]), as the Chair of the Board of Trustees ("Board") of the Utah Transit Authority ("UTA"), I hereby make the following written determinations in support of my decision to hold electronic meetings of the UTA Board without a physical anchor location:

1. Due to the ongoing COVID -19 pandemic, conducting Board and Board Committee meetings with an anchor location presents a substantial risk to the health and safety of those who may be present at the anchor location.
2. Federal, state, and local health authorities continue to encourage institutions and individuals to limit in-person interactions.

This written determination takes effect on March 10, 2021, and is effective until midnight on April 8, 2021 and may be re-issued by future written determinations as deemed appropriate.

Dated this 4th day of March 2021.

DocuSigned by:
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Carlton Christensen, Chair of the Board of Trustees

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Carolyn Gonot, Executive Director
PRESENTER(S): Carolyn Gonot, Executive Director

TITLE:

Agency Report

AGENDA ITEM TYPE:	Reports
RECOMMENDATION:	Informational report for discussion
DISCUSSION:	Carolyn Gonot, UTA Executive Director will report on recent activities of the agency and other items of interest.

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: William Greene, Chief Financial Officer
PRESENTER(S): Brad Armstrong, Senior Manager Budget & Financial Analysis

TITLE:

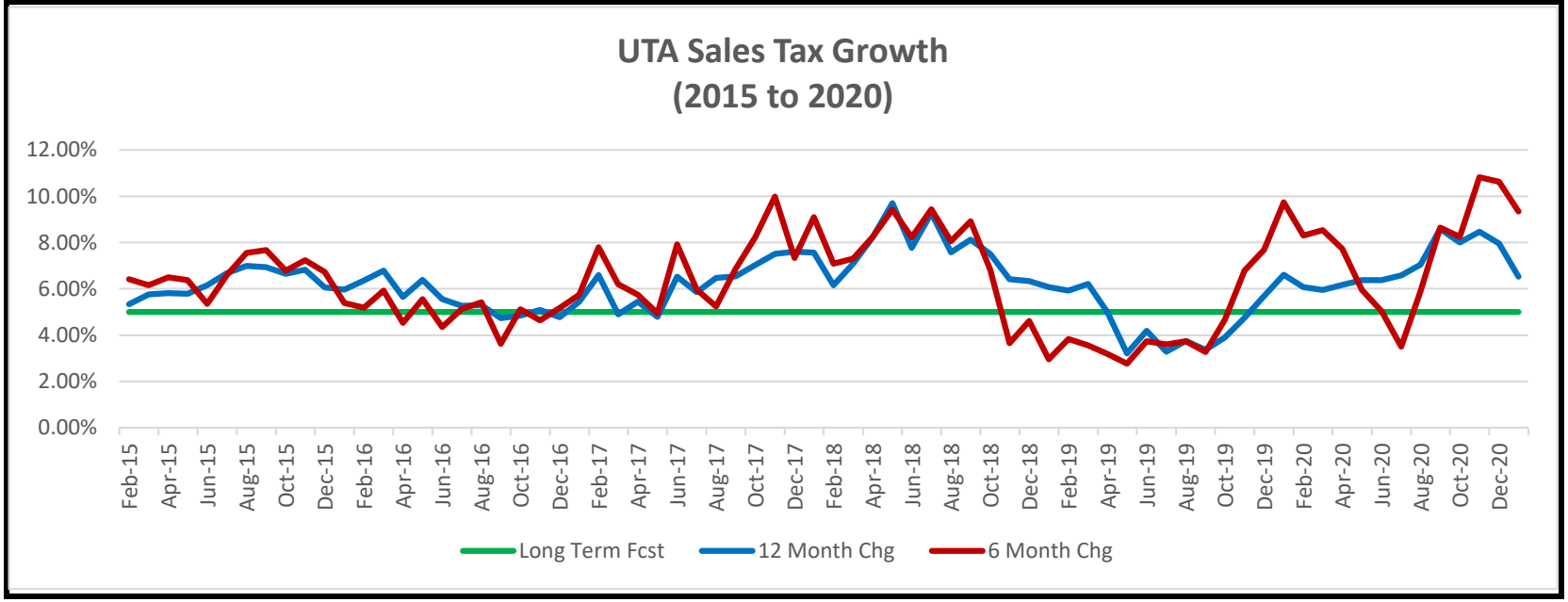
Financial Report - February 2021

AGENDA ITEM TYPE:	Report
RECOMMENDATION:	Informational report for discussion
BACKGROUND:	The Board of Trustees Policy No. 2.1, Financial Management, directs the Chief Financial Officer to present monthly financial statements stating the Authority's financial position, revenues, and expenses to the Board of Trustees as soon as practical with monthly and year-to-date budget versus actual report to be included in the monthly financial report. The February 2021 Monthly Financial Statements have been prepared in accordance with the Financial Management Policy and are being presented to the Board. Also provided, is the monthly Board Dashboard which summarizes key information from the preliminary January Monthly Financial Statements.
DISCUSSION:	At the April 14, 2021 meeting, the Senior Manager Budget and Financial Analysis will review the Board Dashboard key items, passenger revenues, sales tax collections and operating expense variances and receive questions from the Board of Trustees.
ALTERNATIVES:	n/a
FISCAL IMPACT:	n/a
ATTACHMENTS:	• February 2021 Board Dashboard • February 2021 Monthly Financial Statements

Utah Transit Authority

Board Dashboard: February 28, 2021

Financial Metrics	Feb Actual	Feb Budget	*Fav/ (Unfav)*	*%*	YTD Actual	YTD Budget	*Fav/ (Unfav)*	*%*
Sales Tax (Jan '20 mm $)	$ 28.3	$ 26.7	*$ 1.61*	*6.0%*	$ 28.3	$ 26.7	*$ 1.61*	*6.0%*
Fare Revenue (mm)	$ 2.4	$ 2.6	*$ (0.25)*	*-9.5%*	$ 5.1	$ 5.3	*$ (0.19)*	*-3.7%*
Operating Exp (mm)	$ 18.6	$ 26.1	*7.51*	*28.7%*	$ 42.3	$ 53.6	*$ 11.36*	*21.2%*
Subsidy Per Rider **(SPR)**	$ 10.13	$ 15.06	*$ 4.93*	*32.7%*	$ 11.59	$ 15.06	*$ 3.47*	*23.0%*
UTA Diesel Price ($/gal)	$ 1.99	$ 2.25	*$ 0.26*	*11.5%*	$ 1.86	$ 2.25	*$ 0.39*	*17.1%*
Operating Metrics	**Feb Actual**	**Feb-20**	***F/ (UF)***	***%***	**YTD Actual**	**YTD 2020**	***F/ (UF)***	***%***
Ridership (mm)	1.61	3.71	*(2.1)*	*-56.7%*	3.21	7.58	*(4.4)*	*-57.7%*
Alternative Fuels	**CNG Price** (Diesel Gal Equiv)		$ 1.99					



KEY ITEM REPORT
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-1

		2021 YTD ACTUAL	2021 YTD BUDGET	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
1	Operating Revenue	$ (5,263,060)	$ (5,494,000)	$ (230,940)	-4%
2	Operating Expenses	42,271,071	53,631,774	11,360,703	21%
3	Net Operating Income (Loss)	(37,008,011)	(48,137,774)	11,129,763	23%
4	Capital Revenue	(7,201,391)	(15,758,827)	(8,557,437)	-54%
5	Capital Expenses	8,110,331	21,301,565	13,191,234	62%
6	Net Capital Income (Loss)	(908,940)	(5,542,738)	4,633,798	84%
7	Sales Tax	(51,443,697)	(51,443,695)	2	0%
8	Other Revenue	(29,491,501)	(31,162,833)	(1,671,332)	-5%
9	Debt Service	15,278,427	15,065,345	(213,082)	-1%
10	Sale of Assets	6,265	-	(6,265)	
11	Net Non-Operating Income (Loss)	65,650,506	67,541,183	(1,890,677)	-3%
12	Contribution to Cash Balance	$ 27,733,555	$ 13,860,671	$ 13,872,884	100%
13	Amortization	(19,971)			
14	Depreciation	23,242,119			
15	Total Non-cash Items	$ 23,222,148			

STATISTICS

RIDERSHIP

	2021 Actual	February 2021	February 2020	Difference	2021 YTD	2020 YTD	Difference
16	23,530,441	1,605,278	3,706,335	-2,101,056	3,207,703	7,575,635	-4,367,932

OPERATING SUBSIDY PER RIDER -

			SPR
17	Net Operating Expense	$	42,271,071
18	Less: Passenger Revenue	-	(5,079,507)
19	Subtotal		37,191,564
20	Divided by: Ridership	÷	3,207,703
21	Subsidy per Rider	$	11.59

SUMMARY FINANCIAL DATA
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-2

BALANCE SHEET

		2/28/2021	2/28/2020
	CURRENT ASSETS		
1	Cash	$ 13,001,054	$ 14,143,243
2	Investments (Unrestricted)	225,520,027	112,494,725
3	Investments (Restricted)	168,199,177	192,818,698
4	Receivables	68,027,362	57,475,116
5	Receivables - Federal Grants	27,526,986	11,259,215
6	Inventories	34,802,865	37,011,658
7	Prepaid Expenses	1,699,841	1,214,490
8	TOTAL CURRENT ASSETS	$ 538,777,312	$ 426,417,145
9	Property, Plant & Equipment (Net)	2,919,967,128	2,930,077,600
10	Other Assets	152,888,093	156,611,271
11	TOTAL ASSETS	$3,611,632,533	$3,513,106,016
12	Current Liabilities	$ 74,330,501	$ 78,950,564
14	Net Pension Liability	103,864,839	131,548,114
15	Outstanding Debt	2,450,830,241	2,456,184,233
16	Net Investment in Capital Assets	703,271,501	
17	Restricted Net Position	79,562,387	
18	Unrestricted Net Position	199,773,064	846,423,105
19	TOTAL LIABILITIES & EQUITY	$3,611,632,533	$3,513,106,016

RESTRICTED AND DESIGNATED CASH AND CASH EQUIVALENTS RECONCILIATION

	RESTRICTED RESERVES		
20	Debt Service Reserves	$ 67,302	$ 33,152,634
21	2010/2015 Bond DSR Proceeds	7,585,223	
22	2018 Bond Proceeds	15,799,574	27,775,203
23	2019 Bond Proceeds	66,137,603	71,193,766
24	Debt Service Interest Payable	38,804,532	32,891,826
25	Risk Contingency Fund	8,023,668	7,960,175
26	Box Elder County ROW (sales tax)	7,386,258	6,759,560
27	Joint Insurance Trust	10,345,251	6,889,118
28	Davis County Escrow	753,992	1,234,109
29	SL County Escrow	60,918	331,604
30	Amounts held in escrow	13,234,856	4,630,703
31	TOTAL RESTRICTED RESERVES	$ 168,199,177	$ 192,818,698
	DESIGNATED GENERAL AND CAPITAL RESERVES		
32	General Reserves	$ 58,778,000	$ 35,420,968
33	Service Sustainability Reserves	9,796,000	9,166,000
34	Capital Reserve	44,338,000	10,700,000
35	Debt Reduction Reserve	30,000,000	71,341,000
36	TOTAL DESIGNATED GENERAL AND CAPITAL RESERVES	$ 142,912,000	$ 126,627,968
37	TOTAL RESTRICTED AND DESIGNATED CASH AND EQUIVALENTS	$ 311,111,177	$ 319,446,666

SUMMARY FINANCIAL DATA
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-3

REVENUE & EXPENSES

		ACTUAL Feb-21	ACTUAL Feb-20	YTD 2021	YTD 2020
	OPERATING REVENUE				
1	Passenger Revenue	$ 2,385,422	$ 4,543,252	$ 5,079,507	$ 9,172,270
2	Advertising Revenue	90,030	208,334	183,553	416,667
3	TOTAL OPERATING REVENUE	$ 2,475,452	$ 4,751,586	$ 5,263,060	$ 9,588,937
	OPERATING EXPENSE				
4	Bus Service	$ 6,321,915	$ 8,578,532	$ 14,931,476	$ 17,896,723
5	Commuter Rail	1,288,370	1,843,197	3,103,249	3,947,685
6	Light Rail	2,685,614	2,862,618	5,350,485	6,104,365
7	Maintenance of Way	1,199,899	1,445,786	3,329,925	3,150,454
8	Paratransit Service	1,502,945	1,932,801	3,233,312	3,718,527
9	RideShare/Van Pool Services	261,432	383,898	458,897	533,037
10	Microtransit	121,034	-	146,293	-
11	Operations Support	3,002,387	3,548,263	6,983,537	7,802,922
12	Administration	2,059,700	3,044,829	4,148,502	5,156,029
13	Planning/Capital Development/Real Estate	200,311	378,132	585,395	749,992
14	Non-Departmental	-	-	-	-
15	TOTAL OPERATING EXPENSE	$ 18,643,607	$ 24,018,056	$ 42,271,071	$ 49,059,734
16	NET OPERATING INCOME (LOSS)	$ (16,168,155)	$ (19,266,470)	$ (37,008,011)	$ (39,470,797)
	NON-OPERATING EXPENSE (REVENUE)				
17	Investment Revenue	(121,999)	(501,329)	(50,367)	(726,811)
18	Sales Tax Revenue	(24,730,438)	(23,274,739)	(51,443,697)	(46,095,139)
19	Other Revenue	(704,831)	(583,850)	(1,223,659)	(1,218,328)
20	Fed Operations/Preventative Maint. Revenue	(12,742,850)	(4,969,049)	(28,217,475)	(9,804,560)
21	Bond Interest	7,371,254	8,111,753	14,742,508	14,970,131
22	Bond Interest UTCT	162,410	166,776	324,820	330,742
23	Bond Cost of Issuance/Fees	-	1,500	-	1,500
24	Lease Interest	89,239	755,445	211,099	1,510,890
25	Sale of Assets	16,391	-	6,265	-
26	TOTAL NON-OPERATING EXPENSE	$ (30,660,824)	$ (20,293,493)	$ (65,650,506)	$ (41,031,575)
27	CONTRIBUTION TO RESERVES	$ 14,492,669	$ 1,027,023	$ 28,642,495	$ 1,560,778
	OTHER EXPENSES (NON-CASH)				
27	Bond Premium/Discount Amortization	(365,023)	(1,010,103)	(742,811)	(2,020,205)
28	Bond Refunding Cost Amortization	293,694	592,606	587,388	1,185,211
29	Future Revenue Cost Amortization	67,876	67,576	135,452	135,152
30	Depreciation	16,640,589	11,275,427	23,242,119	22,487,304
31	NET OTHER EXPENSES (NON-CASH)	$ 16,637,136	$ 10,925,506	$ 23,222,148	$ 21,787,462

BUDGET TO ACTUAL REPORT
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-4

CURRENT MONTH

		ACTUAL Feb-21	BUDGET Feb-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING REVENUE				
1	Passenger Revenue	$ (2,385,422)	$ (2,637,000)	$ (251,578)	-10%
2	Advertising Revenue	(90,030)	(110,000)	(19,970)	-18%
3	TOTAL OPERATING REVENUE	$ (2,475,452)	$ (2,747,000)	$ (271,548)	10%
	OPERATING EXPENSE				
4	Bus Service	$ 6,321,915	$ 8,911,390	$ 2,589,475	29%
5	Commuter Rail	1,288,370	1,921,481	633,111	33%
6	Light Rail	2,685,614	3,413,961	728,347	21%
7	Maintenance of Way	1,199,899	1,574,846	374,947	24%
8	Paratransit Service	1,502,945	1,994,146	491,201	25%
9	RideShare/Van Pool Services	261,432	303,713	42,281	14%
10	Microtransit	121,034	207,151	86,117	42%
11	Operations Support	3,002,387	4,438,802	1,436,415	32%
12	Administration	2,059,700	2,922,004	862,304	30%
13	Planning/Capital Development/Real Estate	200,311	461,136	260,825	57%
14	Non-Departmental	-	-	-	
15	TOTAL OPERATING EXPENSE	$ 18,643,607	$ 26,148,630	$ 7,505,023	29%
16	NET OPERATING INCOME (LOSS)	$ (16,168,155)	$ (23,401,630)	$ 7,233,475	31%
	NON-OPERATING EXPENSE (REVENUE)				
17	Investment Revenue	$ (121,999)	$ (400,583)	$ (278,584)	-70%
18	Sales Tax Revenue	(24,730,438)	(24,730,438)	-	0%
19	Other Revenue	(704,831)	(888,583)	(183,752)	-21%
20	Fed Operations/Preventative Maint. Revenue	(12,742,850)	(14,292,250)	(1,549,400)	-11%
21	Bond Interest	7,371,254	7,264,797	(106,457)	-1%
22	Bond Interest UTCT	162,410	163,966	1,556	1%
23	Bond Cost of Issuance/Fees	-	-	-	
24	Lease Interest	89,239	103,343	14,104	14%
25	Sale of Assets	16,391	-	(16,391)	
26	TOTAL NON-OPERATING EXPENSE	$ (30,660,824)	$ (32,779,749)	$ (2,118,925)	-6%
27	CONTRIBUTION TO RESERVES	$ 14,492,669	$ (56,181,379)		

BUDGET TO ACTUAL REPORT BY CHIEF
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-4A

CURRENT MONTH

		ACTUAL Feb-21	BUDGET Feb-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING EXPENSE				
1	Board of Trustees	$ 176,691	$ 218,587	$ 41,896	19%
2	Executive Director	512,132	657,569	145,437	22%
3	Chief Planning and Engagement Officer	521,166	754,778	233,612	31%
4	Chief Finance Officer	678,887	1,045,284	366,397	35%
5	Chief Operating Officer	15,094,624	20,829,147	5,734,523	28%
6	Chief People Officer	431,410	663,392	231,982	35%
7	Chief Development Officer	127,835	369,945	242,110	65%
8	Chief Enterprise Strategy Officer	1,100,862	1,609,928	509,066	32%
9	Non-Departmental	-	-	-	
10	TOTAL OPERATING EXPENSE	$ 18,643,607	$ 26,148,630	$ 7,505,023	29%

YEAR TO DATE

		ACTUAL Feb-21	BUDGET Feb-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING EXPENSE				
1	Board of Trustees	$ 350,491	$ 461,438	$ 110,947	24%
2	Executive Director	764,149	1,315,138	550,989	42%
3	Chief Planning and Engagement Officer	945,156	1,695,595	750,439	44%
4	Chief Finance Officer	1,606,042	2,200,535	594,493	27%
5	Chief Operating Officer	34,778,232	42,031,820	7,253,588	17%
6	Chief People Officer	997,475	1,326,784	329,309	25%
7	Chief Devlopment Officer	468,462	740,040	271,578	37%
8	Chief Enterprise Strategy Officer	2,361,064	3,313,591	952,527	29%
9	Non-Departmental	-	546,833	546,833	100%
10	TOTAL OPERATING EXPENSE	$ 42,271,071	$ 53,631,774	$ 11,360,703	21%

BUDGET TO ACTUAL REPORT
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-5

YEAR TO DATE

		ACTUAL Feb-21	BUDGET Feb-21	VARIANCE FAVORABLE (UNFAVORABLE)	% FAVORABLE (UNFAVORABLE)
	OPERATING REVENUE				
1	Passenger Revenue	$ (5,079,507)	$ (5,274,000)	$ (194,493)	-4%
2	Advertising Revenue	(183,553)	(220,000)	(36,447)	-17%
3	TOTAL OPERATING REVENUE	$ (5,263,060)	$ (5,494,000)	$ (230,940)	-4%
	OPERATING EXPENSE				
4	Bus Service	$ 14,931,476	$ 18,106,352	$ 3,174,876	18%
5	Commuter Rail	3,103,249	3,923,722	820,473	21%
6	Light Rail	5,350,485	6,806,303	1,455,818	21%
7	Maintenance of Way	3,329,925	3,180,505	(149,420)	-5%
8	Paratransit Service	3,233,312	3,988,292	754,980	19%
9	RideShare/Van Pool Services	458,897	607,426	148,529	24%
10	Microtransit	146,293	465,378	319,085	69%
11	Operations Support	6,983,537	8,940,989	1,957,452	22%
12	Administration	4,148,502	6,071,974	1,923,472	32%
13	Planning/Capital Development/Real Estate	585,395	994,000	408,605	41%
14	Non-Departmental	-	546,833	546,833	100%
15	TOTAL OPERATING EXPENSE	$ 42,271,071	$ 53,631,774	$ 11,360,703	21%
16	NET OPERATING INCOME (LOSS)	$ (37,008,011)	$ (48,137,774)	$ 11,129,763	23%
	NON-OPERATING EXPENSE (REVENUE)				
17	Investment Revenue	$ (50,367)	$ (801,167)	$ 750,800	-94%
18	Sales Tax Revenue	(51,443,697)	(51,443,695)	(2)	0%
19	Other Revenue	(1,223,659)	(1,777,167)	553,508	-31%
20	Fed Operations/Preventative Maint. Revenue	(28,217,475)	(28,584,500)	367,025	-1%
21	Bond Interest	14,742,508	14,529,593	(212,915)	-1%
22	Bond Interest UTCT	324,820	327,932	3,112	1%
23	Bond Cost of Issuance/Fees	-	-	-	
24	Lease Interest	211,099	207,820	(3,279)	-2%
25	Sale of Assets	6,265	-	(6,265)	
26	TOTAL NON-OPERATING EXPENSE	$ (65,650,506)	$ (67,541,183)	$ (1,890,677)	-3%
27	CONTRIBUTION TO RESERVES	$ 28,642,495	$ (46,156,089)		

CAPITAL PROJECTS
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-6

		2021 ACTUAL	ANNUAL BUDGET	PERCENT
	EXPENSES			
1	REVENUE AND NON-REVENUE VEHICLES	$ 226,120	$ 24,058,619	0.9%
2	INFORMATION TECHNOLOGY	224,750	16,060,000	1.4%
3	FACILITIES, MAINTENANCE & ADMIN. EQUIP.	154,150	3,696,000	4.2%
4	CAPITAL PROJECTS	2,117,163	71,728,984	3.0%
5	AIRPORT STATION RELOCATION	487,773	7,000,000	7.0%
6	STATE OF GOOD REPAIR	1,653,674	34,923,645	4.7%
7	DEPOT DISTRICT	1,900,826	32,400,124	5.9%
8	OGDEN/WEBER STATE BRT	119,045	52,580,513	0.2%
9	TIGER	1,226,830	13,170,900	9.3%
10	TOTAL	$ 8,110,331	$ 255,618,785	3.2%
	REVENUES			
11	GRANT	$ 3,135,502	$ 75,792,972	4.1%
12	STATE CONTRIBUTION	478,425	9,214,417	5.2%
13	LEASES (PAID TO DATE)	950,062	28,305,720	3.4%
14	BONDS	1,411,474	51,259,480	2.8%
15	LOCAL PARTNERS	1,225,928	24,533,340	5.0%
16	UTA FUNDING	908,940	66,512,856	1.4%
17	TOTAL	$ 8,110,331	$ 255,618,785	3.2%

FAREBOX RECOVERY & SPR
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-7

BY SERVICE

	CURRENT MONTH		YEAR TO DATE	
	Feb-21	Feb-20	2021	2020
UTA				
Fully Allocated Costs	18,643,608	24,018,056	42,271,071	49,059,734
Passenger Farebox Revenue	2,385,422	4,543,252	5,079,507	9,172,270
Passengers	1,605,278	3,706,335	3,207,703	7,575,635
Farebox Recovery Ratio	12.8%	18.9%	12.0%	18.7%
Actual Subsidy per Rider	$10.13	$5.25	$11.59	$5.27
BUS SERVICE				
Fully Allocated Costs	9,108,034	11,650,944	21,013,509	23,928,710
Passenger Farebox Revenue	1,110,499	1,764,032	2,534,747	3,670,206
Passengers	883,386	1,779,684	1,762,138	3,663,514
Farebox Recovery Ratio	12.2%	15.1%	12.1%	15.3%
Actual Subsidy per Rider	$9.05	$5.56	$10.49	$5.53
LIGHT RAIL SERVICE				
Fully Allocated Costs	5,428,844	6,404,009	12,115,910	13,337,034
Passenger Farebox Revenue	516,248	1,146,735	1,043,836	2,324,229
Passengers	529,691	1,352,368	1,062,307	2,729,727
Farebox Recovery Ratio	9.5%	17.9%	8.6%	17.4%
Actual Subsidy per Rider	$9.27	$3.89	$10.42	$4.03
COMMUTER RAIL SERVICE				
Fully Allocated Costs	2,062,724	3,245,722	4,826,984	6,784,526
Passenger Farebox Revenue	381,023	821,150	702,887	1,684,978
Passengers	113,759	410,872	225,090	857,298
Farebox Recovery Ratio	18.5%	25.3%	14.6%	24.8%
Actual Subsidy per Rider	$14.78	$5.90	$18.32	$5.95
PARATRANSIT				
Fully Allocated Costs	1,637,919	2,121,909	3,538,147	4,061,064
Passenger Farebox Revenue	98,055	461,409	252,970	794,892
Passengers	30,370	62,356	60,349	131,288
Farebox Recovery Ratio	6.0%	21.7%	7.1%	19.6%
Actual Subsidy per Rider	$50.70	$26.63	$54.44	$24.88
RIDESHARE				
Fully Allocated Costs	406,086	595,472	776,521	948,400
Passenger Farebox Revenue	279,597	349,927	545,068	697,965
Passengers	48,072	101,054	97,819	193,808
Farebox Recovery Ratio	68.9%	58.8%	70.2%	73.6%
Actual Subsidy per Rider	$2.63	$2.43	$2.37	$1.29

FAREBOX RECOVERY & SPR
(UNAUDITED)
As of February 28, 2021 Preliminary

EXHIBIT 1-8

BY TYPE

	CURRENT MONTH		YEAR TO DATE	
	Feb-21	Feb-20	2021	2020
FULLY ALLOCATED COSTS				
Bus Service	$9,108,034	$11,650,944	$21,013,509	$23,928,710
Light Rail Service	$5,428,844	$6,404,009	$12,115,910	$13,337,034
Commuter Rail Service	$2,062,724	$3,245,722	$4,826,984	$6,784,526
Paratransit	$1,637,919	$2,121,909	$3,538,147	$4,061,064
Rideshare	$406,086	$595,472	$776,521	$948,400
UTA	$18,643,608	$24,018,056	$42,271,071	$49,059,734
PASSENGER FAREBOX REVENUE				
Bus Service	$1,110,499	$1,764,032	$2,534,747	$3,670,206
Light Rail Service	$516,248	$1,146,735	$1,043,836	$2,324,229
Commuter Rail Service	$381,023	$821,150	$702,887	$1,684,978
Paratransit	$98,055	$461,409	$252,970	$794,892
Rideshare	$279,597	$349,927	$545,068	$697,965
UTA	$2,385,422	$4,543,252	$5,079,507	$9,172,270
PASSENGERS				
Bus Service	883,386	1,779,684	1,762,138	3,663,514
Light Rail Service	529,691	1,352,368	1,062,307	2,729,727
Commuter Rail Service	113,759	410,872	225,090	857,298
Paratransit	30,370	62,356	60,349	131,288
Rideshare	48,072	101,054	97,819	193,808
UTA	1,605,278	3,706,335	3,207,703	7,575,635
FAREBOX RECOVERY RATIO				
Bus Service	12.2%	15.1%	12.1%	15.3%
Light Rail Service	9.5%	17.9%	8.6%	17.4%
Commuter Rail Service	18.5%	25.3%	14.6%	24.8%
Paratransit	6.0%	21.7%	7.1%	19.6%
Rideshare	68.9%	58.8%	70.2%	73.6%
UTA	12.8%	18.9%	12.0%	18.7%
ACTUAL SUBSIDY PER RIDER				
Bus Service	$9.05	$5.56	$10.49	$5.53
Light Rail Service	$9.27	$3.89	$10.42	$4.03
Commuter Rail Service	$14.78	$5.90	$18.32	$5.95
Paratransit	$50.70	$26.63	$54.44	$24.88
Rideshare	$2.63	$2.43	$2.37	$1.29
UTA	$10.13	$5.25	$11.59	$5.27

SUMMARY OF ACCOUNTS RECEIVABLE EXHIBIT 1-9
(UNAUDITED)
As of February 28, 2021 Preliminary

	Classification	Total	Current	31-60 Days	61-90 Days	90-120 Days	Over 120 Days
1	Federal Grants Government [1]	$ 27,526,986	27,526,986	$ -	$ -	$ -	$ -
2	Sales Tax Contributions	51,443,697	25,576,592	25,867,105	-	-	-
3	Warranty Recovery	1,533,516	1,533,516		-	-	-
4	Build America Bond Subsidies	2,211,877	740,750	1,471,127	-	-	-
5	Product Sales and Development	6,259,120	6,132,410	175,885	(967)	92	(48,300)
6	Pass Sales	23,476	(30,424)	(1,443)	13,905	(431)	41,869
7	Property Management	93,741	25,606	19,430	5,596	32,879	10,230
8	Vanpool/Rideshare	157,413	60,872	14,751	(749)	(17,385)	99,924
9	Salt Lake City Agreement	1,258,292	728,712	446,533	41,088	-	41,959
10	Planning	6,674	-	-	-	-	6,674
11	Capital Development Agreements	3,969,901	2,120,861	-	1,849,040	-	-
12	Other	1,069,657	1,069,657	-	-	-	-
13	Total	$ 95,554,348	$ 65,485,538	$ 27,993,387	$ 1,907,913	$ 15,155	$ 152,356

Percentage Due by Aging

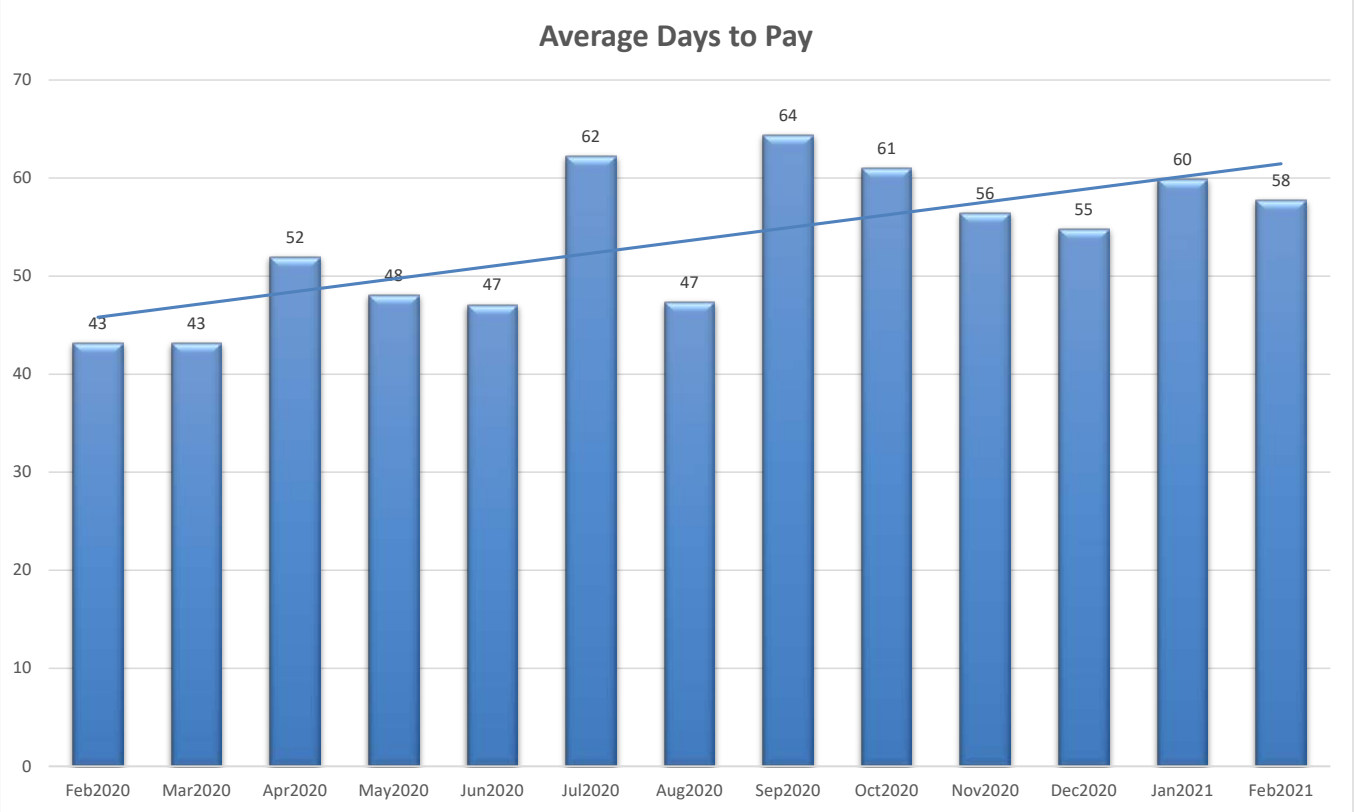
14	Federal Grants Government [1]	100.0%	0.0%	0.0%	0.0%	0.0%
15	Sales Tax Contributions	49.7%	50.3%	0.0%	0.0%	0.0%
16	Warranty Recovery	100.0%	0.0%	0.0%	0.0%	0.0%
17	Build America Bond Subsidies	33.5%	66.5%	0.0%	0.0%	0.0%
18	Product Sales and Development	98.0%	2.8%	0.0%	0.0%	-0.8%
19	Pass Sales	-129.6%	-6.1%	59.2%	-1.8%	178.4%
20	Property Management	27.3%	20.7%	6.0%	35.1%	10.9%
21	Vanpool/Rideshare	38.7%	9.4%	-0.5%	-11.0%	63.5%
22	Salt Lake City Agreement	57.9%	35.5%	3.3%	0.0%	3.3%
23	Planning	0.0%	0.0%	0.0%	0.0%	100.0%
24	Capital Development Agreements	53.4%	0.0%	46.6%	0.0%	0.0%
25	Other	100.0%	0.0%	0.0%	0.0%	0.0%
26	Total	68.5%	29.3%	2.0%	0.0%	0.2%

[1] Federal preventive maintenance funds, federal RideShare funds, and federal CARES Act funding

SUMMARY OF APPROVED DISBURSEMENTS OVER $200,000
FROM FEBRUARY 1, 2021 THROUGH FEBRUARY 28, 2021
(UNAUDITED)

EXHIBIT 1-10

Contract # and Description		Contract Date	Vendor	Check #	Date	Check Total
20-P00006	VINEYARD FRONTRUNNER STATION	9/22/2020	UTAH DEPARTMENT OF TRANSPORTATION	886109	2/3/2021	$ 202,476.35
15-1484PP	PURCHASE PARATRANSIT VEHICLES	9/23/2015	LEWIS BUS GROUP	886110	2/3/2021	310,350.60
19-03125BM	DIESEL AND UNLEADED FUEL	12/23/2019	KELLERSTRASS OIL	886111	2/3/2021	341,162.53
18-2861PP	15-PASSENGER RIDESHARE VANS	11/15/2018	LARRY H. MILLER CHEVROLET	886155	2/10/2021	214,141.75
14-17TH	POSITIVE TRAIN CONTROL	10/6/2014	ROCKY MOUNTAIN SYSTEMS SERVICE	886202	2/17/2021	221,479.86
19-03125BM	DIESEL AND UNLEADED FUEL	12/23/2019	KELLERSTRASS OIL	886203	2/17/2021	354,101.64
18-2398TP	TIGER GRANT CONSTUCTION CONTRACT	4/11/2018	GRANITE CONSTRUCTION COMPANY	358363	2/24/2021	300,014.33
R2020-04-02			ROCKY MOUNTAIN POWER	358364	2/24/2021	635,926.92
14-1109TH	ADA PARATRANSIT AND ROUTE DEVIATION	9/1/2014	MV PUBLIC TRANSPORTATION	886265	2/24/2021	253,763.70



669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: William Greene, Chief Financial Officer
PRESENTER(S): Troy Bingham, Comptroller

TITLE:

Resolution R2021-04-01 Granting Contact and Expenditure Authority

AGENDA ITEM TYPE:	Resolution
RECOMMENDATION:	Adopt Resolution 2021-04-01 which grants expenditure and disbursement authority for designated vendors.
BACKGROUND:	Board Policy 2.2 (III)(D)(3) allows the Board to preapprove disbursements to vendors by resolution. At its April 8, 2020 meeting, the Board, by resolution, preapproved disbursements for 16 vendors covering disbursements related to payroll benefits and taxes, insurance, electricity, bond and lease principal and interest, and P-card purchases as well as disbursements over $200,000 if the associated contract was previously approved by the Board.
DISCUSSION:	The proposed action amends Resolution R2020-04-02 to update the process to approve contracts, expenses, and change orders, specifically updating the list of vendors and estimated disbursement levels. Current thresholds provide sufficient disbursement controls and allows the Authority to pay a major vendor on a timely basis.
ALTERNATIVES:	UTA would hold any disbursement over $200,000 for subsequent Board meetings thus delaying timely payments to vendors.
FISCAL IMPACT:	None
ATTACHMENTS:	1. Resolution R2021-04-01

RESOLUTION OF THE BOARD OF TRUSTEES OF THE UTAH TRANSIT AUTHORITY GRANTING CONTRACT AND EXPENDITURE AUTHORITY

R2021-04-01

April 14, 2021

WHEREAS, the Utah Transit Authority (the "Authority") is a large public transit district organized under the laws of the State of Utah and was created to transact and exercise all of the powers provided for in the Utah Limited Purpose Local Government Entities- Local Districts Act and the Utah Public Transit District Act; and

WHEREAS, UTAH CODE §17B-2a-808.1(2)(v) requires the board of trustees of a large public transit district, such as the Authority, to review and approve any contract or expense exceeding $200,000 and any proposed change order to an existing contract if the value of the change order exceeds 15% of the total contract or $200,000; and

WHEREAS, on June 1, 2019 the Board passed Resolution R2019-06-01 establishing Board Policy 2.2 – Contracting Authority and Procurement that defines contracts, change orders and disbursements that must be approved by the Board; and

WHEREAS, Board Policy 2.2 (3)(D)(III) allows the Board to preapprove disbursements equal to or greater than $200,000 by Resolution; and

WHEREAS, on April 8, 2020 the Board of Trustees of the Authority (the “Board”) passed Resolution R2020-04-02 Granting Contract and Expenditure Authority; and

WHEREAS, the Board wishes to amend Resolution R2020-04-02 to update the process to approve contracts, expenses, and change orders.

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of the Utah Transit Authority:

1. That Resolution R2020-04-02 Granting Contract and Expense Authority is hereby superseded.

2. That the Executive Director is authorized to approve payments to vendors for the purposes and expenditure ranges described in Exhibit A.

3. That the Executive Director is authorized to approve expenses exceeding $200,000 if the associated contract was previously approved at a regular or special meeting by the Board of Trustees.

4. That the Board hereby ratifies any and all actions taken by Authority management and staff in furtherance of and effectuating the intent of this Resolution.

That the corporate seal shall be affixed hereto.

Approved and adopted this 14th day of April 2021.

_____
Carlton Christensen, Chair
Board of Trustees

ATTEST:

_____
Secretary of the Authority

(Corporate Seal)

Approved As To Form:

DocuSigned by:
Mike Bell
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Legal Counsel

Exhibit A

Disbursements Approved for Certain Vendors

Vendor	Purpose	Disbursement Period	Estimated Disbursement Level
Alliant Insurance	Insurance	Annually	$3,100,000
Cambridge Associates	Pension contributions	Annually	$25,100,000
Vantagepoint	457 contributions – employee/er	Annually	$4,900,000
Mutual of America	457 contributions – employee/er	Annually	$2,600,000
Select Health	Health insurance	Annually	$7,500,000
PEHP	Health insurance	Annually	$2,900,000
UTA/Joint Insurance Trust	Health insurance	Annually	$5,400,000
Utah State Tax	Employee payroll taxes	Annually	$6,900,000
IRS	Employee payroll taxes	Annually	$36,100,000
Rocky Mountain Power	Electricity	Annually	$7,100,000
Wells Fargo	Procurement card payment	Annually	$12,000,000
New Vendor in 2021	Procurement card payment	Annually	$12,000,000
Siemens Mobility Inc.	Light Rail Inventory Parts and Vehicle Repairs	Annually	$4,500,000

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Eddy Cumins, Chief Operating Officer
PRESENTER(S): Eddy Cumins, Chief Operating Officer
Kyle Stockley, Rail Infrastructure Project Manager

TITLE:

Contract: Battery Electric Buses and Associated Charging Equipment (Gillig LLC)

AGENDA ITEM TYPE:	Procurement Contract/Change Order
RECOMMENDATION:	Approve the contract and the initial notice to proceed for the base order and authorize Executive Director to execute contract and associated disbursements with Gillig LLC to purchase battery electric buses and associated charging equipment in the amount of $44,267,668.84.
BACKGROUND:	In August 2020, UTA released a request for procurement (RFP) to purchase electric buses and charging equipment. The electric buses and associated charging equipment will provide buses and support for several projects: - Ogden BRT - No Low Grant #2 - VW settlement UTA also partnered with Park City Transit, Summit County Transit District (High Valley Transit) and Suntran (St. George) for additional purchase options. The contract includes buses, charging equipment, tools, and training.

DISCUSSION:	Gillig LLC was selected as the preferred electric bus supplier based on overall scoring using the best value format. This is a five-year bus procurement contract that includes 44 base orders and options for up to 95 additional buses. UTA Staff is requesting approval of the contract with Gillig LLC and the base order to purchase battery electric buses and associated charging equipment. The base order amount is $44,267,668.84. The estimated total contract value over 5 years is $145,944,094 (base and options). Future orders will be brought to the Board as change orders on this contract. Under the terms of this contract Gillig LLC, in partnership with ABB, will provide both buses and charging equipment. The buses will be equipped with a 444kWh battery pack and provide similar range and performance characteristics to the existing battery electric buses currently in operation. UTA staff will identify optimal locations for charging equipment installation. General Contract Information: • Total number of buses: 44 bus base order and 95 buses in options • Total number of depot chargers: 16 charger base order and 32 chargers in options • Total number of on-route chargers: 4 charger base order and 14 chargers in options Base Cost per item: • Transit bus: $916,655 • BRT bus: $927,427 • Commuter bus: $951,022 • Depot charger: $116,233 • On-route charger: $377,130 UTA/Park City Transit procurements in base option: 1. UTA Ogden BRT: 10 buses 2. UTA No Low Grant #2 PCSLC Connect: 2 buses 3. UTA VW Settlement: 20 buses 4. Park City Transit VW award PCSLC connect: 2 buses 5. Park City Transit VW award 35 ft transit: 4 buses 6. Park City Transit local/other funding: 6 buses
CONTRACT SUMMARY:	
Contractor Name:	Gillig LLC
Contract Number:	20-03267
Base Contract Effective Dates:	Through February 20, 2026
Extended Contract Dates:	N/A
Existing Contract Value:	N/A
Amendment Amount:	N/A
New/Total Amount Contract Value:	$44,267,668.84 (base order value), Estimated 5 year value is $145,944,094
Procurement Method:	RFP best value
Funding Sources:	Capital budget
ALTERNATIVES:	Delay procurement of battery electric buses.
FISCAL IMPACT:	This budget is included in the five-year capital program.
ATTACHMENTS:	1) Contract

ELECTRIC BUSES AND CHARGING EQUIPMENT CONTRACT 20-03267

THIS ELECTRIC BUSES AND CHARGING EQUIPMENT CONTRACT ("Contract") is entered into effective ad of the last signature below (the "Effective Date") by and between the **UTAH TRANSIT AUTHORITY**, a public transit district organized under the laws of the State of Utah (the "Agency"), and **GILLIG LLC,** a company, with a place of business at 451 Discovery Drive, Livermore, CA 94551 (the "Contractor").

RECITALS

WHEREAS, on July 20, 2020, the Agency issued a Request for Proposals (RFP No. 20-03267 and hereinafter the "RFP") for the purchase of Electric Buses and Various Charging Equipment (the "Vehicles and Equipment"), including configuration options, and all associated hardware, software, transportation, tools, training and documentation (together with the Vehicles and Charging Equipment collectively the "Goods and Services"); and

WHEREAS, on October 23, 2020, the Agency received an initial proposal from Contractor; and;

WHEREAS, Contractor is willing to furnish the Goods and Services as set forth in the RFP (as modified by this Contract); and

WHEREAS, on January 22, 2021, the Agency issued to Contractor an award notification for the Goods and Services.

AGREEMENT

NOW, THEREFORE, on the stated premises, which are incorporated herein by reference, and for and in consideration of the mutual covenants and agreements hereafter set forth, the mutual benefits to the parties to be derived therefrom, and for other valuable consideration, the receipt and sufficiency of which the parties acknowledge, it is hereby agreed as follows:

1. TO BE PROVIDED BY CONTRACTOR

The Agency hereby retains Contractor to furnish the Goods and Services and Contractor will to the best of its ability and in a professional manner, provide the labor, equipment and materials necessary to furnish, deliver, and test the Goods and Services subject to the terms and conditions of: (i) 20-03267; (ii) Contractor's proposal dated October 23,2020 (the "Proposal"). This Contract includes an initial base order quantity of forty-four (44) electric buses, four (4) overhead chargers, and sixteen (16) depot chargers with a follow-on quantity of twenty-six (26) Vehicles in the Base Order, with the features and options described in an initial notice to proceed issued concurrently with this Contract.

2. TERM

Subject to the provisions for termination as hereinafter provided, this Contract shall be effective with respect to the purchase of any Goods and Services (up to the aggregate number of base and option Vehicle quantities set forth in the RFP) ordered prior to February 20, 2026 (the "Term"). All warranties, indemnities, and other obligations of either party with respect to the Goods and Services shall continue after the Term in accordance with the provisions of this Contract.

3. COMPENSATION AND FEES

For the initial order, the Agency agrees to pay Contractor a sum of $44,267,668.84, determined in accordance with Attachment A. This sum includes all hardware, software, equipment, materials, labor, shipping costs, and other items necessary to supply the Goods and complete the Services in a satisfactory manner in compliance with this Contract.

The Agency (at its sole and exclusive election to be exercised in its sole discretion) may purchase up to ninety-five (95) additional Vehicles and fourteen (14) overhead chargers and thirty-two (32) depot chargers (in any combination of Vehicle powertrain configurations, and option packages) during the Term of this Contract, conditioned upon approval from the UTA Board of Trustees. The price for option Vehicles shall be based on the prices indicated in Attachment A (hereinafter the "Base Order Prices"). The Base Order Prices shall remain firm for any option Vehicles ordered within one hundred twenty (120) days of following the Effective Date. The price of any Vehicles ordered more than one hundred eighty (180) days following the Effective Date shall be the Base Order Price, subject to adjustment as provided in the following paragraph.

Adjustments to the Base Order Prices will be calculated based on the following formula which utilizes the U.S. Department of Labor/(14) of Labor Statistics Producer Price Index ("PPI") Category 1413, "Truck and Bus Bodies". In no event will the price (s) for any order placed exceed by more than five percent (5%) the price(s) that would have been in effect twelve (12) months prior to the date of the release. The Base Order Price will be multiplied by the positive or negative percentage change in this index (subject to the five (5) percent cap on annual price increases to determine pricing for option Vehicles,

FORMULA:

Index Point Change	Example
PPI Index: Future Award Month	141.1
Less PPI Index: Base Award Month	137.6
Index Point Change	3.5
Index Percent Change	3.5
Index Point Change	137.6
Divided by PPI Index: Base Award Month	.0254
Results Multiplied by 100 = Percent Change	2.54%
Base Order Price	$50,000.00
Plus Percent Change (2.54% x $50,000)	1,270.00

Revised Price for Future Order $51,270.00

There is no guarantee that options with respect to any Vehicles will be exercised.

4. INCORPORATED DOCUMENTS

This Contract consists of the documents listed below. In case of any conflict among these documents, the order of precedence shall be:

1. This form of Contract.
2. "Section 4: Special Provisions" of the RFP.
3. "Section 3: General Conditions," and "Section 5: Federal Requirements" of the RFP.
4. "Section 6: Technical Specifications," "Section 7: Warranty Requirements," and "Section 8: Quality Assurance" of the RFP.
5. Contractor's Proposal

A modification or change to any document that is part of this Contract shall take its precedence from the term it amends. All other documents and terms and conditions shall remain unchanged.

As used herein, all referenced sections of RFP are deemed to include the modifications made pursuant to addenda issued by the Agency prior to the due date for proposals.

5. ORDER OF PRECEDENCE

The Order of Precedence for this contract is as follows:

1. UTA Contract including all attachments
2. UTA Terms and Conditions
3. UTA Solicitation Terms
4. Contractor's Bid or Proposal including proposed terms or conditions

Any contractor proposed term or condition which is in conflict with a UTA contract or solicitation term or condition will be deemed null and void.

6. DELIVERY

Contractor hereby agrees to furnish, deliver, install, and test the Vehicles with associated spare parts and manuals within seventy-two (72) weeks after notice to proceed is issued by the Agency. Contractor shall, no later than ten (10) days after the execution of this Contract, provide the Agency with a proposed delivery schedule that satisfies the requirements of Special Provision 2.2 (Delivery Schedule). Once approved by the Agency's Project Manager, such delivery schedule (including agreed modifications thereto) shall constitute the "Delivery Schedule" against which Contractor's performance shall be monitored.

7. PAYMENT

Contractor shall submit to the Agency's Project Manager and Procurement & Contract Specialist

for approval, invoices, after acceptance of the Vehicles, for which Contractor seeks payment from the Agency under this Contract. Within thirty (30) days after receipt of an invoice, the Agency shall: (i) approve and pay the invoice in accordance with Special Provision 5.1 (Payment Terms); or (ii) notify Contractor that it disapproves, in whole or in part, Contractor's invoice and the reasons for such disapproval. The Agency shall not be liable to Contractor for any expenses paid or incurred by Contractor unless listed herein or otherwise agreed to in advance, in writing, by the parties hereto.

8. WARRANTY OF TITLE

Contractor warrants that title to all Vehicles and Charging Equipment delivered as part of the Goods and Services and covered by an invoice for payment will pass to the Agency upon acceptance by the Agency. Contractor further warrants that upon payment, all equipment and/or work for which invoices for payment have been previously issued and payments received from the Agency shall be free and clear of liens, claims, security interests or encumbrances in favor of Contractor or any subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided equipment, materials, and labor related to the equipment and/or work for which payment is being requested. Contractor shall indemnify, defend, and hold the Agency harmless from and with respect to any claims, costs, fees (including attorneys' fees), liens, judgments or other losses sustained as a result of the breach of this warranty by Contractor.

9. USE OF SUBCONTRACTORS

Contractor shall not subcontract any services to be performed by it under this Contract other than those listed and identified in the Proposal without prior approval of the Agency. Contractor shall pay all subcontractors for satisfactory performance of their contracts no later than ten (10) days from receipt of each payment the Agency makes to Contractor, unless other arrangements are agreed to in writing by the parties involved. The Agency shall have no obligations to any subcontractors retained by Contractor.

10. CONTRACTOR SAFETY COMPLIANCE

The Agency is an ISO 14001 for Environmental Management Systems, ISO 9001 Quality and Performance Management, and OSHAS 18001 Safety Systems Management Company. Contractor, including its employees, subcontractors, authorized agents, and representatives, shall comply with the GILLIG Quality Control Manual which was requested and approved during the approved equal process and industry safety standards, NATE, OSHA, EPA and all other State and Federal regulations, rules and guidelines pertaining to safety, environmental Management and will be solely responsible for any fines, citations or penalties it may receive or cause the Agency to receive while working on this project. Each employee, contractor and subcontractor must be trained in the Agency’s EMS and Safety Management principles.

11. BUY AMERICA REQUIREMENTS

The phase increases in domestic content was included in the FAST Act, 49 U.S.C. Section 5323(j)/FAST Section 3011). The phase increases apply to this contract and are as follows:

- FY20 & beyond: more than 70% domestic content

12. AUDIT

The Agency and its authorized agents or representatives may, during the term of this Contract and for a period of three (3) years thereafter, upon giving reasonable notice and during usual business hours, audit and inspect all Contractor's files and records pertaining to the handling of the Agency's account and the products and services provided or performed under this Contract including, without limitation, all cost and profit data required to be provided to comply with General Condition 9.9 (Maintenance of Records; Access by Agency; Right to Audit Records).

13. AMENDMENTS TO GENERAL CONDITIONS AND SPECIAL PROVISIONS

This Contract includes the following changes to the General Conditions and Special Provisions:

a. Special Provision 5.2 (Performance Guarantee (Optional) Alternatives Disputes is hereby deleted in its entirety.

b. Special Provision 10 (Software Escrow Account) is hereby deleted in its entirety.

14. PROJECT MANAGER

The Agency's Project Manager for this Contract is Hal Johnson, or designee. All questions and correspondence relating to the technical aspects of this Contract should be directed to Mr. Johnson, at Utah Transit Authority, office located at 669 West 200 South, Salt Lake City, Utah 84101, office phone (801) 237-1905.

15. CONTRACT ADMINISTRATOR

The Agency's Contract Administrator for this Contract is Pat Postell, Procurement & Contract Specialist, or designee. All questions and correspondence relating to the contractual aspects of this Contract should be directed to Ms. Postell, or designee, phone (801) 287-3060.

16. NOTICES OR DEMANDS

Any and all notices, demands or other communications required hereunder to be given by one party to the other shall be given in writing and will be personally delivered, mailed by US Mail, postage prepaid, or sent by overnight courier service and addressed to such party as follows:

If to the Agency:
Utah Transit Authority
ATTN: Procurement & Contract Specialist
669 West 200 South
Salt Lake City, UT 84101

If to Contractor:
Utah Transit Authority
Attn: General Counsel
669 West 200 South
Salt Lake City, UT 84101

If to Contractor:
GILLIG LLC
ATTN: William F. Fay, Jr., Vice President, Sales
451 Discovery Drive
Livermore, CA 94551

Either party may change the address at which such party desires to receive written notice of such change to any other party. Any such notice shall be deemed to have been given, and shall be effective, on delivery to the notice address then applicable for the party to which the notice is directed; provided, however, that refusal to accept delivery of a notice or the inability to deliver a notice because of an address change which was not properly communicated shall not defeat or delay the giving of a notice.

17. GOVERNING LAW

The validity, interpretation and performance of this Contract shall be governed by the laws of the State of Utah, without regard to its law on the conflict of laws. Any dispute arising out of this Contract that cannot be solved to the mutual agreement of the parties shall be brought in a court of competent jurisdiction in Salt Lake County, State of Utah.

18. SEVERABILITY

In the event any one or more of the provisions contained in this Contract are for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provisions of this Contract. This Contract shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

19. CHANGES

a. UTA's Project Manager or designee may, at any time, by written order designated or indicated to be a Change Order, direct changes in the Work including, but not limited to, changes:

i. In the Scope of Services;
ii. In the method or manner of performance of the Work; or
iii. In the schedule or completion dates applicable to the Work.
iv. To the extent that any change in Work directed by UTA causes an actual and demonstrable impact to: (i) Consultant's cost of performing the work; or (ii) the time required for the Work, then (in either case) the Change Order

shall include an equitable adjustment to this Contract to make Consultant whole with respect to the impacts of such change.

b. A change in the Work may only be directed by UTA through a written Change Order or (alternatively) UTA's expressed, written authorization directing Consultant to proceed pending negotiation of a Change Order. Any changes to this Contract undertaken by Consultant without such written authority shall be at Consultant's sole risk. Consultant shall not be entitled to rely on any other manner or method of direction.

c. Consultant shall also be entitled to an equitable adjustment to address the actual and demonstrable impacts of "constructive" changes in the Work if: (i) subsequent to the Effective Date of this Contract, there is a material change with respect to any requirement set forth in this Contract; or (ii) other conditions exist or actions are taken by UTA which materially modify the magnitude, character or complexity of the Work from what should have been reasonably assumed by Consultant based on the information included in (or referenced by) this Contract. In order to be eligible for equitable relief for "constructive" changes in Work, Consultant must give UTA's Project Manager or designee written notice stating:

i. The date, circumstances, and source of the change; and
ii. adjustment in this Contract.
iii. Consultant must provide notice of a "constructive" change and assert its right to an equitable adjustment under this Section within ten (10) days after Consultant becomes aware (or reasonably should have become aware) of the facts and circumstances giving rise to the "constructive" change. Consultant's failure to provide timely written notice as provided above shall constitute a waiver of Consultant's rights with respect to such claim.

d. As soon as practicable, but in no event longer than 30 days after providing notice, Consultant must provide UTA with information and documentation reasonably demonstrating the actual cost and schedule impacts associated with any change in Work. Equitable adjustments will be made via Change Order. Any dispute regarding the Consultant's entitlement to an equitable adjustment (or the extent of any such equitable adjustment) shall be resolved in accordance with Article 20 of this Contract.

20. GENERAL INDEMNIFICATION

Contractor shall indemnify, hold harmless and defend UTA, its officers, trustees, agents, and employees (hereinafter collectively referred to as "Indemnitees") from and against all liabilities, claims, actions, damages, losses, and expenses including without limitation reasonable attorneys' fees and costs (hereinafter referred to collectively as "claims") related to bodily injury, including death, or loss or damage to tangible or intangible property caused, or alleged to be caused, in whole or in part, by the acts or omissions of Contractor or any of its owners, officers, directors, agents, employees or subcontractors. This indemnity includes any claim or amount arising out of the failure of such Contractor to conform to federal, state, and local laws and regulations. If an employee of Contractor, a subcontractor, anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable brings a claim against UTA or another Indemnitee, Contractor's indemnity obligation set forth above will not be limited by any limitation on the amount of damages, compensation or benefits payable under any employee benefit acts, including workers' compensation or disability acts. The indemnity obligations of Contractor shall not apply to the extent that claims arise out of the sole negligence of UTA or the Indemnitees.

21. INSURANCE

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

- Statutory Workers Compensation and Employers Liability insurance and/or qualified self-insurance program covering Supplier's employees while on Agency property.
- Commercial General Liability Insurance:
  - Bodily Injury and Property Damage, including Contractual Liability covering the indemnification contained herein, $10,000,000 combined single limits per occurrence,
    $10,000,000 aggregate, where applicable.
  - Product liability: $5,000,000 per occurrence, for a period of five (5) years after acceptance of the last bus delivered under this Contract (Products Liability coverage may be affected through one or more excess liability policies).
- Automobile Liability Insurance: Bodily Injury and Property Damage, $1,000,000 combined single limits per occurrence.

a. Insurance is to be placed with insurers duly licensed or authorized to do business in the State of Utah and with an "A.M. Best" rating of not less than A-VII. UTA in no way warrants that the above-required minimum insurer rating is sufficient to protect the Contractor from potential insurer insolvency.

b. Contractor shall furnish UTA with certificates of insurance (ACORD form or equivalent approved by UTA) as required by the Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.

c. Contractors' certificate(s) shall include all subcontractors as additional insureds under its policies **or** Contractor shall furnish to UTA separate certificates and endorsements for each subcontractor. All coverage for subcontractors shall be subject to the minimum requirements identified above.

d. The insurance requirements herein are minimum requirements for this Contract and in no way limit the indemnity covenants contained in this Contract. UTA is no way warrants that the minimum limits contained herein are sufficient to protect the Contractor from liabilities that might arise out of the performance of the work under this contract by the Contractor, his agents, representatives, employees, or subcontractors and Contractor is free to purchase additional insurance as may be determined necessary.

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.

22. STANDARD OF CARE.

Contractor shall perform any Services to be provided under the Contract in a good and

workmanlike manner, using at least that standard of care, skill and judgment which can reasonably be expected from similarly situated independent contractors (including, as applicable, professional standards of care).

23. SUSPENSION OF WORK

a. UTA may, at any time, by written order to Consultant, require Consultant to suspend, delay, or interrupt all or any part of the Work called for by this Contract. Any such order shall be specifically identified as a "Suspension of Work Order" issued pursuant to this Article. Upon receipt of such an order, Consultant shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of further costs allocable to the Work covered by the order during the period of Work stoppage.

b. If a Suspension of Work Order issued under this Article is canceled, Consultant shall resume Work as mutually agreed to in writing by the parties hereto.

c. If a Suspension of Work Order is not canceled and the Work covered by such order is terminated for the convenience of UTA, reasonable costs incurred as a result of the Suspension of Work Order shall be considered in negotiating the termination settlement.

d. If the Suspension of Work causes an increase in Consultant's cost or time to perform the Work, UTA's Project Manager or designee shall make an equitable adjustment to compensate Consultant for the additional costs or time and modify this Contract by Change Order.

24. TERMINATION

a. FOR CONVENIENCE: UTA shall have the right to terminate the Contract at any time by providing written notice to Contractor. If the Contract is terminated for convenience, UTA shall pay Contractor: (i) in full for Goods delivered and Services fully performed prior to the effective date of termination; and (ii) an equitable amount to reflect costs incurred (including Contract close-out and subcontractor termination costs that cannot be reasonably mitigated) and profit on work-in-progress as of to the effective date of the termination notice. UTA shall not be responsible for anticipated profits based on the terminated portion of the Contract. Contractor shall promptly submit a termination claim to UTA. If Contractor has any property in its possession belonging to UTA, Contractor will account for the same, and dispose of it in the manner UTA directs.

b. FOR DEFAULT: If Contractor (a) becomes insolvent; (b) files a petition under any chapter of the bankruptcy laws or is the subject of an involuntary petition; (c) makes a general assignment for the benefit of its creditors; (d) has a receiver appointed; (e) should fail to make prompt payment to any subcontractors or suppliers; or (f) fails to comply with any of its material obligations under the Contract, UTA may, in its discretion, after first giving Contractor seven (7) days written notice to cure such default:

i. Terminate the Contract (in whole or in part) for default and obtain the Goods and Services using other contractors or UTA's own forces, in which event Contractor shall be liable for all incremental costs so incurred by UTA;

ii. Pursue other remedies available under the Contract (regardless of whether the termination remedy is invoked); and/or

iii. Except to the extent limited by the Contract, pursue other remedies available at law.

c. CONTRACTOR'S POST TERMINATION OBLIGATIONS: Upon receipt of a termination notice as provided above, Contractor shall (i) immediately discontinue all work affected (unless the notice directs otherwise); and (ii) deliver to UTA all data, drawings and other deliverables, whether completed or in process. Contractor shall also remit a final invoice for all services performed and expenses incurred in full accordance with the terms and conditions of the Contract up to the effective date of termination. UTA shall calculate termination damages payable under the Contract, shall offset such damages against Contractor's final invoice, and shall invoice Contractor for any additional amounts payable by Contractor (to the extent termination damages exceed the invoice). All rights and remedies provided in this Article are cumulative and not exclusive. If UTA terminates the Contract for any reason, Contractor shall remain available, for a period not exceeding 90 days, to UTA to respond to any questions or concerns that UTA may have regarding the Goods and Services furnished by Contractor prior to termination.

25. FINDINGS CONFIDENTIAL

a. Any documents, reports, information, or other data and materials available to or prepared or assembled by Contractor or subcontractors under this Contract are considered confidential and shall not be made available to any person, organization, or entity by Contractor without consent in writing from UTA.

b. It is hereby agreed that the following information is not considered to be confidential:

c. Information already in the public domain;

d. Information disclosed to Contractor by a third party who is not under a confidentiality obligation;

e. Information developed by or in the custody of Contractor before entering into this Contract;

f. Information developed by Contractor through its work with other clients; and

g. Information required to be disclosed by law or regulation including, but not limited to, subpoena, court order or administrative order.

26. PUBLIC INFORMATION.

Contractor acknowledges that the Contract and related materials (invoices, orders, etc.) will be public documents under the Utah Government Records Access and Management Act (GRAMA). Contractor's response to the solicitation for the Contract will also be a public document subject to GRAMA, except for legitimate trade secrets, so long as such trade secrets were properly designated in accordance with terms of the solicitation.

27. FORCE MAJEURE

Neither party to the Contract will be held responsible for delay or default caused by fire, riot, acts of God and/or war which are beyond that party's reasonable control. UTA may terminate the Contract after determining such delay or default will reasonably prevent successful performance of the Contract.

28. NO THIRD PARTY BENEFICIARIES

The parties enter into the Contract for the sole benefit of the parties, in exclusion of any third party, and no third party beneficiary is intended or created by the execution of the Contract.

29. ENTIRE AGREEMENT

This Contract shall constitute the entire agreement and understanding of the parties with respect to the subject matter hereof, and shall supersede all offers, negotiations and other agreements with respect thereto.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be executed by officers duly authorized to execute the same as of the day and year first above written.

GILLIG, LLC.

Printed Name: WILLIAM F. FAY, JR.
Title: VICE PRESIDENT - SALES

UTAH TRANSIT AUTHORITY

Carolyn M. Gonot
Executive Director

Eddy D. Cumins
Chief Operating Officer

David Hancock
Director of Asset Management

DocuSigned by:
Mike Bell
361F16F838704A9...

Michael Bell
Assistant Attorney General
UTA Counsel

March 1, 2021

Gillig
Attn: William F Fay, Jr.
451 Discovery Drive
Livermore, CA 94551

Sent by email only:
Sales@gillig.com
Tim.McCunney@gillig.com

RE: Contract 20-03267, Electric Buses and Charging Equipment

BASE ORDER NOTICE TO PROCEED

For Forty-Four (44) Electric Buses and Four (4) Overhead Chargers and Sixteen (16) Depot Chargers

Dear Mr. Fay, Jr.,

This letter shall serve as the Base Order for Contract Award wherein the Authority places the base order from Gillig, LLC., Contract Effective February 20, 2021.

These various Electric Buses and Charging Equipment shall be manufactured as outlined in the Authority's Updated Red-Lined Technical Requirements, the above referenced contract and Gillig, LLC.'s Exhibit A Pricing Schedule.

The cost of the forty-four (44) Electric Buses, Four (4) Overhead Chargers, and (Sixteen) Depot Chargers are as follows:

Quantity	Description	U/Price	Total Price
10	Thirty-Five (35') Foot Electric Propulsion Transit/Suburban Bus	$912,446.00	$9,124,460.00
1	Training	$45,600.00	$45,600.00
1	Special Tools	$7,275.71	$7,275.71
10	Keys – Quantity Two (2)/Bus	$0.00	$0.00
10	Extended Warranty – Operator's Seat – Two (2) Years or 100,000 miles, 100% parts and labor except foam and fabric - INCLUDED IN BASE PRICE	$0.00	$0.00

10	Extended Warranty – Exterior Paint and Finish – Two (2) Years unlimited miles, 100% parts and labor - INCLUDED IN BASE PRICE	$0.00	$0.00
10	Delivery Costs-Included in Price	$4,640.00	$46,400.00
	TOTAL 35' COMPUTER		**$9,223,735.71**
20	Forty (40') Foot Electric Propulsion **Transit**/Suburban Buses	$916,655.00	$18,333,100.00
1	Training	$45,600.00	$45,600.00
1	Special Tools	$7,275.71	$7,275.71
20	Keys – Quantity Two (2)/Bus	$0.00	$0.00
20	Extended Warranty – Operator's Seat – Two (2) Years or 100,000 miles, 100% parts and labor except foam and fabric - INCLUDED IN BASE PRICE	$0.00	$0.00
20	Extended Warranty – Exterior Paint and Finish – Two (2) Years unlimited miles, 100% parts and labor - INCLUDED IN BASE PRICE	$0.00	$0.00
20	Delivery Costs-Included in Price	$4,640.00	$92,800.00
	TOTAL 40' TRANSIT		**$18,478,775.71**
4	Forty (40') Foot Suburban (1) door bus with **Commute**r style interior layout	$951,022.00	$3,804,088.00
1	Training	$45,600.00	$45,600.00
1	Special Tools	$7,275.71	$7,275.71
4	Keys – Quantity Two (2)/Bus	$0.00	$0.00
4	Extended Warranty – Operator's Seat – Two (2) Years or 100,000 miles, 100% parts and labor except foam and fabric - INCLUDED IN BASE PRICE	$0.00	$0.00
4	Extended Warranty – Exterior Paint and Finish – Two (2) Years unlimited miles, 100% parts and labor - INCLUDED IN BASE PRICE	$0.00	$0.00
4	Delivery Costs-Included in Price	$4,640.00	$18,560.00

	TOTAL 40' COMMUTER		**$3,875,523.71**

10	Forty (40') Foot BRT route specific bus.	$922,211.00	$9,222,110.00
1	Training	$45,600.00	$45,600.00
1	Special Tools	$7,275.71	$7,275.71
10	Keys – Quantity Two (2)/Bus	$0.00	$0.00
10	Extended Warranty – Operator's Seat – Two (2) Years or 100,000 miles, 100% parts and labor except foam and fabric - INCLUDED IN BASE PRICE	$0.00	$0.00
10	Extended Warranty – Exterior Paint and Finish – Two (2) Years unlimited miles, 100% parts and labor - INCLUDED IN BASE PRICE	$0.00	$0.00
10	Delivery Costs-Included in Price	$4,640.00	$46,400.00
	TOTAL 40' BRT		**$9,321,385.71**
	TOTAL VEHICLES COSTS		**$40,899,420.84**

	CHARGERS		
4	On-Route Chargers – ABB with Mast / Pantograph, 450kW, with commissioning at one site	$377,130.00	$1,508,520.00
16	Depot Chargers, ABB (UL) with two remote dispensers,150 kW, with commissioning at one site	$116,233.00	$1,859,728.00
	TOTAL CHARGER COSTS - BASE ORDER		**$3,368,248.00**
	GRAND TOTAL BASE ORDER		**$44,267,668.84**

The total amount of this Notice to Proceed is $44,267,668.84. Delivery of the Forty-Four (44) Electric Buses, Four (4) On-Route Chargers, and (16) Depot Chargers is no later than July 11, 2022.

If you are in agreement to the above, please sign on the line indicated below and return a copy to Ms. Pat Postell at ppostell@rideuta.com. A fully executed copy will be provided after all signatures are obtained.

GILLIG, LLC.

Printed Name: William F. Fay, Jr.
Title: Vice President - Sales

UTAH TRANSIT AUTHORITY

Carolyn M. Gonot
Executive Director

D. Eddy Cumins
Chief Operating Officer

David Hancock
Director of Asset Management

DocuSigned by:
Mike Bell
361F16F838704A9...

Michael Bell
Assistant Attorney General

GILLIG

October 22, 2020

Upload to: www.SciQuest.com

Pat Postell
Procurement & Contract Specialist
UTAH TRANSIT AUTHORITY
669 West 200 South
Salt Lake City, Utah 84101

RE: RFP 20-03267PP for PURCHASE OF ELECTRIC VEHICLES & CHARGERS

DATE DUE: October 23, 2020 at 11:00 AM

Dear Ms. Postell:

GILLIG is pleased to submit the enclosed **PACKAGE 2: PRICE PROPOSAL** documentation covering our response to the above solicitation for your review and consideration.

Contact During Proposal Evaluation Period:
JOSEPH POLICARPIO, VICE PRESIDENT, SALES
PHONE: 800-735-1500
EMAIL: sales@gillig.com
FAX: 510-785-6819

We appreciate this opportunity and look forward to a successful bid opening.

Very truly yours,

J Policarpio

Joseph Policarpio
Vice President, Sales
Phone: 800-735-1500
Email: sales@gillig.com
FAX: 510-785-6819

JP:df
Encs.

Cc: William F. Fay, Jr., Director National Sales
Javier Hernandez, Jr., Director, Sales Operations
Arminder Dhillon, Director, Technical Publications
Sean Solis, Regional Sales Manager

MINUTES OF A SPECIAL MEETING
OF THE MANAGERS OF
HCC MANAGER LLC

A special meeting of the managers of **HCC MANAGER LLC**, an Illinois limited liability company (the "Company"), was held at 222 N. LaSalle Street, Chicago, IL 60601, on May 31, 2019. All of the Company's managers, namely A. Steven Crown, James S. Crown and William H. Crown, and the Company's Secretary, David M. Rubin, were present either in person or by phone. William H. Crown acted as Chairman of the meeting and David M. Rubin acted as Secretary of the meeting.

The Chairman stated that the purpose of the meeting was the appointment of officers for (a) Gillig LLC, a California limited liability company ("Gillig"); (b) Arkay Acquisition LLC, a Delaware limited liability company ("Acquisition"); (c) Arkay Land LLC, a California limited liability company ("Land"); and (d) Arkay Properties LLC, a California limited liability company ("Properties", and, together with Gillig, Acquisition and Land, the "LLCs"), in the Company's capacity as Manager of the LLCs. Upon motion duly made, seconded and unanimously carried, the following resolutions were adopted:

Gillig

RESOLVED, that the officers of Gillig are set forth below and such persons shall serve in the capacities set forth opposite their names until the earlier of their removal, replacement, or resignation:

DEREK MAUNUS	President and Chief Executive Officer
MICHAEL S. CANMANN	Vice President and Assistant Secretary
CHRISTOPHER TURNER	Executive Vice President – Operations
BRIAN SHEPHERD	Vice President – Finance and Chief Financial Officer
MARLA LOAR	Vice President – Human Resources
CHARLES E. O'BRIEN	Vice President – Aftermarket Parts
JOSEPH POLICARPIO	Vice President – Sales and Marketing
GREG VISMARA	Vice President – Engineering
DAVID M. RUBIN	Vice President, General Counsel and Secretary
MAUREEN FLYNN	Vice President, Controller, Treasurer and Assistant Secretary
AMY BLUMENTHAL	Assistant Secretary
BRIAN B. GILBERT	Assistant Secretary

FURTHER RESOLVED, that the above named officers be, and are hereby, authorized to execute any and all instruments for and on behalf of Gillig which are required in the usual and ordinary conduct of the business, including, but not limited to, Bid Documents, Sales Contracts, Purchase Contracts, Lease Purchase Agreements, assignments to such Lease Purchase Agreements, together with any documents which may be or become necessary to support such transactions of Gillig.

Acquisition

RESOLVED, that the officers of Acquisition are set forth below and such persons shall serve in the capacities set forth opposite their names until the earlier of their removal, replacement, or resignation:

WILLIAM H. CROWN	President
A. STEVEN CROWN	Vice President and Assistant Secretary
JAMES S. CROWN	Vice President and Assistant Secretary
WILLIAM C. KUNKLER III	Vice President and Assistant Secretary
MICHAEL S. CANMANN	Vice President, Treasurer and Assistant Secretary
DAVID M. RUBIN	Vice President, General Counsel and Secretary
MAUREEN FLYNN	Vice President, Controller and Assistant Secretary
DEREK MAUNUS	Vice President
BRIAN SHEPHERD	Vice President
AMY BLUMENTHAL	Assistant Secretary
BRIAN B. GILBERT	Assistant Secretary

Land and Properties

RESOLVED, that the officers of Land and Properties are set forth below and such persons shall serve in the capacities set forth opposite their names until the earlier of their removal, replacement, or resignation:

WILLIAM H. CROWN	President
MICHAEL S. CANMANN	Vice President, Treasurer, and Assistant Secretary
MAUREEN FLYNN	Vice President, Controller and Assistant Secretary
DEREK MAUNUS	Vice President
DAVID M. RUBIN	Vice President, General Counsel and Secretary
WILLIAM C. KUNKLER III	Assistant Secretary
AMY BLUMENTHAL	Assistant Secretary
BRIAN B. GILBERT	Assistant Secretary

Omnibus Resolution

RESOLVED, that any person previously serving the LLCs in the capacity of an officer and not otherwise appointed pursuant to the foregoing resolutions be, and hereby is, removed from such office with immediate effect.

Upon motion duly made, seconded and unanimously carried, the meeting was adjourned.

Respectfully submitted,

David M. Rubin
Secretary of the Meeting

GILLIG

CHARGING EQUIPMENT

We are pleased to submit the following pricing for ABB charging equipment and associated services for use with your GILLIG Battery Electric buses. This pricing has been assembled in coordination with ABB and represents our proposed equipment options based on the scoping information you have provided to date.

Charging Equipment	**Quantity**	**Unit Price**	**Total**
Hardware			
ABB 150kW (HVC-150) Plug-In Charger	33	116,233	3,835,689
ABB Remote Plug-In Dispenser and Pedestal - Includes 23' Cord & CCS1 Plug-In Connector	99	Included	Included
ABB 450kW (HVC-450PD) On-Route Charger - Includes Mast and Pantograph	20	377,130	7,542,600
Warranty			
ABB - 2 year Standard Warranty for Plug-In Chargers	1	Included	Included
ABB - 2 year Standard Warranty for On-Route Charger	1	Included	Included
Services			
ABB Charger Connect & Operator Pro Software 2 Year Subscription	53	Included	Included
ABB Provided Plug-In Charger Commissioning - One Site Mobilization	1	Included	Included
ABB Provided On-Route Charger Commissioning - One Site Mobilization	1	Included	Included
Optional Equipment or Service			
HVC-100/150 Metal Support Frame	-	2,148	-
HVC-100/150 Cold-Climate Upgrade Kit	33	Included	Included
HVC-100/150 Long Distance Support Upgrade (150 meters)	33	Included	Included
ABB Cable Management for Remote Plug-In Dispenser	-	2,353	-
ABB HVC-150C Extended Warranty (3 Year)	-	3,000	-
ABB Remote Plug-In Dispenser Extended Warranty (3 Year)	-	500	-
HVC-450PD Extended Warranty (3 Year) - Pantograph and Pole	-	12,000	-
*Freight Charge***	1	Included	Included
		Total Hardware	**$11,378,289**
		Total Warranty	**$0**
		Total Services	**$0**
		Total Optional Equipment or Services	**$0**
		Total Freight Charge	**$0**
		GRAND TOTAL	**$11,378,289**

The warranties on the charging equipment are provided by ABB and are subject to the ABB Standard Warranty. GILLIG makes no warranty of any kind whatever, express or implied; and all implied warranties of merchantability and fitness for a particular purpose which exceed the aforesaid obligation are hereby disclaimed by GILLIG and excluded from any agreement. Pricing reflects equipment shipped directly to the Agency by ABB and the services described above. No further services are included as part of this GILLIG quote. Payment to GILLIG is due upon shipment of the equipment described herein. All pricing in USD.

CER 6. REVISED Pricing Schedule

	All prices are to be in United States dollars	
	– **Unit Price**	– **Extension**
BUSES:		
Thirty-Five (35') Foot Electric Propulsion Transit/~~Suburban~~ Bus – Quantity One (1)	$860,210.00	$860,210.00
Battery Type and Price: 5 PACKS 370 kWh	BASE	BASE
Battery Type and Price: 6 PACKS 444 kWh	$912,466.00	$912,466.00
Battery Type and Price:	N/A	N/A
Forty (40') Foot Electric Propulsion Transit/Suburban Buses Electric Bus in the following configurations:	SEE BELOW	SEE BELOW
1. Priced Configuration #1: Standard Transit bus configuration of two (2) doors low floor bus. Quantity one (1)	$864,410.00	$864,410.00
Battery Type and Price: 5 PACKS 370 kWh	BASE	BASE
Battery Type and Price: 6 PACKS 444 kWh	$916,655.00	$916,655.00
Battery Type and Price: 7 PACKS 518 kWh	$974,805.00	$974,805.00
2. Priced Configuration #2: Suburban (1) door bus with commuter style interior layout. Padded vinyl forward facing captain's chair commuter seating with seatbelts shall be included. USB and 110v patron outlets. Patron Wi-fi, 70mph Governor, overhead luggage storage racks (if available.) Bus shall be designed for a quiet comfortable highway ride and capable of long highway canyon grade trips. The bus shall also include an automatic tire chain system, or a ~~prewire setup for one to be installed upon delivery.~~ Quantity one (1). FORTY (40') BUS	$951,022.00	$951,022.00
Battery Type and Price: 6 PACKS 444 kWh	BASE	BASE
Battery Type and Price: 7 PACKS 518 kWh	$1,009,161.00	$1,009,161.00

Battery Type and Price:		
3. Priced Configuration #3**:** BRT route specific bus. Bus Shall have a ramp designed for near level platform boarding. Platform height is 12". The bus shall have streamlined large rear door to quickly allow boarding and unloading Wheelchair stations shall be priced with Quantum auto front or rear facing system (or approved equivalent). Provide pricing for one and both sides of the wheelchair securement area. The bus shall also include an automatic tire chain system, or a ~~prewire setup for one to be installed upon delivery.~~ Quantity one (1). FORTY (40') BUS	$922,211.00 (1) QUANTUM 444 kWh	$922,211.00 (1) QUANTUM 444 kWh
Battery Type and Price: 6 PACKS 444 kWh (2) QUANTUM	$927,427.00	$927,427.00
Battery Type and Price: 7 PACKS 518 KwH (1) QUANTUM	$980,361.00	$980,361.00
Battery Type and Price: 7 PACKS 518 KwH (2) QUANTUM)	$985,577.00	$985,577.00
CHARGING EQUIPMENT: **Charging infrastructure/connections: Provide pricing for compatible charging infrastructure, including compatible depot chargers and high-power on route chargers as follows:**		
1. Depot Chargers – Quantity one (1)	$116,233.00	$116,233.00
2. On-Route Chargers – Quantity one (1)	$377,130.00	$377,130.00
Special Tools (provide itemized list with tool manufacturer's name and price for all specialty tools)	SEE RECOMMENDED TOOLS LIST	SEE RECOMMENDED TOOLS LIST
Training – In accordance with Section 6 Technical Specifications.	SEE OPTIONAL TRAINING PRICE LIST	SEE OPTIONAL TRAINING PRICE LIST
Deliverables in accordance with Section 6 Technical Requirements (provide itemized list)	Not Separately Priced	Not Separately Priced
Keys – Any compartment that is lockable – Quantity Two (2)/Bus	INCLUDED	INCLUDED
Extended Warranty – Operator's Seat – Two (2) Years or 100,000 miles, 100% parts and labor except foam and fabric	INCLUDED	INCLUDED
Extended Warranty – Exterior Paint and Finish – Two (2) Years, unlimited miles, 100% parts and labor	INCLUDED	INCLUDED

BUS OPTION QUANTITIES - A total of ninety-five (95) option quantities of any pricing configurations described above maybe purchased during the term of this contract.	35' OR 40' BUS PRICE + PPI**	35' OR 40' BUS PRICE + PPI**
OPTIONS – Depot Chargers – An option quantity of thirty-two (32) Depot Chargers may be purchased during the term of this contract.	$116,233.00	$3,719,456.00
OPTIONS – On-Route Chargers – An option quantity of fourteen ~~(14)~~ **(20)** On-Route Chargers may be purchase during the term of this contract.	$377,130.00	$7,542,600.00
Leasing of Battery (indicate size) * 5 PACKS 370 kWh	**DEDUCT $202,960.00 PER BASE BUS PRICE ADD TWELVE $30,933.00 ANNUAL PAYMENTS**	
Leasing of Battery (indicate size) * 6 PACKS 444 kWh	**DEDUCT $248,753.00 PER BASE BUS PRICE ADD TWELVE $37,120.00 ANNUAL PAYMENTS**	
Leasing of Battery (indicate size) * 7 PACKS 518 kWh	**DEDUCT $294,546.00 PER BASE BUS PRICE ADD TWELVE $45,290,00 ANNUAL PAYMENTS**	
– Sales tax (if applicable)	N/A	N/A
–Delivery charges PER BUS	$4,640.00	$4,640.00
– **TOTAL PROPOSED PRICE**	DEPENDENT UPON CONFIGURATION SELECTION	DEPENDENT UPON CONFIGURATION SELECTION
40' BUS CONFIGURATION #1 – ADA equipment (included in above unit prices)	$23,860.00	N/A

– This form is to be completed and included in the Price Package

*PROFORMA PROPOSAL. LEASE RATES AND PAYMENTS WILL BE FINALIZED AT TIME OF LEASE CONTRACT EXECUTION. CUMMINS TO REPLACE BATTERY PACKS AT THE SIXTH YEAR.

** BASE BUS PRICE IS VALID FOR 120 DAYS. OPTION BUSES AND EQUIPMENT PURCHASED AFTER INITIAL ORDER WILL BE PRICED AT THE BASE PRICES SHOWN ON THIS PRICING SCHEDULE PLUS PPI (PRODUCER PRICE INDEX) "CATEGORY 1413 TRUCK & BUS BODIES". BASE INDEX USED WILL BE THE INDEX AT CONTRACT EXECUTION OR FIRM P.O. DATE.

SALT LAKE CITY, UT RFP 20-03267PP

Maintenance & Diagnostic Tools

E-Bus

LAPTOPS		
82-19526-000	COMPUTER, LAPTOP DELL E5570 LATITUDE	$ 1,453.00
82-19526-001	LAPTOP, TOUGHBOOK CF31	$ 4,648.00
82-19526-004	LAPTOP, DELL LATITUDE 14 RUGGED	$ 2,046.00
82-19526-005	TABLET, 10.1" PANASONIC TOUGHBOOK 20	$ 3,940.60
82-19526-007	SAMSUNG GALAXY TABLET	$ 561.00
CUMMINS TOOLS		
82-17098-003	SOFTWARE, INSITE LITE SUBSCRIPTION	$ 1,040.00
82-17098-002	SOFTWARE, INSITE PRO SUBSCRIPTION	$ 1,320.00
82-23481-004	KIT,DATALINK ADAPTER	$ 1,327.00
ABS TOOLS		
82-24262-000	WABCO SOFTWARE, ABS TOOLBOX	$ 498.00
DESTINATION SIGN		
82-83177-000	SOFTWARE, MIE (FOR SMART SERIES 3 SIGNS)	$ 350.00
82-55054-000	USB 2.0 DATA KEY	$ 64.00
HVAC TOOLS		
82-58779-001	TOOL,INTELLIGARE III,SMART PAC	$ 1,676.00
82-43359-001	KIT, DIAGNOSTIC, W/USB WEBASTO	$ 530.00
10-76769-000	KIT, COOLANT BUCKET FILL	$ 267.00
82-64551-014	PROHEAT SOFTWARE, DATALINK	FREE
82-09171-000	TOOL, CLUTCH PULLER (TK)	$ 570.00
RAD/CAC TOOLS		
82-73071-000	KIT, MODINE RADIATOR DIAGNOSTIC	$ 216.00
I/O TOOLS		
82-40737-008	CABLE, INTERFACE(LAPTOP)	$ 47.00
82-40737-012	UTILITY PROGRAM, G5-DINEX	$ 142.00
82-40737-010	USB, DOWNLOADER, PROGRAM	$ 50.00
82-40737-011	TOOL, MAINTENANCE I/O, (TABLET)	$ 5,000.00

GILLIG

SALT LAKE CITY, UT RFP 20-03267PP

Maintenance & Diagnostic Tools

E-Bus

82-79937-000	SOFTWARE,REAL TIME LADDER LOGIC	$ 4,000.00
GENERAL TOOLS		
06-42218-000	BAR TOW, LOWFLOOR	$ 3,325.00
83-01910-000	AIMER, OPTICAL HEADLIGHT	$ 1,845.00
82-85747-000	DIAGNOSTIC THERMAL IMAGER	$ 1,992.86
83-00238-000	JACK, FLOOR HYDRAULI,C 10 TONS	$ 2,047.00
54-43146-001	KEY,COMBINATION COMPRESSION LATCH & 5/16 INSQUAR	$ 24.66
82-90178-000	KIT, LOW FLOOR TOW BRKT & PIN	$ 717.60
82-47673-001	LIFTER,WINDSHIELD,250LBS	$ 4,599.00
53-15741-000	LOCK ASM,W/2 BH010 KEYS	$ 10.83
82-77708-000	ON-VEHICLE DISC BRAKE LATHE	$ 28,257.43
83-00848-000	REFRIGERANT RRR MACHINE	$ 9,163.20
82-86101-000	TOOL, BRAKE MATE VIS CHECK	$ 20,460.00
82-08122-000	TOOL, BUSHING REMOVAL SUSPENSION	$ 948.73
82-47680-000	USB-S TRANLATOR (MAGIC KEY)	$ 974.67
82-84075-000	VOLTAGE DETECTOR TOOL, USB CURRENT	$ 26.32
ELECTRICAL TOOLS		
82-90661-000	AMP CONNECTOR & TERMINAL KIT	$ 305.32
82-51914-001	DT DEUTSCH CONN W/TOOLS KIT	$ 783.32
82-77874-000	VANNER, DIAGNOSTIC KIT (INCLUDES SOFTWARE, DRIVERS & HARNESS)	$ 1,200.00
82-84075-000	VOLTAGE DETECTOR TOOL, USB CURRENT	$ 26.32
82-90029-000	WEATHER PACK CONNECTOR & TERMINAL KIT	$ 327.88
83-02283-000	DIAGNOSTIC DEVICE, QUICK CHECK for C703 & C706 ALTERNATOR	$ 254.00
83-02284-000	DIAGNOSTIC DEVICE, QUICK CHECK for C803D ALTERNATOR	$ 254.00

GILLIG

SALT LAKE CITY, UT RFP 20-03267PP

Maintenance & Diagnostic Tools

E-Bus

HIGH VOLTAGE TOOLS			
82-33295-003	FLUKE DIGITAL MULTIMETER	$	707.14
83-03379-000	FLUKE 1503 INSULATION TESTER	$	901.43
83-03151-000	SALISBURY TORQUE WRENCH	$	766.07
83-03151-001	SALISBURY TORQUE DRIVER	$	673.93
83-03151-002	SALISBURY 6” EXTENSION	$	63.57
83-03157-000	WIHA INSULATED SCREW DRIVER SET	$	378.89
83-03153-000	WIHA INSULATED NUT DRIVER SET	$	125.57
83-03154-000	WIHA INSULATED OFFSET WRENCH SET	$	461.40
83-03155-000	WIHA INSULATED OFFSET WRENCH 8MM	$	47.49
83-03156-000	WIHA INSULATED OFFSET WRENCH 9MM	$	47.50
83-03157-000	WIHA INSULATED SLIMLINE SET	$	157.11
83-03158-000	WIHA 10MM SOCKET	$	41.86
83-03159-000	WIHA 8MM SOCKET	$	41.86
83-03160-000	WIHA ¼” SOCKET	$	26.71
83-03161-000	WIHA ¼” OPEN-END WRENCH	$	36.94
B00ES8KX84	CARHARTT GEAR BAG, BLACK	$	107.13
83-03163-000	MASTERLOCK #488 PLUG LOCKOUT COVERS	$	31.05
83-03179-000	(2PCS) ZING 3” LOCK	$	46.57
83-03164-000	(6PCS) BRADY 1” LOCK	$	85.74
83-03165-000	(3PCS) LOCKOUT HASP	$	17.10
83-03166-000	LOCKOUT TAGS	$	19.77
PERSONAL PROTECTION EQUIPMENT			
83-03167-000	KNIPEX INSULATED MAT 39 3/8 IN.	$	651.11
83-03168-000	DELTA ARC FLASH HARNESS UNIVERSAL	$	676.11
83-03169-000	CAPITOL SAFETY 6FT. ARC FLASH KEVLAR LANYARD	$	361.11
83-03170-000	SALISBURY ARC FLASH KIT	$	983.33
	Kit Includes:		
	Coverall		
	12 cal./cm2 Face Shield		
	Safety Glasses		
	ATPV Rated AFHOOD		
	Storage Bag		

October 22, 2020

SALT LAKE CITY, UT
RFP 20-03267PP
TRAINING

GILLIG training can only be purchased in 24-hour blocks, a GILLIG instructor will travel to your facility to administer all GILLIG training. These classes are scheduled Tuesday thru Thursday (they travel Monday & Friday) and can be tailored to your operational needs. Some OEM training may be conducted at a local dealer as determined by the OEM and their training resources at the time of purchase.

OPTION TRAINING	**PRICE**
Operator Instruction (Provided During PDI) provided by GILLIG	No Charge
Maintenance Department General Vehicle Orientation (Provided During PDI) provided by GILLIG	No Charge
GILLIG Aftermarket Parts Orientation provided by GILLIG	No Charge
Wheel Chair Ramp – 8 hours up to 12 students provided by Lift-U	No Charge
Destination Sign Training - 8 hours up to 12 students provided by Luminator	No Charge
Fire Suppression Training – 8 hours up to 12 students provided by Amerex	No Charge
Multiplex Electrical System – 24-hour program up to 12 students provided by GILLIG	$5,000.00
System Level Maintenance Training - 24-hour program up to 12 students provided by GILLIG	$5,000.00
Shop Level Maintenance Training - 24-hour program up to 12 students provided by GILLIG	$5,000.00
Any Future New Technologies Equipment Not Identified - 24-hour program up to 12 students provided by GILLIG	$5,000.00
GILLIG Training – 24 hours custom tailored up to 12 students provided by GILLIG	$5,000.00
Air System and Brake – 16-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Steering/Suspension – 8-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Body and Panel Repair – 4-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Tow, Service Truck Procedures and Proper Lifting of Vehicle - 4-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Battery Electric Bus Operator Training – 8-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Battery Electric Bus Service Personnel Training – 8-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Battery Electric Bus Technician Training – 8-hour program (to be included with 24-hour block)	Part of 24hr Purchase

Hydraulic System - 8-hour program (to be included with 24-hour block)	Part of 24hr Purchase
EFAN System – 6-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Entrance/Exit Door Systems - 8-hour program (to be included with 24-hour block)	Part of 24hr Purchase
Electric Powertrain Familiarization Training – Provided at local Cummins dealer, price is per student per day. Does not include travel. (3 mechanics for one (1) 8hr class = $2,700.00)	$2,700.00
Cummins Commercial Electric Vehicle Qualification Training - Provided at Cummins Facility in Columbus, IN, price is per student per day. Does not include travel. (3 mechanics for one (1) 16hr class = $5,400.00)	$5,400.00
Thermo King HVAC Virtual Training – Price is per student per day. Does not include travel. Requires minimum of (8) attendees, $200.00 per student per day.	$1,600.00
Thermo King HVAC Field Training at Customer Site – Price is per student per day. Does not include travel. Requires minimum of (8) attendees, $300.00 per student per day.	$2,400.00

PRICING CLARIFICATION

All the following general comments and clarifications may not apply to your specific procurement, but they are included so as to avoid misunderstandings, so they should not be construed as making this a conditional bid. These comments do not change the quoted pricing for the initial order and build.

TAX/FEE STATEMENT

The prices quoted for this procurement are for the specified deliverables only and **exclude** (unless specifically noted by buyer or seller) any Local, City, County, State, Franchise or Income or Value Added(VAT) taxes, tariffs, fees, business licenses, or other licenses, that may need to be paid as part of the performance of this contract, or any option of it. If any additional fees are required, they will be noted and added to the appropriate invoice.

PAYMENT

All prices are in U.S. Dollars and payments are only accepted on U.S. bank checks or via electronic funds transfers, (no credit, debit or bank cards) and any applicable transaction fees would be the responsibility of the buyer.

EMISSIONS AND OTHER REGULATED OR MANDATED CHANGES

The prices quoted for the initial build quantity are for vehicles meeting all applicable Federal and State regulations (including EPA, CARB, or NHTSA requirements) **currently known to be in effect at the time of delivery of those vehicles.** Changes caused by or related to future regulations, any subsequently enacted regulations, or technologies necessitating revisions from the currently proposed vehicle configuration (e.g. component change/availability due to emission or other regulations, requirements or mandates), may require a price adjustment, which would be subject to negotiation and agreement by both GILLIG and the buyer. This latter statement applies to future builds only that may need to use different components or currently unknown or unavailable technology, to meet regulations or requirements in effect at the time(s) of those optional deliveries.

OPTIONAL BUILD PRICING

Most bids include a PPI adjuster to determine pricing for future builds, and this is to clarify that bus pricing for such future build quantities may be different from the PPI adjusted price because of the above regulated/mandated changes and/or due to customer initiated change notices.

GILLIG LLC

By: _____

JOSEPH POLICARPIO

Title: VICE PRESIDENT, SALES

Date: OCTOBER 22, 2020

CER 9. Other Certifications

CER 9.1 Proposal Form

Proposer shall complete the following form and include it in the price Proposal.

PROPOSAL

By execution below by a duly authorized representative(s) of the Proposer, the Proposer hereby offers to furnish equipment and services as specified in its Proposal submitted to ***Utah Transit Authority*** in response to Request for Proposal No. ***UT 20-03267PP*** in its entirety.

Proposer: GILLIG LLC

Street address: 451 DISCOVERY DRIVE

City, state, ZIP: LIVERMORE, CA 94551

Name and title of Authorized Signer(s): JOSEPH POLICARPIO, VICE PRESIDENT, SALES

Name and title of Authorized Signer(s): ---

Phone: 800-735-1500 OR 510-785-1500

Authorized signature — Date: OCTOBER 22, 2020

Authorized signature — Date: ---

PRODUCT LEAFLET

Electric Vehicle Infrastructure

HVC-C UL depot charging for electric fleets

ABB HVC-C UL Depot Charging systems offer a highly reliable, intelligent and cost-effective solution to charge large EV fleets such as buses, trucks and other commercial vehicles.

—
HVC Depot Boxes and power cabinets, lined up at a depot site.

A practical solution for busy depots
ABB Heavy Vehicle Charger (HVC) products enable electric buses and trucks to charge at the depot ensuring flexibility and scale for every fleet operation that is transitioning to zero-emission transportation.

Key Benefits
+ Smart charging
+ Small infrastructure footprint at vehicle interface
+ Flexible design for roof and floor mounting
+ SAE J1772 CCS and OCPP 1.6 compliant
+ Remote diagnostics and management tools

Sequential Charging
Improving total cost of ownership is easy using the sequential charging feature offered by ABB's depot chargers. This feature allows connection of up to three depot charge boxes with a single power cabinet and vehicles are charged sequentially over time. The system can follow an embedded, predefined charging process or remote triggers sent by a fleet management system via OCPP 1.6.

- Vehicles are charged with high power, maximizing vehicle availability
- The required grid connection is smaller, reducing upfront investments and operational costs
- The compact depot box is easy to install at sites with space constraints
- Optimal utilization of installed infrastructure meaning lower investments in charging equipment.

Buy America
ABB can offer the HVC-C Depot Charging Solution with compliance to the Buy America Act Rule 49 CFR Part 661.5.

Future-proof modular design
Power cabinets can be upgraded from 100 or 150 kW in the field, as well as add additional depot charge boxes, allowing operators to scale their operation and to spread investments over time.

Safe and reliable operation
ABB fast chargers are designed to the highest international electrical, safety, and quality standards, and are certified by notified bodies - guaranteeing safe and reliable operation.

Connectivity and remote services
ABB chargers come with an extensive suite of connectivity features including remote services such as monitoring, management, diagnostics and software upgrades. These advanced services provide equipment owners with powerful insights into their charging operations while enabling high uptime.

ABB is your experienced partner
ABB HVC products are based on a decade of high power experience in EV charging solutions. ABB has installed over 13,000 fast charging systems in more than 80 countries – and is the leading EV infrastructure technology supplier globally.

Overnight charging 100 kW - 150 kW

A field upgradeable system with future proof reliability

HVC 100C

Upgrade

HVC 150C

HVC 150C*

A power upgrade can be done in the field by adding an extra power module. No groundworks, digging and disturbance to the site are required.

* 150 kW overnight charging system with three depot charge boxes; shown mounted on pedestal option.

Technical specifications

Configurations		HVC 100C	HVC 150C
Maximum output power		100 kW	150 kW
AC Input voltage		UL: 3-phase, 480Y/277 VAC +/- 10% (60 Hz) CSA: 3-phase, 600Y/347 VAC +/-10% (60 Hz)	
AC Input connection		L1, L2, L3, GND (no neutral)	
Rated input power		117 kVA	170 kVA
Rated input current		UL: 132 A / CSA: 108 A	UL: 198 A / CSA: 168 A
Recommended upstream circuit breaker(s)		UL: 1 x 200 A / CSA: 1 x 150 A	UL: 1 x 250 A / CSA: 1 x 250 A
Output voltage range		150 – 850 VDC	
Maximum DC output current		166 A	200 A
Vehicle connection interface		CCS/Combo Type 1 Connector	
Cable length		3.5 m (11.5 ft) standard; 7 m (23 ft) optional	
DC connection standard		SAE J1772 - IEC 61851-23 / DIN 70121 - ISO 15118	
Environment		Indoor/Outdoor	
Operating temperature		Standard: -10 °C to +50 °C (de-rating characteristic applies) Optional: -35 °C to +50 °C	
Protection		Power Cabinet: IP54 – IK10 (equivalent to NEMA 3R) Depot Charge Box: IP65 - IK10	
Network connection		GSM/3G modem | 10/100 base-T Ethernet	
Compliance and Safety		CSA No. 107.1-16 and UL 2202 certified by TUV BA Rule 49 CFR Part 661.5 (Optional)	
Dimensions			
Power Cabinet	Dimensions (H x W x D)	2030 x 1170 x 770 mm / 79.9 x 46.1 x 30.3 in	
	Weight	1340 kg / 2954 lbs	
Depot Charge Box (without pedestal)	Dimensions (H x W x D)	800 x 600 x 210 mm / 31.5 x 23.6 x 8.3 in	
	Weight	61 kg / 134.5 lbs (with 7 m / 23 ft cable)	
Depot Charge Box (with pedestal)	Dimensions (H x W x D)	1914 x 600 x 400 mm / 75.4 x 23.6 x 16.3 in	
	Weight	181 kg / 398 lbs (with 7 m / 23 ft cable)	

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PRODUCT LEAFLET

Electric Vehicle Infrastructure

HVC-PD UL opportunity charging for electric buses

ABB's HVC-PD opportunity charging system offers high-power charging via an automated rooftop connection. With typical charge times of 3 to 6 minutes the system can be easily integrated in existing operations by installing chargers at endpoints, terminals and intermediate stops.

—
The HVC-PD charging system leverages an automated connection to enable extremely fast charge times.

A practical solution for route charging
ABB's Heavy Vehicle Charger (HVC) system architecture offers an ideal solution for opportunity charging, ensuring zero-emission public transit during the day without impacting daily route operations.

Key Benefits
+ Charge in 3 to 6 minutes
+ One charger serves many vehicle makes and models
+ Safe and reliable fully automated connection
+ SAE J3105-1 and OCPP 1.6 compliant
+ Remote diagnostics and management tools

Future-proof modular design
Additional power cabinets can be installed at any time, allowing operators to scale their operation and flexibly spread out infrastructure investments as their fleet grows.

Safe and reliable operation
ABB fast chargers are designed to the highest international electrical, safety, and quality standards, and are certified by notified bodies - ensuring safe and reliable operation.

Interoperability
ABB HVC chargers are based on international standards for operational compatibility with multiple vehicle types and brands. This allows operators to select vehicles from multiple vendors and not be locked into a single supplier.

Connectivity and remote services
ABB chargers come with an extensive suite of connectivity features including remote services such as monitoring, diagnostics and software upgrades. These advanced services provide equipment owners with powerful insights into their charging operations while delivering high uptime.

OCPP 1.6
ABB HVC-PD charging systems can be connected to standardized charging infrastructure management platforms using OCPP 1.6. ABB's HVC suite supports OCPP 1.6 Core and Smart Charging Profiles.

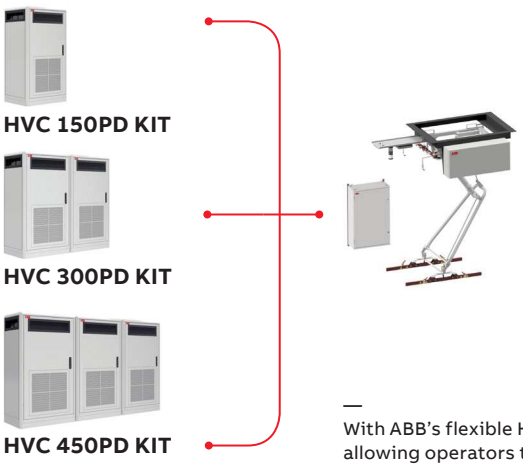
Buy America
ABB can offer the HVC-PD Depot Charging Solution with compliance to the Buy America Act, Rule 49 CFR Part 661.5.

ABB is your experienced partner
ABB HVC products are based on a decade of high-power experience in EV charging solutions. ABB has installed over 14,000 fast charging systems in more than 80 countries – and is the leading EV infrastructure technology supplier globally.

Opportunity charging 150 kW to 450 kW

A scalable system with future-proof reliability

Charging on existing structure



Charging on route

With ABB's flexible HVC architecture, power capability can be expanded over time, allowing operators to spread out infrastructure investments as their fleet grows.

Technical specifications

Configurations		HVC 150PD	HVC 300PD	HVC 450PD
Maximum output power		150 kW	300 kW	450 kW
Input AC connection		UL: 3-phase, 480Y/277 VAC +/- 10 % (60 Hz); CSA: 3-phase, 600Y/347 VAC +/-10% (60 Hz)		
Rated input power		170 kVA	2x 170 kVA	3x 170 kVA
Rated input current		UL: 198 A CSA: 168 A	UL: 2x 198 A CSA: 2x 168 A	UL: 3x 198 A CSA: 3x 168 A
Recommended upstream circuit breaker(s)		1 x 250 A	2 x 250 A	3 x 250 A
Output voltage range		150 – 850 VDC		
Maximum DC output current		250 A	500 A	600 A*
Vehicle connection interface		Inverted crossrail pantograph - OppCharge		
DC connection standard		SAE J3105-1 - IEC 61851-23-1** - ISO 15118		
Environment		Indoor/Outdoor		
Operating temperature		Standard: -10 °C to +50 °C (de-rating characteristic applies); Optional: -35 °C to +50 °C		
Protection		IP54 – IK10 (NEMA 3R)		
Network connection		GSM/3G/4G modem | 10/100 base-T Ethernet		
Compliance and safety		CSA No. 107.1-16 and UL 2202, certified by TUV BA Rule 49 CFR Part 661.5 (Optional)		
Dimensions				
Power cabinet (each)	Number of Power Cabinets	1	2	3
	Dimensions (H x W x D)	2030 x 1170 x 770 mm / 79.9" x 46.1" x 30.3"		
	Weight	1340 kg / 2954 lbs		
Charge pole (includes Pantograph & ACM)	Dimensions (H x W x D)	5240 x 1040 x 300 mm / 206.3" x 40.9" x 11.8"		
	Outreach	4670 mm / 183.9" x 30.3"		
	Weight	1706 kg / 3762 lbs		
ACM Control Module KIT	Dimensions (H x W x D)	1600 x1000 x 476.9 mm / 63" x 39.4" x 18.8"		
	Weight	193 kg / 425 lbs		
Pantograph KIT	Dimensions (H x W x D)	(resting position / bolt-hole pattern) 574 x 1300 x 900mm / 22.6"H x 51.2"W x 35.4"D		
	Weight	227 kg / 500 lbs		

* Limited by inverted pantograph contact ratings
** IEC 61851-23-1 in draft status

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GILLIG LLC

LOW FLOOR TRANSIT COACH

STANDARD LIMITED WARRANTY & EXTENDED COVERAGE FOR

UTAH TRANSIT AUTHORITY - SALT LAKE CITY, UTAH
BID RFP 20-03267PP FOR ELECTRIC VEHICLES – OCTOBER 23, 2020

GILLIG LLC warrants to the original purchaser, that its transit coaches, save and except for those major component assemblies and other parts described below which are separately warranted by their respective manufacturer's (OEM's), will be **FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE**, for the distance or time periods specified in the attached, and agrees to REPAIR or REPLACE the defective parts AT NO COST TO THE PURCHASER. This is a limited warranty subject to the provisions stated below and is referred to as GILLIG's Standard Limited Warranty.

This warranty **DOES NOT COVER** malfunction or failure resulting from the purchaser's or its agents or employees alteration, misuse, abuse, accident, neglect or failure to perform normal preventive maintenance as outlined in GILLIG's Service Manual, nor does it cover components or assemblies not originally provided by GILLIG. Further, this warranty **DOES NOT APPLY** to normal replacement items such as light bulbs, seals, filters or bushings, nor to consumable items such as belts, tires, brake linings or drums.

PURCHASER'S SOLE REMEDIES FOR LIABILITY OF ANY KIND WITH RESPECT TO THE PRODUCTS FURNISHED UNDER THIS WARRANTY AND ANY OTHER PERFORMANCE BY GILLIG UNDER OR PURSUANT TO THIS WARRANTY, OR WITH RESPECT TO PURCHASER'S USE THEREOF, INCLUDING NEGLIGENCE, SHALL BE LIMITED TO THE REMEDIES PROVIDED IN THIS WARRANTY AND SHALL IN NO EVENT INCLUDE ANY INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES OR LOSS OF USE, REVENUE OR PROFIT. IN NO EVENT SHALL GILLIG'S LIABILITY FOR DAMAGES WITH RESPECT TO ANY OF THE PRODUCTS COVERED UNDER THIS WARRANTY EXCEED THE AMOUNT PAID BY THE PURCHASER TO GILLIG FOR SUCH PRODUCTS.

GILLIG **DOES NOT WARRANT** some major component assemblies (such as the engines, transmissions and air conditioning systems) which are warranted by their respective manufacturers (OEM's) and identified as Category 3 items on page three (3) of this Warranty. **Warranty coverage for these items is as defined in those manufacturer's own warranty documents** and per their terms and conditions, and as administered by their own support networks.

GILLIG makes **NO OTHER WARRANTIES,** except as stated herein, and GILLIG's obligation under this warranty is **LIMITED AND FULLY DESCRIBED HEREIN**. Determination of warrantable defects is at GILLIG's (or the OEM's) discretion and will require inspection of failed components. Correction or compensation under this warranty for Category 1 and Category 2 items cannot be made unless requested on a GILLIG Application for Warranty Claim form and in accordance with the claim procedure established by GILLIG.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER WARRANTY EXPRESSED OR IMPLIED, but if such has legal status, it **CANNOT EXCEED THE DURATIONS STATED HEREIN**. This warranty gives the purchaser specific legal rights and some state statutes may include other rights.

This is GILLIG's sole warranty with respect to its transit coaches. **GILLIG MAKES NO OTHER WARRANTY OF ANY KIND WHATEVER, EXPRESS OR IMPLIED; AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEED THE AFORESAID OBLIGATION ARE HEREBY DISCLAIMED BY GILLIG AND EXCLUDED FROM THIS AGREEMENT.**

GILLIG LLC

LOW FLOOR TRANSIT COACH

STANDARD LIMITED WARRANTY & EXTENDED COVERAGE FOR

UTAH TRANSIT AUTHORITY - SALT LAKE CITY, UTAH
BID RFP 20-03267PP FOR ELECTRIC VEHICLES – OCTOBER 23, 2020

GILLIG's Standard Limited Warranty which covers Category 1 and Category 2 parts, components and assemblies, covers the following systems, components or assemblies for the period specified, and includes 100% PARTS AND LABOR to repair or replace the defective components as determined by GILLIG. (See Page 3 for explanation of notes (1)-(7).)

CATEGORY 1

Includes GILLIG manufactured or assembled components and systems as well as some purchased assemblies. Warranty and warranty claims administration provided by GILLIG.

	Coverage Period [1]	
	Months	Miles
FULL COACH WARRANTY [2] [3] [7]	12	50,000
BODY STRUCTURE WARRANTY [4]	36	150,000
CORROSION & STRUCTURAL INTEGRITY WARRANTY [5]	84	350,000

CATEGORY 2

Includes major components purchased and installed by GILLIG. Warranty provided by component OEM's. Warranty claims administration provided by GILLIG.

AXLE		
Meritor Front Steering	60	300,000
Meritor Rear Driving	60	300,000
BRAKE SYSTEM		
(Excludes Friction Material)		
Bendix Valves	24	100,000
Meritor Brakes	24	100,000
ELECTRONIC COOLING PACKAGE		
Modine System	36	Unlimited

GILLIG LLC

LOW FLOOR TRANSIT COACH

STANDARD LIMITED WARRANTY & EXTENDED COVERAGE FOR

UTAH TRANSIT AUTHORITY - SALT LAKE CITY, UTAH
BID RFP 20-03267PP FOR ELECTRIC VEHICLES – OCTOBER 23, 2020

Major components listed below under "Category 3" are covered by warranties or extended coverages[6], for the miles and/or months indicated, provided by the manufacturer (OEM's) of those components. Purchasers should refer to specific OEM warranty documents for details. Warranty claims are and will be administered by the respective manufacturers (OEM's) and all warranty claims must be made directly to said manufacturers. GILLIG will assist purchasers in dealing with these OEM's and warranty issues that may arise from time to time.

CATEGORY 3

	Coverage Period [1]	
	Months	Miles
POWERTRAIN [7]		
CUMMINS	60	250,000
Energy Storage System	144	500,000 (90% of Original Useable Capacity/Pack Depth Charge 70%)
AIR CONDITIONING SYSTEM		
Thermo King Electric	24	Unlimited
WHEELCHAIR RAMP		
Lift-U LU18	24	Unlimited
DOOR SYSTEM		
Vapor	12	Unlimited

Low Floor Transit Coach Emission Warranty

GILLIG warrants to the ultimate purchaser and each subsequent purchaser that the new vehicle is designed, built and equipped so it conforms at the time of sale to the ultimate purchaser with all U.S. federal emissions regulations applicable at the time of manufacture and that it is free from defects in materials or workmanship which would cause the vehicle to fail to not meet these regulations within five years or 100,000 miles of operation, whichever occurs first, as measured from the date the vehicle is placed into service. In no case may this period be less than the Standard Limited Warranty where applicable to emission warrantable parts. If the ultimate purchaser registers the vehicle in the state of California (or any other state following the applicable California Air Resources Board regulations) a separate California Emissions Warranty applies.

GILLIG LLC

LOW FLOOR TRANSIT COACH

STANDARD LIMITED WARRANTY & EXTENDED COVERAGE FOR

UTAH TRANSIT AUTHORITY - SALT LAKE CITY, UTAH
BID RFP 20-03267PP FOR ELECTRIC VEHICLES – OCTOBER 23, 2020

GILLIG warrants to the ultimate purchaser that registers the vehicle in the state of California (or any other state following the applicable California Air Resources Board regulations), and each subsequent purchaser, that the new vehicle is designed, built and equipped so it conforms at the time of sale to the ultimate purchaser with all applicable regulations adopted by the California Air Resources Board at the time of manufacture and that it is free from defects in materials or workmanship which would cause the vehicle to fail to not meet these regulations within five years, 100,000 miles or 3000 hours of operation, whichever occurs first, as measured from the date the vehicle is placed into service. In no case may this period be less than the basic mechanical warranty provided to the purchaser of the engine.

GILLIG warrants to the ultimate purchaser and each subsequent purchaser that the tires on this vehicle conform at the time of sale to the ultimate purchaser with all U.S federal emissions regulations and all applicable regulations adopted by the California Air Resources Board at the time of manufacture and are free from defects in materials or workmanship which would cause the vehicle to fail to not meet these regulations for a period of 2 years or 24,000 miles, whichever occurs first.

This list of emission control parts may be covered by the Emission Warranty under certain failure modes.

- Ambient Air Temperature Sensor
- Wire harness circuits connected at both ends to emissions warrantable components
- On-Board Diagnostic (OBD) Malfunction Indicator Lamp (MIL)
- OBD Connector

NOTES

1) Coverage ceases at the first expiration of the time or distance noted.
2) Full coach warranty includes and applies to electrical, doors, seats, flooring, roof hatches, destination signs, wheelchair ramp, handrails, radio, P.A., etc., but not to IVS systems or special options.
3) Fleet defect coverage is for a maximum of 12 months or 50,000 miles and includes all warrantable components and assemblies on the vehicle.
4) Basic body structure warranty includes and applies to structural members in the body and undercarriage including the structural members in the suspensions.
5) The corrosion and structural integrity guarantee covers against a significant loss of structural integrity of the assembly or its functional performance, resulting from a pertinent loss of cross-section due to corrosion caused by normal environmental elements but excludes corrosion caused by aggressive road de-icers such as Magnesium Chloride or equivalents, unless Gillig approved preventative measures are taken (see Service Manual).
6) Extended coverage may not duplicate Standard Limited warranty coverage. Note: Please refer to OEM warranty documents for details.

EXHIBIT B -Final Relined Specifications

SECTION 6: TECHNICAL SPECIFICATIONS

GENERAL

TS 1. Scope

Bus specifications will be for Electric Propulsion Transit/Suburban Buses, The Bus body shall have the newer look of a "BRT" styling package which includes a more rounded and curved appearance on the top, front and rear of the bus, frameless passenger windows and an extra-large two-piece windshield.

The proposed buses shall have the following priced variants;

Length: *Provide a price for 40ft and 35 ft bus if offered.*

Priced Configuration #1: *Standard Transit bus configuration of 2 door low floor bus.*

Priced Configuration #2: *Suburban (1) door bus with commuter style interior layout. Padded vinyl forward facing captain's chair commuter seating with seatbelts shall be included. USB and 110v patron outlets. Patron Wi-fi, 70mph Governor, overhead luggage storage racks (if available.) Bus shall be designed for a quiet comfortable highway ride and capable of long highway canyon grade trips. The bus shall also include an automatic tire chain system, or a prewire setup for one to be installed upon delivery*

Priced Configuration #3: *BRT route specific bus. Bus Shall have a ramp designed for near level platform boarding. Platform height is 12" The bus shall have streamlined large rear door to quickly allow boarding and unloading Wheelchair stations shall be priced with Quantum auto front or rear facing system (or approved equivalent). Provide pricing for one and both sides of the wheelchair securement area. The bus shall also include an automatic tire chain system, or a prewire setup for one to be installed upon delivery*

Charging infrastructure/connections: *Provide pricing for compatible charging infrastructure, including compatible depot chargers and high-power on route chargers. Proposed chargers will be included in the technical/delivery schedule/price scores and should meet the following requirements.*

1. *The successful proposer will need to demonstrate that the buses and charging equipment are fully tested and integrated. The contractor must show that the protocol on the bus is correct and matches the agency's selected charger protocol before the buses leave the factory.*
2. *Proposed Charging equipment must be compatible with the Agency's existing electric buses.*
3. *Proposed buses must be compatible with the Agency's existing chargers.*
4. *Depot charger connections should utilize SAE J1772 DC CCS type 1*
5. *Overhead High-Power chargers should utilize SAE J3105, and conductors on the proposed bus shall be located towards the front of the bus.*
6. *Provide a standardized application protocol for communication between Electric vehicle (EV) charging stations and central management systems from different vendors to communicate with each other. The Open Charge Point Protocol (OCPP) is APPROVED.*
7. *Charging equipment shall include an online system where the agency can see the status of the charging equipment, pull reports/data on charger use, and diagnose problems.*

8. *The proposer should disclose the maximum rate of charge the proposed bus ESS can accept from the overhead charger, as well as the max output of the On-route charger, since a long-range type battery typically can't accept max output of the high-power charger*
9. *The agency is requesting pricing for the equipment/hardware only and is NOT soliciting design or construction costs for chargers.*
10. *Provide an estimated delivery date/lead-time for charging equipment from NTP. This is considered in the delivery schedule score since infrastructure can make or break the project schedule.*
11. *The agency will accept pricing for inductive charging options, as well as overhead depot charging options if they exist. This is for informational purposes mainly & will not be required.*

Product Demo: *If there is interest, the agency will entertain the idea of a bus demonstration/test from proposers. This will be on an as needed or as requested basis and is not intended for scoring purposes, but for supplementation/clarification of what is being proposed and for answering questions that may arise.*

The expanded specifications are easy to recognize because they are underlined, and italicized. This paragraph is a good example of added specifications. The original specifications that are specifically not used have either been removed, or they are in their original font, black ink and have been struck through, such as this ~~example.~~ *Whenever a brand name of a component is mentioned, the words "or approved equal" follows the brand name even though the words "or approved equal" are not printed in the specification.*

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

TS 2. Definitions

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

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

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

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

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.

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

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

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

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

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

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

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

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

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

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.

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

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

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

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

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

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

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

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

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

Gross Load: 150 lbs 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 Pressure: Those portions of the CNG fuel system that see full container or cylinder pressure.

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

Hose: Flexible line.

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

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

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

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

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

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

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

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

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

Local Regulations: Regulations below the state level.

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

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

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

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.

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

Module: An assembly of individual components

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

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

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

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

Pipe: Nonflexible line.

Pressure Relief Device (PRD):A pressure and/or temperature activated device used to vent the container/cylinder contents and thereby prevent rupture of an NGV fuel container/cylinder, when subjected to a standard fire test as required by fuel container/cylinder standards.

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

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

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

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

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

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

Seated Load: 150 lbs 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 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 "pigtails" commonly used to absorb flexing in piping.

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

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

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 3. Referenced Publications

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

TS 4. Legal Requirements

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

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

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

TS 5. Overall Requirements

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

TS 5.1 Weight

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

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

TS 5.2 Capacity

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

TS 5.3 Service Life

The minimum useful design life of the bus in transit service shall be at least twelve (12) years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year, including the 12th year.

TS 5.4 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be in accordance with the manufacturer's

recommended preventative maintenance schedule (along with routine daily service performed during the ~~fueling~~ *charging* operations).

Test ports, as required, shall be provided for commonly checked functions on the bus, such as ~~air intake, exhaust~~, hydraulic, pneumatic, ~~charge-air and engine~~ cooling systems.

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

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

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

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

TS 5.5 Interchangeability

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

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

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

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

TS 5.6 Training

Introduction

Training Costs shall be part of the bus evaluation, but priced separately.

Contractor shall be responsible for providing the following training:

1. *Training in the maintenance and operation of the contracted buses. Training materials sufficient to support continued in-house Agency's training.*

2. *Update training and training materials when, in the scope of the contract, changes or modifications are made that affect the operation or maintenance of the buses that are contracted through final delivery of the initial base order of buses. All subsequent training which may be requested for optional bus orders will be negotiated and priced accordingly. This deliverable section specifies the nature of the training activities and training materials that are required from the Contractor.*

Scope of Work for the Maintenance and Operation's Departments

Operation's Department:
The Contractor shall have at least one qualified instructor who will be available at UTA for three continuous days between the hours of 8:00 am – 5:00 pm sometime after the acceptance of the first bus. The instructor shall conduct classes to teach UTA training staff on the proper operation of the buses as well as useful trouble shooting techniques associated with operating the bus. The Contractor shall provide sufficient operating manuals for the training staff to be used during the 2 days of training sessions. Provide an electronic copy of the operating manual to UTA for future training needs.

Maintenance Department:

Up to five (5) Maintenance Training Specialists and Maintenance Instructors, and five (5) Maintenance Supervisors shall be provided "Train the Trainer" instructions for Maintenance Procedures, as outlined below in Salt Lake City, Utah. Up to forty (40) mechanics shall be trained on the proper and recommended procedures to perform Maintenance procedures as outlined below at a UTA location to be determined by Maintenance Training and, at the discretion of UTA, be provided on more than one (1) shift (i.e. days, swing).

1. *Maintenance Training will be tailored specifically to the Agency's buses, including all new technology equipment, and be designed to develop the knowledge and skills of the Maintenance Employees and Maintenance Training Specialists required to maintain the buses delivered under the contract. Maintenance Training will be provided in the following major areas:*

    a. *Propulsion system (Vendor Specific)*
    b. *Transmission (Vendor Specific if applicable)*
    c. *Battery system*
    d. *HVAC(Vendor Specific)*
    e. *Passenger Door*
    f. *Wheelchair ramp (R & R and Overhaul) (Vendor Specific)*
    g. *Air & Brake System*
    h. *Electrical System (emphasis on new technologies)*

i. *Steering/Suspension*
j. *Familiarization and Orientation*
k. *Preventive Maintenance (Contractor shall provide Inspection Sheets)*
l. *Body and Panel Repair*
m. *Tow, Service Truck procedures, and proper lifting of vehicle (specific to UTA equipment & facility).*
n. *Fire Suppression Systems (Vendor Specific*
o. *Any new technology equipment not covered in section 2 a-m.*

2. *System Level Maintenance Training, covering:*

a. *Theory of Operation*
b. *Mechanical System Configuration*
c. *Preventive Maintenance*
d. *Written and Validated Inspection*
e. *Use of any and all special tools and equipment necessary to diagnose, troubleshoot, and repair the bus.*

3. *Shop Level Maintenance Training, covering:*

a. *Detailed Theory of operation to module, board, and/or device level.*
b. *Component level Troubleshoot and Replacement.*
c. *Testing and Alignment of repaired units.*
d. *Use of any and all special tools and equipment necessary to diagnose, troubleshoot, and repair the bus.*

Deliverables

Within sixty (60) days after Notice to Proceed, the Contractor will provide the Agency's Maintenance Training Department an outline of the proposed training programs for approval.

The Contractor shall submit two (2) draft copies of each deliverable for approval ninety (90) days prior to the first scheduled class. The Agency's Maintenance Training Department will coordinate and schedule all classes.

Thirty (30) days prior to the beginning of the first scheduled class, the Agency's Training Department requires the following approved course materials to be delivered by the Contractor according to the following specifications:

1. *Instructor's Guide to contain all the information and directions necessary for the Agency's instructors to make an effective presentation and practical demonstration. It shall include adequate guidelines to conduct a comprehensive training program. Individual lessons within the course will be organized as separate units or modules which may be taught as a unit. In some instances, the same unit could be used more than once. For example, the unit on standard operating procedures could be used to train operators, mechanics and service personnel.*

The Instructors Guide should contain, at a minimum:

a. *A list of learner prerequisites (if any);*

b. *Program Overview;*
c. *A statement of overall program goals;*
d. *Lesson Plans that include a session by session outline containing the following:*
   1. *A Terminal Objective stated in measurable terms, defining the expected behavior of the learner at the completion of the specific session.*
   2. *Enabling Objectives identifying the specific behavior the learner must exhibit to achieve the Terminal Objective.*
   3. *Overview of each lesson.*
   4. *Suggested instructional methods/learning activities.*
   5. *Required equipment, audio/visual aids and/or other resources.*
   6. *Estimated time required for each lesson and objective.*
e. *Evaluation devices, (written and practical tests with an answer key for each of the tests developed) designed to measure the extent of Knowledge and Skill transfer that align with Terminal Objectives of courses*

2. *Learner Materials, to include all materials for the student to interact in the learning situation. It shall contain, at a minimum:*

   a. *Program overview/introduction.*
   b. *Statement of overall program goals.*
   c. *Terminal objectives stated in measurable terms that specifically describe desired behaviors or knowledge to be gained.*
   d. *Enabling Objectives identifying the specific behavior the learner must exhibit to achieve the Terminal Objective.*
   e. *A fully developed prose treatment of content presentation, developed to follow the instructors guide.*
   f. *Illustrations, charts, or graphics, as needed to enhance learner's retention.*
   g. *Problem/questions related to lesson content, as appropriate.*

3. *Audio-visual (AV) aids shall be included for all systems listed in Scope of Work 1: a., b., c., d., e., f., g., h., i., j., k., l., m, and n. These AV aids may include: handouts, videos, online training and slide presentations (PowerPoint, Prezi, etc.)..*

4. *Special Tools*

   a. *The Contractor shall submit a list of equipment or tools, other than those normally found in a mechanic's tool box, necessary for the general upkeep, maintenance, and overhaul of the equipment or products contained in buses delivered under this contract. This list must contain the tool manufacturer's name and price for all specialty tools.*

5. *Supplemental Materials. A functional mock-up, or a functional representation, is required of any equipment which requires discussions. This may be in the form of a model of the equipment, actual device, an interactive video training device, or the Procuring Agency's Training Department's approved substitute. All mock-ups, training aids and audio visual supplies and equipment shall become the property of the Procuring Agency.*

All Training "Deliverables" listed above, including Items 1 through 5, shall be provided upon acceptance of the last bus. If all items are not delivered with the acceptance of the last bus, the five percent (5%) retention payment on all buses will be withheld until all items are received by the Agency.

Number of Copies

The Contractor shall deliver final copies to the Agency as follows:

1. *One (1) complete set of training materials that is completely camera-ready. Camera-ready is defined as typewritten or typeset originals or high quality copies such that further copies can be made with no noticeable decrease in copy quality.*
2. *Forty(40) copies of Learners guides and two (2) instructor guides, (maintenance courses) to be used for archival purposes in the Agency's Technical Library.*
3. *A complete set of all written materials, drawings, pictures, etc. shall be in electronic format (stored on DVD). The electronic format shall be written in Word or Excel. If the Contractor uses a software other than that specified, the Contractor's software shall be included.*
4. *All written and audio-visual training and software materials shall become the property of the Agency. The Agency reserves the right to copy any and all materials to be used in training the Agency's personnel.*

Instructional Delivery

Contractor shall meet the following specifications in instructional delivery:

1. *Instructor Qualifications. A description of instructor qualifications, a resume, curriculum vita, or other description of instructor qualifications must be submitted during the RFP's Approved Equals stage of the procurement. The description should document a thorough knowledge of the equipment being taught, an understanding of the adult learning process, and demonstrated experience in vocational instruction.*
2. *Class Size. Classes shall be limited to a maximum of ten (10) mechanics per class for Maintenance personnel.*
3. *Testing. Instructor must give written and practical tests as a measuring device to determine knowledge and skills transference. Tests must be pre-approved by the Agency. A practical hands-on test is required (if applicable) to measure the skills transfer of Technicians. The practical test, if provided, shall be administered by the use of a check list of each job and/or task.*

TS 5.6.1 Technical/Service Representatives

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

TS 5.7 Operating Environment

ALTERNATIVE----------*APPROVED*

Agency will provide temperature range.

The bus shall achieve normal operation in ambient temperature ranges of 10 ºF to 115 ºF, at relative humidity

between 5 percent and 100 percent, and at altitudes ~~up to~~ *4,200 ft thru 5,200 ft* above sea level *in urban service areas.* Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10 °F, above 115 °F or at altitudes above 5200. Altitude requirements above will need separate discussions with the ~~engine~~ 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 5.8 Noise

TS 5.8.1 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 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed ~~and with the engine and accessories switched off~~.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 80 dBA. The driver area shall not experience a noise level of more than 75 dBA. Measurements of interior noise levels shall be taken in accordance with ISO 3381. An exception shall be made for the turntable area, which shall be considered a separate environment. ***The Agency will accept performance at 75 dBA with A/C off and 78 dBA with A/C on at the diver's area.***

TS 5.8.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full power acceleration when operated at 0 to 35 mph at curb weight. The 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. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Agency and SAE J366. ***The Agency will accept a Curbside idle noise level of 68 dB.***

DEFAULT----------*APPROVED*
Noise level should be as stated.

TS 5.9 Fire Safety

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

TS 5.9.1 Materials

DEFAULT----------*APPROVED*
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.

TS 5.10 Fire Suppression

DEFAULT----------APPROVED

The bus shall have a fire suppression system installed per manufacturer's recommendations.

Any proposed fire suppression system MUST be specifically designed and engineered for the ESS system that is proposed. The agency will not accept a fire suppression system designed for an internal combustion powered vehicle.

Supply and install a Fire Suppression System for bus protection. The system shall be a dry chemical or other pre-engineered fire suppression system with automatic detection and actuation.

1. *System must comply with NFPA 17.*
2. *System shall provide 24-hour fire detection of the electric drive compartment.*
3. *The system shall be designed to operate at 12 or 24 VDC and shall not exceed 0.1 amp current draw.*
4. *The entire Fire Suppression System shall be Factory Mutual Research Corporation approved.*
5. *A minimum of four ambient, temperature-sensitive sensors shall be provided.*
6. *Sensors shall be located in the electric drive compartment under all horizontal bulkheads, above and downwind of the major heat sources, and in areas likely to be exposed to leaking flammable fluids.*
7. *Additional sensors shall be located in other potentially critical areas.*
8. *The sensors shall detect over-temperature in the critical areas and shall activate the fire alarm bell and warning light in the driver's compartment.*
9. *The sensors shall return to normal setting and deactivate alarms when the temperature returns to normal.*
10. ~~*The fire suppression system shall shut down the engine when activated.*~~
11. *Install the fire extinguisher Control Panel and Manual Switch in the Operator's compartment.*
12. *System must have self-check and manual test functions to ensure the system is operational.*
13. *The dry chemical bottle must be located so the gauge can be easily seen and for ease of maintenance.*

TS 5.11 Respect for the Environment

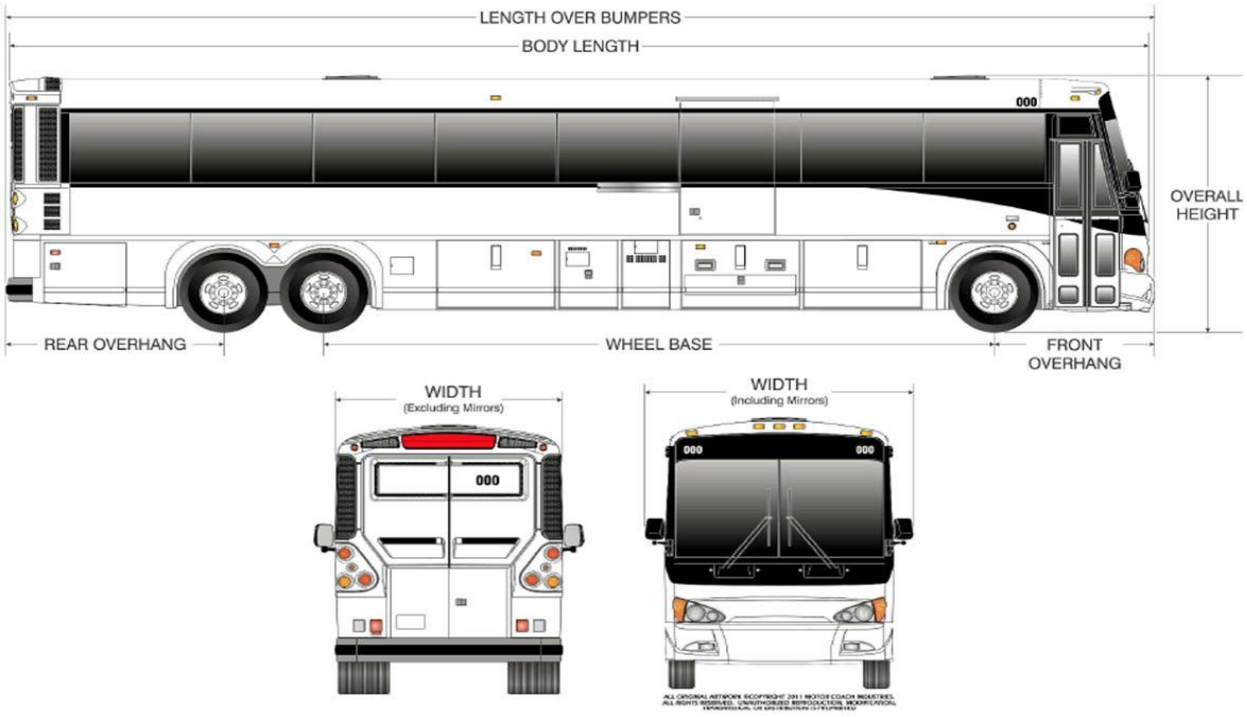
In the design and manufacture of the bus, the Contractor shall make every effort to reduce the amount of potentially hazardous waste. In accordance with Section 6002 of the Resource Conservation and Recovery Act, the Contractor shall use, whenever possible and allowed by the specifications, recycled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

DIMENSIONS

TS 6. Physical Size

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

FIGURE 1
Transit Bus Exterior Dimensions



TS 6.1 Bus Length

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

- **30 ft bus:** 29 ft, 11 in. to 34 ft, 11 in.
- **35 ft bus:** 35 ft to 39 ft, 11 in.
- **40 ft bus:** 40 ft to 44 ft, 11 in.

TS 6.2 Bus Width

TS 6.2.1 Transit Coach

DEFAULT----------*APPROVED*

102 in. Width Bus

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

~~TS 6.2.2 Commuter Coach~~

TS 6.3 Bus Height

DEFAULT----------*APPROVED*

Maximum Overall Height

Maximum overall height shall be 140 in., including all rigid, roof-mounted items such as A/C~~, exhaust, fuel system~~ *Batteries* and cover, etc.

TS 6.4 Step Height

TS 6.4.1 Transit Coach

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

~~TS 6.4.2 Commuter Coach~~

~~TS 6.4.3 Articulated Coach~~

TS 6.5 Underbody Clearance

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

TS 6.6 Ramp Clearances *with the use of Skid Plates*

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

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

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

DEFAULT----------*APPROVED with the exception of front and rear Skid Plates*

Refer to **Table 2a**.

TABLE 2a
Default Breakover Angle

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

SKID PLATES:

*The bus must meet the Approach and Departure Angles with the **exception** of the protective skid plates that are added to both front corners of the bus and the two skid plates at the rear of the bus.*

Attach two (2) front corner skid plates securely to the bumper/bus frame members to protect under floor components from damage when scrapping the road, gutter or curb. The front skid plates shall be approximately 6-8 inches by 6-8 inches by ¼ inch thick steel. The skid plates are to be sloped or curved downward and pointed towards the rear of the bus and extend sideways at least 1/4 to 1/2 inch past the curb-side or street-side side body panels at the front corners of the bus. The skid plates are to have a smooth surface to slide or rub against the concrete curbs or street pavement. The skid plates are approved even if they provide less than the required 8.6 degrees Approach Angle.

The Agency will accept front skid plates that are of slightly different dimensions and on the StreetSide and do not extend past the side body panel.

Attach two (2) rear skid plates to the bus frame members at the very rear of the bus. Each steel skid plate needs to be at least 2 inches wide, 2 inches thick and 6 inches long. The leading edge of the skid plate is to be curved slightly up to prevent digging into the road surface when sliding on street pavement. The skid plates are approved even if they provide less than the required 8.6 degrees Departure Angle.

TS 6.7 Ground Clearance

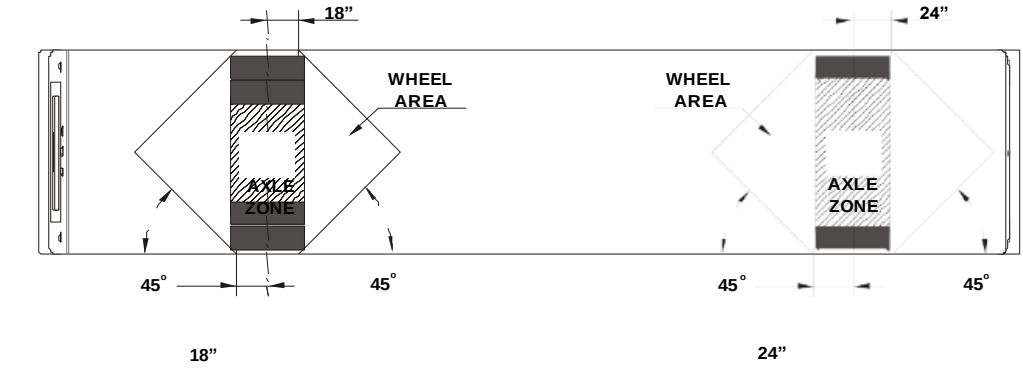
Ground clearance shall be no less than 9 in., (8 in. at jacking pad) except within the axle zone and wheel area.

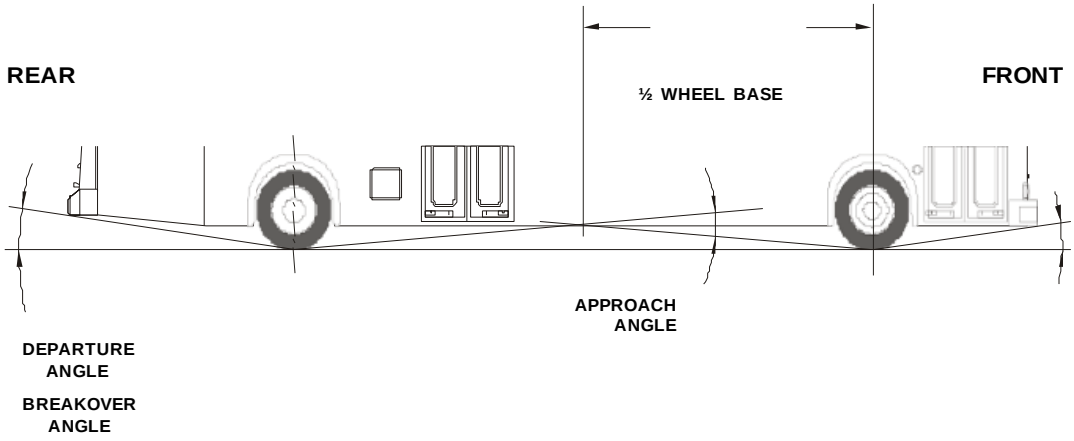
Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.4 in.

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

FIGURE 2

Transit Bus Minimum Road Clearance





TS 6.8 Floor Height

TS 6.8.1 Transit Coach

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

~~TS 6.8.2 Commuter Coach~~

TS 6.9 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 in. in the forward half of the bus tapering to no less than 74 in. forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 in., except for parcel racks and reading lights, if specified. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 in~~., but it shall increase to the ceiling height at the front of the seat cushion.~~ In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his or her head, padding shall be provided on the overhead paneling.

VEHICLE PERFORMANCE

TS 7. Power Requirements

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

The bus shall have a double wound or high output motor for canyon service at highway speeds and a min of 210kw output.

TS 7.1 Top Speed

ALTERNATIVE----------*APPROVED*

Agency to specify top speed limit. The bus shall be capable of achieving a top speed of *72* mph *(when and if programed*) *and a governed speed of 65 mph* on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed according to the recommendations by the tire manufacturer.

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

TS 7.2 Gradability

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

DEFAULT----------*APPROVED*

The propulsion system shall enable the bus to achieve and maintain a speed of *45* mph on a *3* percent ascending grade and *18* mph on a 10 percent ascending grade continuous.

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

TS 7.3 Acceleration

TS 7.3.1 ~~Non-Hybrid~~ Electric bus

The acceleration shall meet the requirements in **Table 3** below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement *from idle* shall commence when the accelerator is depressed. *Use the information from the engine data logger to calculate and determine the acceleration rates as found in Table 3.*

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

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

1. Vehicle weight = GVWR

TS 7.3.2 ~~Acceleration Hybrid~~ Electric bus deceleration

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

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

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

~~TS 7.3.3 Acceleration (Commuter Coach)~~

TS 7.4 Operating Range

The operating range of the coach shall be designed to meet the operating profile as stated in the "Design Operating Profile" section. *Operating range is subjective and dependent upon battery size. Final battery size and operating range TBD at a later time by the Agency. The bus batteries should however include a minimum of a 12 year warranty built into the base bus price.*

~~**TS 7.4.1 Diesel (Transit Coach)**~~

~~**TS 7.4.2 Diesel (Commuter Coach)**~~

~~**TS 7.4.3 CNG**~~

~~**TS 7.4.4 Hybrid**~~

~~TS 8. Fuel Economy (Design Operating Profile)~~

POWERPLANT

~~TS 9. Engine~~

~~**TS 9.1 Engine (CNG)**~~

~~**TS 9.2 Propulsion System (Hybrid)**~~

~~**TS 9.2.1 Propulsion System Description**~~

~~**TS 9.2.2 Propulsion System Service**~~

~~**TS 9.2.3 Primary Propulsion Unit and Traction Motor**~~

~~**TS 9.2.4 Energy Storage and Controller**~~

~~**TS 9.2.5 Hybrid System Controller (HSC)**~~

~~**TS 9.2.6 Engine**~~

ALTERNATIVE----------*APPROVED*

Agency shall define required ~~powerplant.~~ *Propulsion system*

The ~~engine~~ *Propulson system* shall be equipped with an electronically controlled management system, compatible with multiplex wiring systems and either 12 or 24 V electrical systems.

The ~~engine~~ *Propulson system* shall have on-board diagnostic capabilities, be able to monitor vital functions, store out-of- parameter conditions in memory and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in the operator's area and near or inside the electric drive compartment. The on-board diagnostic system shall inform the operator via visual and/or audible alarms when out-of-parameter conditions exist for vital engine functions.

~~The engine starting system shall be protected by an interlock that prevents its engagement when the engine is running. Special equipment or procedures may be employed to start the engine when exposed to temperatures less than 30 °F for a minimum of four hours without the engine in operation. All cold weather starting aids, engine heating devices and procedures shall be of the type recommended by the engine manufacturer and approved by the Agency.~~

TS 10. Cooling Systems

The cooling systems *if applicable for electric propulsion* shall be of sufficient size to maintain all ~~engine and transmission fluids and engine intake air~~ *propulsion drive components* at safe, continuous operating temperatures during the most severe operations possible and in accordance with ~~engine and transmission~~ *propulsion drive* manufacturers' cooling system requirements. The cooling system fan controls should sense the temperatures of the operating fluids and *any temperature critical components (electrical boxes ect.)* ~~the intake air~~ , and if either is above safe operating conditions, the cooling fan should be engaged. The fan control system shall be designed with a fail- safe mode of "fan on." The cooling system shall meet the requirements stated in the operating environment.

TS 10.1 ~~Engine~~ Cooling *System Requirements, Electric Fan, Coolant, Coolant Sample Test Port*

If applicable for Electric Propulsion, A means of determining satisfactory ~~engine~~ coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than ±60 in. above the ground. Both shall be accessible through the same access door. *Provide a means for checking coolant level whether the vehicle is hot or cold*

Minimum Ambient Cooling Capacity of 110 ˚F ** at 5,000 ft. Elevation

If applicable for Electric Propulsion, The cooling system in new condition is required to have a minimum Ambient Cooling Capacity of at least 110 ˚F using a 50/50 mix of antifreeze and water as coolant, while operating at 5,000 feet above sea level at GVW. A brand new bus cooling system meeting the above Ambient Cooling Capacity of 110˚F with 50/50 coolant, at 5,000 ft. altitude will perform at a minimum Ambient Cooling Capacity of 123˚F at sea level (from 0 to 500 ft. above sea level).

*** Actual maximum summer temperature is more like 105˚F. After 3 or more years in bus transit use, the degradation of the cooling system would perform more like it was 110 ˚F.*

Ambient cooling capacity figure notes:

- *Start at 500 ft. above sea level. Add an average 3˚F per 1000 ft. rise in elevation, which equals to 13.5˚F less cooling capacity at 5,000 ft (almost the highest point of the Authority's **urban** service area) than at sea level.*

- *When the 13.5˚F is added to the minimum specification of 110˚F, the total equals the required minimum Ambient Cooling Capacity of just over 123˚F at sea level.*

The proposer shall provide detailed test and evaluation reports showing how the electric fan cooling system was determined to meet the minimum Required Ambient Cooling Capacity of 110˚F at 5,000 ft. elevation.

DEFAULT

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

ALTERNATIVE---------- *APPROVED*

If applicable for electric propulsion, The radiator ~~and charge air cooler~~ shall be of durable, corrosion-resistant construction with non-removable radiator headers.

Add Corrosion Resistant Epoxy (E-Coat) to the entire exterior of the radiator ~~and charge air cooler~~ by the dipping process. Provide a strong, cross braced, if necessary, radiator core made totally of aluminum; lead free solder inside and out, with reinforced tubes and core corners. Provide solid fins made out of aluminum with the leading and trailing edges folded and crimped with a maximum of 10 fins per inch. Hump hoses are to be installed on the radiator inlet and outlet. ***The Agency requests this be a part of the base bus price.***

The threads of all bolts/nuts that are used to mount the Radiator shall be coated with anti-seize.

TS 10.1.1 Radiator Screen

ALTERNATIVE----------*APPROVED*

Screen in Front of Radiator

The radiator input shall be protected by an easily cleanable screen designed to collect large debris. Radiators with a fin density greater than ~~12~~ ***10*** fins per inch or a louvered slit design shall not be used. ~~No heat-producing components or climate-control system components shall be mounted between the engine cooling air intake aperture and the radiator.~~ The radiator ~~and charge air cooler~~ shall be designed to withstand thermal fatigue and vibration associated with the installed configuration. The radiator ~~and charge air cooler~~ cores shall be easily cleaned (to include engine side core surface) with standard pressure-washing equipment.

TS 10.1.2 Coolant

DEFAULT---------*APPROVED*

Standard Requirement for Coolant Filtration

If applicable for Electric Propulsion ,The ~~engine~~ cooling system shall be equipped with a properly sized water filter with a spin-on element and an automatic system for releasing supplemental coolant additives *(Nitrite/Borate Chemistry)* as needed to replenish and maintain protection properties. When replacing the water filter, only the water in the filter will be lost. *Use ¼ turn brass valves rated at 150 psi on each side of the coolant filter. Gate valves are not approved for any reason, anywhere on the bus.*

Engine Coolant

If applicable for Electric Propulsion ,Provide a fully formulated (Nitrite/Borate Chemistry) antifreeze from virgin antifreeze that is phosphate free, low silicone, ethylene glycol base, mixed with de-ionized or vacuum distilled water in a 50/50 water and antifreeze blend. Coolant shall meet the minimum Cummins Engineering Standard 14603.

Install a heavy duty push button valve from the coolant outlet to take coolant samples.
Location TBD.

The "Checkfluid KP18NV" sample valve has been ***APPROVED****.*
Old World Industries FLEET CHARGE® coolant has been APPROVED

TS 10.1.3 Drive Design

ALTERNATIVE----------*APPROVED*
Electric Fans
The bus shall be equipped with an electric fan drive bus cooling system. A screen guard must be installed on electric motor fans per SAE J1308.

ALTERNATIVE----------*APPROVED*
Self-Cleaning
Radiator ~~and charge air cooler~~ fan(s) shall be electrically driven and capable of automated reverse operations for periodic self-cleaning of the radiator ~~and charge air cooler~~.

If applicable for Electric Propulsion provide an electric cooling fan system with electronic controls:
- *The system shall be constructed completely of lightweight materials.*
- *The fan system shall have the ability to separately cool the radiator using J1939 information.*
- *The fan system shall have the ability to vary fan speeds according to the coolant and electrical component cooling needs*
- *The entire electric fan system shall be sealed from the elements to prevent corrosion and premature failure.*
- *The system shall fully shut down in the event of a fire.*
- *The fans used shall have guards to prevent finger injury by accidental insertion.*

TS 10.1.4 Mounting

DEFAULT----------*APPROVED*
Standard Mounting Design
Mounting location of radiator ~~and charge air cooler~~ shall be the Contractor's standard design.

~~TS 10.2 Charge Air Cooling~~
~~TS 10.3 Transmission Cooling~~

TS 10.4 ~~Hybrid~~ Propulsion Drive System Cooling

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

~~TS 11. Transmission (Conventional Powertrain)~~

If bus is equipped with a mechanical transmission with oil, provide a transmission oil sampling valve on a pressurized flow through oil line, or approved equal. Care should be taken to minimize the length of the line that feeds the sampling valve. Location TBD.

The "Checkfluid KP18NV" sampling valve has been ***APPROVED****.*

ALTERNATIVE----------*APPROVED*

A nominal brake pedal application of 15 to 20 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

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

An electronic transmission fluid level monitoring and protection system shall be provided.

ALTERNATIVE----------*APPROVED*

Automatic Neutral Function with Automatic Re-Engagement

The transmission, when in forward direction, shall automatically shift the transmission to neutral when the vehicle registers zero road speed, engine is idle and service brakes are applied. If the status of any one or more of the three signals changes, the transmission immediately and automatically resumes forward mode operation.

The transmission shall have the ability to travel 48,000 miles between oil changes, in transit service, when using approved synthetic transmission oil.

~~TS 12. Retarder (Transit Coach)~~

.

~~*A hydraulic retarder application gauge is not required for the Vansco Multiplex Instrument cluster.*~~

~~TS 13. Engine Brake (Commuter Coach)~~

TS 14. Mounting

All ~~powerplant~~ *drivetrain* 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 ~~powerplant~~ *drivetrain* so as not to affect performance of belt-driven accessories or cause strain in piping and wiring connections to the ~~powerplant~~ *drivetrain*.

TS 14.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. ~~The muffler, exhaust system, air cleaner,~~ air compressor, ~~starter,~~ alternator, radiator, all accessories and any other component requiring service or replacement shall be easily removable and independent of the *Electric Propulsion drive* ~~engine and transmission removal. An engine oil pressure gauge and~~ *If applicable for Electric Propulsion,* A coolant temperature gauge shall be provided in the electric drive 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.

TS 15. Hydraulic Systems

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

Provide a service port on the steering gear for testing hydraulic pressure and flow.

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

ALTERNATIVE----------*APPROVED*

Hydraulic System Sensors

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

TS 15.1 Fluid Lines

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

Add split plastic conduit over all flexible hoses that carry fluids and air located in the electric drive compartment, a/c compartment and under the bus. ***Flexible hoses that are adequately clamped to ensure that there is no chaffing and when hoses are routed close to the heat source adequate protection is provided is Approved without split plastic conduit.***

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

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

TS 15.2 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 electric drive compartment, resistant to road salts near the road surface, and so on).

*Oetiker and Breeze clamps have been **APPROVED**.*

*Ideal constant torque clamps have been **APPROVED***

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

~~TS 15.3 Charge Air Piping~~

TS 16. 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, ~~including biodiesel~~. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360 deg seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

TS 17. Oil and Hydraulic Lines

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

Add split plastic conduit over all flexible hoses that carry fluids and air located in the electric drive compartment, a/c compartment and under the bus. ***Flexible hoses that are adequately clamped to ensure that there is no chaffing and when hoses are routed close to the heat source adequate protection is provided is Approved without split plastic conduit.***

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

~~TS 18. Fuel~~

~~TS 19. Emissions and Exhaust~~

STRUCTURE

TS 20. General

TS 20.1 Design

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

TS 21. Altoona Testing

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

DEFAULT----------*APPROVED*

If available, The Altoona Test Report shall be provided to the Agency with the Proposal submittal. If not available, then the report shall be provided prior to first acceptance of bus.

TS 21.1 Structural Validation

DEFAULT----------*APPROVED*

Baseline Structural Analysis

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

TS 22. Distortion

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

TS 23. Resonance and Vibration

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

TS 23.1 Electric drive compartment Bulkheads

The passenger and ~~engine~~ *Electric Propulsion* compartment shall be separated by fire-resistant bulkheads. ~~The electric drive compartment shall include areas where the engine and exhaust system are housed.~~ This

bulkhead shall preclude or retard propagation of ~~an electric drive compartment~~ fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90A, dated October 20, 1993. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-resistant. Any passageways for the climate control system air shall be separated from the ~~engine~~ *Electric Propulsion* compartment by fire- resistant material. Piping through the bulkhead shall have fire-resistant fittings sealed at the bulkhead. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. ~~Engine~~ Access panels in the bulkhead shall be fabricated of fire-resistant material and secured with fire-resistant fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead.

TS 23.2 Crashworthiness (Transit Coach)

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

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

Exterior panels below 35 in. from ground level shall withstand a static load of 2000 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.

TS 24. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing materials for a period of 12 years or 500,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with 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.

ALTERNATIVE----------*APPROVED*

Corrosion Resistance Requirements

All exposed surfaces and the interior surfaces of tubing and other enclosed members *below and above the lower window line* shall be corrosion resistant through application of a corrosion protection system.

The following is the procedure that shall be followed when using non-inherently corrosion resistant material for

the main structure:

Surface Preparation:
After the bus frame has been welded together, it must be prepped before applying corrosion protection. This involves several processes to adequately protect the structure from premature corrosion.

1. *All bus frame members must be thoroughly washed with a mild detergent using a high pressure wand wash at 140°F (60°C). This process will remove mill oils, machine shop oils and weld antispatter compounds from the surface to be treated.*
2. *All steel members to be thoroughly blown dry.*
3. *Using at least 50 grit, grit blast all surfaces to bare metal. Grit blast surfaces to an SSPC-SP6 profile of 1.0 to 2.5 mils. Wheel abrade any spots missed during grit blasting which still have rust, mill scale or weld spatter present. (SSPC-SP6/NACE No. 3 "Commercial Blast Cleaning" is a standard available from SSPC: The Society for Protective Coatings.)*
   This will provide the bonding surface required for adequate primer adhesion for corrosion protection.

Primer Application:
1. *Apply primer to all exterior metal parts forming the structure.*
2. *Prepare a low VOC, two part Urethane, organic Zinc Rich Primer (such as PPG S2809 catalyst and S28080 zinc powder, or approved equal) by following the manufacturer's instructions.*
   Apply primer using appropriate spraying equipment. Wet film thickness should be 8.0 to 10.0 mils. This will result in a dry film of 5.0 to 6.0 mils. Film thickness is important to ensure adhesion and corrosion protection.
   Ensure all surfaces are properly coated and allow a minimum of 4 hours curing time.

Frame Tubing Internal Coating:
Use an internal structural tube coating (such as PPG CoraTube, or approved equal).
1. *Insert spray nozzle into tube through 1/2" hole previously drilled and spray sufficient compound to fully coat the internal vertical and horizontal faces of the tubing.*
2. *Remove spray nozzle and install sealing plugs in each hole.*

Undercoating Application
Apply to all the under chassis areas exposed to road spray.
NOTE: Do not apply undercoat to the following components: axles, bellows, suspension beams, radius rods, steering box, leveling valves, brake valves, safety valves, drain cocks, and the air dryer.
1. *Mix undercoating compound (such as PPG Corashield™ 7972, or approved equal) and thin to required consistency.*
2. *Ensure ambient temperature is between 50 and 90°F (10 and 32°C) and humidity is under 80%. Substrate temperature cannot exceed 212°F (100°C).*
3. *Spray repair areas with a wet film thickness of 11 to 14 mils while maintaining a spray distance of 12 to 15" (30 to 38 cm).*
4. *If undercoating will not adhere properly, wash area with appropriate solvent and allow drying for 5 to 10 minutes. Repeat spraying process and allow undercoating to set for a minimum of 10 minutes.*
   Allow adequate air flow to ensure even drying. Material should be dry to touch in 30 minutes, dry hard in 24 hours and fully cured in 72 hours.

The proposer shall submit documentation on proposal due date that explains how they met all corrosion requirements listed above.

Corashield 7947 applied to the structural exterior and underbody, And Cora Tube applied to the inside structural tubing from the window-line down is Approved

TS 25. Towing

Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 deg of the longitudinal axis of the bus. If applicable, the rear towing device(s)

shall not provide a toehold for unauthorized riders. The method of attaching the towing device shall not require the removal, or disconnection, of front suspension or steering components. Removal of the bike rack is permitted for attachment of towing devices.

DEFAULT----------*APPROVED*

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.

*A shop air connector, Foster 10-3 and tethered dust cap have been **APPROVED.***

DEFAULT----------*APPROVED*

No Provision of Glad-Hand Type Connectors for Towing

No glad-hand type connector shall be provided.

DEFAULT----------*APPROVED*

Lifted (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 Agency. Any tow bar or adapter exceeding 50 lbs should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with a 1 in. throat.

TS 26. Jacking

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

without permanent deformation or damage.

DEFAULT----------*APPROVED*

Yellow Pads

Jacking pads shall be painted safety yellow.

TS 27. Hoisting

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

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

TS 28. Floor

TS 28.1 Design (Transit Coach)

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

DEFAULT----------*APPROVED*

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 28.2 Design (Commuter Coach)~~

~~TS 28.3 Design (Articulated Transit Coach)~~

TS 28.4 Strength

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

The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an

elastic deflection of no more than 0.60 in. from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. The floor, with coverings applied, shall withstand a static load of at least 150 lbs applied through the flat end of a ½ in. diameter rod, with 1/32 in. radius, without permanent visible deformation.

TS 28.5 Construction

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

DEFAULT

Pressure-Preserved Plywood Panel

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

The following floor Construction is APPROVED:

Greenwood Forest, NTǎ ACQ Bus Panel ¾ in. -7-PLY Veneer plywood Floor that is undercoated with Corashield for superior protection against the elements.. Pressure treated plywood shall be supplied in the wheelchair ramp cavity also. The forward five (5) feet of the upper level floor has been designed with a light weight durable molded "Fiberglass honey comb core with polyester resin" composite which incorporates a stylized step up to the upper level on the 40 ft. bus. Green Forest, NTǎ ACQ Bus panel does not require sealing of cut edges as it is developed to assure full penetration and retention of ACQ, the environmentally-friendly preservative that prevents decay and insect damage.

ALTERNATIVE----------*APPROVED*

Composite flooring.

~~TS 28.6 Construction (Commuter Coach)~~

TS 29. Platforms

TS 29.1 Driver's Area

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

DEFAULT----------*APPROVED*

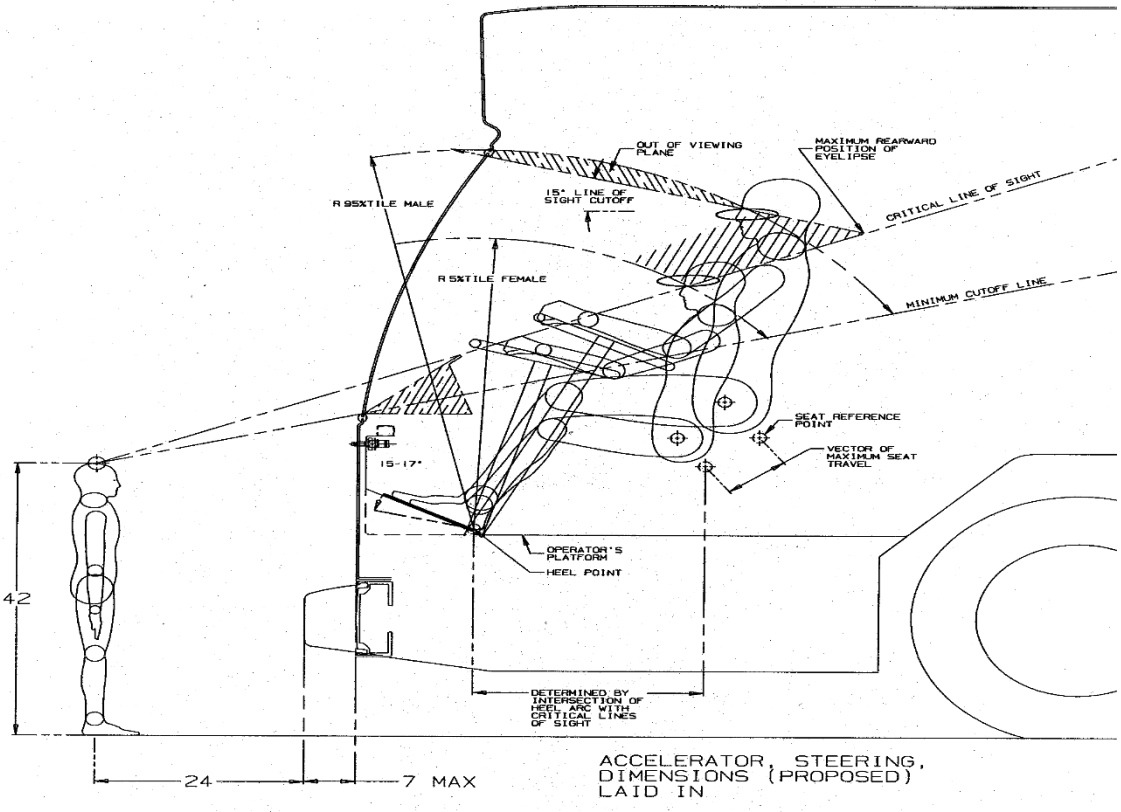
No specific trim.

TS 29.2 Driver's Platform

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

FIGURE 2

Determining Platform Height



TS 29.3 Farebox

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

DEFAULT----------*APPROVED*

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

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

The farebox base is approximately 13 in. by 13 in. The farebox platform is not to be usable as a step for the bus operator. A No-Step farebox platform provides additional maneuverability space for mobility devices.

TS 29.4 Rear Step Area to Rear Area (Transit Coach)

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

TS 30. Wheel Housing

TS 30.1 Design and Construction

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

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

TS 30.2 Design and Construction (Transit Coach)

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

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

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

A black wheelhouse cover is APPROVED

Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than 4 in. higher than the wheel well housing. ***Horizontal assist on wheel housings measuring 6.7" from the housing service is Approved.***

Provide front wheel housings with square tops.

Luggage rack tops that are rectangular and measure 30" x 19.5" are APPROVED.

DEFAULT----------*APPROVED*

No provision shall be made to chain *regular transit* buses.

ALTERNATIVE

The wheel housing shall be designed to have the ability to chain buses.

~~**TS 30.3 Articulated Joint (Articulated Transit Coach)**~~

~~**TS 30.4 Raceway (Articulated Transit Coach)**~~

~~**TS 30.5 Bellows**~~

CHASSIS

TS 31. Suspension

TS 31.1 General Requirements

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

TS 31.2 Alignment

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

TS 31.3 Springs and Shock Absorbers

TS 31.3.1 Suspension Travel

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

TS 31.3.2 Damping

Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location 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. *Provide hydraulic shock absorbers that can be manually adjusted for stiffness.*

"Koni" shock absorbers have been ***APPROVED***

TS 31.3.3 Lubrication

DEFAULT----------*APPROVED*

Standard Grease Fittings

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 31.3.4 Kneeling

DEFAULT----------*APPROVED*

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. ***A kneeling rate of 2" per second is Approved.*** 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 0.2 g, and the jerk shall not exceed 0.3 g/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.

The "raise" function (only) shall be operable while the bus is in motion, and shall be controlled by a momentary contact switch. This will enable the operator to raise the front above normal ride height when negotiating dips, gutters, etc. The bus shall automatically return to normal height quickly after the switch is released.

Provide a minimum of two (2) air ride springs on the front axle and a minimum of four (4) air ride springs on the rear axles for a firm suspension and anti-roll features. 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 outside edge of the rear air springs measuring 11" inboard from the outer skin of the bus sidewalls or more specifically, 7.9" inboard from the closest edge of the side structure is APPROVED.

All bolts/nuts used to mount suspension components shall be coated with anti-seize on the threads.

TS 32. Wheels and Tires

TS 32.1 Wheels

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

ALTERNATIVE----------*APPROVED*

Two-sided polished aluminum rims *with cryogenic hardened surfaces and flanges to prevent premature wear.*

Provide a total of eleven (11) wheels per bus. Mount 1 wheel for the spare tire. The other (4) spare wheels are for the Agency to mount snow tires on for winter use. ***(Spare wheels to be included in the bus price)***

Provide 6 plastic wheel separators per bus for installation by the Agency between all wheels and hubs.

Provide double seal, Flow-Through Valve Stem Caps that do not stick so air will not slowly exhaust from the tire.

Provide Valve Stems that are the right length for use with long double seal flow-through stem caps.

Provide lug nut covers with a chrome appearance for all lug nuts on the bus.

Alcoa Dura Bright and Dura Flange wheels have been ***APPROVED****.*
Myers V2B Flow through Valve Stem Caps (21534) for all mounted wheels have been ***APPROVED.***
Dill (VS-554-D) Valve Stems for all mounted wheels have been ***APPROVED****.*
Alcoa #000185 Lug Nut Covers have been ***APPROVED.***

DEFAULT----------*APPROVED*

Standard non-locking lug nut.

TS 32.2 Tires

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

~~Sufficient space shall be provided to allow the Agency to carry a spare tire, if required.~~

DEFAULT----------*APPROVED*

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

TS 33. Steering

DEFAULT----------*APPROVED*

Hydraulically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. ~~Engine-driven~~ hydraulic pump shall be provided for power steering. *Provide a pressure fitting off of the steering gear to test hydraulic pressure.*

ALTERNATIVE----------*APPROVED*

Electrically assisted steering shall be provided to reduce steering effort. – ***The Agency requests this be a part of the base bus price.***

*The TRW Electric Steering Assist has been **APPROVED.***

TS 33.1 Steering Axle (Transit Coach)

ALTERNATIVE----------*APPROVED*

Oiled-Type Front Bearings

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.

Front M.A.N axles with "Unitized", non-serviceable, maintenance free wheel bearings - APPROVED.

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 33.2 Steering and Tag Axles (Commuter Coach)~~

TS 33.3 Steering Wheel

TS 33.3.1 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the *drive system in an operational state* ~~engine at normal idling speed~~ on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure.

Under these conditions, the torque required to turn the steering wheel 10 deg shall be no less than 5 ft-lbs and no more than 10 ft-lbs. Steering torque may increase to 70 ft-lbs when the wheels are approaching the steering stops, as the relief valve activates.

Power steering failure shall not result in loss of steering control. With the bus in operation, the steering effort

shall not exceed 55 lbs at the steering wheel rim, and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Caster angle shall be selected to provide a tendency for the return of the front wheels to the straight position with minimal assistance from the driver.

TS 33.3.2 Steering Wheel, General

The steering wheel diameter shall be approximately ~~18 to 20~~ ***16*** in.; the rim diameter shall be ⅞ to 1¼ in. and shaped for firm grip with comfort for long periods of time.

Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in line with or behind the instrument cluster.

The VIP 16 inch, Soft Touch, 2 Spoke Steering Wheel has been ***APPROVED***.

A 16" steering wheel standard with the Electric Assist Steering Column offered as standard in conjunction with base bus price to include electric assist steering.

TS 33.3.3 Steering Column Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 40 deg from the vertical and easily adjustable by the driver and shall be accessible by a 5th percentile female and 95th percentile male.

TS 33.3.4 Steering Wheel Telescopic Adjustment

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

TABLE 4

Steering Wheel Height[1] Relative to Angle of Slope

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

1. Measured from bottom portion closest to driver.

TS 34. Drive Axle

The bus shall be driven by a heavy-duty axle with a load rating sufficient for the bus loaded to GVWR. The drive axle shall have a design life to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type. If a planetary gear design is employed, the oil level in the planetary gears shall be easily checked through the plug or sight gauge. The axle and driveshaft components shall be rated for both propulsion and retardation modes with respect to duty cycle.

NOTE: The retardation 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.

The axle ratio of the drive axle is to be optimum for the electric propulsion drive system. Any change in ratio needed to meet the agency's local operating conditions shall be included in the base bus price.

TS 34.1 Non-Drive Axle

The non-drive axle is the drive axle without the drive gear with a load rating sufficient for the load to GVWR.

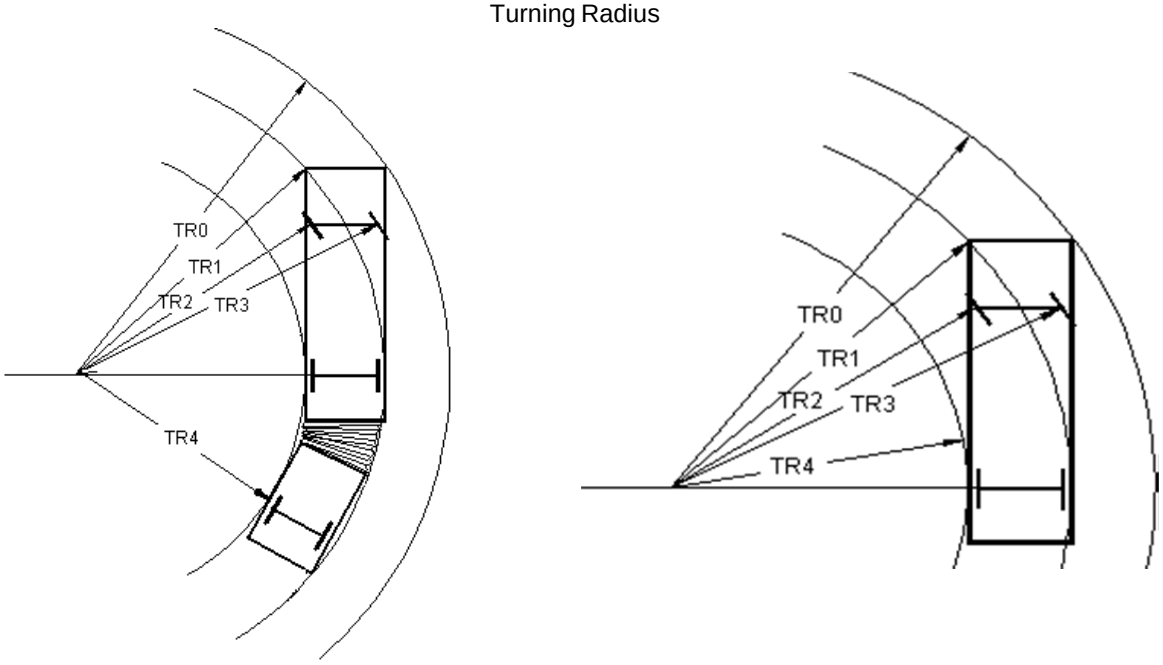
~~TS 35. Tag Axles (Commuter Coach)~~

TS 36. Turning Radius

TABLE 5
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see Figure 3)	Agency Requirement
30 ft	31 ft (TR0)	*31'*
35 ft	39 ft (TR0)	*39'*
40 ft	44 ft (TR0)	*44'*
45 ft	49 ft (TR0)	*49'*
60 ft	44.5 ft (outside front axle, TR0) 17 ft (inside rearmost axle, TR4)	*44.5'* *17'*

FIGURE 3
Turning Radius



TS 37. Brakes

TS 37.1 Service Brake

DEFAULT----------*APPROVED*

Brakes shall be self-adjusting. Brake wear indicators (visible brake sensors) shall be provided on exposed push rods.

ALTERNATIVE----------*APPROVED*

Visible stroke indicators may be combined with electronic brake monitoring system and vehicle brake warning system to notify driver and maintenance of unsafe brake conditions.

Vehicles provided under this RFP are to include Electronic Brake Monitoring (specifically brake stroke) as part of the vehicle air disc braking on-board diagnostic system. The Electronic Brake Monitoring System (EBMS) shall include both parking brake and service brake electronic monitoring utilizing a computer module with appropriate software, brake application pressure sensing via pressure transducer(s), associated cabling communicating the required electronic signals, and optical as well as mechanical sensing at the brake actuator / air disc caliper. The EBMS system shall be designed to detect over-stroke, non-functioning, brake drag and low pad-to-rotor clearance conditions at each vehicle wheel end. ***The Agency requests this be a part of the base bus price.***

Any wheel-end brake fault condition detected by the EBMS shall be communicated via SAE brake fault codes over the vehicle J-1939 network in real-time. These predefined fault codes shall provide instant warnings to operations and maintenance of critical brake system problems which may affect the safe operation of vehicle.

The system shall specifically employ embedded optical and mechanical sensing at each wheel end which

monitors operational conditions for air brake delivery and release, (as well as mechanical conditions inside the caliper that effect lining and pad clearance), and the proper mechanical functionality of air disc calipers at each wheel end position
The on-board EBMS shall be designed to augment safety and aid maintenance in determining when to perform necessary unscheduled maintenance to mitigate vehicle performance and safety concerns. The EBMS shall additionally provide a log of stored fault codes for later retrieval by maintenance personnel to additionally be utilized by maintenance personnel for vehicle troubleshooting. The system shall also provide additional capability for conducting electronic pre-trip and/or post trip inspection on air disc brake vehicles.

The E-stroke Brake Monitoring System has been APPROVED.

TS 37.2 Actuation

DEFAULT----------*APPROVED*
Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 75 lbs at a point 7 in. above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU for the ABS system shall be protected, yet in an accessible location to allow for ease of service. The total braking effort shall be distributed among all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. Manufacturer shall demonstrate compliance by providing a copy of a thermodynamic brake balance test upon request. *The Agency requires a copy of the complete test.*

ALTERNATIVE----------*APPROVED*
Microprocessor controlled automatic traction control (ATC) shall be provided *on all buses.* ***The Agency requests this be a part of the base bus price.***

Provide a momentary type Mud and Snow switch on the dash. This switch is to be used temporarily by the bus operator when the ATC is activated to the point the electric drive system has derated to the point of removing almost all power to the drive wheels. The Mud and Snow switch temporarily over-rides the ATC and allows for maximum throttle if necessary, regardless of wheel slip.

TS 37.3 Friction Material

The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or a chamfer indicating the thickness at which replacement becomes necessary shall be provided on each brake lining. The complete brake lining wear indicator shall be clearly visible from the hoist or pit without removing backing plates.

ALTERNATIVE----------*APPROVED*
Remote brake wear indicator shall be provided. ***The Agency requests this be a part of the base bus price.***

TS 37.4 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.

ALTERNATIVE----------*APPROVED*

Disc Brakes on All Axles *Disc Brakes should be considered the Default with the base bus price.*

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

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

~~TS 37.5 Hubs and Drums (Commuter Coach)~~

TS 37.6 Parking/Emergency Brake

DEFAULT----------*APPROVED*

Air Brakes

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121.

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 38. Interlocks (Transit Coach)

TS 38.1 Passenger Door Interlocks

To prevent opening mid and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the mid/rear doors from being enabled or opened unless the bus speed is less than 2 mph.

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus when the driver's door control is moved to a mid/rear door enable or open position, or a mid or rear door panel is opened more than 3 in. from the fully closed position (as measured at the leading edge of the door panel).The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a 6 percent grade, with the ~~engine at idle~~ and the transmission in gear, until the interlocks are released. These interlock functions shall be active whenever the vehicle master run switch is in any run position.

All door systems employing brake and accelerator interlocks shall be supplied with supporting failure mode

effects analysis (FEMA) documentation, which demonstrates that failure modes are of a failsafe type, thereby never allowing the possibility of release of interlock while an interlocked door is in an unsecured condition, unless the door master switch has been actuated to intentionally release the interlocks.

DEFAULT----------*APPROVED*

Non-adjustable brake interlock regulator.

DEFAULT----------*APPROVED*

No requirements for accelerator and brake interlocks whenever front doors are open.

TS 39. Pneumatic System

TS 39.1 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 electric drive compartment and near the front bumper area for towing *and for filling the air tanks of the bus*. 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.

If retaining caps on tow fittings cannot be not provided. – The Agency will work with the vendor to determine the best solution after award in pre-production stage.
*A Foster #10-3 with a tethered dust cap has been **APPROVED**.*

TS 39.2 Air Compressor

DEFAULT----------*APPROVED*

~~The engine-driven~~ air compressor shall be sized to charge the air system from 40 psi to the governor cut-off pressure in less than 4 minutes ~~while not exceeding the fast idle speed setting of the engine.~~

TS 39.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 °F. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. Nylon tubing shall be installed in accordance with the following color-coding standards:

DEFAULT----------*APPROVED*

- **Green:** Indicates primary brakes and supply.
- **Red:** Indicates secondary brakes.
- **Brown:** Indicates parking brake.
- **Yellow:** Indicates compressor governor signal.
- **Black:** Indicates accessories.
- ***An additional air line- Blue for suspension -*** *APPROVED*

Line supports shall prevent movement, flexing, tension, strain and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines shall be supported at no more than 5 ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

The compressor discharge line between powerplant and body-mounted equipment shall be flexible convoluted ~~copper or~~ stainless steel line, or may be ***a #16*** flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at ~~2 ft~~ *30 in*. 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. *All flexible air lines (except air compressor discharge air line to the air dryer) are to be covered with split plastic conduit.* ***Flexible hoses that are adequately clamped to ensure that there is no chaffing and when hoses are routed close to the heat source adequate protection is provided is Approved without split plastic conduit.***

TS 39.4 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. *If ¼ turn valves are used anywhere on the bus, provide valves with a minimum pressure rating of 150 psi.*

TS 39.5 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~~ *two* replaceable *spin-off* desiccant cartridges, *two electrically heated drains, two oil separator filters and is capable of handling up to a 100% air compressor duty cycle with a maximum of 30.7 cfm.*

A SKF Dual Turbo-2000 Air Dryer with double oil and water filtration, heated, has been ***APPROVED****.*

The Bendix AD-IP Tandem has been Approved.

DEFAULT----------*APPROVED*

No requirements for additional oil separator provision.

ALTERNATIVE----------*APPROVED*

The air system shall be equipped with an air dryer located before the no. 1 air tank and as far from the compressor as possible to allow air to cool prior to entering the air dryer.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

TS 40. Overview

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

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

The data communication system consists of the bi-directional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both 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 ~~(engine, transmission and hybrid units)~~ and anti-lock braking system (ABS),which may include traction control. At a minimum, powertrain components ~~consisting of the engine, transmission, retarder, 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.

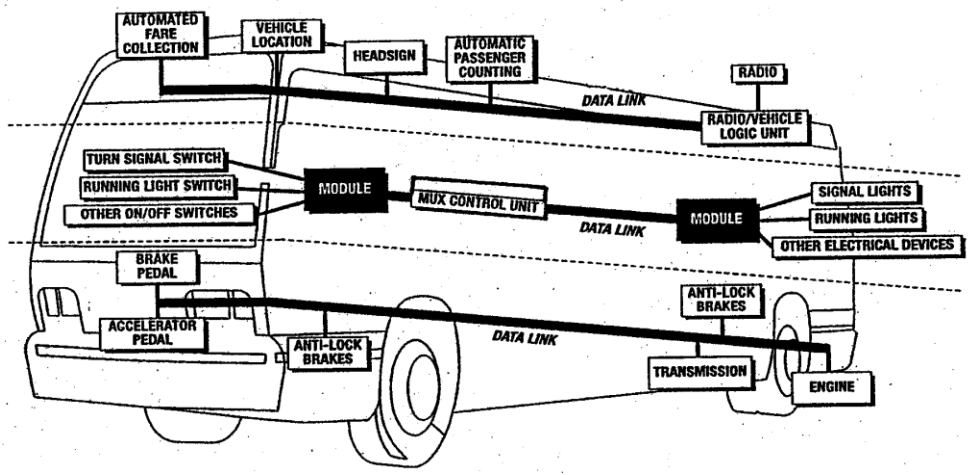
FIGURE 4

Information level

Data Communications Systems Levels

Multiplex level

Drivetrain level



TS 40.1 Modular Design

Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.

~~Powerplant~~ *Drivetrain* wiring shall be an independent wiring harness. Replacement of the electric drive compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

TS 41. Environmental and Mounting Requirements

The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system when operating within the design operating profile. As a recommendation, no vehicle component 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 SAE J1113 and UNECE Council Directive 95/54 (R10).

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

TS 41.1 Hardware Mounting

The mounting of the hardware shall not be used to provide the sole source ground, and all hardware shall be isolated from potential EMI/RFI, as referenced in SAE J1113.

All electrical/electronic hardware mounted in the interior of the vehicle shall be inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

All electrical/electronic hardware mounted on the exterior of the vehicle that is not designed to be installed in an exposed environment shall be mounted in a sealed enclosure.

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

TS 42. General Electrical Requirements

TS 42.1 Batteries

TS 42.1.1 Low-Voltage Batteries (24 V)

DEFAULT----------*APPROVED*

Same Size Terminal Ends

Positive and negative terminal ends shall be the same size.

NOTE: Agency to specify post size if different sized terminal ends are utilized.

ALTERNATIVE----------APPROVED *(If applicable for Electric Propulsion,)*

Four Group 31 AGM Batteries

Four Group 31 Series deep-cycling sealed non spillable maintenance free absorbed glass mat (AGM) batteries shall be provided. Each battery shall have a minimum of 1000 cold cranking amps (CCA) at 0 °F. The batteries shall be d*esigned and installed to withstand the operating environment. Each battery shall have a purchase date no more* than one year from the date of release for shipment to the Agency.

Additional specifications for AGM Batteries

- *Requires a built in handle*
- *Reserve Capacity: 200 minutes minimum at a 25 amp discharge at 0° F.*
- *Must meet or exceed SAE J2185, minimum cycle rating for "Commercial Starting is 200 cycles" and "Deep cycle is 300 cycles". Bidders must provide proof that batteries meet or exceed this requirement with their offer.*
- *Positive and negative plate construction: Pure lead or pure lead/tin.*
- *Battery terminals: Top mounted 3/8 inch coarse thread, stainless steel terminals with lead or brass pads, aligned on the longitudinal centerline of the battery.*
- *Warranty: 4 year full replacement warranty.*
- *Must be available for delivery locally.*

An Odyssey AGM Battery 31-PC2150S-H has been ***APPROVED****.*

TS 42.1.2 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.

ALTERNATIVE----------*APPROVED*

Color code each voltage.

A jumper power cable in the fuse box which links the disconnect switch to the main 24V busbar. A power cable feeds the starter from the main 24V busbar is APPROVED.

TS 42.1.3 Jump Start *(If applicable for Electric Propulsion)*

Base bus price to include front and rear jump connectors .

ALTERNATIVE----------*APPROVED*

Jump-Start Connector

A jump-start connector, red for 24 V ~~and blue for 12 V~~, shall be provided in the electric drive compartment, equipped with dust cap and adequately protected from moisture, dirt and debris. *Provide access to the connector by opening the large rear electric drive access door*

*The Whitaker #15121 jump-start connector with dust cap has been **APPROVED**.*

ALTERNATIVE----------*A second 24 V Jump-Start connector is APPROVED*

Jump-Start Connector

A jump-start connector shall be located next to the battery disconnect switch *if the disconnect switch is located at the front of the bus.*

*The Whitaker #15121 jump-start connector with dust cap has been **APPROVED**.*
The Whitaker jumpstart 15126 is APPROVED provided the connection matches the 15121 to allow for backwards compatibility.

TS 42.1.4 Battery Compartment

The battery compartment shall prevent accumulation of snow, ice and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. The battery compartment temperature should not exceed manufacturers specification.

The vehicle shall be equipped with a 12 V DC and 24 V DC quick disconnect switch(es). The battery compartment door shall conveniently accommodate operation of the 12 V DC and 24 V DC quick disconnect switch(es).

A disconnect switch located on the fuse box with access through a flip open door positioned on the curbside electric drive compartment door when the fuse box is located directly rearward of the battery tray is APPROVED

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

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

This access door shall not require any special locking devices to gain access to the switch, and it shall be accessible without removing or lifting the panel. The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

The batteries shall be securely mounted on a stainless steel or equivalent tray that can accommodate the size and weight of the batteries. The battery tray, if applicable, shall pull out easily and properly

support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced. *One or more* ~~A~~ locking device(s) shall retain the battery tray to the stowed position *to prevent the battery tray from rattling and bouncing around.*

A polyethylene battery tray supported by a stainless steel sub-frame, with an enclosure that is also polyethylene, and batteries supported by structural stainless steel U-channels, sized to provide the correct support for 4 GP 31 batteries is APPROVED.

The location of the batteries or the design of the battery box, must keep the majority of the road spray off the batteries. The batteries shall not be located in the hot electric drive compartment unless the batteries have their own enclosure that protects them from the high electric drive compartment heat. This box must slide or rotate out easily and be corrosion proof. A battery box with ¼ inch or larger stainless steel ball rollers is acceptable.

If not located in the electric drive compartment, the same fire-resistant properties must apply to the battery compartment. No sparking devices should be located within the battery box.

TS 42.1.5 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 42.1.6 Master Battery Switch

The location of the *heavy duty* master battery *knife* switch shall be clearly identified on the exterior access panel, be accessible *with-out locks* 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.

A rotary style disconnect switch supplied by Kissling is APPROVED.

Turning the master switch off with the ~~powerplant operating~~ *bus in an operational state*, during an emergency, shall ~~shut off the engine and shall~~ not damage any component of the electrical system. The master switch shall be capable of carrying and interrupting the total circuit load.

DEFAULT----------*APPROVED*

Single Switch

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

TS 42.1.7 Low-Voltage Generation and Distribution

The low-voltage generating system shall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with a total low-voltage generator load exceeding 70 percent of the low-voltage generator nameplate rating.

Voltage monitoring and over-voltage output protection (recommended at 32 V) 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 42.1.8 Circuit Protection

All branch circuits, except ~~battery-to-starting motor and battery-to-generator/alternator circuits~~ *except where applicable for Electric Propulsion*,, 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 42.2 Grounds

The battery shall be grounded to the vehicle chassis/frame at one location only, as close to the batteries as possible. When using a chassis ground system, the chassis shall be grounded to the frame in multiple locations, evenly distributed throughout the vehicle to eliminate ground loops. No more than five ground ring/spade terminal connections shall be made per ground stud with spacing between studs ensuring contactivity and serviceability. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded through the chassis *but to the battery ground cable.*

TS 42.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292. Double insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall be met by 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 datalinks and communication cables. Wiring harness length shall allow end terminals to be replaced twice without pulling, stretching or replacing the wire. Terminals shall be crimped to the wiring according to the connector manufacturer's recommendations for techniques and tools. All cable connectors shall be locking type, keyed and sealed, unless enclosed in watertight cabinets or vehicle interior. Pins shall be removable, crimp contact type, of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall use either different inserts or different insert orientations to prevent incorrect connections.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, only stranded wire shall be used. Insulation clearance shall ensure that wires have a minimum of "visible clearance" and a maximum of two times the conductor diameter or 1/16 in., whichever is less. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands that can penetrate the insulation of the inner wires.

Ultra-sonic and T-splices may be used with 8 AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

- It shall include a mechanical clamp in addition to solder on the splice.
- The wire shall support no mechanical load in the area of the splice.
- The wire shall be supported to prevent flexing.
- *If harnesses with T-splices are located so they will be in contact with liquid corrosive magnesium and sodium chloride salts, the T-splices will need to be examined by the Agency for being weather-proof on a case by case basis.*

  T-splices made from pre-molded weather sealed T-connectors may be approved by the Agency.

A "T" or a "Y" connection using Packard Electric, WeatherPack connectors has been ***APPROVED.***

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 electric drive 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 42.4 Electrical Components

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

equivalent environment.

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

TS 42.5 Electrical Compartments

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

A side console decal is shipped loose is APPROVED

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 electric drive compartment and shall
be protected from the environment.

TS 42.6 Electrical Corrosion Prevention Requirements

1. *The Agency is extremely concerned about corrosion. During the winter months, the Agency's buses are covered with sodium chloride, calcium chloride, liquid magnesium chloride, and sand soaked in salt and moisture. Even though the exteriors are washed frequently, these elements cover the bus and work their way into the bus body and wiring connections. Many of the electrical specifications as written in this section have been developed over the 34 years this writer has purchased buses and for the total of 39 years being in bus maintenance. These performance specifications help combat the destructive corrosion caused by the chlorides and moisture.*
2. *Only non-insulated, tin/lead covered, brazed seam, copper electrical terminals will be used on the wiring underneath the bus, in the battery compartment, electric drive compartment, and HVAC compartment. All terminals and adjoining wires shall be covered with heat shrink tubing that has an inner meltable sealer. The heat shrink will act as insulation, a strain relief and will seal against the wire insulation. The heat shrink needs to be heated enough to have the melted sealer seep out from underneath the heat shrink tubing. Attach heat shrink before spraying the wires and terminals with corrosion preventer.*
3. *All positive and negative connections from 8 gauge and larger, that are located on the exterior of the bus, including but not limited to, underneath the bus, in the HVAC compartment, battery compartment, and in the electric drive compartment, shall be made against clean terminals and clean grounds. Before making the electrical connection, grind off any paint and undercoating to expose bare metal. BEFORE making a connection, spray the corrosion preventer on and around the clean metal, bolt, nut, washers and terminal. Use under the bolt heads and lock nuts, hardened flat washers (grade "C"). Split lock washers, star lock washers, or stainless steel washers, WILL NOT be allowed between the terminals and/or grounds. The Agency will decide if there are exceptions to this rule.*
4. *AFTER the connection is made, the Contractor shall spray the corrosion preventer on the connection again.*
5. *The battery cable terminals are to have heat shrink with a meltable sealer. Do not use the preformed, rubber covered terminal/cable assemblies that trap and hide corrosion.*
6. *Electrical terminals that end inside the bus or inside exterior weather proof junction boxes where moisture does not penetrate, ARE NOT to be sprayed with corrosion preventer. The corrosion preventer is very messy. These terminals may be of the standard insulated type.*
7. *All 10 gauge and smaller wires that are on the exterior of the bus and are connected as a "T" or "Y"or in-line with another wire, shall be connected together by weather proof connectors.*

8. *Wires terminating in junction boxes (located anywhere on the bus), in the dash, shall terminate preferably at a stud/nut or screw. Tight spade type connectors may be used on a limited number of components, when there is no other choice, such as horns, that require a spade terminal. Any spade terminals on components which are located in areas where moisture can be present, must be sprayed from both sides of the insulated terminal with corrosion preventer. Be sure to cover the bare exposed copper wire with the corrosion preventer.*
9. *Cover the battery cable with split loom or provide battery cable conduit from the battery box to the starter motor.*
10. ***Corrosion Preventer Specifications**:*
This material shall be: 1) a liquid that can be sprayed on terminals, bare copper wires, etc.; 2) the sprayed liquid shall have the ability to wick its way up stranded copper wires wrapped in an insulated vinyl jacket to provide a corrosion inhibited liquid barrier against air and corrosive liquids. This barrier prevents copper wires that are covered with vinyl insulation from corroding; 3) the liquid shall not dry out or become hard over time which could eventually act as an insulator if the terminal is removed and reattached; 4) the preventive corrosion spray shall be a bright red color for quick identification that the corrosion preventer has been applied; 5) the preventive corrosion spray shall be such a powerful deterrent that when tested, corrosive sodium chloride salts will not create a salt bridge over the corrosion inhibitor and will not wick its way up conductors covered with insulation when tested in a 206 ^{0}F heated salt/water vapor bath.
11. *Send proposed corrosion preventer sprays with product information and any test results when requesting an Approved Equal. The proposed sprays will be tested by the Agency to see if they meet the preceding performance specifications.*

*The best available corrosion preventive spray that has been **APPROVED** is Battery Corrosion Preventive Spray, NOCO, NCP-2. This red spray is available in many auto part and battery stores as Part #A-202. This product is made by the NOCO Company in Cleveland, Ohio.*

Not providing loom on the battery cables if located within a contained assembly is APPROVED.

TS 42.7 Other General Electrical Requirements (equalizer, min. alternator amps, clean air, nylon ties square cut smooth)

1. *Provide heavy-duty bus-bars, terminal strips, or stud-terminal blocks. This means they do not crack, break, become loose, fall apart, and do not need constant preventive maintenance to check or tighten the studs or nuts. All electrical panels are to be located in clean, dry, weatherproof compartments, especially those electrical panels located in the electric drive compartment.*
2. *Provide a minimum 80-amp (12-volt) capable, 12/24 volt battery Equalizer.*
3. *If the alternator is belt driven, the belt must be entirely enclosed within a shroud that is hinged to the bus and locked with several 5/16" inch square lock(s).*
4. *Provide a minimum, 450 amp alternator.*
5. *If the alternator is air cooled, the air shall be clean as compared to the dirty electric drive compartment air or air from around the rear of the drive tires. The clean air for the alternator can come from one of two sources:*
   a. *The air can be drawn from a cleaner air source near where an air intake would be for a traditional bus. Preferred method.*
   b. *The air can be pre-cleaned by using a centrifuge type cleaner in the electric drive compartment.*
6. *Provide a separate 12-volt "cigarette" style power connector that can be used to power diagnostic laptops etc., somewhere near the interior main J1939 connector.*
7. ~~*For ease of starting, especially in cold weather, when starting the engine from the front or the rear of bus, all un-necessary loads shall be eliminated by the use of the bus multiplex system.*~~
8. *Whenever nylon ties are used anywhere on the bus, they shall be square cut-off with a blunt cut-off*

plier or tool. The nylon ties shall not have sharp or pointed edges.

TS 43. General Electronic Requirements

If an electronic component has an internal real-time clock, it shall provide its own battery backup to monitor time when battery power is disconnected, and/or it may be updated by a network component. If an electronic component has an hour meter, it shall record accumulated service time without relying on battery backup.

All electronic component suppliers shall ensure that their equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage (over 32 V DC on a 24 V DC nominal voltage rating with a maximum of 50 V 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 43.1 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 43.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled, stamped or color-coded in a fashion that allows unique identification at a spacing not exceeding 4 in. Wiring for each I/O device shall be bundled together. If the I/O terminals are the same voltages, then jumpers may be used to connect the common nodes of each I/O terminal.

TS 43.1.2 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However, certain standards or special requirements, such as cs 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 43.1.3 Communications

The data network cabling shall be selected and installed according to the selected protocol requirements. The physical layer of all network communication systems shall not be used for any purpose other than communication between the system components, unless provided for in the network specifications. Communications networks that use powerline carriers (e.g., data modulated on a 24 V powerline) shall meet the most stringent applicable wiring and terminal specifications.

TS 43.1.4 Radio Frequency (RF)

RF components, such as radios, video devices, cameras, global positioning systems (GPS), etc., shall use coaxial cable to carry the signal. All RF systems require special design consideration for losses along the cable. Connectors shall be minimized, since each connector and crimp has a loss that will attribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. If this cannot be done, then a conduit of sufficient size shall be provided for ease of attachment of antenna and cable assembly. The corresponding component vendors shall be consulted for proper application of equipment, including installation of cables.

TS 43.1.5 Audio

Cabling used for microphone level and line level signals shall be 22 AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be 18 AWG minimum.

TS 44. Multiplexing

TS 44.1 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.

DEFAULT----------*APPROVED*

Ten percent of the total number of inputs and outputs, or at least one each for each voltage type utilized (0 V, 12 V, 24 V) at each module location shall be designated as spares.

TS 44.2 System Configuration

Multiplexing may either be distributed or centralized. A distributed system shall process information on multiple control modules within the network. A centralized system shall process the information on a single control module. Either system shall consist of several modules connected to form a control network.

TS 44.2.1 I/O Signals

The input/output for the multiplex system may contain four types of electrical signals: discrete, modulating, 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 (0–12 V, 10–24 V, etc.) or current signal (4–20 mA). Both types of analog signals shall represent the status of variable devices such as rheostats, potentiometers, temperature probes, etc. Serial data signals shall reflect ASCII or alphanumeric data used in the communication between other on-board components.

TS 45. Data Communications

TS 45.1 General

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

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

- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

Any electronic vehicle components used on a network shall be conformance tested to the corresponding network standard.

TS 45.2 Drivetrain Level

Drivetrain components, consisting of ~~the engine~~, transmission, ~~retarder~~, anti-lock braking system and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols. At a minimum, drivetrain components consisting of the ~~engine~~, transmission, ~~retarder~~ ASR, and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the "on" position. *Provide a gateway (J1939) and a 12 volt power plug (cigarette lighter type) inside the bus and close together for diagnostic laptop connections. Location TBD.*

TS 45.2.1 Diagnostics, Fault Detection and Data Access

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

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

TS 45.2.2 Programmability (Software)

The drivetrain level components shall be programmable by the Agency with limitations as specified by the subsystem Supplier.

TS 45.3 Multiplex Level

TS 45.3.1 Data Access

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

Providing diagnostic connectors in four areas on the bus which are; the electric drive compartment switch box, under the left hand side of the dash, behind the driver on the SDS enclosure and in the SDS box. The diagnostic connectors available at each location:

Electric drive compartment Switch Box:
-9 pin diagnostic connector for Powertrain J1939
Under the Left Hand Side of the Dash:
-USB port for the Vansco Multiplexing System
Behind the driver on the SDS Enclosure:
-9 pin diagnostic connector for powertrain J1939 and chassis J1939
Inside the SDS enclosure:
-9 pin diagnostic connector for the agency installed Smart Drive camera system

TS 45.3.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of 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.

DEFAULT----------*APPROVED*
No requirement for mock-up board.

TS 45.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all of the following procedures:

- Password protection
- Limited distribution of the configuration software
- Limited access to the programming tools required to change the software
- Hardware protection that prevents undesired changes to the software

Provisions for programming the multiplex system shall be possible through a PC or laptop. The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. Revision control shall be provided by all of the following:

- Hardware component identification where labels are included on all multiplex hardware to identify components
- Hardware series identification where all multiplex hardware displays the current hardware serial

number and firmware revision employed by the module
- Software revision identification where all copies of the software in service display the most recent revision number
- A method of determining which version of the software is currently in use in the multiplex system

DEFAULT----------*APPROVED*

Revision control labels shall be electronic.

TS 45.4 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 onboard the buses, AC or DC power lines and RFI/EMI emissions from other vehicles.

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION

TS 46. Driver's Area Controls

TS 46.1 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 46.2 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. *Both front wheel housings are to be dark matte gray to reduce glare on the windshield.* The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.

Providing Black wheelhousings to reduce the glare on the windshield is APPROVED.

Providing a Vansco DPS70 dash display is Approved.

TS 46.3 Visors/Sun Shades

DEFAULT----------*APPROVED*

Front and Side Sun Shade/Visor

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. *To minimize light leakage, apply a dark shaded band similar in size and color to the windshield shaded band, to the glass between the visor and windshield/window 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.

Provide manual pull-down/push-up style (solid) visors at driver's side window and street-side windshield.

Provide a curb-side windshield visor if it does not block the curb-side exterior mirrors. This visor shall pull down approximately 10 inches (TBD) and shall be mounted as close as possible to the windshield.

Automotion Sun Shades have been ***APPROVED.***

The agency approves the disuse of a sunshade that blocks the mirror, but will work with vendor for a possible solution for a sunshade for the operator on the curbside.

Driver's Window Sunscreens

An adjustable roller type sunscreen shall be provided over the driver's windshield and/or the driver's side window. The sunscreen shall be capable of being lowered to the midpoint of the driver's window. When deployed, the screen shall be secure, stable, and shall not rattle, sway or intrude into the driver's field of view due to the motion of the coach or as a result of air movement. Once lowered, the screen shall remain in the lowered position until returned to the stowed position by the driver. Sunscreen shall be shaped to minimize light leakage between the visor and windshield pillars to the extent possible.

TS 46.4 Driver's Controls

Frequently used controls must be in easily accessible locations. These include the door control, kneel control, windshield wiper/washer controls, ramp, and lift and run switch. Any switches and controls necessary for the safe operation of the bus shall be conveniently located and shall provide for ease of operation. They shall be identifiable by shape, touch and permanent markings. Controls also shall be located so that passengers may not easily tamper with control settings.

All panel-mounted switches and controls shall be marked with easily read identifiers. Graphic symbols shall conform to SAE Recommended Practice J2402, "Road Vehicles – Symbols For Controls, Indicators, and Tell Tales," where available and applicable. Color of switches and controls shall be dark with contrasting typography or symbols.

Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from a convenient location. Switches, controls and instruments shall be dust- and water-resistant.

DEFAULT----------*APPROVED*

All switches/controls in the driver's controls area shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for items like food, drinks, cell phones, etc.

ALTERNATIVE----------*APPROVED*

The transmission shift selector shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for electronic devices such as cell phones, music players, navigation systems, etc.

TS 46.5 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 *by using a dimmer switch.* All indicators *and dash lighting* shall be illuminated using *fiber optics for* backlighting.

The side console and any other controls the operator may use from his/her seat must be illuminated at night. The agency prefers fiber optic backlighting if available but will accept LED light.

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. **Table 6** represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

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

A dash mounted MFD multifunction display shall be provided with a minimum screen size of 7" measured diagonally. The display shall have a brightness adjustment and incorporate all electronic gauges, all warning light indicators and rear view or any installed door camera images. The electronic gauges shall include but not be limited to: Large Font Speedometer, 24 volt gauge, Coolant Temp (1 for each coolant loop),12 volt gauge.

A shift selector position will TBD in pre-production.

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Final instrument panel layout to be approved by the Agency pre-production. Location TBD.

Device	Description	Location	Function	Visual/ Audible
Master run switch	Rotary, four-position detent	Side console	Master control for bus, off, day run, night run and clearance ID lights	
~~Engine start, front~~	~~Approved momentary switch~~	~~Side console~~	~~Activates engine starter motor~~	
~~Engine start, rear~~	~~Approved momentary switch~~	~~Electric drive compartment~~	~~Activates engine starter motor~~	
~~Engine~~ run, rear	Three-position toggle switch	Electric drive compartment	Permits ~~running engine~~ *activating propulsion system* from rear start, normal front run position and off	Amber light
Drive selector	Touch panel switch	~~Side console~~ ***TBD***	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, ~~cool, heat, low fan, high fan~~ or full auto ~~with on/off only~~	
Driver's ventilation	Rotary, three-position detent	Side console or dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Rotary, three-position detent	Side console or dash left wing	Permits defroster: fan off, low, medium or high	
Defroster temperature	Variable position	Side console or dash left wing	Adjusts defroster water flow and temperature	
Windshield wiper	One-variable rotary position operating both wipers	Dash left wing	Variable speed control of left and right windshield wipers	
Windshield washer	Push button	Dash left wing	Activates windshield washers	
Dash panel lights	Rotary rheostat or stepping switch	Side console or dash left wing	Provides adjustment for light intensity in night run position	

Interior *Dome* light *switch*	Three-position switch	Side console *or front dash*	*Reduces interior light reflection from the windshield at night.* Selects mode of passenger compartment lighting: ~~off, on, normal~~ *All, Off, Normal*	*"All" = all Dome lights "on" when doors are open or closed.* *"Off" = all Dome lights "off".* *"Normal" = only street-side Dome lights "on" when all doors are closed.* *When either door is opened, all Dome lights are "on".*
Dimmer Switch for all Dome lights or knob	*Two position switch or knob*	*Next to the "Interior Dome Light" three-position switch.*	*Select mode: "Bright", "Dim"*	*"Bright" = All Dome lights are 100% "bright".* *"Dim" = All Dome lights dimmed to 60% bright when both front and rear doors are closed. When one or both doors are open, dome lights are 100% bright.*
~~Fast idle~~	~~Two-position switch~~	~~Side console~~	~~Selects high idle speed of engine~~	
~~WC ramp/ kneel enable~~	~~Two-position switch[1]~~	~~Side console or dash right wing~~	~~Permits operation of ramp and kneel operations at each door remote panel~~	~~Amber light~~
~~Front door ramp/kneel enable~~	~~Two-position keyed switch[1]~~	~~Front door remote or dash right wing~~	~~Permits ramp and kneel activation from front door area, key required[1]~~	~~Amber light~~
Front door ramp	~~Three-position momentary switch~~ *Buttons on door control handle*	~~Right side of steering wheel~~ *door control handle*	Permits deploy and stow of front ramp	Red light/*other*
Front kneel	~~Three-position momentary switch~~ *Buttons on door control handle*	~~Front door remote~~ *door control handle*	Permits kneeling activation and raise and normal ~~at front door remote location~~	Amber or red dash indicator; exterior alarm *(only when raising or lowering)* and amber *flashing* light
~~Rear door ramp/kneel enable~~	~~Two-position keyed switch[1]~~	~~Rear door remote~~	~~Permits ramp and kneel activation from rear door area; key required[1]~~	~~Red light~~
~~Rear door ramp~~	~~Three-position momentary switch~~	~~Rear door remote~~	~~Permits deploy and stow of rear ramp~~	

~~Rear kneel~~	~~Three-position momentary switch~~	~~Rear door remote~~	~~Permits kneeling activation and raise and normal at rear door remote location~~	
Silent alarm	~~Recessed push button, NO and NC contacts momentary~~ *Heel switch*	~~Side console~~ *On floor in front of Operator's seat*	Activates emergency radio alarm at dispatch ~~and permits covert microphone and/or enables destination sign emergency message~~	*Harness and switch provided by the Agency and installed by the Contractor*
~~Video system event switch~~	~~on/off momentary switch with plastic guard~~	~~Side console~~	~~Triggers event equipment, triggers event light on dash~~	~~Amber light~~
Left remote *Flat & Convex* mirrors	*Single control*-Four-position toggle type	Side console	*Individually* Permits two-axis adjustment of *both flat and convex* left exterior mirrors	
Right remote *Flat & Convex* mirrors	*Single control*-Four-position toggle type	Side console	*Individually* Permits two-axis adjustment of *both flat and convex* right exterior mirrors	
Mirror heater	*Momentary 15 minute* Switch/button ~~or temperature~~	Side console	Permits heating of *ALL* outside mirrors when required	*Lighted button with "Push on" decal near heated mirror decal*
Passenger door control	*A Vapor control handle with built in kneel and ramp controls with fiberoptic backlighting(or similar)* ~~Five-position handle type detent or two momentary push buttons~~	Side console, forward	Permits open/close control of front and rear passenger doors	Red light
~~Rear door override~~	~~Two-position switch in approved location~~	~~Side console, forward~~	~~Allows driver to override activation of rear door passenger tape switches~~	
~~Engine~~ Propulsion system shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto ~~engine~~ Propulsion system shutdown	

Hazard flashers	Two-position, *long handle steel* switch	Side console ~~or dash right wing~~	Activates emergency flashers. *Not audible with parking brake activated. Medium audible clicking when "in gear" and parking brake released.*	Two green lights
Fire suppression ***Fire suppression manual actuator and fire suppression control module***	Red push button with protective cover	Dash left wing or dash center ***Above the driver on the saw tooth panel***	Permits driver to override and manually discharge fire suppression system	Red light
~~Mobile data terminal~~	~~Mobile data terminal coach operator interface panel~~	~~Above *To the right of the* right dash wing~~	~~Facilitates driver interaction with communication system and master log-on~~	~~LCD display with visual status and text messages~~
~~Farebox interface~~	~~Farebox coach operator interface panel~~	~~Near farebox~~	~~Facilitates driver interaction with farebox system~~	~~LCD display~~
Destination sign interface	Destination sign interface panel	In approved location	Facilitates driver interaction with destination sign system, manual entry	LCD display
Turn signals	Momentary push button (two required) raised from other switches	Left foot *on 30% raised* panel	Activates left and right turn signals	Two green lights and optional *low* audible *clicking* indicator
PA manual	*Vendor provided,* Momentary push button	In approved location *on floor next to steering column*	Permits driver to manually activate public address microphone	
~~Low-profile microphone~~ *Microphone-less*	~~Low-profile discrete mounting~~ *Microphone provided as part of the PA amplifer*	~~Steering column~~ *In approve d location*	Permits driver to make announcements with both hands on the wheel and focusing on road conditions	
High beam	Detented push button *located above and between the two turn signal switches*	~~In approved location~~ *Left foot on 30% raised panel*	Permits driver to toggle between low and high beam	Blue light

Parking brake	Pneumatic PPV*(must have metal knob)*	Side console or dash left wing	Permits driver to apply and release parking brake	Red light
Park brake release ***Park brake release valve***	Pneumatic PPV	Vertical side of the side console or dash center. ***Horizontal surface of the side console***	Permits driver to push and hold to release brakes	
Hill holder	~~Two-position momentary switch~~	~~Side console~~	~~Applies brakes~~ to prevent bus from rolling *All hill holding/anti roll back devices shall be automatic and seamless to the operator.*	
~~Remote engine speed~~	~~Rotary rheostat~~ *~~3 position momentary toggle switch (Increase-off-Decrease)~~*	~~Electric drive compartment~~	~~Permits technician to raise and lower engine RPM from electric drive compartment in 250 rpm increments~~	
Master door/ interlock	Multi-pole toggle, detented	Out of operator's reach *in approved location*	Permits driver override to disable door and brake/throttle interlock	Red light
Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated	Red light
~~Retarder~~ *Regen braking* disable	Multi-pole switch detented *2 position with red guard*	Within reach of operator or approved location	Permits driver override to disable brake retardation/regeneration (*only if allowable for electric propulsion system)*	Red light
~~Alarm acknowledge~~	~~Push button momentary~~	~~Approved location~~	~~Permits driver to acknowledge alarm condition~~	
~~Rear door passenger sensor disable~~	~~Multi-pole toggle, detented~~	~~In sign compartment or driver's barrier compartment~~	~~Permits driver to override rear door passenger sensing system~~	
Indicator/ alarm test button	Momentary switch or programming[1]	Dash center panel	Permits driver to activate test of sentry, indicators and audible alarms	All visuals and audibles

~~Auxiliary power~~	~~110 V power receptacle~~	~~Approved location~~	~~Property to specify what function to supply~~	
Speedometer	Speedometer, odometer, and diagnostic capability, 5- mile increments	Dash center panel/MFD	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Air pressure gauge	Primary and secondary, 5 psi increments	Dash center panel	Visual indication of primary and secondary air systems	Red light and buzzer
Fire detection	Coach operator display	Property specific or dash center	Indication of fire detection activation by zone/location	Buzzer and red light
Door obstruction	Sensing of door	Dash center	Indication of rear door sensitive edge activation	Red light and buzzer
Door ajar	Door not properly closed	Property specific or dash center	Indication of rear door not properly closed	Buzzer or alarm and red light
Low system air pressure	Sensing low primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
~~Methane detection function~~	~~Detection of system integrity~~	~~Property specific or dash center~~	~~Detects system failure~~	~~No start condition, amber light~~
~~Methane detection~~	~~Indication of 20% LED emergency light (LEL)~~	~~Property specific or dash center~~	~~Detects levels of methane~~	~~Flashing red at 20% LEL~~
~~Methane detection~~	~~Indication of 50% LEL~~	~~Property specific or dash center~~	~~Detects levels of methane~~	~~Solid red at 50% LEL~~
~~Engine~~ coolant indicator	Low coolant indicator may be supplied as audible alert and visual and/or text	Within driver's sight	Detects low coolant condition	Amber light
Hot ~~engine~~ *Drivetrain* indicator	Coolant temperature indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects hot ~~engine~~ *drivetrain* condition and initiates time delay shutdown	Red light
~~Low engine oil pressure indicator~~	~~Engine oil pressure indicator may be supplied as audible alert and visual and/or text message~~	~~Within driver's sight~~	~~Detects low engine oil pressure condition and initiates time-delayed shutdown~~	~~Red light~~
ABS indicator	Detects system status	Dash center	Displays system failure	Amber light
HVAC indicator	Detects system status	Dash center	Displays system failure	Amber or red light
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no charge condition and optionally detects battery high, low, imbalance, no charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition

~~Bike rack deployed indicator~~	~~Detects bike rack position~~	~~Dash center~~	~~Indication of bike rack not being in fully stowed position~~	~~Amber or red light~~
~~Fuel tank~~ *SOC* level	Analog gauge, ~~graduated based on fuel type~~	Dash center	Indication of *SOC* ~~fuel tank level/pressure~~	
~~DEF gauge~~	~~Level Indicator~~	~~Center dash~~	~~Displays level of DEF tank and indicates with warning light when low~~	~~Red light~~ ***~~Amber light~~***
Active regeneration	Detects status	Dash center	Indication of electric regeneration	Amber or red light
~~Turntable~~	~~Detects status~~	~~Dash center~~	~~Warning indication for hinge locking~~	~~Audible and amber warning and red light if locked~~
~~Turntable~~	~~Interlock momentary switch~~	~~Side console~~	~~Momentarily release interlock brakes due to overangled condition~~	
Mud and Snow Switch	*Push On/Push Off switch*	*Front dash or side console*	*Temporary overrides ~~engine idle~~ ATC derate*	*Blinking ATC Tell-Tale light*
Switch	*On/Off toggle switch*	*Side console*	*Turns off the "Stop Request" chime*	
Switch	*Volume switch*	*Side console*	*Controls the volume of the "Stop Request" chime*	
Connect System			*Remote diagnostics. Reduces road calls.*	
No Adjustable Chime		*Mounted behind driver on forward side of the SDS enclosure*	*Outputs 83DBA when measured at a distance of 18"*	

~~1. Indicate area by drawing. Break up switch control from indicator lights.~~

TABLE 6 (ALTERNATIVE (*APPROVED*), Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/Audible
Control switches for 3 extra Fans (6 in. dia.) (in approved location)	*2 or 3 switches, 3 position (Off, High, Low)*	*In approved location*	*extra Fans (6 in. dia.) (in approved location) to assist windshield defroster*	

Additonal "Stop Requested" Indicator Light	*LED indicator*	*Front Dash--to be HIGHLY visible to the driver*	*Additional, highly visible "Stop Requested" tell-tale light*	*Large Amber LED, independently dimmable*
Dimmer knob for additional "stop Requested" LED Indicator	*Dimmer Knob*	*Front Dash next to the additional LED Indicator*	*Controls the brightness of the additional "Stop Requested" tell-tale light during bright sun light or night time.*	*Independent of regular dimmer dash knob*

TS 46.6 Driver Foot Controls

Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material.

TS 46.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 deg at the point of initiation of contact and extend downward to an angle of 10 to 18 deg at full throttle.

The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield and vertical H-point.

TS 46.6.2 Pedal Dimensions and Position

The floor-mounted accelerator pedal shall be 10 to 12 in. long and 3 to 4 in. wide. Clearance around the pedal must allow for no interference precluding operation.

The accelerator and brake pedals shall be positioned such that the spacing between them, measured at the heel of the pedals, is between 1 and 2 in. Both pedals should be located approximately on the same plane coincident to the surface of the pedals.

TS 46.7 Brake and Accelerator Pedals

ALTERNATIVE----------*APPROVED*

Adjustable Brake and Accelerator Pedals *The Agency requests this be a part of the base bus price.*

Both pedals shall be adjustable forward and rearward a minimum of 3 in. The adjustment shall be made by use of a dash-mounted toggle or rocker switch. The switch shall be clearly labeled to identify it as pedal adjustment and shall be within easy reach of the driver. Pedal adjustment shall be enabled only when the bus is stationary and the parking brake engaged.

*The Konsberg Pedals have been **APPROVED**.*

TS 46.8 Driver Foot Switches

Floor-Mounted Foot Control Platform

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

DEFAULT----------*APPROVED*

Foot Switch Control

The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid-resistant. All other signals, including high beam and public address system, shall be in approved locations.

The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The foot switches for the directionals shall be momentary type, while those for ~~the PA system and~~ the high beam shall be latching type. The spacing of the switches *(minimum 5" between Turn Signal Switches)* shall be such that inadvertent simultaneous deflection of switches is prevented.

ALTERNATIVE----------*APPROVED*

Other Floor-Mounted Controls

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

- Hazard *mounted on operator's* ***side panel***.
- Silent Alarm *harness ~~and heel operated switch~~ shall be provided by the Agency, installed by the Contractor on the floor in front of the operator's seat.*
- PA System *Clam-Shell Switch shall be a vendor supplied momentary switch, mounted to the floor next*
- *to the rear left-side of the steering column. Exact location TBD.*
- *High Beam Switch to be mounted between and slightly above the two Turn Signal Switches.*

An inclined stainless steel mounting surface, but not skid resistant is Approved.

TS 47. Driver's Amenities

TS 47.1 Coat Hanger

ALTERNATIVE----------*APPROVED*

Coat Hook

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

TS 47.2 Drink Holder

ALTERNATIVE----------*APPROVED*

Drink Holder

A device shall be provided to securely hold the driver's drink container, which may vary widely in diameter. It must be mounted within easy reach of the driver and must have sufficient vertical clearance for easy

removal of the container. When the container is in the device, the driver's view of the road must not be obstructed, and leakage from the container must not fall on any switches, gauges or controls. *Requires approval by the Agency.*

TS 47.3 Storage Box

DEFAULT----------*APPROVED*

Storage Box

An enclosed driver storage area shall be provided with a positive latching door ~~and/or lock~~. The minimum size is 2750 in.^{3}

A Storage box above the seated driver: 12"H x 13-19"L x 9W (~1728 in.3) along with a Storage box behind the seated driver: 12"H x 19"L x 7"W (~1596 in.3) is approved with the condition that both storage boxes are installed.

TS 47.4 Garbage Cans and Mount

Provide two (2) plastic, beige colored, 8 quart, garbage cans and one (1) stainless steel garbage can mount. Location TBD.

*A Rubbermaid #2952 plastic garbage can has been **APPROVED.***

TS 48. Windshield Wipers and Washers

TS 48.1 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

DEFAULT----------*APPROVED*

Single-control, electric two-speed intermittent wiper.

ALTERNATIVE----------*APPROVED*

Intermittent Wiper with Variable Control

A variable-speed feature shall be provided to allow adjustment of wiper speed for each side of the windshield between approximately five (5) and twenty-five (25) cycles per minute.

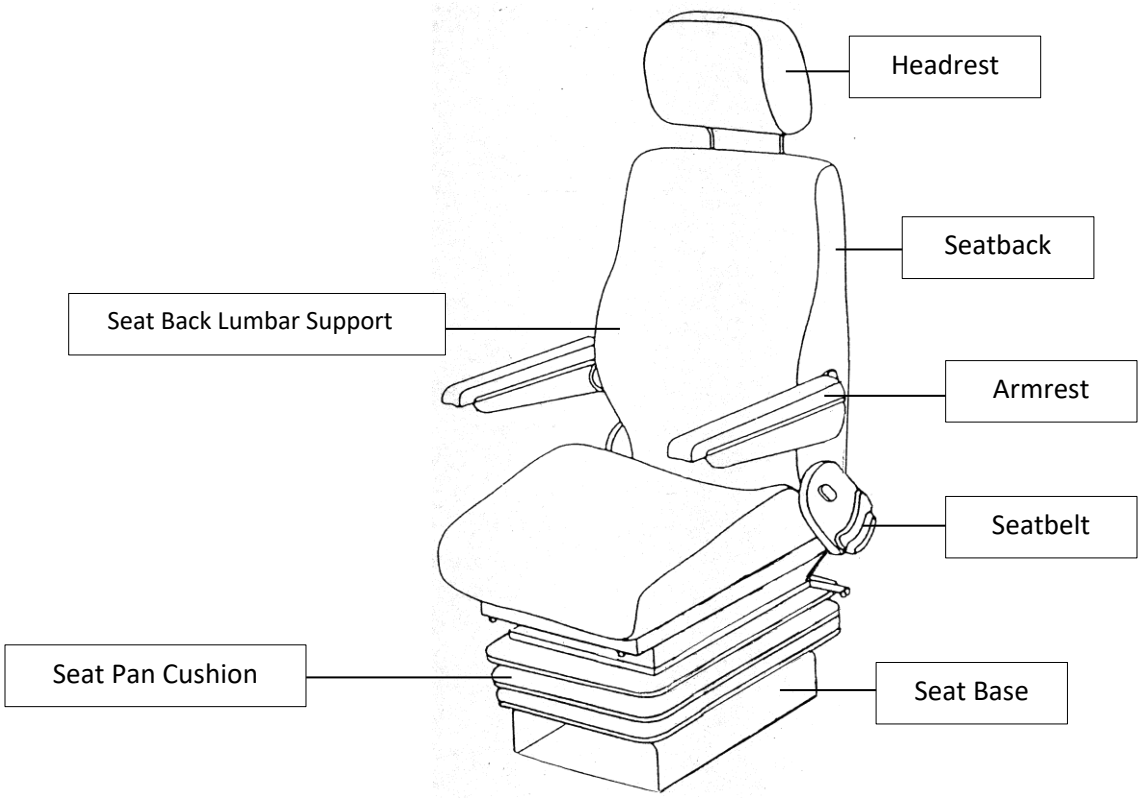
TS 48.2 Windshield Washers

The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area.

The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling from outside the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant and must include a means to determine fluid level.

TS 49. Driver's Seat

FIGURE 5
Driver's Seat



TS 49.1 Dimensions

The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

TS 49.1.1 Seat Pan Cushion Length

Measurement shall be from the front edge of the seat pan to the rear at its intersection with the seat back. The adjustment of the seat pan length shall be no less than 16.5 in.at its minimum length and no more than 20.5 in.at its maximum length.

SP 12.1.1 Seat Pan Cushion Height

DEFAULT----------*APPROVED*

Dimensions

Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14 in., with a minimum 6 in. vertical range of adjustment.

TS 49.1.2 Seat Pan Cushion Slope

Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 deg). The seat pan shall adjust in its slope from no less than plus 12 deg (rearward "bucket seat" incline) to no less than minus 5 deg (forward slope).

TS 49.1.3 Seat Base Fore/Aft Adjustment

Measurement is the horizontal distance from the heel point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15 in.). On all low-floor buses, the seat base shall travel horizontally a minimum of ~~9~~ ***11*** 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 49.1.4 Seat Pan Cushion Width

Measurement is the horizontal distance across the seat cushion. The seat pan cushion shall be 17 to 21 in. across at the front edge of the seat cushion and 20 to 23 in. across at the side bolsters.

TS 49.1.5 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 49.1.6 Seat Back

Width

Measurement is the distance between the outermost points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 19 in. Seat back will include dual recliner gears

on both sides of the seat.

Height
Standard height seat back.

TS 49.1.7 Headrests

DEFAULT----------*APPROVED*
Adjustable headrest.

TS 49.1.8 Seat Back Lumbar Support

Measurement is from the bottom of the seat back at its intersection with the seat pan to the top of the lumbar cushioning. The seat back shall provide adjustable-depth lumbar back support with three individual operating lumbar cells within a minimum range of 7 to 11 in.

TS 49.1.9 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 deg is the upright position and 90 deg-plus represents the amount of recline.

The seat back shall adjust in angle from a minimum of no more than 90 deg (upright) to at least 105 deg (reclined), with infinite adjustment in between.

TS 49.2 Seat Belt

The belt assembly should be an auto-locking retractor (ALR).All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt.

The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

DEFAULT----------*APPROVED*
Lap seat belt only. *Mount the lap seat belt Retractor on the street-side of the operator's seat.*

DEFAULT----------*APPROVED*
Seatbelt webbing shall be black in color.

ALTERNATIVE----------*APPROVED*
All seatbelt assemblies shall come equipped with a warning switch device *(buzzer and light)* to remind operators to buckle up.

Lap Belt Length

ALTERNATIVE----------*APPROVED*
72 in. with Extension

The lap belt assembly shall be 72 in. in length with an 8 in. extension

TS 49.3 Adjustable Armrest

ALTERNATIVE----------*APPROVED*

One armrest, right side.

TS 49.4 Seat Control Locations

While seated, the driver shall be able to make seat adjustments by hand without complexity, excessive effort or being pinched. Adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes.

TS 49.5 Seat Structure and Materials

Cushion

Cushions shall be fully padded with at least 3 in. of materials in the seating areas at the bottom and back.

See TS 49.7 Seat Options for Approvals

Cushion Materials

DEFAULT----------*APPROVED*

Open-cell polyurethane (FMVSS 302***). Polyurethane with Liquicell upgrade is approved.***

TS 49.6 Pedestal

DEFAULT----------*APPROVED*

Powder-coated steel. ~~Stainless steel~~

TS 49.7 Seat Options

Choose among the following:

- heated seat
- seat alarm
- fabric options----------***APPROVED,*** *Transit grade black vinyl*
- seat air vent
- side bolsters adjustments----------***APPROVED*** *with Transit grade black vinyl Bolsters*
- silicone seat cushion
- *LiquiCell*----------***APPROVED***
- *Adjustable Thigh Cushion*----------***APPROVED***

The Ergo Metro AM80 has been ***APPROVED****.*

TS 49.8 Mirrors

TS 49.8.1 Exterior Mirrors

The bus shall be equipped with corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss

of adjustment with a breakaway mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors should be positioned to prevent blind spots.

Mirrors shall retract or fold sufficiently to allow bus washing operations but avoid contact with windshield.

ALTERNATIVE----------*APPROVED*
Exterior mirrors shall be installed with a breakaway mounting system.

ALTERNATIVE----------*APPROVED*
Spring-loaded mirror heads auto return. ***The Agency request the Auto Return be part of the base bus price.***

Spring back mounted mirrors are APPROVED.

ALTERNATIVE----------*APPROVED*
Combination of flat and convex mirrors referred to as transit-specific.

*Provide a High Mounted exterior **Curb-side,** hanging down, single mirror housing with an upper flat and a lower convex mirror, both heated and remotely adjusted. Use a minimum 10"w **x** 9"h flat mirror and a minimum 10"w **x** 5.5"h convex mirror.*

*Provide a Low Mounted exterior **Street-side,** pointing up, single mirror housing with an upper flat and a lower convex mirror, both heated and remotely adjusted. Use a minimum 10"w **x** 8"h flat mirror and a minimum 10"w **x** 4"h convex mirror.*

*A Hadley mirror housing of 10" **x** 16" inclosing a flat mirror of 10"w **x** 9"h and a convex mirror of 10"w **x** 5.5"h (convex located under the flat mirror)for the **Curb-side** has been **APPROVED**. These large dimensions are critical for removing blind spots and for good rear side vision.*

*A Hadley mirror housing of 10" **x** 13" inclosing a flat mirror of 10"w **x** 8"h and a convex mirror of 10"w **x** 4"h (convex located under the flat mirror) for the **Street-side** has been **APPROVED**. These large dimensions are critical for removing blind spots and for good rear side vision.*

The Hadley 9x13 2/1 Dual Remove and Heated Mirrors are Acceptable but larger mirrors above are preferred. Mirror should include a ball and collet mechanism to allow for tilt up and down adjustment.

TS 49.8.1 Curbside Mirrors

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

The curb-side exterior mirror housing which includes the flat and convex mirrors is to been seen within the windshield or window wiper sweep area by a 95th percentile male sitting comfortably in an adjusted operator's seat.

DEFAULT----------*APPROVED*

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. *Provide a single joy stick switch without a neutral switch position for adjusting both the flat mirror and convex mirror with-in a single housing. Use a molded weatherproof 9 pin connector for connecting the mirror wires to the bus.*

ALTERNATIVE----------*APPROVED*

Heated and Remote Mirrors

The heaters shall be energized whenever the driver's heater and/or defroster is activated or activated independently. One (1) switch on the driver's side dash shall activate the heat for ALL Street-side and Curb-side mirrors.

Activate both curb-side and street-side flat and convex mirror heaters using one momentary dash switch with a 15 minute shutdown timer.

Street-Side Mirrors

ALTERNATIVE----------*APPROVED*

Remote Adjustment of ~~Curbside~~ ***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.

Provide a single joy stick switch without a neutral switch position for adjusting both the flat mirror and convex mirror with-in a single housing. Use a molded weatherproof 9 pin connector for connecting the mirror wires to the bus.

ALTERNATIVE ----------*APPROVED*

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.

See "Alternative---Heated and Remote Mirrors" above.

Provide a rear back-up camera which automatically turns "on" when the bus is backed up. Provide an automatic full screen visual on the dash Multifunctional Display (Minimum 7" screen). This is a non-recorded visual tool for the operator when backing the bus.

*A Safety Vision rear bus camera with a metal guard has been **APPROVED**.*

TS 49.8.2 Interior Mirrors

Mirrors shall be provided for the driver to observe passengers throughout the bus without leaving the seat and without shoulder movement. The driver shall be able to observe passengers in the front/entrance and rear/exit areas (if applicable), anywhere in the aisle, *behind the street-side front wheel housing* and in the rear seats.
Use a minimum 8" x 16" convex rear view mirror mounted below the destination sign to observe the interior of the bus. Provide the ability to adjust this mirror horizontally or vertically.
Provide a 6" flat adjustable mirror attached to the destination sign cabinet, pointed at the seats behind the street-side front wheel housing.

Provide a 6" flat adjustable mirror attached to the destination sign cabinet, pointed at the 12" round mirror located at the rear exit door.

Standard mirror that is 8" x 15" is APPROVED.

Lucerix p/n 271960 which as "ball type" joint for adjustment in all directions is APPROVED.

WINDOWS

TS 50. General

Use with 30ft length: A minimum of 6000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 35ft length: A minimum of 8000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 40ft length: A minimum of 10,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 45ft length: A minimum of 12,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

~~Use with 60ft length: A minimum of 16,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.~~

TS 51. 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 deg, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3½ ft high no more than 2 ft in front of the bus. The horizontal view shall be a minimum of 90 deg above the line of sight .Any binocular obscuration due to a center divider may be ignored when determining the 90 deg requirement, provided that the divider does not exceed a 3 deg angle in the operator's field of view. Windshield pillars shall not exceed 10 deg of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

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

TS 51.1 Glazing

The windshield glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping AS-1 and the recommended practices defined in SAE J673.

DEFAULT----------*APPROVED*

Shaded Band The upper portion of the windshield above the driver's field of view shall have a dark, shaded band and marked AS-3, with a minimum luminous transmittance of 5 percent when tested in accordance to ASTM D- 1003

The shaded band shall extend to the winglets on both sides of the bus, including the entrance door top window and the operator's side window. The shaded band for the side window and upper door window may be a decal that is no darker than the windshield shaded band.

DEFAULT----------*APPROVED*

Two-piece windshield. *Preferred because a rock chip can crack only ½ of the windshield resulting in less windshield replacement expense.*

TS 52. Driver's Side Window

The driver's side window shall be the sliding type, requiring only the rear half of the sash to latch upon closing, and *the front half of the sash* shall open sufficiently to permit the seated operator to easily adjust the street-side outside rearview mirror. *The front half of the sash shall have an inside and outside handle and shall not have a latch to prevent the opening or closing of the window.* 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 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

ALTERNATIVE----------*APPROVED*

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

The design shall prevent sections from freezing closed in the winter. Light transmittance shall be 75 percent on the glass area below 53 in. from the operator platform floor. On the top-fixed-over-bottom-slider configuration, the top fixed area above 53 in. may have a maximum 5 percent light transmittance.

ALTERNATIVE----------*APPROVED*

Hidden Frame (Flush "Euro-Look") Driver's Side Window

Agency to choose from the following options:

- full slider
  - egress
  - non-egress----------***APPROVED***
- top fixed over bottom slider
  - egress
  - non-egress

ALTERNATIVE----------*APPROVED*

Quick Change Operator's Side Window

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

TS 53. Side Windows

TS 53.1 Configuration

Side windows shall not be bonded in place, but shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from ~~engine~~ *drivetrain* operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.

TS 53.2 Emergency Exit (Egress) Configuration

DEFAULT----------*APPROVED*

Minimum Egress

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

DEFAULT----------*APPROVED*

Standard Passenger Side Window Configurations

Agency to choose from the following options:

- traditional frame
  - full fixed
  - openable windows with inward-opening transom panels
  - openable windows with sliding transom panels

- openable windows with a fixed transom panel and sliding lower panels
- openable windows with full-height sliding panels
- hidden frame (flush "Euro-look")
- full fixed
- openable windows with inward-opening transom panels
- *fixed lower panel with inward-opening upper transom panel* ----------***APPROVED***

Quick Change Passenger Side Windows

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

ALTERNATIVE----------*APPROVED*

Hidden Frame (Seamless)

Agency to choose from the following options:

- full fixed
- openable windows with inward-opening transom panels
- *fixed windows with inward-opening transom panels*

The Agency has approved in the base bus price "Fixed lower panel with inward opening upper transom panels" only. It is the only bullet point with APPROVED listed directly next to it in the section listed above.

TS 53.3 Configuration

DEFAULT----------*APPROVED*

Fixed Side Windows

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

ALTERNATIVE----------*APPROVED*

Operable Windows with Inward-Opening Transom Panels (Fixed Bottom, Tip-In Top)

Each operable side window shall incorporate an upper transom portion. The transom shall be between 25 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

Transom panels to be held open or closed with gas springs.

TS 53.4 Materials

DEFAULT----------*APPROVED*

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the recommended practices defined in SAE J673.

DEFAULT----------*APPROVED*

Windows on the bus sides and in the rear door shall be tinted a neutral ***gray*** 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.

DEFAULT (LIGHT) ----------*APPROVED*

55 percent luminous transmittance.

5mm tempered (per spec) glass which comes in 50% LT is APPROVED.

Flush windows manufactured by Arrow Global are APPROVED

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 53.5 Rear Window

DEFAULT----------*APPROVED*

No requirement for rear window.

TS 54 HEATING, VENTILATING AND AIR CONDITIONING

Capacity and Performance the HVAC climate control system shall be capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs.

DEFAULT----------*APPROVED*

HVAC equipped. See below for configuration.

No Requirements for Cooling

All requirements relevant to the HVAC cooling mode contained in this section, as well as throughout this specification, need not apply. All other requirements for heating and ventilation still apply.

DEFAULT----------*APPROVED*

Allow Either Roof- or Rear-Mounted HVAC Unit

The HVAC unit may either be roof or rear-mounted. Note that a rear-mounted unit will preclude a rear

window and that the term “roof-mounted unit” includes units mounted on top of or beneath the roof surface. ***Base bus price to include the recommended configuration for electric proplulsion powertrain. R-134a refrigerant is APPROVED.***

ALTERNATIVE ----------*APPROVED*

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 °F for each degree of exterior temperature in excess of 95 °F.

When the 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 APTA’s *Recommended Practice* “Transit Bus HVAC System Instrumentation and Performance Testing.”

NOTE: 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.

ALTERNATIVE----------*APPROVED*

Hotter Ambient Conditions

The air conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110 to 70 °F ± 3 °F in less than 30 minutes after system engagement for 30, 35 and 40 ft buses. ~~Engine~~ *coolant* temperature shall be within the normal operating range at the time of start-up of the

cool-down test, ~~and the engine speed shall be limited to fast idle at three-quarters max governed speed that 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. No simulated solar load shall be used. There shall be no passengers on board, and the doors and windows shall be closed.

ALTERNATIVE----------*APPROVED*

Colder Ambient Conditions

The pull-up requirements for the heating system shall be in accordance with Section 11.1 of APTA's *Recommended Practice* "Transit Bus HVAC System Instrumentation and Performance Testing." With ambient temperature at -20 °F, and vehicle cold soaked at that temperature, the bus heating system shall warm the interior passenger compartment to an average temperature of 70 °F ±2 °F within 70 minutes.

ALTERNATIVE----------*APPROVED*

R134a

The air conditioning system shall meet these performance requirements using R134a. [Note that selection of this refrigerant may impact pull-down performance.]

TS 54.1 Other HVAC Performance Specifications

If applicable, provide an a/c compressor oil sample port (Shrader Valve) on the compressor for taking oil samples.

The compressor shall have suction and discharge convoluted SSTL refrigerant hoses covered with a stainless steel braid and with welded fittings.

Provide a "reheat" option instead of the "cycling clutch" option.

Provide two (2) electronic pressure gauges in the air-return compartment. ***A Electronic Pressure Display module in place of the Electronic Pressure Gauges is Approved.***

Use copper Type "K" hard copper lines with brazed or silver soldered connections.

A Thermo King HVAC system has been ***APPROVED.***

TS 55. 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.

Hot ~~engine~~ coolant water 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 sealless

having a minimum maintenance-free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

ALTERNATIVE----------*APPROVED*

Fully Automatic Climate Control System

The climate control system shall be fully automatic and control the interior average temperature to within ±2 °F of specified temperature control setpoint.

ALTERNATIVE----------*APPROVED*

Manually Adjustable Temperature Control Set Point

The climate control system shall have the provision to allow the driver to adjust the temperature control setpoint at a minimum of between ~~68~~ ***62*** and ~~72~~ ***78***°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 55.1 Auxiliary Heater

ALTERNATIVE----------*APPROVED*

Auxiliary Heater

An auxiliary heater fired by diesel fuel shall be provided to supplement the heat supplied by the ~~engine~~ ***Electric propulsion system.*** and shall have an output necessary *(minimum of 30,0000 btu)* to meet the performance criteria. The heater shall be equipped with safety devices to prevent overfueling, overheating due to loss of coolant or water pump failure, and operation during conditions of low battery voltage. ~~The auxiliary heater shall have capability of functioning in the supplemental mode and preheat mode.~~ *Provide a toggle switch located to the left of the bus operator, labeled "Auxiliary Heater" and "Enabled/Off". Provide an amber telltale light next to the switch which lights up when the Auxiliary Heater is operating.* The supplemental mode shall automatically cycle the auxiliary heater "on" and "off" according to the coolant temperature. No driver input shall be required when the *bus is in operating mode*. ~~engine is running.~~ The preheat mode shall be enabled through a single-pole double-throw momentary switch *located on the street-side rear corner of the bus, under a weatherproof cap.* With the master run switch in the "off" position, toggling the switch to its momentary upward ("on") position shall enable the auxiliary heater to operate in preheat. Once in preheat, the unit shall continue to operate and cycle until either the preheat switch is toggled to its momentary downward ("off")

position, or the master run switch is turned "on," or the time elapsed exceeds 60 minutes, at which time the preheat mode will automatically be disabled. The supplement mode will always override the preheat mode. The auxiliary heater coolant pump shall shut down when the coolant is up to temperature during the supplemental mode. With the *bus is in operating mode*. ~~engine running~~, there shall be coolant flow through the heater all the time. The temperature sensor shall constantly measure the coolant temperature and cycle "on" if required, at which time the coolant pump turns on. *The Auxiliary Heater shall obtain air for combustion somewhere other than inside the rear propulsion system compartment or from behind the bus tires The proposers shall state where and how the relatively clean combustion air will be obtained and delivered to the Auxiliary Heater.*

Provide a variable BTU type auxiliary heater. The Proheat X30 31k BTU heater is APPROVED

The auxiliary heater shall be equipped with a self-priming fuel pump. The unit shall be electronically controlled with appropriate diagnostics for troubleshooting. Operation, as well as diagnostic data, shall be stored and shall be retrievable through an IBM compatible PC. The auxiliary heater maintenance/diagnostic information shall be communicated through the appropriate protocol, SAE J1708 or J1939.

TS 56. Air Flow

TS 56.1 Passenger Area

The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic ft per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed throughout the bus, with air velocity not exceeding 100 ft per minute on any passenger. The ventilating mode shall provide air at a minimum flow rate of 20 cfm per passenger.

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load) when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.

The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements.

DEFAULT----------*APPROVED*

No "Fresh Air" Requirements

To be used by agencies that have an operating profile where the door opening cycle results in effectively providing an adequate "fresh air" mixture.

TS 56.2 Driver's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE Recommended Practice J382, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.

TS 56.3 Controls for the ***Operator's*** 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 56.4 Driver's Compartment Requirements

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

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

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

TS 56.5 Driver's Cooling

DEFAULT----------*APPROVED*

No dedicated evaporator.

ALTERNATIVE

Separate Dedicated Evaporator

Using a separate, dedicated evaporator, the climate control system shall be designed to maintain the driver's compartment temperatures within the range specified for the passenger compartment. The unit shall operate when the climate control switch is in the "Cool" position. It shall have a separate thermostatic control.

ALTERNATIVE

A separate fan unit shall provide 100 cfm of air to the driver's area through directionally adjustable nozzles and an infinitely variable fan control, both of which shall be located above and ahead of the driver.

ALTERNATIVE----------*APPROVED*

Driver's booster blower.

TS 56.6 Three (3) additional Dash Fans

Provide an additional three (3)black fans (6" in diameter) to be mounted under the destination sign compartment. Provide fans with a heavy duty bolt & hinge swivel as opposed to a light duty ball & socket swivel. The purpose for these fans is to assist the defroster when removing fog and condensation from the windshield, window winglets, operator's side window and front door. The preferred fan mounting locations are the upper left corner of the streetside windshield, the top center between both windshields and the top center of the curbside windshield. Provide 2 or 3 switches on the dash with High/Low/Off for fan control. Location TBD. ***Approval is provided to work with the Agency to find the best solution based on the front windshield/dash design.***

TS 57. Air Filtration

Air shall be filtered before entering the AC system and being discharged into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.1 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

ALTERNATIVE----------*APPROVED*

Other Type Filters

Air filters shall be *made out of cleanable, electrostatic mesh.*

A Polypropylene Electrostatic Mesh cleanable filter has been ***APPROVED****.*

TS 58. Roof Ventilators

Each ventilator shall be easily opened and closed manually. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq in. and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 in., or with all four edges raised simultaneously to a height of no less than 3½ in. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator(s) shall be sealed to prevent entry of water when closed.

Clarification – One roof hatch is required.

DEFAULT----------*APPROVED*

One Roof Ventilator

One ventilator shall be provided in the roof of the bus.
Provide a cable to physically attach the escape hatch lid to the roof of the bus.

ALTERNATIVE----------*APPROVED*
A tool shall be provided to manually open and close the hatch.

TS 59. 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.

DEFAULT----------*APPROVED*
High and low refrigerant pressure electronic gauges to be located in the return air area.

NOTE: The Agency may include the following sections if an alternative for colder ambient performance is specified above.

TS 60. Entrance/Exit Area Heating

ALTERNATIVE----------*APPROVED*
Entrance/Exit Area Heating
Heat *(hot air)* shall be supplied to the entrance and exit areas to maintain a tread surface temperature no less than 35 °F in an ambient of -10 °F to prevent accumulation of snow, ice or slush with the bus operating under design operating profile and corresponding door opening cycle *of the Transit Buses.*

TS 61. Floor-Level Heating

TS 61.1 Transit Coach

ALTERNATIVE----------*APPROVED for Transit Buses*
Floor-Level Heating
Sufficient floor-level heaters shall be provided to evenly supply heated forced air. Control of the floor-level heating shall be through the main heating system electronic control.

~~**TS 61.2 Commuter Coach**~~

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

TS 62. Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus.

Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches and doors shall be able to be sealed. Accumulation of spray and splash generated by the bus's wheels shall be minimized on windows and mirrors.

TS 62.1 Materials

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

DEFAULT----------*APPROVED*

No requirement for protection against graffiti/vandalism for body material surfaces.

TS 62.2 Roof-Mounted Equipment (Transit Coach)

A non-skid, clearly marked walkway or steps shall be incorporated on the roof to provide access to equipment without damaging any system or bus paneling. *Provide an emergency fall protection clip-ring associated with each type of roof mounted equipment (a/c components, CNG tanks, etc.).*

TS 63. 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 64. Repair and Replacement

TS 64.1 Side Body Panels (Transit Coach)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 ft.

ALTERNATIVE----------*APPROVED*

Easily Replaceable Full-Height Side Body Panels

Full-height side body panels between the window and floor shall be easily and quickly replaceable in sections.

~~TS 64.2 Side Body Panels (Commuter Coach)~~

TS 65. 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 66. 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.

ALTERNATIVE----------*APPROVED*

Front Plate or Holder is Required

Location to be provided to OEM.

Provide a recessed rear license plate mount with an LED light.

TS 66.1 Rub rails

DEFAULT----------*APPROVED*

No requirement for rub rails.

The rub rail may be discontinued at doorways, wheel wells and articulated joints if applicable. A damaged portion of the rub rail shall be replaceable without requiring removal or replacement of the entire rub rail.

NOTE: Installation of rub rails may preclude the installation and/or size of exterior advertising signs or racks.

TS 67. Fender Skirts

DEFAULT----------*APPROVED*

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 68. Wheel Covers (Transit Coach)

DEFAULT----------*APPROVED*

Wheel covers not required.

TS 68.1 Splash Aprons

DEFAULT----------*APPROVED*

Standard Splash Aprons

Splash aprons, composed of ¼ in. minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and to protect under floor 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.

ALTERNATIVE (TRANSIT COACH)----------*APPROVED*

Full width rear splash apron.

ALTERNATIVE----------*APPROVED*

Other Locations Required

Splash apron in front of either or both front wheels to reduce splashing on ramp/lift and left mirror.

TS 69. *Exterior* Service Compartments and Access Doors

TS 69.1 Access Doors (Transit Coach)

Conventional or pantograph hinged doors shall be used for the electric drive compartment and for all auxiliary equipment compartments, including doors for checking the quantity and adding to the ~~engine~~ coolant, ~~engine~~ lubricants and transmission fluid. Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems.

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

Depot Charger connection ports: Bus shall include 2 depot charger connection ports preferably at the front and rear to allow two buses to charge on one depot charger at a time parked front to back. If front and back is not available, provide two ports on either side of the bus.

~~TS 69.2 Access Doors (Commuter Coach)~~

TS 69.3 Access Door Latch/Locks

DEFAULT----------*APPROVED*

Requirement for Latches on Access Doors

Access doors larger than 100 sq in. in area shall be equipped with corrosion-resistant flush-mounted latches or locks except for coolant and ~~fuel fill~~ *plug in charger* 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.

The large rear electric drivetrain access door is not required to have locks. Attach a large grab handle to the access door and use non-locking, over-center gas springs to hold the engine access door open or closed.

A handle on the rear electric drivetrain access door that is recessed at the bottom of the door is APPROVED.

ALTERNATIVE----------*APPROVED*

Other Locks and Latches

Agency may define any required locks or latches for access doors.

Use barrel locks for A/C access doors and other sensitive areas. Use tumbler lock(s) and barrel locks on the Electronic/Radio Compartment door. Use a push latch for the operator's storage compartment door.

TS 70. Bumpers

TS 70.1 Location

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 27 in., ±2 in., above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

TS 70.2 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5 mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lbs parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30 deg angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of

the bus. The bumper may increase the overall bus length specified by no more than 7 in. *Do not paint the naturally black bumper.*

A front bumper height of 24 inches (610 mm) at the center line of the bus and a height at the outer edges of 27 inches (686 mm) from the street level at ride height is Approved.

ALTERNATIVE----------*APPROVED*
Mounting provisions for integrated bike rack.

The "through the bumper" Apex3 bike rack front bumper mount from Sportworks has been ***APPROVED****.*

DEFAULT----------*APPROVED*
Standard bumper.

TS 70.2.1 Bike Rack

Install a bike rack on the front bumper that will support ***3 bicycles****. The bike rack tubing cannot be located exactly in front of headlights or turn signals in a raised or lowered position. Therefore, the high beam light center-to-center, is to be a minimum of 70 inches and low beam center-to-center, is to be a minimum of 81 inches.* The bike rack shall be made out of brushed stainless steel. Use no paint.

A Sportworks Apex3 bike rack has been approved.

TS 70.3 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 2 mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 ft wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to 5 mph, over pavement discontinuities up to 1 in. high, and at accelerations up to 2 mph/sec. The rear bumper shall protect the bus when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lbs, at 4 mph parallel to or up to a 30 deg angle to the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than ~~7~~0 in. *Do not paint the naturally black bumper.*

TS 70.4 Bumper Material

Bumper material shall be corrosion-resistant and withstand repeated impacts of the specified loads without sustaining damage. These bumper qualities shall be sustained throughout the service life of the bus.

TS 71. Finish and Color

TS 71.1 Appearance

All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system Supplier prior to application of paint to ensure a proper

bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Paint shall be applied smoothly and evenly with the finished surface free of visible dirt and the following other imperfections:

- blisters or bubbles appearing in the topcoat film
- chips, scratches or gouges of the surface finish
- cracks in the paint film
- craters where paint failed to cover due to surface contamination
- overspray
- peeling
- runs or sags from excessive flow and failure to adhere uniformly to the surface
- chemical stains and water spots
- dry patches due to incorrect mixing of paint activators
- buffing swirls

All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals.

Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum 300 ft-lbs. The bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

DEFAULT----------*APPROVED*

Standard Contractor exterior paint finish quality.

ALTERNATIVE

High Gloss External Paint Finish Quality

Painted surfaces shall have a minimum 95 gloss and an orange peel rating of 7 or more on the Advanced Coating Technologies, Inc., orange peel standard panels set #APR 14941 or Agency accepted wave scan equipment. Paint shall last a minimum of six years with a minimum gloss of 90 as measured in ASTM E97-92, “Standard Test Method For Directional Reflectance.”

DEFAULT

Base coat/clear coat paint system.

ALTERNATIVE----------*APPROVED*
Standard OEM exterior paint system.

ALTERNATIVE
Maintenance-Free Exterior Finish, Color Impregnated Panels or Unpainted Panels
Except for periodic cleaning, exterior surfaces of the bus shall be maintenance free, permanently colored and not require refinish/repaint for the life of the vehicle. In general, the exterior surfaces shall be white. Durable, peel-resistant, pressure-sensitive appliqués shall be used for any striping and coloring required.

NOTE: The Agency should insert approved paints, color scheme and graphics.

The following brand of material has been APPROVED for color, color durability, and material durability.

1. *UTA's Logos*
   3M White Scotchlite = #280-10
   3M Ruby Red Scotchlite = #280-82
   3M Blue Scotchlite = #280-75

2. *The Authority's logo shall be located in the front, both sides, and rear of the bus. A copy of UTA's logo will be sent to the successful proposer.*

3. *Four exterior bus numbers, four-inch high, white or black decals, are to be installed. Exact location TBD.*

   On the front of the bus
   On the rear of the bus
   On the street-side of the bus above the driver's window
   On the curb-side of bus above the front entrance door

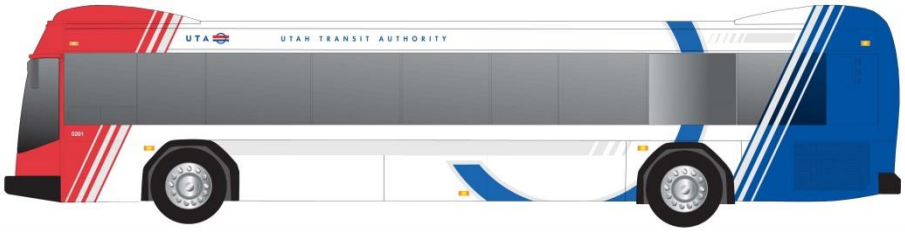
   Use 3M White Scotchlite #280-10,
   Use 3M Black Scotchlite #285-85,

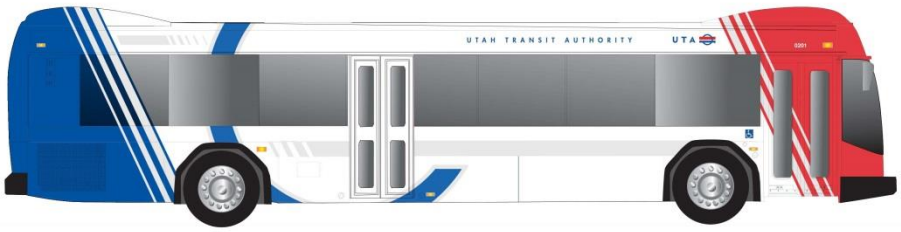
4. *Install one interior bus number – four (4) inches high – white or black, located on the center of the front destination sign door.*

5. *The style of both the interior and exterior numbers shall be Helvetica Medium.*

5. *The bus numbers shall be numbered consecutively from #XXXXX through #XXXXX …TBD*

The paint scheme shown below is for illustration only. Details will be provided to the successful vendor.





Dupont Imron 5000 Paint Colors:	*White Base*	*735085-EX*
	Blue	*777407-EX*
	Red	*777406-EX*
	Black	*N0001-EX*
Color for axle hubs:	*Silver*	

TS 72. Decals, Numbering and Signing

Monograms, numbers and other special signing shall be applied to the inside and outside of the bus as required. Signs shall be durable and fade-, chip- and peel-resistant. They may be painted signs, decals or pressure-sensitive appliqués. All decals shall be installed per the decal Supplier recommendations. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part 38, Subpart B, 38.27.

NOTE: The Agency should supply a list of interior and exterior decals including size and location.

Provide signs and decals in English and Spanish for the passengers. Include the following if they apply to this bus purchase. If the Proposer desires to use their decals, they will need to be reviewed and accepted by the Procuring Agency:

Watch your step - Tenga Cuidado al Caminar; Caution, Do Not Cross in Front of the Bus - Advertencia, No se Cruce Delante del Autobuś; Remain Behind the Yellow Line until the Bus Stops-Permanezca Detras De La

Linea Amarilla hasta que el Autobuś se Detenga; Do Not Talk to the Operator While the Bus is in Motion - No Hable con el Conductor Mientras el Autobus este en Marcha; Emergency Door Release, (1) Lift Cover, Push Button, (2) Pull Handles on Doors to Open - Para Abrir la Puerta de Emergencia, (1) Levante la tapa y Oprima el Botoń, (2) TIRE de las Manijas que hay en Las Puertas); Emergency Door -Puerta de Emergencia; Mobility Aid Securement Location-Area Designada para las Sillas de Ruedas; Push Button to Signal Driver to Stop-Presione el Botoń Para Indicarle al Conductor que Pare; Pull Cord to Signal Driver to Stop-Tire de la Cuerda para Indicarle al Conductor que Pare; It is a Violation of Federal Law to Operate Bus with Passengers in Prohibited Áreas-Conducir un Autobus con Pasajeros en Areas Prohibidas va Contra las Leyes Federales; Emergency Exit-Salida De Emergencia,;Pull Out and Down on Red Handle and Push Window Out-Primero Saque Y Tire Hacia Bajo la Manija Roja Despueś Empuje la Ventana Hacia Fuera; Priority Seating for Passengers with Disabilities-Cédale Estos Puerstos a los Pasajeros con Discapacidades; Fare Payment Required Upon Boarding-Pague el Costo del Recorrido al Subirse al Autobuś; Driver Carries No Change- El Conductor NO lleva Cambio; Disorderly Conduct and or Interfering with the Safe Operation of this Bus Violates State Law and UTA Ordinance. Persons Engaging in Such Conduct Will be Subject to Criminal Punishment and Civil Penalites Utah Code 76-10-1401; UTA Ord. CH. 5, Sec. 3 - El Tener Una Conducta Desordenada Y/O Interferir Con La Seguridad En Este Autobuś Va En Contra De Leyes Y Decretos Estatales. La Persona Que Tenga Una Conducta Indeseada Estara Sujeta A Los Castigos Y Multas Correspondientes, LEY 76-10-1401; Decreto, C.5, Sec. 3; Push Here to Close-Empuje Aqui para Cerrar; Keep Feet Off Seats-NO ponga los pies en los asientos; CAUTION: Do Not Stand in Designated Area-Atención: No se Pare en las Áreas Marcadas; Do Not Lean Against Door-NO se Recueste a la Puerta.

***ISO Symbol:** No Smoking/No Eating/No open Radio playing*

Signs and decals for operators and maintenance employees only need to be in English.

Provide a decal on the destination sign door and in front of the operator that shows the height of the vehicle.

TS 72.1 Passenger Information

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

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

TS 73. Exterior Lighting

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the ~~engine~~ *electric drivetrain* service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer.

DEFAULT----------*APPROVED*

Commercially available LED-type lamps shall be utilized at all exterior lamp locations.

DEFAULT----------*APPROVED*

Standard Lamps

All LED lamps shall be standard installation of the OEM. The entire assembly shall be specifically coated to protect the light from chemical and abrasion degradation.

ALTERNATIVE----------*APPROVED*

Potted Lamps

LED lamps shall be potted type and designed to last the life of the bus.

DEFAULT----------*APPROVED*

Standard Size

Size of LED lamps used for tail, brake and turn signal lamps shall be standard installation of OEM. *Each LED light shall consist of at least 10 super size diodes.*

ALTERNATIVE----------*APPROVED*

Front marker (clearance) lights along with lights located on the roof and sides of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts.

In an effort to reduce rear end accidents, program the turn signals and 4-way flashers so that the flashing pattern is non-typical. This would include something like a pattern where the light illuminates in two short bursts, followed by a pause, then two short bursts, etc.

Low profile lights without guards are Approved.

Turn signal flasher programming TBD pre-production.

TS 73.1 Backup Light/Alarm

Visible and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D.

TS 73.2 Doorway Lighting

LED 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 73.3 Turn Signals

DEFAULT----------*APPROVED*

Standard Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with federal regulations. *Provide (2) additional amber turn-signal LED lights in the upper rear corners of the*

bus in addition to the lower mounted turn-signal lights required by federal regulations.

Mirror mounted turn signals

Provide mirror housing mounted LED turn signal lamps

Curbside Corner Lamps

(2) additional Grote Silver Housing LED curb lamps (or similar)required, (1) Low mounted on the Curbside, fwd of REAR wheel with light facing aft and (1) mounted about 5" above the first one on the same panel also facing aft to light up rear wheel area... Lights are activated "solid on" in night run with the right turn signal switch ONLY @ or below 25MPH.. Over25MPH, the light will not be active.

Final layout of curbside light to be Approved by the Agency.

Rear Yield

Data LED, amber, triangular yield sign lamp (or similar) shall be provided on the streetside of the rear HVAC door. Programming for operation of this lamp shall be:

Light will flash when bus is operating with air pressure at normal range, Parking Brake released, Transmission in a forward gear, either door is cycled from the open to closed position, and both doors closed, and the left foot signal is depressed with amber indicator at dash panel 1. Once turn signal switch is released or the multiplexing system senses a speed output (approximately 3MPH), the light will continue to flash for an additional 8 seconds then extinguish.

TS 73.4 Headlights

Headlamps shall be designed for ease of replacement.

ALTERNATIVE----------*APPROVED*

Daytime Running Lights

Headlamps shall incorporate a daytime running light feature.

ALTERNATIVE----------*APPROVED*

LED

Headlamps shall be LED/~~halogen, sealed beam~~ lights *with extra LED lights pointed to the right and left. The extra lights are to be programmable through the bus multiplex system. Program the extra lights to be 100% bright when when turn signal is activated left or right and 30% bright all other times.* ***The Agency requests this be a part of the base bus price.***

High and Low Beam Dinex Star LED Adaptive Headlights with Turning Alert have been ***APPROVED.***

TS 73.5 Brake Lights

TS 73.5.1 Transit Coach

Brake lights shall be provided in accordance with federal regulations.

ALTERNATIVE----------*APPROVED*

High and Center Mount Red Brake Lamp

Bus shall include red, *4" LED's in both upper rear corners of the bus or* high and center mount brake lamp(s) *(two 12 inch horizontal LED bars)* along the backside of the bus in addition to the lower brake lamps required under FMVSS. The *high 4" LED's or the* high and center mount brake lamp(s) shall illuminate steadily with brake application. Agency to specify the size of the high and center mount brake lamp(s).

2 – 1x18" strip LED high center mount brake lights located above the electric drivetrain door are approved in lieu of 2 – 12 inch horizontal LED bars.

~~**TS 73.5.2 Commuter Coach**~~

TS 73.6 Service Area Lighting (Interior and Exterior)

LED lamps shall be provided in the ~~engine~~ *rear electric drivetrain* and all other compartments where service may be required to generally illuminate the area for night emergency repairs or adjustments. These service areas shall include, but not be limited to, the electric drive 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.

Electric drive 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.

INTERIOR PANELS AND FINISHES

TS 74. General Requirements

Materials shall be selected on the basis of maintenance, durability, appearance, safety, flammability and tactile qualities. Materials shall be strong enough to resist everyday abuse and be vandalism and corrosion resistant. Trim and attachment details shall be kept simple and unobtrusive. Interior trim shall be secured to avoid resonant vibrations under normal operational conditions.

Interior surfaces more than 10 in. below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the coach is parked on a level surface. Any components and other electrical components within close proximity to these surfaces shall also be resistant to this cleaning method.

ALTERNATIVE----------*APPROVED*

Requirements for additional anti-graffiti/vandalism treatments for interior surfaces.

The Agency requests anti-graffiti window film.

TS 75. Interior Panels

Panels shall be easily replaceable and tamper resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable.

DEFAULT----------*APPROVED*

Interior panel required to meet FMVSS 302.

ALTERNATIVE----------*APPROVED*

Composite.

ALTERNATIVE----------*APPROVED*

Scratch-resistant plastic.

ALTERNATIVE----------*APPROVED*

Melamine-type material.

TS 75.1 Driver Area Barrier

TS 75.1.1 Transit Coach

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel ***(11 horizontal inches)*** and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to prevent passengers from reaching the driver by standing behind the driver's seat. The lower area between the seat and panel must be accessible to the driver. The partition must be strong enough in conjunction with the entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. The panel should be properly attached to minimize noise and rattles.

Attach a 4" diameter fire extinguisher to the vertical part of the front dash near the fare box. Attach the emergency reflecting triangles to the top of the curb-side wheel housing near the garbage can mount.

*Fire extinguisher located on the driver's barrier is **APPROVED** with the condition that it does not hinder seat adjustment range of motion. Fire extinguisher mounting bracket/kit is to be included in base bus price*

*The Amerex 5 lbs ABC rated fire extinguisher with hose has been **APPROVED.***
*The K-D 610-4645 Safety Triangles have been **APPROVED.***

Safety triangle kit from ABC is APPROVED.

DEFAULT (TC) ----------*APPROVED*

Wheel-Well-to-Ceiling Configuration of Driver's Barrier

The driver's barrier (*black in color)* shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus side windows and wall to prevent passengers from reaching the driver or the driver's personal effects.

~~**TS 75.1.2 Commuter Coach**~~

TS 75.2 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers.

Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to 1 and 1½ in. above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways, where applicable, shall provide no less than a 2½ in. clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passenger assists are not provided by other means.

The modesty panel and its mounting shall withstand a static force of 250 lbs applied to a 4 × 4 in. area in the center of the panel without permanent visible deformation.

DEFAULT----------*APPROVED*

Modesty panels shall be installed as stated.

TS 75.3 Front End

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the driver's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing at the front of the standee line area of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the driver's compartment shall be formed metal or composite material. Composite dash panels shall be reinforced as necessary, vandal-resistant and replaceable. All colored, painted and plated parts forward of the driver's barrier shall be finished with a surface that reduces glare. Any mounted equipment must have provision to support the weight of Equipment. *Color TBD.*

Everything forward of the driver's barrier being black is Approved.

TS 75.4 Rear Bulkhead

The rear bulkhead and rear interior surfaces shall be material suitable for exterior skin; painted and finished to exterior quality; or paneled with melamine-type material, composite, scratch-resistant plastic or ~~carpeting and~~ trimmed with stainless steel, aluminum or composite. *Color TBD.*

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat backs so that any litter or trash will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or liter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, then the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage and ***use barrel locks to*** limit unauthorized access.

TS 75.5 Headlining

Ceiling panels shall be made of durable, corrosion resistant, easily cleanable material. Headlining shall be supported to prevent buckling, drumming or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment that is mounted above the ceiling shall be on hinges for ease of service but retained ***with barrel locks*** to prevent inadvertent opening. *Color TBD.*

TS 75.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Fasteners should be corrosion resistant. Panels and fasteners shall not be easily removable by passengers. Exposed interior fasteners should be minimized, and where required shall be tamper resistant.

TS 75.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. Any insulation material used inside the electric drive compartment shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations.

The combination of inner and outer panels on the sides, roof, wheel wells and ends of the bus, and any material used between these panels, shall provide a thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

ALTERNATIVE----------*APPROVED*

FMVSS 302

Insulation shall meet the requirements of FMVSS 302.

TS 75.8 Floor Covering

The floor covering shall have a non-skid walking surface that remains effective in all weather conditions. The floor covering, as well as transitions of flooring material to the main floor and to the entrance and exit area, shall be smooth and present no tripping hazards. Seams shall be sealed/welded per manufacturer's specifications. The standee line shall be approximately 2 in. wide ***(deep yellow)*** and shall extend across the bus aisle. The color and pattern shall be consistent throughout the floor covering.

Any areas on the floor that are not intended for standees, such as areas "swept" during passenger door operation, shall be clearly and permanently marked.

The floor shall be easily cleaned and shall be arranged to minimize debris accumulation.

A one-piece center strip shall extend from the vertical wall of the rear settee between the aisle sides of transverse seats to the standee line. If the floor is of a bi-level construction, then the center strip shall be one piece at each level. The covering between the center strip and the wheel housings may be separate pieces. At the rear door, however, a separate strip as wide as the door shall extend from the center strip to the outboard edge of the rear/exit area.

The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall in a fully sealed butt joint or extend to the top of the cove.

Provide single color floor covering.

*A floor covering has been **APPROVED** using ALTRO, Meta TFM27421 Midnight 2.7mm.*

TS 75.9 Interior Lighting

The light source shall be located to minimize windshield glare, with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The lighting system may be designed to form part of or the entire air distribution duct.

The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged.

TS 75.10 Passenger

DEFAULT----------*APPROVED*

First Row Lights

The first light on each side (behind the driver and the front door) is normally turned on only when the front door is opened, in "night run" and "night park." As soon as the door closes, these lights shall go out. These lights shall be turned on at any time if the switch is in the ~~"on"~~ ***"All"*** position.

TS 75.10.1 Modified Passenger Dome Light Requirements

See TS 46.5, Table #6, Interior Dome Lights---3 position switch

To help eliminate windshield reflection on suburban roads where street lighting is at a low level, provide the following "3 position" switch:

*Switched to "**All**" (On)*
All dome lights shall have the ability to be turned "on" at any time (even when bus is not in an operational mode) *when the dash toggle switch is moved from the "Off" position to the "All" position. The interior lights are to be programmed by the bus multiplex system to turn "off" after 20 min. when the bus rotary Master Switch is turned "off".*

*Switched to **"Off"***

All passenger dome lights turn "off.

Switch to ***"Normal"***

When the front and exit doors are closed, only the street-side dome lights are still "on".

When the front or exit doors are open, the first row of dome lights (above the driver and the front door) and the curb-side passenger dome lights are turned "on" when in "night run" and "night park". As soon as the front and rear doors are closed, these lights shall go out.

TS 75.10.2 Dimmer Switch for all Dome Lights

See TS 46.5, Table #6, Dimmer Switch for all Dome Lights.

To help eliminate windshield reflection on suburban roads where street lighting is at a low level, provide a toggle switch or dimmer knob on the dash that can be used to dim the interior dome lights if the operator so desires. This switch or knob shall reduce the lights to 60% brightness. When the front or rear doors open, the dome lights return to full brightness for boarding passengers. When the front and rear doors are both closed, the dome lights return to their previous brightness setting.

~~**Dimming Second Row Lights**~~

~~To help eliminate windshield reflection on suburban roads where street lighting is at a low level, the second light on each side, when "night run" or "night park" is selected, shall be controlled by the switch; off in "off" and on in "normal." These lights shall be turned on at any time if the switch is in the "on" position.~~

All interior lighting shall be turned off whenever the transmission selector is in reverse and the ~~engine~~ run switch is in the "on" position.

The design of the interior lighting shall require the approval of the Agency.

DEFAULT----------*APPROVED*

LED lights.

DEFAULT----------*APPROVED*

First Light Modules Dim/Extinguish When Front Door is Closed

When the master switch is in the "run" or "night/run" mode, the first light module on each side of the coach shall automatically extinguish or dim when the front door is in the closed position and illuminate when the door is opened.

TS 75.11 Driver's Area

The driver's area shall have a light to provide general illumination, and it shall illuminate the half of the steering wheel nearest the driver to a level of 5 to 10 foot-candles. *Provide and "on/off" switch within reach of the operator while sitting in the operator's seat.*

TS 75.12 Seating Areas (Transit Coach)

The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 sq ft plane at an angle of 45 degrees from horizontal, centered 33 in. above the floor and 24 in. in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 foot-candles *only when the switch is turned to "ALL" interior lights and/or when the front and exit doors are open in the "Rear" position.*

LED light fixtures and lenses shall be a maximum 6-foot length.
Provid sufficient low watt LED's that effectively make the dome light look as if a bright white fluorescent bulb is behind the lens. This means the individual LED's and their various color tones cannot be seen through the lens.

A Pretoria LED dome light system has been ***APPROVED****.*

~~TS 75.13 Seating Areas (Commuter Coach)~~

TS 75.14 Vestibules/Doors (Transit Coach)

Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of 4 foot- candles with the front doors open and a minimum of 2 foot-candles with the front doors closed. The front entrance area and curb lights shall illuminate when the front door is open and master run switch is in the "lights" positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked***/opened***.

TS 75.15 Vestibules/Doors (Commuter Coach)

TS 75.16 Step Lighting

Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of 4 foot- candles and shall illuminate in all ~~engine~~ *master* run positions. The step lighting shall be low profile to minimize tripping and snagging hazards for passengers and shall be shielded as necessary to protect passengers' eyes from glare.

TS 75.17 Ramp Lighting (Transit Coach)

Exterior and interior ramp lighting shall comply with federal regulations.

~~TS 75.18 Turntable Lighting (Articulated Coach)~~

TS 75.19 Farebox Lighting

TS 75.19.1 Transit Coach

DEFAULT (TC) ----------*APPROVED*

Farebox Light *(LED)*

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

~~**TS 75.19.2 Commuter Coach**~~

TS 76. Fare Collection

Space and structural provisions shall be made for installation of currently available fare collection devices, which shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver 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 farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox. *Provide a pedestal, approximately 13" x 13" with a side access door for hooking up wires to the fare box (12" x 12"). The Agency will install a 41" high, GFI Transview 100 on the pedestal. Provide a ground wire and 12 volt power through the Ignition.*

Contractor shall provide fare collection installation layout to the Agency for approval.

TS 76.1 Electronic Fare Collection

The bus manufacturer shall install an Agency's supplied harness for the Electronic Fare Collection (EFC) from the front dash next to the Entrance Door to the Electronics/Radio Compartment which also includes a harness from the rear modesty panel next to the Exit Door to the Electronics/Radio Compartment. The bus manufacture will also install Agency supplied EFC mounting brackets, TBD. The Agency will install Electronic Fare Collection units to the harnesses and mounting brackets.

Transfer mounting, cutting and punching equipment shall be located in a position convenient to the driver.

TS 76.2 Transfer Cutter and Mount

Ship the Transfer Cutter and Mount loose. The Agency will install the Transfer Cutter and Mount.

*A Globe 600090 Transfer Cutter with 2 notchers has been **Approved**.*

DEFAULT----------*APPROVED*
Agency will install its own farebox.

The Agency requests a Priced alternate for vendor to install a 41" high, GFI Transview 100 farebox

TS 77. Interior Access Panels and Doors (Transit Coach)

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Access doors shall be hinged with gas props or over-center springs, where practical, to hold the doors out of the mechanic's way. Panels shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

ALTERNATIVE----------*APPROVED*
Access Doors with Locks
Access doors shall be secured with locks. ~~The locks shall be standardized so that only one tool is required to open access doors on the bus.~~

*Access doors shall be secured with 2 locks. The square 5/16 key and the barrel key are **APPROVED**.]*

SDS box with a key local and two square key locks is APPROVED.

Rear bulkhead small access panels secured with captive screws is APPROVED upon condition that captive

screws are a tamper resistant type.

*The Electronic/Radio Compartment will have a **standard key** lock (TBD) along with 2 barrel locks.*

TS 77.1 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material at or around access openings shall be flush with the floor and shall be edge-bound with stainless steel or another material that is acceptable to the Agency to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor.

A driveshaft access panel that is manufactured completely out of polyurethane is APPROVED

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

PASSENGER ACCOMMODATIONS

TS 78. Passenger Seating

TS 78.1 Arrangements and Seat Style (Transit Coach)

The passenger seating arrangement in the bus shall be such that seating capacity is maximized and in compliance to the following requirements.

> **NOTE:** The Agency recognizes that ramp location, foot room, hip-to-knee room, doorway type, width, seat construction, floor level type, seat spacing requirements, ramp or lift, number of wheelchair positions, etc. ultimately affect seating capacity and layout.

DEFAULT----------*APPROVED*

Forward-Facing Seat Configuration

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings and turntable, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms (such as for ~~fuel tank~~ *battery* storage space).

TS 78.2 Rearward Facing Seats (Transit Coach)

DEFAULT----------*APPROVED*

Rearward facing seats not allowed.

~~TS 78.3 Turntable Seating (Articulated Coach)~~

TS 78.4 Padded Inserts/Cushioned Seats (Transit Coach)

ALTERNATIVE----------*APPROVED*

Padded Inserts

The passenger seats shall be equipped with vandal-resistant padded inserts throughout the bus (measure to uncompressed surface).

*The American Seating "InSight" with 980 Gray color, cantilevered without shroud has been **APPROVED** for Configuration #1 and Configuration #3. These seats shall be blue padded vinyl. Final color TBD pre-production.*

*The American seating model 2096 with 3 point seatbelts is **APPROVED** for suburban bus configuration. Seats shall have a vinyl upholstery. Final color TBD pre-production.*

TS 78.5 Drain Hole in Seats

DEFAULT----------*APPROVED*

No requirements for drain hole provision in seat inserts.

ALTERNATIVE

Requirement for Drain Hole Provision in Seat Inserts

Provision, such as a small grommeted hole, to allow drainage shall be incorporated into seat insert. (Drain through hole, ¼ in. through hole, bottom seat only, one per seat.)

~~TS 78.6 Arrangements and Seat Style (Commuter Coach)~~

TS 78.7 Hip-to-Knee Room

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to a vertical surface immediately in front, shall be a minimum of 26 in. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to- knee room shall be no less than 27 in.

TS 78.8 Foot Room

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 in. Seats immediately behind the wheel housings and modesty panels may have foot room reduced.

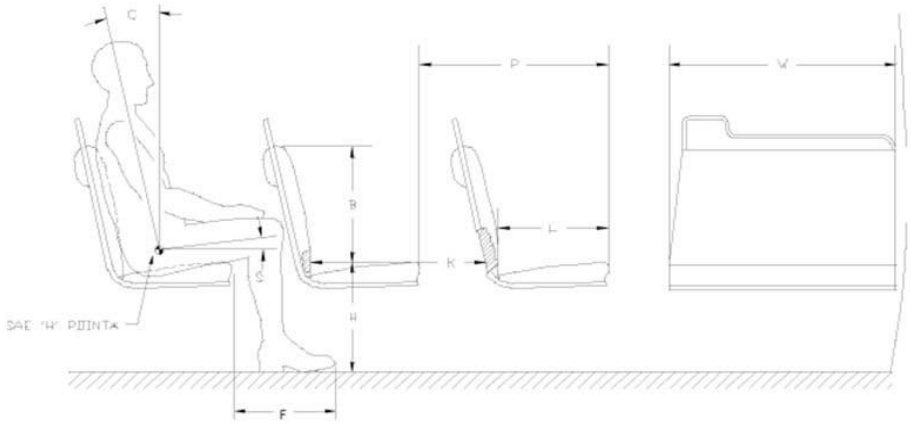
TS 78.9 Aisles (Transit Coach)

The aisle between the seats shall be no less than 20 in. wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 in. at 32 in. above the floor (standing passenger hip height).

~~**TS 78.10 Aisles (Commuter Coach)**~~

TS 78.11 Dimensions (Transit Coach)

FIGURE 6
Seating Dimensions and Standard Configuration



DEFAULT----------*APPROVED*

Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to **Figure 6**):

- The width, W, of the two-passenger transverse seat shall be a minimum ~~35~~ ***36*** 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.

TS 78.12 Structure and Design (Transit Coach)

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized and is completely free of obstructions to facilitate cleaning.

Seats, structures and restraints around the securement area should not infringe into the mobility device envelope or maneuverability.

The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 in. of the aisle shall be at least 10 in. above the floor.

In locations at which cantilevered installation is precluded by design and/or structure, other seat mounting may be allowed ***(pedestal allowed)***.

All transverse objects—including seat backs, modesty panels, and longitudinal seats—in front of forward-facing seats shall not impart a compressive load in excess of 1000 lbs onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at 0.05 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 ¼ in. permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 lbs evenly distributed along the top of the seat back with less than ¼ in. permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-lb sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36 in. pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10 and 12 in. Seats at both seating positions shall withstand 4000 vertical drops of a 40-lb sandbag without visible deterioration. The sandbag shall be dropped 1000 times each from heights of 6, 8, 10 and 12 in. Seat cushions shall withstand 100,000 randomly positioned 3½ in. drops of a squirming, 150-lb, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than ⅞ in. in diameter for standees and seat access/egress. *Provide an Energy Absorbing handhold on the back of transverse seats.* 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 125 lbs with less than ¼ in. permanent deformation and without visible deterioration.

~~TS 78.13 Structure and Design (Commuter Coach)~~

TS 78.14 Construction and Materials (Transit Coach)

Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. Any exposed metal touching the sides or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges.

The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼ in. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy-absorbing materials to provide passenger protection and, in a severe crash, to allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable.

A Rear Settee Hinge is required on the 3 center seats (1-3-1) with gas spring props.

~~TS 78.15 Construction and Materials (Commuter Coach)~~

TS 79. Passenger Assists (Transit Coach)

Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape and size for both the 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided either as the vertical portion of the seat back assist or as a separate item so that a 5th-percentile female passenger may easily move from one assist to another using one hand and the other without losing support. 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.

ALTERNATIVE----------*APPROVED*

The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be powder-coated yellow.

TS 79.1 Assists (Transit Coach)

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ in. or shall provide an equivalent gripping surface with no corner radii less than ¼ in. All passenger assists shall permit a full hand grip with no less than 1½ in. of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door-mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be powder-coated metal castings. Assists shall withstand a force of 300 lbs applied over a 12 in. lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

DEFAULT----------*APPROVED*

Two Forward-Facing Wheelchair Securement Locations

TS 79.2 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. *Provide yellow powder coated grab rail passenger assists and stanchions.*

TS 79.3 Vestibule (Transit Coach)

The aisle side of the driver's barrier, the wheel housings and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 in. of the floor. These assists hall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arms.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. The assist shall be no less than 36 in. above the floor. The assists at

the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the driver's barrier, wheel housings or front modesty panel. *Provide yellow powder coated grab rail passenger assists and stanchions.*

TS 79.4 Rear Doorway(s) (Transit Coach)

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists having a cross-sectional diameter between 1¼ and 1½ in. or providing an equivalent gripping surface with no corner radii less than ¼ in., and shall provide at least 1½ in. of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than 6 in. from the outside edge of the rear doorway step.

Paint the door grab rails, modesty panel grab rails and the vertical stanchions forward and to the rear of the rear exit door with yellow powder coated paint.

> **NOTE:** For an articulated bus, passenger assists will be provided to aid in the transition between the front and rear sections of the bus.

TS 79.5 Overhead (Transit Coach)

Except forward of the standee line and at the rear door, a continuous, full-grip, overhead assist shall be provided. This assist shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 in. above the floor.

ALTERNATIVE----------*APPROVED*

Grab straps or other extensions as necessary shall be provided for sections where vertical assists are not available and for use by passengers that cannot reach to 70 in.

ALTERNATIVE----------*APPROVED*

Grip straps shall be fabric. *Provide 9 Black Nylon straps on each side of the isle for a total of 18 straps. Locations TBD.*

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

TS 79.6 Longitudinal *and Transverse* Seat Assists (Transit Coach)

Longitudinal *and transverse* 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 *longitudinal* seat *or the upper corner of the transverse 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 79.7 Wheel Housing Barriers/Assists (Transit Coach)

Unless passenger seating is provided on top of wheel housings, passenger assists shall be mounted around

the exposed sides of the wheel housings (and propulsion compartments if applicable), which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housings.

TS 80. Passenger Doors

TS 80.1 Transit Coach

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

TS 80.1.1 Front door

DEFAULT----------*APPROVED*

Vapor electric-powered door (or submitted deviation) shall be forward of the front wheels and under direct observation of the driver.

TS 80.1.2 Rear Door(s)

ALTERNATIVE----------*APPROVED*

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

ALTERNATIVE----------*APPROVED*

Electric-powered doors.

~~TS 80.2 Commuter Coach~~

TS 80.2.1 Front door

DEFAULT

Forward of the front wheels and under direct observation of the driver

TS 80.3 Materials and Construction

Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be corrosion resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. Door edges shall be sealed to prevent infiltration of exterior moisture, noise, dirt and air elements from entering the passenger compartment, to the maximum extent possible based on door types.

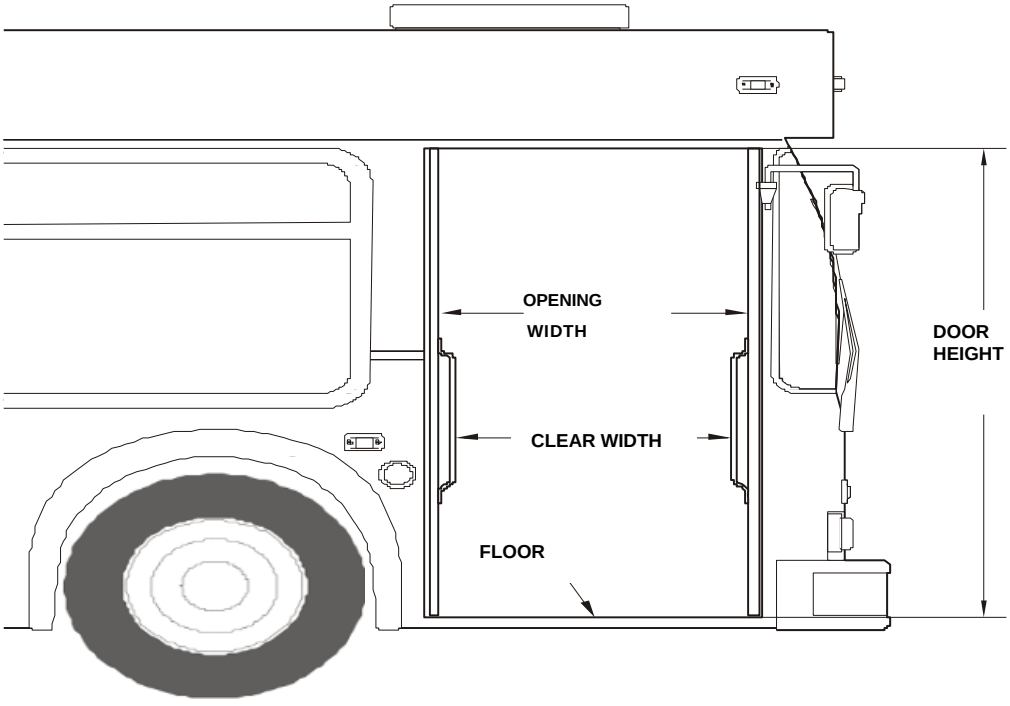
The closing edge of each door panel shall have no less than 2 in. of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least 4 in. apart (not applicable to single doors).The combined weather seal and window glazing elements of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

doors shall leave an opening no less than 75 in. in height.

TS 80.4 Dimensions

TS 80.4.1 Transit Coach

FIGURE 7
Transit Bus Minimum Door Opening



DEFAULT ***APPROVED DOOR SIZE for TRANSIT BUSES***

31¾ in. Minimum Doorway Clear Width

Front door clear width shall be a minimum of 31¾ in. with the doors fully opened. Rear door opening clear width shall be a minimum of 24 in. with the doors fully opened. If 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 80.4.2 Commuter Coach**~~

TS 80.5 Door Glazing

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section.

Door glazing shall be easily replaceable.

DEFAULT----------*APPROVED*

Zip type glazing rubber.

ALTERNATIVE----------*APPROVED*

The front door panel glazing material shall have a nominal ¼ in. thick tempered glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the recommended practices defined in SAE J673.

Glazing material in the rear doorway door panels shall be defined by the Agency.

Provide in the rear exit door: two piece door glass, tempered and of the same color as the side passenger windows.

An entrance door glass that is laminated that meets the ANSI reuirements and SAE best practices is Approved.

TS 80.6 Door Projection (Transit Coach)

TS 80.6.1 Exterior

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the 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.

If the rear exit door has a hinge, the hinge shall have a rubber seal to help maintain the conditioned air inside the bus.

TS 80.6.2 Interior

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

TS 80.7 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an 8 in. high curb on a street sloping toward the curb so that the street-side wheels are 5 in. higher than the right-side wheels.

TS 80.8 Closing Force

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

Doors closed by a return spring or counterweight-type device shall be equipped with an obstruction-sensing device that, at a minimum, alerts the driver if an obstruction is detected between the closing doors. Doors closed by a return spring or counterweight type device, when unlocked, shall be capable of being pushed to the point where the door starts to open with a force not to exceed 25 lbs applied to the center edge of the forward door panel.

Whether or not the obstruction-sensing system is present or functional, it shall be possible to withdraw a 1½ in. diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 lbs.

TS 80.8.1 Rear Door Closing Force (Transit Coach)

The electric style power-close rear doors shall be equipped with a Pneumatic Sensitive Edge and Optical Pressure Switch 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.

~~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 80.9 Actuators

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

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuildable. If powered by compressed air, exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in the air system and to muffle sound.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

The rear door actuator(s) shall be under the complete control of the vehicle operator and shall open and close in response to the position of the driver's door control.

DEFAULT----------*APPROVED*

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 80.9.1 Actuator (Commuter Coach)~~

TS 80.9.2 Rear Door Interlocks (Transit Coach)

See "Hardware Mounting" for door system interlock requirements.

TS 80.10 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 80.11 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.

Door control located on street side.

DEFAULT----------*APPROVED*

The front door shall remain in commanded state position even if power is removed or lost.

ALTERNATIVE

As specified by Agency.

TS 80.12 Door Controller

TS 80.12.1 Transit Coach

DEFAULT

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. Locate the door control lever next to the operator's left hand and next to the forward sliding sash of the operator's side window.

The operator needs to have access from outside the bus through the sliding sash to the door lever.

The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard.

Position of the door control handle shall result in the following operation of the front and rear doors:

- **Center position:** Front door closed, rear door(s) closed or set to lock.
- **First position forward:** Front door open, rear door(s) closed or set to lock.
- **Second position forward:** Front door open, rear door(s) open or set to open.
- **First position back:** Front door closed, rear door(s) open or set to open.
- **Second position back:** Front door open, rear door(s) open or set to open.

ALTERNATIVE----------*APPROVED*

A Vapor control handle with built in kneel and ramp controls with fiberoptic backlighting (or submitted deviation) shall be provided. **The Agency requests this be part of the base bus price.**

~~**TS 80.12.2 Commuter Coach**~~

TS 80.13 Door Open/Close

ALTERNATIVE----------APPROVED

Operator-Controlled Front and Rear Doors (If Applicable)

Operation of, and power to, the passenger doors shall be completely controlled by the operator.

A switch shall be provided to enable the driver to obtain full control of the rear doors.

DEFAULT----------*APPROVED*

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 81. 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 81.1 Loading Systems

There are three options:

- high-floor lift
- low-floor ramp
- platform (boarding bridgeplate) level boarding

~~TS 81.2 Lift~~

TS 81.3 Loading System for 30 to 40 ft Low-Floor Bus

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

DEFAULT----------*APPROVED*

Front Door Location of Loading System, Flip-Out Design Ramp with 6:1 Slope

The wheelchair loading system shall be located at the front door, with the ramp being of a simple hinged, flip- out type design being capable of deploying to the ground at a maximum 6:1 slope.

A 'Lift-U' LU18 Ramp has been APPROVED

~~TS 81.4 Loading System for Level Boarding on a 45 to 60 ft Low-Floor BRT~~

TS 81.5 Wheelchair Accommodations

NOTE: Agency will approve acceptable securement system. The final layout and dimensions of all wheelchair accommodation areas shall be shown in drawings transmitted by the Contractor and approved by the UTA Office of Civil or Rights. Contractor shall not commence with the manufacture of buses until such approval is obtained.

Two forward-facing locations, as close to the wheelchair loading system as practical, shall provide parking
space and securement system compliant with ADA requirements for a passenger in a wheelchair.

ALTERNATIVE

Additional (Beyond Two) Number of Wheelchair Securement Locations **[insert number**] forward-facing location(s), 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.

ALTERNATIVE

Non-Forward Facing

All passenger securement devices must be stowed off the floor and out of the way when not in use.

Provide a securement system using: 3 belts to secure a mobility device, one front belt, 2 rear belts, a timed release mechanism for connecting the 2 rear belts to the mobility device with one hand, and a tensioning lever to tighten the 2 rear belts. Include a tire rub-rail on the floor beneath the flip-up seats or on the underside of the seats, a 14 inch stainless steel horizontal passenger assist (grab rail) on the bottom of the flip-up seats and where space permits, a wall mounted stainless steel horizontal passenger assist.

A O'Straint O'Pod is Approved.

TS 81.6 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 20 in. shall be maintained. As a guide, no width dimension should be less than 34 in. Areas requiring 90 deg turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180 deg turns are expected, space should be clear in a full 60 in. diameter circle. A vertical clearance of 12 in. above the floor surface should be provided on the outside of turning areas for wheelchair footrests.

~~TS 82. Wheelchair Lifts (Commuter Coach)~~

~~TS 82.1 Lift~~

~~TS 82.2 Lift Door~~

~~TS 82.3 Lift Width~~

~~TS 82.4 Lighting Requirements~~ Deleted

~~Lighting for the lift areas shall be designed to meet Title 13 and ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the lift area. Light shall be wired through the lift master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "on" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair lift door. During lift operation, the street surface shall be illuminated to a minimum of 6 candlepower a distance of 3 ft beyond the external dimensions of the lift platform once deployed and lowered. Additional lighting shall be provided to ensure illumination of the instruction placard and the manual override pump when it is in use.~~

~~TS 82.5 Securement System~~ Deleted.

~~The vehicle interior shall permit the securement of two forward-facing wheelchair passengers in which the primary position shall be on the street side of the coach directly across from the lift. Securement areas shall be a minimum 30 × 48 in. as required by the ADA.~~

~~A separate three-point belt securement shall be provided to effectively secure wheelchair passengers. To further secure the passenger during the lift operation, a retractable seat belt strap shall be provided at the ingress/egress area of the lift platform. A minimum 10.5 in. high barrier shall also be provided at the rear of the lift area for additional passenger protection.~~

TS 82.6 Roof Ventilation/Escape Hatches

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

SIGNAGE AND COMMUNICATION

TS 83. Destination Signs

DEFAULT----------*APPROVED*

A destination sign system shall be furnished on the front *and* on the right side near the front door.

ALTERNATIVE----------*APPROVED*

Route sign on the rear of the vehicle. ***The Agency requests this be a part of the base bus price.***

All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver.

Provide a front sign requiring 24 rows x 200 columns with LED's in full color, a curb side destination sign requiring 8 rows x 96 columns with amber LED's and a rear route sign requiring 16 rows x 48 columns with amber LED's. The destination sign shall be capable of being programmed with USB memory sticks.

A Luminator full Color Spectrum 24 Row X 200 Column Titan sign is Approved.

DEFAULT----------*APPROVED*

The driver shall be able to access the sign while seated.

DEFAULT----------*APPROVED*

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself *when the operator's defroster heater is turned on*.
- Access shall be provided to allow cleaning of inside compartment window and unit glazing.
- The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide.

TS 84. Passenger Information and Advertising (Transit Coach)

TS 84.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules. Size TBD.

A metal schedule holder shall be installed on the dash, just inside of curbside A-post. This shall be 18" wide, ¾" thick and 7" high.

Advertising media 11 in. high and 0.09 in. thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior light system.

TS 84.2 Exterior Displays

Provisions shall be made to integrate advertising into the exterior design of the bus. Advertising media, frames or supporting structures shall not detract from the readability of destination signs and signal lights, and shall not compromise passenger visibility. Advertising provisions shall not cause pedestrian hazards or foul automatic bus washing equipment, and shall not cover or interfere with doors, air passages, vehicle fittings or in any other manner restrict the operation or serviceability of the bus.

Attach only one advertising sign frame on the front bicycle rack.

A 21" x 44"clear anodized aluminum Yarder advertising frame with solid center backing has been ***APPROVED.***

A Sportworks 14" x 44" ad frame is Approved.

TS 85. Passenger Stop Request/Exit Signal

TS 85.1 Transit Coach

ALTERNATIVE----------*APPROVED*

Pull Cord Passenger Signal

A passenger "stop requested" signal system that complies with applicable ADA requirements defined in 49 CFR, Part 38.37, shall be provided. The system shall consist of a heavy-duty pull cable *(yellow in color),* chime and interior sign message. The pull cable shall be located the full length of the bus on the sidewalls at the level where the transom is located. If no transom window is required, then the height of the pull cable shall approximate this transom level and shall be no greater than 63 in. as measured from the floor surface. It shall be easily accessible to all passengers, seated or standing. Pull cable(s) shall activate one or more solid state or magnetic proximity switches. *Provide a drop down pull cord between each window in the low floor section of the bus.* At each wheelchair passenger position and at priority seating positions, additional provisions shall be included to allow a passenger in a mobility aid to easily activate the "stop requested" signal. An auxiliary passenger "stop requested" signal shall be installed at the rear door to provide passengers standing in the rear door/exit area a convenient means of activating the signal system. The signal shall be a heavy-duty push button type located in the rear door vicinity. Button shall be clearly identified as "passenger signal."

In addition to the interior "stop requested" message sign. Provide a 2 line amber LED sign for future use as a next stop display. The sign shall come programmed to also display "stop requested" in the meantime.

A Hanover 144 x 19 Amber LED, Flush Mounted sign is APPROVED

ALTERNATIVE----------*APPROVED*

Additional "Stop Request" Button on Rear Door Stanchion

A heavy-duty "stop request" signal button shall be installed on the modesty panel stanchion immediately

forward of the rear door and clearly identified as “STOP.”

~~TS 85.2 Commuter Coach~~

TS 85.3 Signal Chime

TS 85.3.1 Transit Coach

DEFAULT----------*APPROVED*

A single “stop requested” chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas. *Opening the front or rear doors will cancel the “Stop Requested” sign message.*

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

Provide an On/Off toggle switch on the operator’s dash to turn “off” the “Stop Request” chime. See TS 46.5, Table #6.

ALTERNATIVE

Passenger signal system shall be arranged with push-button switches accessible by each seated passenger and on stanchions and at rear door locations for standees.

TS 85.3.2 Commuter Coach

DEFAULT

A single “stop requested” chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

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

ALTERNATIVE

Agency to specify the stop request system for wheelchair seating area

TS 86. Communications

TS 86.1 Camera Surveillance System

DEFAULT

No surveillance system provisions required.

ALTERNATIVE----------*APPROVED*

~~Provide all~~ *Install all Agency provided* wiring and mounting locations for a multi-camera surveillance system for the later provision of and installation of cameras, recorder, microphone, etc. Agency to *provide* ~~specify~~ the camera system cable to be installed *and specify* the locations for pre-wiring and the quantity.

ALTERNATIVE

Provide all wiring and mounting locations for a multi-camera surveillance system, including the installation of cameras, recorder, microphone, etc.

TS 86.2 Public Address System

A public address system shall be provided on each bus for facilitating radio system and driver-originated announcements to passengers.

Provide a microphoneless (microphone imbedded in PA amplifier housing) PA system. Provide a clam-shell switch on the floor next to the steering column to activate the microphone. Mounting locations TBD. Provide a fully populated and labeled harness from the amplifier (mounted on the dash) to the Electronics/Radio Compartment located on the street-side front wheel housing well. The Auxiliary Microphone Key and Input Harness is part of the fully populated harness. Provide approximately 36 extra inches of circular coiled harness in the Electronic/Radio Compartment.

*The Clever Devices / SpeakEasy-II has been **APPROVED.***

TS 86.2.1 Speakers

DEFAULT----------*APPROVED*

Eight (8) premium interior loudspeakers shall be provided, semi-flush mounted, on alternate sides of the bus passenger compartment, installed with proper phasing. Total impedance seen at the input connecting end shall be *4-*8 Ohms. Mounting shall be accomplished with riv-nuts and machine screws.

*A Misco, JC54WP-4A premium interior speaker has been **APPROVED.***

Exterior PA Speaker

If exterior speaker is exposed to wheelspray from rain/snow off the front wheel, provide an access door with a removable speaker/assembly to allow for easy replacement of Exterior PA speaker.

TS 86.3 Automatic Passenger Counter (APC)

ALTERNATIVE----------*APPROVED*

An infrared APC system shall be installed. Agency to provide details of APC system, including installation locations and number of buses to be equipped.

Install a vertically mounted (Hella type sensors), APC at the front and rear exit door(s) of each bus. Location TBD. Mount the CPU in the Electronic/Radio Compartment.

The Agency requests this be a part of the base bus price.

*The Urban Transportation Associates, two door installation (Integrated System RS232) has been **Approved.***

TS 86.4 Radio Handset and Control System

TS 86.4.1 Drivers Speaker

Each bus shall have a recessed speaker in the ceiling panel above the driver. This speaker shall be the same component used for the speakers in the passenger compartment. It shall have 8 Ohms of impedance. *The contactor will install the Agency's supplied harness from the Electronic/Radio Compartment to the driver's speaker located on the dash unless there is a better location. Exact location TBD. The Agency will install the speaker once the bus is delivered.*

TS 86.4.2 Handset

Contractor will install *the Agency's provided handset harness from the Electronic/Radio Compartment to the dash. Exact location TBD. The Agency will install the handset once the bus is delivered.* ~~a handset for driver use.~~

TS 86.4.3 Driver Display Unit (DDU) *(or MDC)*

~~Contractor shall install a driver display unit as close to the driver's instrument panel as possible.~~ *The Contractor will install the Agency provide MDC (DDU) harness from the dash to the Electronic/Radio Compartment. Exact location TBD. The Agency will install the MDC once the bus is delivered.*

Provide a reinforced mounting pad on the dash to mount these components. Location TBD.

TS 86.4.4 Emergency Alarm

Contractor shall install an *Agency supplied emergency alarm wiring harness for the foot operated Emergency Alarm Switch from the Electronic/Radio Compartment down to the floor in front of the operator's seat . Exact location TBD.* ~~emergency alarm that is accessible to the driver but hidden from view.~~

TS 87. Event Data Recorders (EDR)

DEFAULT----------*APPROVED for the installation of harnesses, see TS 86.1. Cameras and EDR to be installed later by the Agency.*

No EDR shall be installed.

ALTERNATIVE

EDRs shall be installed on the bus, one at the front and the other at the rear. These units are to be installed as low as possible. The EDRs shall be able to communicate over the Jl939 CAN line and shall each be equipped with three-axis accelerometers. Settings are to be finalized with the Agency during pre-production. EDRs shall broadcast via the Jl939 data communication link severe impact events to the vehicle monitoring system and also trigger an event in the camera system. The EDR shall also tag an event from a signal received over the Jl939 CAN line from the silent alarm switch signal and the camera event button and in turn broadcast these events to the vehicle monitoring system. The EDR shall also record the following operational data: headlights on or off, turn signals and hazard lights on or off, ignition on or off, low air pressure warning, whether moving in forward or reverse or idling, and whether parking brake is on or off.

TS 88. Approved Equals

Table 8 lists products that have been approved for the bus procurement. The list contains products that are of interest to the Agency and is not intended to be a comprehensive listing of every product required for the manufacture of the subject buses. Product categories not listed are left to the discretion of the Contractor so long as the product complies with the specifications. Product specification information is for reference only and may not reflect the latest or future improvements by manufacturers. Any change, revision or substitution of specified products requires approval of the agency. To add to or revise this list, Contractor must submit a written request *and performance specifications/test results* per the Specification by the due date found in the RFP for approved equals.

NOTE: Transit agencies are encouraged to list as many suppliers as possible.

TABLE 8
Approved Equals Products

Product	Manufacturer	Product Specification
~~TS 9. Oil pan drain valve~~	~~Fumoto Engineering~~	~~Fumoto #F104, N-Series valve~~
TS 9. HD push button sample valve		Check Fluid #KP18NV
~~CNG powered engine~~	~~Cummins~~	~~TS 9. Cummins ISL-G 320 hp, 1000 lbs-ft~~
~~CNG powered engine~~	~~Cummins~~	~~TS 9. Cummins ISB-G, 280 hp, 660 lbs-ft~~
~~Diesel powered engine~~	~~Cummins~~	~~TS 9. Cummins ISL, 330 hp, 1,154 lbs-ft~~
~~Diesel powered engine~~	~~Cummins~~	~~TS 9. Cummins ISB, 280 hp, 660 lbs-ft~~
~~Engine block heater~~	~~Phillips-Temro~~	~~TS 9. Phillips-Temro, 110 volts, 1,000 watts~~
Electric cooling fans ~~for radiator/CAC~~	Modine	TS 10. Modine electric fan system
~~Transmission~~	~~Voith~~	~~TS 11. Voith, SensoTop programming~~
~~Oil cleaner spinner~~	~~T.F. Huggins~~	~~TS 14. Spinner II 576 HE~~
Electric drive compartment	Forester Instruments	TS 14. LCD display #7-743-028
Constant torque hose clamps	Oetiker and Breeze Clamps	TS 15. Oetiker and Breeze
~~Diesel fuel filling components~~	~~Emco Wheaton~~	~~TS 18. Posilock 105 Dry Break/Flip Cap~~
~~CNG fuel system~~	~~Agility~~	~~TS 18. Agility CNG System~~
Shop air couplers	Foster	TS 25. Foster 10-3
Shock Absorbers	Koni	TS 31. Adjustable shock absorbers
Aluminum Bus wheels	Alcoa	TS 32. Cryogenic hardened surfaces and
Flow thru valve stem Caps	Meyers Tire Supply	TS 32. V2B Flow thru Valve Stem Caps, #21534
Valve Stems	Meyers Tire Supply	TS 32. Dill Valve Stems , #VS-554-D
Lug Nut Covers	Alcoa	TS 32. Alcoa Lug Nut Covers, #000185
Electric Steering Assist	TRW	TS 33. Electric steering assistance with

Small diameter steering wheel		TS 33. VIP 16", Soft Touch, 2 spoke steering wheel
Air System Dryer for 100% air compressor duty cycle	SKF	TS 39. Dual Turbo 2000 with double oil and water filtration and heated
Bus AGM Batteries	Odyssey	TS 42. AGM Odyssey 4yr warranty battery, #31-PC2150S-H
~~UltraCapacitor for bus starting~~	~~KBI~~	~~TS 42. KBI KAPower #KSM050024~~
Battery jump start connector	Whitaker	TS 42. Whitaker Jump Start Connector
Electrical Corrosion Preventive Spray	NOCO Chemical in Cleveland	TS 42. Battery Corrosion Preventive Spray, NOCO, NCP-2, Part #A-202
Weatherproof low voltage electrical connectors	Packard Electric	TS 42. Packard Electric Weather Pack Connectors
Sun Shades (Windshield Visors)	Automation Sun Shade	TS 46. Push/Pull scissor action sun shades
Adjustable Throttle and Brake Pedals	Konsberg Pedals	TS 46. Push button adjustable, throttle and brake pedals
2 Garbage cans	Rubbermaid	TS 47. Rubbermaid Garbage Cans, #2952
Operator's Seat	Recaro	TS49. Recaro, Ergo-Metro AM80
Curb-side exterior rear mirrors,	Hadley	TS 49. Part #20-55185V009
Street-side exterior rear mirrors, mirror housing, and arms	Hadley	TS 49. Part #20-55184V192
Rear view camera for backing up	Safety Vision	TS 49. Safety Vision rear view backing camera
Air Conditioning Compressor	Thermo King	TS 54. Thermo King Screw Compressor, #S391

TS 89. Radio Antennas

The Contractor shall install 2 Agency supplied antennas with attached cables in the roof of the bus just over the Electronic/Radio Compartment. Route the antenna cables into the electronic/radio compartment with the extra cable in a round service loop. Do not tie the service loop into a dog-bone shape. Exact location and details TBD.

TS 90. Electronic/Radio Compartment

Provide an Electronic/Radio Compartment on top of the street-side front wheel well . Minimum Size: 44 inches high, 2 feet wide, 2 feet deep, 4 sliding shelves that can be latched tight so they don't rattle. The interior of the Electronics/Radio Compartment shall be painted white and have two electric fans controlled by a thermostat to remove hot air from inside the compartment.

Install a 12 volt and 24 volt power cable sized for a maximum of 40 amps directly from a 40 amp fuse located in the battery box to the Electronic/Radio Compartment. Install a ground cable from a battery ground lug in the battery box to the Electronic/Radio Compartment. Provide an Ignition Sense wire into the Electronic/Radio Compartment. Provide all cables and wires with at least a 30 inch service loop. Wiring shall be approved by the Agency.

Four (4) aluminum trays 15.31" wide, 19.50" deep with a variation in height accommodation within the SDS enclosure of 32.5", with a base tray of 13.0" wide, 19.5" deep is Approved.

A single electric fan that is controlled by a thermostat is Approved.

A fuse box that is the main power distribution proint for the LVDC power on the bus, located directly rearward of the battery enclosure, protected by a 50 amp breaker that is re-settable is Approved.

The radio power battery ground attached to a stainless steel ground bar in the electric drive compartment (with a cable routes from the batter ground lug to this main power cable batter ground bar) is Approved.

TS 91. Spare Power Train and Accessories

The Power Train Assemvlies and Accessories consit of the following for a bus: ~~engine, transmission, tranmission oil cooler, turbocharger,~~ electric cooling fan, radiator and shroud, surge tank, ~~fuel filters, catalytic converter, DPF, Selective Reduction Catalyst and piping, engine full flow lube oil filter (spin-on type), by-pass oil spinner,~~ air compressor, ~~transmission filters, starting motor, engine block heater with its electrical cord,~~ all wiring with attaching clips and brackets, power steering hydraulic pump~~, a/c compressor,~~ bus alternator, and differential 3rd member gear set. Provide all air, water, ~~fuel~~ and oil lines for the above components.

All components may be shipped loose. UTA will require a parts/component list with part numbers.

TS 92. Card (Display) Holder

Mount a Card (Display) Holder on the front dash, centered on the curb-side windshield. Provide a card holder, 18" long x ¾" thick x 7" high with a base 6" wide. Make out of .080" aluminum, powder coated black. A sample Card Holder will be given to the successful proposer.

TS 93. Hubodometer and Guard

Provide an electronically read hubodometer with the capacity of 999,999 miles, mounted on the curb-side rear axle hub. Provide a stout metal guard around the hubodometer, painted with zinc rich primer and aluminum paint.

The Stemco Data Trac 600-9999 has been ***APPROVED.***

TS 94. Schedule Racks, Driver's Defect Booklet Holder, Registration Card Holder

Provide 3 Schedule Holders mounted to the rear but near the operator and accessible to customers. Dimensions:
3.88" wide x 5" high x 1.62" deep.

Provide 1 Driver's Defect Booklet Holder mounted behind the operator. Dimensions:
6" wide x 6.13" high x 2.16 " deep.

Provide 1 Registration/Permit Holder mounted above the operator. Dimensions:
9" wide x 6" high x .090" deep with clear plastic cover.

TS 95. Real Time Operating and Maintenance Telematics

Provide an onboard telematics system allowing the agency to monitor the vehicle in real-time. The system shall include tools to assess vehicle health, driver monitoring information, location, conditions and diagnostics. All hardware, software and subscription charges to be included in the base bus price.

New Flyer Connect ™ has been ***APPROVED***

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Mary DeLoretto, Chief Service Development Officer
PRESENTER(S): Mary DeLoretto, Chief Service Development Officer
Manjeet Ranu, Director of Capital Projects

TITLE:

Contract: Program Management Services (HNTB)

AGENDA ITEM TYPE:	Procurement Contract/Change Order
RECOMMENDATION:	Approve contract and authorize Executive Director to execute contract and associated disbursements with HNTB for Program Management Services for a three-year period of performance, in the amount of $17,086,498. Two additional option years allowed in the contract are subject to future board approval.
BACKGROUND:	To successfully deliver the Capital Program at UTA, specialty services and additional staff resources are needed at times to complete specific tasks and projects, while also helping support strategic direction and expert review with the benefit of a national perspective. These services include, but are not limited to, project management, construction inspection and oversight, right-of-way acquisition services, surveying, public involvement assistance, stray current identification, environmental and design assistance, project controls, design reviews, etc. Collectively, these and similar types of services are organized as “program management services” that support a program of many interrelated projects, tasks and initiatives involving multiple business units at UTA. At times, some contractor staff may co-locate at UTA offices.
DISCUSSION:	A competitive qualifications-based procurement process was recently followed where HNTB was selected to provide these Program Management Services to UTA for a 3-year period with two, 1-year options available after the initial 3-year contract period. Four proposals were received and HNTB was selected from this competitive, open procurement. This new Program Management Services Consultant (PMSC) contract between UTA and HNTB will enable UTA to continue to progress on successfully delivering it’s 5-year capital plan, supporting ongoing state of good repair needs and adjunct services, as appropriate. The major tasks in the contract

	include: 1. Program/project management services 2. Capital program development services 3. Project support services 4. Planning, engagement, and outreach services 5. Grants management services 6. NEPA/environmental services 7. Pre-construction services 8. Construction management, administration, and oversight services 9. Project controls services 10. Systems and signals engineering oversight services 11. Quality assurance and consultant evaluation services 12. Adjunct services To ensure an even transition between current work and projects, the current Program Management Services contract with WSP is being amended to allow them to provide services for specific projects and tasks while the transition shifts to HNTB. To expedite the onboarding of HNTB and to facilitate the transition with WSP, an advance work agreement was executed with HNTB for a portion of scope of services and is a part of this contract value. The total contract amount with HNTB for the three-year period of performance is $17,086,498, based on the following annual estimates: - Year 1: $5,903,441 - Year 2: $5,508,895 - Year 3: $5,674,162 If one or both option years are executed, a contract amendment will be brought to the Board for approval at that time. The value of this contract reflects an expanded capital program and the need to modernize project controls/management to support the larger capital program and emphasis on delivering projects. The contract value is an estimate; actual cost will be based on the services provided and will not exceed the authorized Board amount without additional Board approval. The loaded labor rates inclusive of overhead and profit are fixed for the contract period of performance subject to a 3% escalation rate for COLA and merit increases. Any additional rate increases or participation by additional HTNB personnel is subject to review and approval by the UTA PM. Exceeding the amount authorized by the Board would require a contract amendment to be approved by the Board.
CONTRACT SUMMARY:	
Contractor Name:	Contractor Name: HNTB
Contract Number:	Contract Number: 20-03384VW
Base Contract Effective Dates:	4/15/2021 to 4/15/2024
Extended Contract Dates:	Two, 1-year options available after base contract with future board approval
Existing Contract Value:	N/A
Amendment Amount:	N/A
New/Total Amount Contract Value:	$17,086,498
Procurement Method:	RFQu
Funding Sources:	Various capital project budgets and operating funds.

ALTERNATIVES:	The alternative would be to procure each service for each project, as needed, separately through UTA's procurement office.
FISCAL IMPACT:	The contract amount is divided up among many UTA projects and groups where the program management services are provided. Each project manager and division manager have included these services into their capital project budgets which are included in the 5-year capital budget plan, or in their operating budgets. In addition, the Capital Department has included funds in its operating budget for special studies and support. As such, the funding for this contract is predominately sourced from capital funds, with a portion from operating funds.
ATTACHMENTS:	1. Contract

PROFESSIONAL SERVICES AGREEMENT

UTA CONTRACT #20-03384VW
Program Management Services Consultant

This Professional Services Agreement is entered into and made effective as of the date of last signature below (the "Effective Date") by and between UTAH TRANSIT AUTHORITY**,** a public transit district organized under the laws of the State of Utah ("UTA"), and HNTB CORPORATION, an engineer, architects and planner company ("Consultant").

RECITALS

WHEREAS, UTA desires to hire professional services for a Program Management Services Consultant (PMSC) for various UTA department.

WHEREAS, On December 11, 2020 UTA issued Request for Qualification Package Number 20-03384VW ("RFQu") encouraging interested parties to submit proposals to perform the services described in the RFQu.

WHEREAS, Upon evaluation of the proposals submitted in response to the RFQU, UTA selected Consultant as the preferred entity with whom to negotiate a contract to perform the Work.

WHEREAS, Consultant is qualified and willing to perform the Work as set forth in the Scope of Services.

AGREEMENT

NOW, THEREFORE, in accordance with the foregoing Recitals, which are incorporated herein by reference, and for and in consideration of the mutual covenants and agreements hereafter set forth, the mutual benefits to the parties to be derived here from, and for other valuable consideration, the receipt and sufficiency of which the parties acknowledge, it is hereby agreed as follows:

1. **SERVICES TO BE PROVIDED**
   a. Consultant shall perform all Work as set forth in the Scope of Services (Exhibit A). Except for items (if any) which this Contract specifically states will be UTA-provided, Consultant shall furnish all the labor, material and incidentals necessary for the Work.
   b. Consultant shall perform all Work under this Contract in a professional manner, using at least that standard of care, skill and judgment which can reasonably be expected from similarly situated professionals.
   c. All Work shall conform to generally accepted standards in the transit industry. Consultant shall perform all Work in compliance with applicable laws, regulations, rules, ordinances, permit constraints and other legal requirements including, without limitation, those related to safety and environmental protection.
   d. Consultant shall furnish only qualified personnel and materials necessary for the performance of the Work.
   e. When performing Work on UTA property, Consultant shall comply with all UTA work site rules including, without limitation, those related to safety and environmental protection.

2. **MANAGEMENT OF WORK**

a. Consultant's Project Manager (also referred to as Program Manager) will be the day-to-day contact person for Consultant working under the supervision of the UTA's Project Manager (also referred to as Project Director), and will be responsible for coordination of such Work with UTA.
b. UTA's Project Manager shall be responsible for the Work and give overall direction and maintain control over the Work to be performed by Consultant hereunder until the completion or termination of this contract. UTA's Project Manager will be the day-to-day contact person for UTA and shall act as the liaison between UTA and Consultant with respect to the Work. UTA's Project Manager shall also coordinate any design reviews, approvals or other direction required from UTA with respect to the Work.

3. **PROGRESS OF WORK**

a. Consultant shall prosecute the Work in a diligent and continuous manner and in accordance with all applicable notice to proceed, critical path schedule and guaranteed completion date requirements set forth in (or developed and agreed by the parties in accordance with) the Scope of Services.
b. Consultant shall conduct regular meetings to update UTA's Project Manager regarding the progress of the Work including, but not limited to, any unusual conditions or critical path schedule items that could affect or delay the Work. Such meetings shall be held at intervals mutually agreed to between the parties.
c. Consultant shall deliver monthly progress reports and provide all Contract submittals and other deliverables as specified in the Scope of Services.
d. Any drawing or other submittal reviews to be performed by UTA in accordance with the Scope of Services are for the sole benefit of UTA and shall not relieve Consultant of its responsibility to comply with the Contract requirements.
e. UTA will have the right to inspect, monitor and review any Work performed by Consultant hereunder as deemed necessary by UTA to verify that such Work conforms in accordance with the standard of care. Any such inspection, monitoring and review performed by UTA is for the sole benefit of UTA and shall not relieve Consultant of its responsibility to comply with the Contract requirements.
f. UTA shall have the right to reject Work which materially fails to conform to the standard of care in accordance with this Contract. Upon receipt of notice of rejection from UTA, and through no fault of UTA or other project participants, Consultant shall (at its sole expense and without entitlement to equitable schedule relief) promptly re-perform, replace or re- execute the Work so as to conform to the standard of care. Except as provided in this section, Consultant makes no other warranties or guarantees, express or implied, relating to Consultant's services. This section governs, modifies, and supersedes any other terms in this Contract which may be construed to address warranties or guarantees or the quality of the Work.
g. If Consultant fails to promptly remedy rejected Work as provided in Section 3.f, UTA may (without limiting or waiving any rights or remedies it may have) perform necessary corrective action using other consultants or UTA's own forces. Any actual costs reasonably incurred by UTA in such corrective action shall be chargeable to Consultant.
h. Consultant may reasonably rely on any documents, information and materials provided by or

through UTA. UTA represents that Consultant's use of such documents, information or materials will not infringe upon any third party's rights and UTA will indemnify and protect Consultant from any infringement claims arising from Consultant's use of such documents or other materials in the performance of its services hereunder

4. **PERIOD OF PERFORMANCE**

This Contract shall commence as of the Effective Date. This Contract shall remain in full force and effect for an initial Three (3) year period expiring April 15, 2024. UTA may, at its sole election and in its sole discretion, extend the initial term for up to two (2) additional one-year option periods, for a total Contract period not to exceed five (5) years. Extension options may be exercised by UTA upon providing Consultant with notice of such election at least thirty (30) days prior to the expiration of the initial term or then-expiring option period (as applicable). This Contract may be further extended if the Consultant and UTA mutually agree to an extension evidenced in writing. The rights and obligations of UTA and Consultant under this Contract shall at all times be subject to and conditioned upon the provisions of this Contract.

5. **COMPENSATION**

a. For the performance of the Work, UTA shall pay Consultant in accordance with the fully loaded rates shown in Exhibit B.

b. Compensation for Work shall be based on the loaded labor rates for each individual contained in the proposal and shown in Exhibit B. The loaded rates contained in Exhibit B are inclusive of direct labor costs, indirect costs, other direct costs, fee, and subconsultant markup.

c. The loaded rates contained in Exhibit B shall be multiplied by the number of hours worked in order to arrive at the amount payable on a monthly basis by UTA for each individual employee or subconsultant.

d. The loaded rates shall be increased by 3% each year to account for COLA and merit increases. All other increases, including those stemming from promotion of key personnel, shall be subject to concurrence by the UTA Program Manager based upon significant justification.

e. If Consultant desires to bring in new or additional employees or subconsultants not listed in Exhibit B to perform Work under the contract, advance approval shall be received in writing from the UTA Program Manager for both the identity of the person and the individual's fully loaded billing rate. An addendum shall be added to Exhibit B semi-annually in July and January of each year identifying the individuals or subconsultants who have been added along with their approved fully loaded rates.

6. **INCORPORATED DOCUMENTS**

a. The following documents hereinafter listed in chronological order, with most recent document taking precedence over any conflicting provisions contained in prior documents (where applicable), are hereby incorporated into the Contract by reference and made a part hereof:

1. The terms and conditions of this Professional Services Supply Agreement (including any exhibits and attachments hereto):

2. Consultant's Proposal including, without limitation, all federal certifications (as applicable).
3. UTA's RFQu including, without limitation, all attached or incorporated terms, conditions, federal clauses (as applicable), drawings, plans, specifications and standards and other descriptions of the Professional Services.

b. The above-referenced documents are made as fully a part of the Contract as if hereto

7. **ORDER OF PRECEDENCE**

The Order of Precedence for this contract is as follows:

- UTA Contract including all attachments
- UTA Terms and Conditions
- UTA Solicitation Terms
- Consultant's Bid or Proposal including proposed terms or conditions

Any consultant proposed term or condition which is in conflict with a UTA contract or solicitation term or condition will be deemed null and void.

8. **CHANGES**

a. UTA's Project Manager or designee may, at any time, by written order designated or indicated to be a Change Order, direct changes in the Work including, but not limited to, changes:

1. In the Scope of Services;
2. In the method or manner of performance of the Work; or
3. In the schedule or completion dates applicable to the Work.

To the extent that any change in Work directed by UTA causes an actual and demonstrable impact to: (i) Consultant's cost of performing the work; or (ii) the time required for the Work, then (in either case) the Change Order shall include an equitable adjustment to this Contract to make Consultant whole with respect to the impacts of such change.

b. A change in the Work may only be directed by UTA through a written Change Order or (alternatively) UTA's expressed, written authorization directing Consultant to proceed pending negotiation of a Change Order. Any changes to this Contract undertaken by Consultant without such written authority shall be at Consultant's sole risk. Consultant shall not be entitled to rely on any other manner or method of direction.

c. Consultant shall also be entitled to an equitable adjustment to address the actual and demonstrable impacts of "constructive" changes in the Work if: (i) subsequent to the Effective Date of this Contract, there is a material change with respect to any requirement set forth in this Contract; or (ii) other conditions exist or actions are taken by UTA which materially modify the magnitude, character or complexity of the Work from what should have been reasonably assumed by Consultant based on the information included in (or referenced by) this Contract. In order to be eligible for equitable relief for "constructive" changes in Work, Consultant must give UTA's Project Manager or designee written notice stating:

A. The date, circumstances, and source of the change; and

B. That Consultant regards the identified item as a change in Work giving rise to an

adjustment in this Contract.

Consultant must provide notice of a "constructive" change and assert its right to an equitable adjustment under this Section within ten (10) days after Consultant becomes aware (or reasonably should have become aware) of the facts and circumstances giving rise to the "constructive" change. Consultant's failure to provide timely written notice as provided above shall constitute a waiver of Consultant's rights with respect to such claim.

d. As soon as practicable, but in no event longer than 30 days after providing notice, Consultant must provide UTA with information and documentation reasonably demonstrating the actual cost and schedule impacts associated with any change in Work. Equitable adjustments will be made via Change Order. Any dispute regarding the Consultant's entitlement to an equitable adjustment (or the extent of any such equitable adjustment) shall be resolved in accordance with Article 21 of this Contract.

e. Notwithstanding the foregoing, Consultant shall not be required to perform out-of-scope or change order work unless such work and any applicable change has been approved in writing by change order or amendment to this Contract or subject task order executed by both parties.

9. **INVOICING PROCEDURES**

a. Consultant shall submit invoices to UTA's Project Manager for processing and payment in accordance with Exhibit B. Invoices shall be provided in the form specified by UTA. Reasonable supporting documentation demonstrating Consultant's entitlement to the requested payment must be submitted with each invoice. Consultant shall submit invoices to UTA on a monthly basis in conjunction with the monthly progress report as outlined in Article 3.c of this agreement.

b. If UTA objects to any invoice by Consultant, UTA shall so advise Consultant in writing giving reasons therefore within seven (7) days of receipt of such invoice. If any invoice submitted by Consultant is disputed by UTA, only that portion so disputed may be withheld from payment. Payment for all invoice amounts not specifically disapproved by UTA shall be provided to Consultant within thirty (30) calendar days of invoice submittal.

10. **OWNERSHIP OF DESIGNS, DRAWINGS, AND WORK PRODUCT**

Any deliverables prepared or developed pursuant to the Contract including without limitation drawings, specifications, manuals, calculations, maps, sketches, designs, tracings, notes, reports, data, computer programs, models and samples, shall become the property of UTA when prepared, and, together with any documents or information furnished to Consultant and its employees or agents by UTA hereunder, shall be delivered to UTA upon request, and, in any event, upon termination or final acceptance of the Professional Services. UTA shall have full rights and privileges to use and reproduce said items. To the extent that any deliverables include or incorporate preexisting intellectual property of Consultant, Consultant hereby grants UTA a fully paid, perpetual license to use such intellectual property for UTA's operation, maintenance, modification, improvement and replacement of UTA's assets. The scope of the license shall be to the fullest extent necessary to accomplish those purposes, including the right to share same with UTA's consultants, agent, officers, directors, employees, joint owners, affiliates and consultants. Consultant shall retain its preexisting copyright and ownership rights in its design, drawing details, specifications, data bases, computer software, and other proprietary property. Preexisting intellectual property developed, utilized, or modified in the

performance of the services shall remain the property of Consultant.

11. **USE OF SUBCONSULTANTS**

a. Consultant shall give advance written notification to UTA of any proposed subcontract (not indicated in Consultant's SOQ) negotiated with respect to the Work. UTA shall have the right to approve all subconsultants, such approval not to be withheld unreasonably.

b. No subsequent change, removal or substitution shall be made with respect to any such subconsultant without the prior written approval of UTA.

c. Consultant shall be solely responsible for making payments to subconsultants, and such payments shall be made within thirty (30) days after Consultant receives corresponding payments from UTA.

d. Consultant shall be responsible for and direct all Work performed by subconsultants.

e. Consultant agrees that no subcontracts shall provide for payment on a cost-plus-percentage-of-cost basis. Consultant further agrees that all subcontracts shall comply with all applicable laws.

12. **KEY PERSONNEL**

Consultant shall provide the key personnel as indicated in Consultant's Proposal (or other applicable provisions of this Contract), and shall not remove or change assignments of the Key Personnel without the prior written consent of UTA. Consultant acknowledges that having the Key Personnel participate under this Agreement was a major contributing factor in UTA awarding this Agreement to the Consultant. Accordingly, any change in Key Personnel or the level of effort of Key Personnel without the prior written consent of UTA may be considered a material breach of this Agreement and grounds for UTA to impose sanctions, including termination of this Agreement. Notwithstanding, if key personnel are no longer available to support this agreement due to an unforeseen force majeure event or other event beyond the control and without the fault of the Consultant (e.g., key personnel is no longer employed by Consultant), then Consultant is not liable for the penalties described under this Section 12.

For the avoidance of doubt, the follow individuals are considered to be "Key Personnel" under this Agreement:

Jason Bleyl
Maria Vyas
Brett Paxton
Dave Farley
Sean Libberton
Laren Livingston
Jeanne Witzig

In addition to the foregoing, in the absence of consent by the UTA Program Manager or the occurrence of an unforeseen force majeure event, liquidated damages in the amount of $100,000 shall be paid by Consultant for the early departure of Jason Bleyl, from his role as the HNTB Program Manager in the first year of the contract. These damages shall be applied as an offset to the amounts owed to Consultant by UTA.

13. **SUSPENSION OF WORK**

a. UTA may, at any time, by written order to Consultant, require Consultant to suspend, delay, or interrupt all or any part of the Work called for by this Contract. Any such order shall be specifically identified as a "Suspension of Work Order" issued pursuant to this Article. Upon receipt of such an order, Consultant shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of further costs allocable to the Work covered by the order during the period of Work stoppage.

b. If a Suspension of Work Order issued under this Article is canceled, Consultant shall resume Work as mutually agreed to in writing by the parties hereto.

c. If a Suspension of Work Order is not canceled and the Work covered by such order is terminated for the convenience of UTA, reasonable costs incurred as a result of the Suspension of Work Order shall be considered in negotiating the termination settlement.

d. If the Suspension of Work causes an increase in Consultant's cost or time to perform the Work, UTA's Project Manager or designee shall make an equitable adjustment to compensate Consultant for the additional costs or time, and modify this Contract by Change Order.

14. **TERMINATION**

a. **FOR CONVENIENCE**:
UTA shall have the right to terminate the Contract at any time by providing written notice to Consultant. If the Contract is terminated for convenience, UTA shall pay Consultant: (i) in full for Goods delivered and Services fully performed prior to the effective date of termination; and (ii) an equitable amount to reflect costs incurred (including Contract close-out and subconsultant termination costs that cannot be reasonably mitigated) and profit on work-in-progress as of to the effective date of the termination notice. UTA shall not be responsible for anticipated profits based on the terminated portion of the Contract. Consultant shall promptly submit a termination claim to UTA. If Consultant has any property in its possession belonging to UTA, Consultant will account for the same, and dispose of it in the manner UTA directs.

b. **FOR DEFAULT:**
If Consultant(a) becomes insolvent; (b) files a petition under any chapter of the bankruptcy laws or is the subject of an involuntary petition; (c) makes a general assignment for the benefit of its creditors; (d) has a receiver appointed; (e) should fail to make prompt payment to any subconsultants or suppliers; or (f) fails to comply with any of its material obligations under the Contract, UTA may, in its discretion, after first giving Consultant seven (7) days written notice to cure such default:

1. Terminate the Contract (in whole or in part) for default and obtain the Professional Services using other consultants or UTA's own forces, in which event Consultant shall be liable for all incremental costs so incurred by UTA;
2. Pursue other remedies available under the Contract (regardless of whether the termination

remedy is invoked); and/or

3. Except to the extent limited by the Contract, pursue other remedies available at law.

c. **CONSULTANT'S POST TERMINATION OBLIGATIONS:**
Upon receipt of a termination notice as provided above, Consultant shall (i) immediately discontinue all work affected (unless the notice directs otherwise); and (ii) deliver to UTA all data, drawings and other deliverables, whether completed or in process. Consultant shall also remit a final invoice for all services performed and expenses incurred in full accordance with the terms and conditions of the Contract up to the effective date of termination. All rights and remedies provided in this Article are cumulative and not exclusive. If UTA terminates the Contract for any reason, Consultant shall remain available, for a period not exceeding 90 days, to UTA to respond to any questions or concerns that UTA may have regarding the Professional Services furnished by Consultant prior to termination. This paragraph c. applies only to Terminations for Default under paragraph b. above.

15. **INFORMATION, RECORDS and REPORTS; AUDIT RIGHTS**
Consultant shall retain all books, papers, documents, accounting records and other evidence to support any cost-based billings allowable under Exhibit B (or any other provision of this Contract). Such records shall include, without limitation, time sheets and other cost documentation related to the performance of labor services, as well as subcontracts, purchase orders, other contract documents, invoices, receipts or other documentation supporting non-labor costs. Consultant shall also retain other books and records related to the performance, quality or management of this Contract and/or Consultant's compliance with this Contract. Records shall be retained by Consultant for a period of at least six (6) years after completion of the Work, or until any audit initiated within that six-year period has been completed (whichever is later). During this six-year period, such records shall be made available at all reasonable times for audit and inspection by UTA and other authorized auditing parties including, but not limited to, the Federal Transit Administration. Copies of requested records shall be furnished to UTA or designated audit parties upon request. Consultant agrees that it shall flow-down (as a matter of written contract) these records requirements to all subconsultants utilized in the performance of the Work at any tier.

16. **FINDINGS CONFIDENTIAL**
Any documents, reports, information, or other data and materials available to or prepared or assembled by Consultant or subconsultants under this Contract are considered confidential and shall not be made available to any person, organization, or entity by Consultant without consent in writing from UTA.

a. It is hereby agreed that the following information is not considered to be confidential:
   A. Information already in the public domain;
   B. Information disclosed to Consultant by a third party who is not under a confidentiality obligation;
   C. Information developed by or in the custody of Consultant before entering into this Contract;
   D. Information developed by Consultant through its work with other clients; and
   E. Information required to be disclosed by law or regulation including, but not limited to, subpoena, court order or administrative order.

17. **PUBLIC INFORMATION.**

Consultant acknowledges that the Contract and related materials (invoices, orders, etc.) will be public documents under the Utah Government Records Access and Management Act (GRAMA). Consultant's response to the solicitation for the Contract will also be a public document subject to GRAMA, except for legitimate trade secrets, so long as such trade secrets were properly designated in accordance with terms of the solicitation.

18. **GENERAL INDEMNIFICATION**

Consultant shall indemnify and hold harmless UTA, its officers, trustees, agents, and employees (hereinafter collectively referred to as "Indemnities") from and against all liabilities, claims, actions, damages, losses, and expenses including without limitation reasonable attorneys' fees and costs (hereinafter referred to collectively as "claims") related to bodily injury, including death, or loss or damage to tangible or intangible property caused, by the negligent acts, errors or omissions of Consultant or any of its owners, officers, directors, agents, employees or subconsultants. This indemnity includes any claim or actual amount arising out of the failure of such Consultant to conform to federal, state, and local laws and regulations. If an employee of Consultant, a subconsultant when acting within the scope of their subcontract, anyone employed directly or indirectly by any of them or anyone for whose acts any of them may be liable brings a claim against UTA or another Indemnities, Consultant's indemnity obligation set forth above will not be limited by any limitation on the amount of damages, compensation or benefits payable under any employee benefit acts, including workers' compensation or disability acts. The indemnity obligations of Consultant shall not apply to the extent that claims arise out of the negligence of UTA or the Indemnities. Neither party to this Contract shall be liable to the other party or any third party claiming through the other respective party, for any special, incidental, indirect, punitive, liquidated, delay or consequential damages of any kind including but not limited to lost profits or use of property, facilities or resources, that may result from this Agreement, or out of any goods or services furnished hereunder.

19. **INSURANCE REQUIREMENTS**

The insurance requirements herein are minimum requirements for this Contract and in no way limit the indemnity covenants contained in this Contract. The Utah Transit Authority in no way warrants that the minimum limits contained herein are sufficient to protect the Consultant from liabilities that might arise out of the performance of the work under this contract by the Consultant, his agents, representatives, employees or subconsultants and Consultant is free to purchase additional insurance as may be determined necessary.

A. MINIMUM SCOPE AND LIMITS OF INSURANCE: Consultant shall provide coverage with limits of liability not less than those Stated below. An excess liability policy or umbrella liability policy may be used to meet the minimum liability requirements provided that the coverage is written on a "following form" basis.

1. Commercial General Liability – Occurrence Form
   Policy shall include bodily injury, property damage and broad form contractual liability coverage.
   - General Aggregate $4,000,000
   - Products – Completed Operations Aggregate $1,000,000
   - Personal and Advertising Injury $1,000,000
   - Each Occurrence $2,000,000

   a. The policy shall be endorsed to include the following additional insured language: "The Utah Transit Authority shall be named as an additional insured with respect to liability

arising out of the activities performed by, or on behalf of the Consultant".

2. Business Automobile Liability
   Bodily Injury and Property Damage for any owned, hired, and non-owned vehicles used in the performance of this Contract.

   Combined Single Limit (CSL) $2,000,000

   a. The policy shall be endorsed to include the following additional insured language: "The Utah Transit Authority shall be named as an additional insured with respect to liability arising out of the activities performed by, or on behalf of the Consultant, including automobiles owned, leased, hired or borrowed by the Consultant".

3. Worker's Compensation and Employers' Liability
   Workers' Compensation Statutory

   - Employers' Liability Each Accident $100,000
   - Disease – Each Employee $100,000
   - Disease – Policy Limit $500,000

   a. Policy shall contain a waiver of subrogation against the Utah Transit Authority.

   b. This requirement shall not apply when a consultant or subconsultant is exempt under UCA, AND when such consultant or subconsultant executes the appropriate waiver form.

4. Professional Liability (Errors and Omissions Liability)
   The policy shall cover professional misconduct or lack of ordinary skill for those positions defined in the Scope of Services of this contract.

   - Each Claim $1,000,000
   - Annual Aggregate $2,000,000

   a. In the event that the professional liability insurance required by this Contract is written on a claims-made basis, Consultant warrants that any retroactive date under the policy shall precede the effective date of this Contract; and that either continuous coverage will be maintained or an extended discovery period will be exercised for a period of three (3) years beginning at the time work under this Contract is completed.

B. ADDITIONAL INSURANCE REQUIREMENTS: The policies shall include, or be endorsed to include the following provisions:

1. On insurance policies where the Utah Transit Authority is named as an additional insured, the Utah Transit Authority shall be an additional insured to the full limits of liability purchased by the Consultant. Insurance limits indicated in this agreement are minimum limits. Larger limits may be indicated after the consultant's assessment of the exposure for this contract; for their own protection and the protection of UTA.

2. The Consultant's insurance coverage shall be primary insurance and non- contributory with respect to all other available sources.

C. NOTICE OF CANCELLATION: Each insurance policy required by the insurance provisions of this Contract shall provide the required coverage and shall not be suspended, voided or canceled except after thirty (30) days prior written notice has been given to the Utah Transit Authority, except when cancellation is for non-payment of premium, then ten (10) days prior

notice may be given. Such notice shall be sent directly to (Utah Transit Authority agency Representative's Name & Address).

D. ACCEPTABILITY OF INSURERS: Insurance is to be placed with insurers duly licensed or authorized to do business in the State and with an "A.M. Best" rating of not less than A-VII. The Utah Transit Authority in no way warrants that the above-required minimum insurer rating is sufficient to protect the Consultant from potential insurer insolvency.

E. VERIFICATION OF COVERAGE: Consultant shall furnish the Utah Transit Authority with certificates of insurance (on standard ACORD form) as required by this Contract. The certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf.

All certificates and any required endorsements are to be sent to insurancecerts@rideuta.com and received and approved by the Utah Transit Authority before work commences. Each insurance policy required by this Contract must be in effect at or prior to commencement of work under this Contract and remain in effect for the duration of the project. Failure to maintain the insurance policies as required by this Contract or to provide evidence of renewal is a material breach of contract.

All certificates required by this Contract shall be emailed directly to Utah Transit Authority's insurance email address at insurancecerts@rideuta.com. The Utah Transit Authority project/contract number and project description shall be noted on the certificate of insurance. The Utah Transit Authority reserves the right to require complete, certified copies of all insurance policies required by this Contract at any time. DO NOT SEND CERTIFICATES OF INSURANCE TO THE UTAH TRANSIT AUTHORITY'S CLAIMS AND INSURANCE DEPARTMENT.

F. SUBCONSULTANTS: Consultants' certificate(s) shall include all subconsultants as additional insureds under its policies or subconsultants shall maintain separate insurance as determined by the Consultant, however, subconsultant's limits of liability shall not be less than $1,000,000 per occurrence / $2,000,000 aggregate. Sub-consultants maintaining separate insurance shall name Utah Transit Authority as an additional insured on their policy. Blanket additional insured endorsements are not acceptable from sub-consultants. Utah Transit Authority must be scheduled as an additional insured on any sub-consultant policies.

G. APPROVAL: Any modification or variation from the insurance requirements in this Contract shall be made by Claims and Insurance Department or the Office of General Counsel, whose decision shall be final. Such action will not require a formal Contract amendment but may be made by administrative action.

20. **OTHER INDEMNITIES**

a. Consultant shall release, indemnify and hold harmless UTA and the other Indemnities against and from any and all Claims of any kind or nature whatsoever on account of infringement relating to Consultant's performance under this Contract. If notified promptly in writing and given authority, information and assistance, Consultant shall defend, or may settle at its expense, any suit or proceeding against UTA so far as based on a claimed infringement and Consultant shall pay all actual damages and costs awarded therein against UTA due to such breach. In case any portion of the Work is in such suit held to constitute such an infringement or an injunction is filed that interferes with UTA's rights under this Contract, Consultant shall, at its expense and through mutual agreement between the UTA and Consultant, either procure for

UTA any necessary intellectual property rights, or modify Consultant's services or deliverables such that the claimed infringement is eliminated.

b. Consultant shall: (i) release, indemnify and hold harmless UTA and the other Indemnities against and from any and all liens or Claims made or filed against UTA or upon the Work or the property on which the Work is located on account of any labor performed or labor, services, and equipment furnished by subconsultants of any tier; and (ii) keep the Work and said property free and clear of all liens or claims arising from the performance of any Work covered by this Contract by Consultant or its subconsultants of any tier. If any lien arising out of this Contract is filed, before or after Work is completed, Consultant, within ten (10) calendar days after receiving from UTA written notice of such lien, shall obtain a release of or otherwise satisfy such lien. If Consultant fails to do so, UTA may take such steps and make such expenditures as in its discretion it deems advisable to obtain a release of or otherwise satisfy any such lien or liens, and Consultant shall upon demand reimburse UTA for all costs incurred and expenditures made by UTA in obtaining such release or satisfaction. If any non-payment claim is made directly against UTA arising out of non-payment to any subconsultant, Consultant shall assume the defense of such claim within ten (10) calendar days after receiving from UTA written notice of such claim. If Consultant fails to do so, Consultant shall upon demand reimburse UTA for all costs incurred and expenditures made by UTA to satisfy such claim.

c. Should the Consultant be required to provide defense pursuant to the requirements set forth in this section, any such defense cost shall be accrued to Consultant in a prorated proportion in accordance with its Consultant percentage of fault as determined by any applicable trier-of fact or as agreed to and incorporated into any settlement agreements.

21. **INDEPENDENT CONSULTANT**

Consultant is an independent consultant and agrees that its personnel will not represent themselves as, nor claim to be, an officer or employee of UTA by reason of this Contract. Consultant is responsible to provide and pay the cost of all its employees' benefits.

22. **PROHIBITED INTEREST**

No member, officer, agent, or employee of UTA during his or her tenure or for one year thereafter shall have any interest, direct or indirect, including prospective employment by Consultant in this Contract or the proceeds thereof without specific written authorization by UTA.

23. **CLAIMS/DISPUTE RESOLUTION**

a. "Claim" means any disputes between UTA and the Consultant arising out of or relating to the Contract Documents including any disputed claims for Contract adjustments that cannot be resolved in accordance with the Change Order negotiation process set forth in Article 6. Claims must be made by written notice. The responsibility to substantiate claims rests with the party making the claim.

b. Unless otherwise directed by UTA in writing, Consultant shall proceed diligently with performance of the Work pending final resolution of a Claim. UTA shall continue to pay any undisputed payments related to such Claim.

c. The parties shall attempt to informally resolve all claims, counterclaims and other

disputes through the escalation process described below. No party may bring a legal action to enforce any term of this Contract without first having exhausted such process.

d. The time schedule for escalation of disputes, including disputed requests for change order, shall be as follows:

Level of Authority	Time Limit
UTA's Project Manager-Manjeet Ranu/Consultant's Project Manager	Five calendar days
UTA's Chief Service Development Officer Mary DeLoretto/Consultant's [SECOND LEVEL]	Five calendar days
UTA's Executive Director Carolyn Gonot/Consultant's [THIRD LEVEL]	Five calendar days

Unless otherwise directed by UTA's Project Manager, Consultant shall diligently continue performance under this Contract while matters in dispute are being resolved.

If the dispute cannot be resolved informally in accordance with the escalation procedures set forth above, than either party may commence formal mediation under the Juris Arbitration and Mediation (JAMS) process using a mutually agreed upon JAMS mediator. If resolution does not occur through Mediation, then legal action may be commenced in accordance the venue and governing law provisions of this contract.

24. **GOVERNING LAW**

This Contract shall be interpreted in accordance with the substantive and procedural laws of the State of Utah. Any litigation between the parties arising out of or relating to this Contract will be conducted exclusively in federal or state courts in the State of Utah and Consultant consents to the jurisdiction of such courts.

25. **ASSIGNMENT OF CONTRACT**

Consultant shall not assign, sublet, sell, transfer, or otherwise dispose of any interest in this Contract without prior written approval of UTA, and any attempted transfer in violation of this restriction shall be void.

26. **NONWAIVER**

No failure or waiver or successive failures or waivers on the part of either party in the enforcement of any condition, covenant, or article of this Contract shall operate as a discharge of any such condition, covenant, or article nor render the same invalid, nor impair the right of either party to enforce the same in the event of any subsequent breaches by the other party.

27. **NOTICES OR DEMANDS**

a. Any formal notice or demand to be given by one party to the other shall be given in writing by one of the following methods: (i) hand delivered; (ii) deposited in the mail, properly stamped with the required postage; (iii) sent via registered or certified mail; or (iv) sent via recognized overnight courier service. All such notices shall be addressed as follows:

If to UTA:
Utah Transit Authority
ATTN: Vicki Woodward
Contract Administrator
669 West 200 South
Salt Lake City, UT 84101

with a required copy to:
Utah Transit Authority
ATTN: Legal Counsel
669 West 200 South
Salt Lake City, UT 84101

If to Consultant:
HNTB Corporation
Jason Bleyl
Program Manager
7730 S. Union Park Ave. #110
Midvale, UT 84047

b. Any such notice shall be deemed to have been given, and shall be effective, on delivery to the notice address then applicable for the party to which the notice is directed; provided, however, that refusal to accept delivery of a notice or the inability to deliver a notice because of an address change which was not properly communicated shall not defeat or delay the giving of a notice. Either party may change the address at which such party desires to receive written notice by providing written notice of such change to any other party.

c. Notwithstanding Section 27, the parties may, through mutual agreement, develop alternative communication protocols to address change notices, requests for information and similar categories of communications. Communications provided pursuant to such agreed means shall be recognized as valid notices under this Contract.

28. CONTRACT ADMINISTRATOR

UTA's Contract Administrator for this Contract is Vicki Woodward, or designee. All questions and correspondence relating to the contractual aspects of this Contract should be directed to said Contract Administrator, or designee.

29. INSURANCE COVERAGE REQUIREMENTS FOR CONSULTANT EMPLOYEES

a. The following requirements apply to the extent that: (i) the initial value of this Contract is equal to or in excess of $2 million; (ii) this Contract, with subsequent modifications, is reasonably anticipated to equal or exceed $2 million; (iii) Consultant has a subcontract at any tier that involves a sub-consultant that has an initial subcontract equal to or in excess of $1 million; or (iv) any subcontract, with subsequent modifications, is reasonably anticipated to equal or exceed $1 million:
b. Consultant shall, prior to the effective date of this Contract, demonstrate to UTA that Consultant has and will maintain an offer of qualified health insurance coverage (as defined by Utah Code Ann. § 17B-2a-818.5) for the Consultant's employees and the employee's dependents during the duration of this Contract.
c. Consultant shall also demonstrate to UTA that subconsultants meeting the above-described subcontract value threshold have and will maintain an offer of qualified health insurance coverage (as defined by Utah Code Ann. § 17B-2a-818.5) for the subconsultant's employees

and the employee's dependents during the duration of the subcontract.

30. **COSTS AND ATTORNEYS FEES**

If any party to this Agreement brings an action to enforce or defend its rights or obligations hereunder, the prevailing party shall be entitled to recover its costs and expenses, including mediation, arbitration, litigation, court costs and attorneys' fees, if any, incurred in connection with such suit, including on appeal

31. **ANTIDISCRIMINATION**

a. Employment Practices. Offeror hereby declares that it is and will remain fully compliant with the provisions of the Utah Anti-discrimination Act (UTAH CODE §§ 34A-5-101 TO 34A-5-108) and the equivalent anti-discrimination laws of its State of incorporation and/or headquarters location. Under the Act, an employer may not refuse to hire, promote, discharge, demote, or terminate a person, or to retaliate against, harass, or discriminate in matters of compensation or in terms, privileges, and conditions of employment against a person otherwise qualified, because of: race, color, sex, pregnancy, childbirth, or pregnancy-related conditions; age, if the individual is 40 years of age or older; religion; national origin; disability; sexual orientation; or gender identity.
b. Goods and Services Provided to UTA. In addition to avoiding discriminatory employment practices as described above, Offeror also declares that all goods and services it provides to UTA are useable and accessible by individuals with disabilities as described in Title II of the American with Disabilities Act and also Section III (H) of UTA Policy 6.1.1 which states that programs, services, and facilities procured by UTA will be accessible to and useable by individuals with disabilities. Offeror further certifies that any digital software, tool, program or web application must meet the most recent version of the Web Content Accessibility Guidelines (WCAG) found at https://www.w3.org/TR/WCAG21. To the extent Offeror is providing transportation services, vehicles or facilities it also declares that it is in compliance with Department of Transportation (DOT) ADA standards found at 49 CFR Parts 27, 37, 38, and 39.

32. **NO THIRD-PARTY BENEFICIARY**

The parties enter into this Contract for the sole benefit of the parties, in exclusion of any third-party, and no third-party beneficiary is intended or created by the execution of this Contract.

33. **FORCE MAJEURE**

Neither party to the Contract will be held responsible for delay or default caused by fire, riot, acts of God and/or war which are beyond that party's reasonable control. UTA may terminate the Contract after determining such delay or default will reasonably prevent successful performance of the Contract.

34. **SEVERABILITY**

Any provision of this Contract prohibited or rendered unenforceable by operation of law shall be ineffective only to the extent of such prohibition or unenforceability without invalidating the remaining provisions of this Contract.

35. **ENTIRE AGREEMENT**

This Contract shall constitute the entire agreement and understanding of the parties with respect to the subject matter hereof, and shall supersede all offers, negotiations and other agreements with respect thereto. The terms of the Contract supersede any additional or conflicting terms or provisions that may be preprinted on Vendor's work plans, cost estimate forms, receiving tickets, invoices, or any other related standard forms or documents of Vendor that may subsequently be used to implement, record, or invoice Goods and/or Services hereunder from time to time, even if such standard forms or documents have been signed or initialed by a representative of UTA. The terms of the Contract prevail in any dispute between the terms of the Contract and the terms printed on any such standard forms or documents, and such standard forms or documents will not be considered written amendments of the Contract.

36. **AMENDMENTS**

Any amendment to this Contract must be in writing and executed by the authorized representatives of each party.

37. **COUNTERPARTS**

This Contract may be executed in any number of counterparts and by each of the parties hereto on separate counterparts, each of which when so executed and delivered shall be an original, but all such counterparts shall together constitute but one and the same instrument. Any signature page of the Contract may be detached from any counterpart and reattached to any other counterpart hereof. The electronic transmission of a signed original of the Contract or any counterpart hereof and the electronic retransmission of any signed copy hereof shall be the same as delivery of an original.

38. **SURVIVAL**

Provisions of this Contract intended by their nature and content to survive termination of this Contract shall so survive including, but not limited to, Articles 5, 7, 8, 10, 14, 15, 17, 18, 19, 20, 23, 29 and 30.

UTAH TRANSIT AUTHORITY:

By_____
Manjeet Ranu
Director of Capital Projects
Date:

By_____
Mary DeLoretto
Chief Service Development Office
Date:

By_____
Carolyn Gonot
Executive Director
Date:

HNTB CORPORATION

DocuSigned by:
By Thomas Schnetzer, Vice President HNTB
693BA602872248A...
Thomas Schnetzer
Vice President
Date: 3/18/2021

Fed ID# 43-1623092

Approved as to Content and Form

DocuSigned by:
Michael L. Bell
70E33A415BA44F6...
Date 3/18/2021

Mike Bell, AAG State of Utah
And UTA Legal Counsel

Reviewed & Recommended

_____Date_____

Grey Turner, Sr Program Mgr, EngProject Dev
UTA Project Manager

UTA Project Code 20-03384VW

Exhibit A – Scope of Work

UTA Program Management Services Consultant Scope of Services

Consultant's organizational structure consists of the program manager and key roles including NEPA/Environmental, Grants Management, Pre-Construction Engineering, Systems & Signals, Construction Management, Project Controls. The Consultant program manager will work closely with and under the direction of UTA's Project Director and other departments to identify issues, opportunities for improvement, and to identify and allocate resources needed on assigned projects and departments in order to assist with the successful delivery of UTA's program. Consultant staff will be integrated with their respective UTA counterparts to provide the Scope of Services to UTA and help identify and assign resources to projects and departments.

The following Scope of Services closely mirrors the Scope of Services provided by UTA and identifies deliverables and our team's key resources for each task. The key resources for each task will function as the primary drivers of the task and will draw upon our extensive pool of local and national resources as needed to deliver the program. The Consultant will provide adjunct services at the request and under the direction of the UTA Project Director and coordination with the specific department as directed or by separate task orders.

Task 1.0 – Project Management

Task 1.1 – Project Management Meetings	
Task 1.1.1	Project Kickoff Meeting – Excluded (Included in Early NTP)
Task 1.1.2	Weekly Meetings - weekly meetings with UTA Project Director - Consultant's Program Manager (PM) will conduct regular coordination with UTA's Project Director and other UTA Management for program and project management support ***Deliverables: Meeting Agendas and Meeting Minutes***
Task 1.1.3	Executive Monthly Meeting – Monthly meetings with UTA executive leadership team to discuss PMSC performance, program, and projects ***Deliverables: Meeting Agendas and Meeting Minutes***

Task 1.2 – Program Schedule	
Task 1.2.1	Develop Capital Projects Program Schedule
Task 1.2.2	Program Schedule Monthly Updates - PM will provide monthly updates to program schedule including progress updates on capital projects

Task 1.3 – Program Schedule	
Task 1.3.1	Develop Capital Projects Budget Tracking
Task 1.3.2	Program Budget Monthly Updates - PM will track project budgets and regularly manage the performance of projects (monthly expenditures, trends, and cost-to-complete analysis)

Task 1.4 – Program Resources	
Task 1.4.1	Develop Program Resource Plan – Excluded (Included in Early NTP)
Task 1.4.2	Program Resource Plan Monthly Updates - provide monthly updates to identify resource needs for UTA departments and capital projects.

Task 1.5 – Project Delivery Assessments	
Task 1.5.1	Project Delivery Process Assessments - PM and leads will evaluate UTA project management processes including scope, budget, schedule, quality, and risk management. Discipline leads will be integrated with UTA counterparts to evaluate and make recommendations for improving the delivery processes and tools. ***Deliverables:*** • ***Project Development and Delivery White Paper – summary of findings and recommendations for project delivery.*** • ***Project Management Guidance White Paper – documented project management best practices for project setup, scope, schedule, budget, risk, and quality.***
Task 1.5.2	Project Management Training – PM will provide project management training to UTA project managers on an as-needed basis including training for new PMs and refresher training for existing PMs.

Task 1.6 – Success Management & Team Building	
Task 1.6.1	Capital Program Success Kickoff Meeting – kickoff meeting to establish agenda and key topics for Success Management Workshop. ***Deliverables: Meeting Agendas and Meeting Minutes***
Task 1.6.2	Success Management Workshop – PM will coordinate with UTA on scope and schedule and organize Success Management Workshops for UTA's program and projects as identified. One day workshop will evaluate strategic goals/objectives, evaluate opportunities and threats, and develop a plan for success. ***Deliverables: Success Management Plan***
Task 1.6.3	Quarterly Success Update Meetings (cross functional) ***Deliverables: Meeting Agendas and Meeting Minutes***
Task 1.6.4	Bi-Annual Partnering & Team Building - In coordination with UTA's Continuous Improvement Department, assist with the development, planning, and implementation of a team-building program for UTA. ***Deliverables: Team building plan and implementation***

Task 1.7 – PM Administration	
Task 1.7	PM Administration – monthly invoicing and progress reports

Task 2.0 – Capital Program Development Support

Task 2.1 – Evaluate 5-Year Capital Plan	
Task 2.1.1	Evaluate 5-Year Capital Plan - In coordination with UTA, under the guidance of the Planning and Engagement office, conduct evaluation and recommendations of UTA 5-Yr Capital Plan with an assessment of WFRC, MAG, UDOT, and Local Government plans and projects.
Task 2.1.2	Develop Capital Program Work Plan – develop plan based on evaluation of 5-year Capital Plan that considers funding, schedules, and relationships between UTA projects and other key stakeholder projects.

Task 2.2 – Capital Financial Planning	
Task 2.2.1	Capital and Financial Planning Support – support UTA with capital and financial planning
Task 2.2.2	Alternative Financial Program Analysis – support UTA with financial analysis and evaluation of grants and alternative financial programs
Task 2.2.3	Develop Unified Project development Approach White Paper

Task 2.3 – Horizon Program Management Controls System	
Task 2.3.1	Implementation Kickoff and Pre-Discovery Planning
Task 2.3.2	PMCS Discovery Workshops and Technical Memorandum - In coordination with UTA's project controls and accounting, investigate the development of the Horizon program management controls system or integration of IPCS into Horizon.
Task 2.3.3	Cost/Change Control Management Solution Implementation
Task 2.3.4	Scheduling Management Solution Implementation
Task 2.3.5	Document Control Management Solution Implementation
Task 2.3.6	Construction Management Solution Implementation
Task 2.3.7	Geospatial Mapping Management Solution Implementation
Task 2.3.8	Program Performance Dashboard and Reporting Solution Implementation
Task 2.3.9	Public Program Website Solution Implementation
Task 2.3.10	Support and Maintenance

Task 3.0 – Project Support

Task 3.1 – Project Management/Project Associate Project Support	
As determined by the UTA Project Director and working under the direction of the UTA PM, provide project management and/or project associate for delivery of assigned UTA capital projects including managing or assisting with scope, schedule, budget, risks, and quality.	
Task 3.1.1	Davis-SLC Community Connector Design
Task 3.1.2	Central Corridor Environmental and Design
Task 3.1.3	FrontRunner
Task 3.1.4	Downtown SLC Trax Feasibility Study
Task 3.1.5	Midvalley Connector
Task 3.1.6	Mountain View Corridor 5600 West Express Bus
Task 3.1.7	Sharp-Tintic
Task 3.1.8	UVX BYU Infill Station
Task 3.1.9	Innovative Mobility
Task 3.1.10	Point of the Mountain Transit Study Environmental and Design
Task 3.1.11	TIGER Grant Project
Task 3.1.12	Proposition 1
Task 3.1.13	S-Line Streetcar Extension to 2100 South
Task 3.1.14	TOD Station Area Planning
Task 3.1.15	Depot District CMGC
Task 3.1.16	600 South Station Platform
Task 3.1.17	Station and Platform Rehab
Task 3.1.18	Parking Lot Rehab
Task 3.1.19	Bridge Rehab and Maintenance

Task 3.2 – General Project Management Support	
Task 3.2.1	Risk Management - Develop and manage risk registers throughout the duration of assigned capital projects. Conduct risk workshops on more complex projects as determined by the UTA Project Director and PM. ***Deliverables: Risk registers for assigned projects***
Task 3.2.2	Readiness Reviews - Organize and conduct readiness reviews on assigned new capital projects to confirm Scope of Services, deliverables, work breakdown structure, cost estimate, schedule, resources, risks, document control, quality, and contracting are developed and meet the program and project requirements. (WSP did for Federal projects but not all) ***Deliverables: Readiness review meeting agendas and reports***

Task 3.2.3	Develop Cost Estimating Process - Develop consistent processes for cost estimating. Evaluate existing practices/processes and make recommendations for improvements or modifications. ***Deliverables: Standardized cost estimating processes***
Task 3.2.4	Develop Project Scheduling Process - Develop consistent processes for project delivery scheduling. Evaluate existing practices/processes and make recommendations for improvements or modifications. ***Deliverables: Standardized project delivery scheduling processes***
Task 3.2.5	Construction Delivery Review - Organize and conduct construction delivery reviews to plan projects that minimize disruptions to operations and select the most efficient delivery method. ***Deliverables: Construction delivery reports***
Task 3.2.6	FTA Project Management Plan Support - Support in development of FTA compliant project management plans, sub-plans, and other required documentation, as well as assisting with monthly and/or quarterly meetings and plan updates as necessary. ***Deliverables: FTA compliant project management and other readiness documentation***
Task 3.2.7	Safety and Security Reviews - Assist the UTA safety department with safety and security reviews of assigned projects and assist with development of PHAs, TVAs and other analysis and evaluations.

Task 4.0 – Planning

Task 4.0 – Planning	
Task 4.0	Planning - Provide planning support to UTA's Planning and Engagement office. Specific tasks include the following: (Not in the past three or four years) • Transit planning support • Project management or assistance • Procurement support • GIS support and analysis • Travel demand modeling • Development and review of planning documents • TOD planning and evaluation of funding/financing options and value capture • Alternative and micro transit planning support • Land use planning and visioning • Real estate market analysis • Equity analysis • Equitable public engagement opportunities

Task 5.0 – Engagement and Outreach

Task 5.0 – Engagement and Outreach	
Task 5.0	Engagement and Outreach - Provide engagement and outreach support to UTA's Planning and Engagement office. Specific tasks include the following: • In coordination with UTA, under the guidance of the Planning and Engagement Office, develop stakeholder outreach and coordination plan – identification of key stakeholders for projects and program success • Organize and staff public stakeholder events • Assist the development of the Horizon external facing dashboard for transparency to the public and stakeholder groups ***Deliverables: Stakeholder Outreach Plan for program and projects***

Task 6.0 – Grants Management Services

Task 6.0 – Grants Management Services	
Assist UTA's Grants Management group and Project Development group	
Task 6.1	Evaluate 5-year Capital Plan - Evaluation of 5-year capital plan funding program, provide program wide risk assessment, and developing strategies to advance projects.
Task 6.2	Conduct Grants Workshop - Identify and define potential grant funding opportunities
Task 6.3	Develop Federal & State Grants Strategy/Roadmap
Task 6.4	Grants Support - Grant application support and review. Assistance with benefit cost analysis, ridership projections, land-use models and other data required for grants. Assistance in Grant tracking and reporting
Task 6.5	Evaluate Grants Management Practices - Assessment of UTA grants management practices
Task 6.6	Develop Grants Management Memo – provide recommendations for improvement

Task 7.0 – NEPA/Environmental Services

Task 7.0 – NEPA/Environmental Services	
Task 7.1	Procurement Services - Assist UTA in procurement of services including development of Scope of Services, proposal evaluation criteria, cost estimates, and negotiation support. ***Deliverables:*** • ***Procurement documents and evaluation criteria*** • ***Negotiation documents (independent cost estimates, cost estimate analysis, scope review)***
Task 7.2	Environmental Document Review - Review environmental documents prepared by UTA and other consultants. ***Deliverables: Quality records from reviews***
Task 7.3	Environmental Support - Provide environmental support to UTA including the following: • Strategic advice • Environmental analysis to meet requirements of the National Environmental Policy Act (NEPA) • Preparation of environmental documents and reports • Perform Section 106 and Section 4(f) surveys and studies as directed • Perform monitoring, modeling and reports, as directed • Prepare NEPA Mitigation Tracking Logs ***Deliverables:*** • ***Environmental reports and surveys*** • ***NEPA Mitigation Tracking Logs***

Task 8.0 – Pre-Construction Services

Task 8.0 Pre-Construction Services	
Task 8.1	Design Criteria Review - Review design criteria for industry best practices and standards. Organize and hold after action reviews for projects upon completion for lessons learned and to recommend changes to standards if necessary. ***Deliverables:*** • ***After action review reports – recommendations for changes in design criteria*** • ***Lessons learned logs on assigned projects***

Task 8.2	Procurement Services - Assist with development of procurement documents and independent cost estimates for design services contracts. ***Deliverables: Procurement documents for design services on assigned projects***
Task 8.3	Project Support - Provide project support to UTA including the following: • Assist with the development of permit/agreement logs for assigned projects and support UTA with providing the required documentation, coordination, and management of schedule relating to securing permits and agreements. Review of design team project schedules and work plans for required permits. • Perform design and constructability quality reviews of assigned project plans, specifications, estimates, and schedules. • Perform reviews of right-of-way plans for property needs for permanent and temporary use including permanent features and required easements for construction purposes, slopes, and/or utilities. • Assist with the development and/or review of utility matrices to track utility conflicts for assigned projects. Coordinate and manage utility agreements and designs as required with utility companies. • Organize and conduct value engineering workshops as directed by UTA. Develop value engineering report documenting the findings of the workshop. • Provide assistance with safety and security reviews of assigned projects and assist with development of safety and security documents. • Provide engineering support for projects as directed. ***Deliverables:*** • ***Permit/agreement logs reviews*** • ***Design and constructability quality review documentation*** • ***Utility matrices and agreements*** • ***Value engineering workshops and reports*** • ***Safety and security documents***
Task 8.4	Structure Load Rating – perform structure load rating as requested
Task 8.5	Right-of-Way Acquisition Services - Assist UTA with right-of-way acquisition process as necessary to include preparation of legal descriptions, right-of-way tracking tools, appraisal reviews, and other acquisition support as needed. ***Deliverables:*** • ***Right-of-way instruments***

Task 9.0 – Construction Management, Administration and Oversight Services

Task 9.1 – Review CM and Oversight Processes	
Task 9.1	Review CM and Oversight Processes - Review of construction management and oversight processes including submittals, Requests for Information (RFI's), as-built, record drawings, and document control. Consultant will draft a technical memorandum outlining suggested recommendations to enhance processes for the delivery of projects including activities and timelines for implementation. ***Deliverables:*** • ***CM Processes Technical Memorandum***

Task 9.2 – Procurement Services	
Task 9.2	Procurement Services - Development of procurement documents for construction on assigned projects as requested.

	Deliverables: • ***Procurement documents for construction projects***

Task 9.3 – Construction Management and Oversight
Consultant will assist UTA with construction management on assigned projects, performing the following tasks: • Review of routine construction related documents including Requests for Information (RFIs), submittals, Notice of Design Changes (NDCs), Field Design Changes (FDCs), and as-built documentation as requested. • Develop and manage change order logs, evaluate consultant change orders, assess merit, develop independent cost estimates, and assist UTA with change order negotiations as requested. • Provide construction oversight activities as directed including observation, coordination of testing, daily logs, project progress updates, punch-list management, and project close-out functions. Review consultant quality plans, audit quality activities regularly, and manage non-conformance resolution. • Develop or review monthly reports on the status of assigned construction projects. Report are to include a snapshot of schedule, cost, quality, risks, DBE/SBE utilization, and a summary of critical project activities/issues. Progress reports will be integrated with Horizon and/or IPCS for both internal and external transparency to senior leadership, stakeholders, and the public • Provide support upon project completion, participating in walk-throughs, final acceptance, testing, certification, start-up, commissioning, and documentation. ***Deliverables:*** • ***Construction oversight documentation*** • ***Change order logs and documentation*** • ***Monthly progress reports and Horizon/IPCS integration*** • ***Documentation at project completion***

Task 9.3.1	Ogden/WSU BRT
Task 9.3.2	Tiger Grant Projects
Task 9.3.3	Depot District CMGC
Task 9.3.4	Other Projects as Assigned
Task 9.3.5	Stations and Platforms Rehab and Replacement
Task 9.3.6	Park and Ride Rehab and Replacement
Task 9.3.7	Bridge Rehab and Maintenance
Task 9.3.8	Grade Crossing Rehab and Replacement
Task 9.3.9	Rail Rehab and Replacement
Task 9.3.10	Ballast and Ties Rehab and Replacement

Task 9.4 – Project Partnering Workshops	
Task 9.4	Project Partnering Workshops – Evaluate need for partnering on projects and participate in partnering workshops.

Task 9.5 – FTA Program Plan and Approval Support	
Task 9.5	FTA Program Plan and Approval Support – Develop schedule for and provide support in developing and obtaining necessary FTA-required program plans and approvals. ***Deliverables:*** • ***Schedule of FTA approvals and associated plans***

Task 9.6 – Safety and Oversight	
Task 9.6	Safety and Oversight – Provide safety oversight assistance on construction projects.

Task 10.0 – Project Controls Services

Task 10.0 – Project Controls Services	
Task 10.1	Cost Estimating - Develop or review of cost estimates for assigned capital projects and perform periodic reviews/updates as the projects progress. Utilize the Cost Estimate Validation Process (CEVP) for larger more complex projects as agreed upon by UTA. ***Deliverables:*** • ***Cost estimates*** • ***Estimate review documentation***
Task 10.2	Funding Plan Analysis - Analysis of funding plan for capital program for efficient utilization of funding. ***Deliverables:*** • ***Funding plan recommendations***
Task 10.3	Monthly Project Status Reporting - Development and evaluation of project budgets and tracking budgets throughout the life of projects. Review functionality of Horizon/IPCS for tracking project's progress and recommend improvements or changes to project controls systems to ensure accurate reporting on budget, schedule, deliverables, quality, and risks. Develop monthly project status reports. Develop and/or coordinate regular cost-to-complete analysis on capital projects and prepare cash flow curves for funding sources to assess project performance. ***Deliverables:*** • ***Monthly project status reports*** • ***Cost-to-complete analysis and cash flow curves***
Task 10.4	Change Order Tracking and Management - Maintain change management logs for assigned projects for tracking change orders. Assist UTA with documenting and evaluating change orders including contract review, development of independent cost estimates, schedule analysis, and negotiation support. Impacts to program funding will be evaluated monthly. ***Deliverables:*** • ***Project change order logs and documentation***
Task 10.5	Project Negotiation Support - Review external consultant scopes of work, schedules, costs, and quality plans. Develop independent scopes and estimates for evaluation. Assist UTA with negotiation strategy and negotiation meetings. ***Deliverables:*** • ***Review and independent analysis documentation***
Task 10.6	Program and Project Scheduling - Evaluate schedules for existing projects and coordinate development of cost loaded schedules for new projects. Develop program wide schedule integrating capital project cost loaded schedules to assess time-based funding requirements for the Financial Plan. ***Deliverables:*** • ***Project and program schedules***
Task 10.7	Develop Document Control Manual and Training - Develop document control manual for consistent project record keeping. Provide training and oversight of document control processes. ***Deliverables:*** • ***Document control manual and training***

Task 11.0 – Systems & Signal Engineering Oversight

Task 11.1 – Engineering and Construction Oversight	
Provide engineering oversight, design reviews, and technical support for the following: • Rail systems/signals • Traffic/transit signals and ITS • Rail communications • Traction power • Rail operation and simulation analysis • Positive Train Control • Asset and fleet management • Vehicle engineering • Overhead Catenary System ***Deliverables:*** • ***Systems & Signals Oversight and review documents***	
Task 11.1.1	Technical Engineering Oversight
Task 11.1.2	Traction Power Rehab and Replacement
Task 11.1.3	Rail Switches/Trackwork Controls
Task 11.1.4	Stray Current Mitigation
Task 11.1.5	OCS Rehab and Replacement

Task 11.2 – Rail Operations and Simulations Analysis Review	
Task 11.2	Rail Operations and Simulations Analysis Review ***Deliverables:*** • ***Rail Operations and Simulations Analysis Report***

Task 12.0 – Quality Assurance and Consultant Performance Evaluation

Task 12.0 – Quality Assurance and Consultant Performance Evaluation	
Task 12.1	Evaluate UTA Quality Plan and Procedures - Review UTA's quality control plan and procedures. Develop technical memorandum with recommendations for revisions to the plan, processes, and procedures. Draft revisions to UTA quality management plan (QMP). ***Deliverables:*** • ***Quality Management Plan Tech Memo*** • ***Draft Revisions to UTA QMP***
Task 12.2	Submit HNTB QMP for UTA Review and Approval - Develop Consultant quality management plan for UTA approval. ***Deliverables:*** • ***HNTB Quality Management Plan***
Task 12.3	Procurement Quality Documents Support - Develop procurement language for quality management plan requirements. Assist UTA with review and approval of consultant and consultant quality management plans. ***Deliverables:*** • ***Quality management plan procurement language***
Task 12.4	Quality Management and Auditing - Perform audits of consultant and consultant quality processes.

	Deliverables: • ***Audit reports***

Task 13.0 – Adjunct Services

Task 13.0 – Adjunct Services	
Task 13.0	Adjunct Services - •Provide adjunct services as outlined in the RFQu as requested by UTA.

Exhibit B – Pricing

UTA Program Management Services
March 29, 2021 through March 31, 2022
Prepared March 11, 2021

Task	Task Description	HNTB Total Hours	HNTB Labor Cost	HNTB ODCs (Travel, etc.)	HNTB TOTAL
1	Project Management	3,490	$689,377	$24,415	$713,792
2	Capital Program Development Support	3,930	$740,682	$199,468	$940,151
3	Project Support	2,610	$588,490	$962	$589,453
4	Planning	270	$58,097	$1,767	$59,864
5	Engagement and Outreach	0	$0	$0	$0
6	Grants Management Services	290	$101,563	$304	$101,866
7	NEPA/Environmental Services	460	$109,916	$1,083	$110,999
8	Pre-Construction Services	1,820	$382,400	$18,580	$400,980
9	Construction Management, Administration and Oversight Services	2,910	$499,438	$924	$500,362
10	Project Controls Services	1,450	$313,939	$843	$314,782
11	Systems and Signals Engineering Oversight	770	$197,440	$595	$198,035
12	Quality Assurance and Consultant Performance Evaluation	420	$80,262	$417	$80,680
13	Adjunct Services	180	$40,477	$490	$40,967
	Totals	**18,620**	**$3,802,081**	**$249,849**	**$4,051,931**

Subconsultant	Subconsultant Hours	Subconsultant Labor	Subconsultant ODCs	Total Subconsultant Cost
ARUP	70	$27,510	$2,100	$29,610
B2 Land Services	720	$72,000	$710	$72,710
Coco Consulting	230	$80,500	$1,330	$81,830
Connetics	180	$37,568	$710	$38,278
Consulting Eng.	280	$46,094	$710	$46,804
CRSA	170	$36,234	$1,210	$37,444
Deutsche Bahn	120	$25,493	$2,555	$28,048
Fehr & Peers	1,630	$276,592	$3,698	$280,290
Infinity Corrosion	280	$43,400	$355	$43,755
Jacques & Associates	190	$36,512	$2,646	$39,158
Johnson Construction	920	$110,400	$1,507	$111,907
Kimley-Horn	900	$234,941	$24,777	$259,718
Leland Consulting	120	$26,827	$6,035	$32,862
Mgrodner LLC	100	$24,000	$2,400	$26,400
MIG	210	$40,500	$5,435	$45,935
PineTop	90	$12,623	$0	$12,623
RailPros	430	$101,153	$1,317	$102,470
Redcon	450	$59,850	$710	$60,560
Stanton Constructability	640	$101,562	$1,460	$103,022
Terracon	460	$97,934	$1,210	$99,144
TRES	280	$64,400	$355	$64,755
Subconsultant Subtotal	**8,470**	**$1,556,092**	**$61,230**	**$1,617,322**
Subtotals	**27,090**	**$5,358,174**	**$311,079**	**$5,669,253**
Subconsultant 4% Markup				**$62,244**
		Total Cost prior to 3.0% Cost of Living Inflation / Merit Escalation		**$5,731,497**

Year One 3.0% Escalation	$171,945	$	**5,903,441**
Year Two subtract 1.5 FTE (Horizon and establishing PM processes	-$555,000		
Year Two Subtotal	$5,348,441		
Year Two 3.0% Escalation	$160,453	$	**5,508,895**
Year Three 3.0% Escalation	$165,267	$	**5,674,162**
	Three Year Contract Costs	$	**17,086,498**

UTA PMSC Fee Estimate Detail

							29-Mar-21	31-Mar-22	264	14.66	27,090	$5,358,174	$311,079	$5,669,253
WBS	COUNT	FIRM	NAME (Last, First)	CLASSIFICATION	DBE	Bill Rate	Start Date (Input Est)	End Date (Input Est)	Net Work Days	FTE	Total Hours	Total Labor	ODC's	Total Amount
1.0 Project Management					**3**		**29-Mar-21**	**31-Mar-22**	**264**	**2.16**	**4,000**	**$846,596**	**$33,662**	**$880,258**
1.1 Project Management Meetings					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.22**	**400**	**$99,120**	**$9,545**	**$108,665**
1.1	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.09	170	$38,211	$0	$38,211
1.1	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.05	100	$24,339	$0	$24,339
1.1	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.05	100	$25,313	$0	$25,313
1.1	1	HNTB	Spaethling, Dominic	Principal In Charge		$375.25	29-Mar-21	31-Mar-22	231	0.02	30	$11,257	$9,000	$20,257
1.1	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545
1.2 Program Schedule					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.12**	**230**	**$54,774**	**$545**	**$55,318**
1.2	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.02	40	$8,991	$0	$8,991
1.2	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.07	130	$31,641	$0	$31,641
1.2	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.03	50	$12,656	$0	$12,656
1.2	4	Stanton	Pala, Pam	Scheduling Lead		$148.56	29-Mar-21	31-Mar-22	231	0.6%	10	$1,486	$0	$1,486
1.2	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545
1.3 Program Budget					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.66**	**1,230**	**$227,942**	**$545**	**$228,487**
1.3	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.02	30	$6,743	$0	$6,743
1.3	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.05	90	$21,905	$0	$21,905
1.3	2	HNTB	Project Accountant	Project Accountant		$185.19	29-Mar-21	31-Mar-22	231	0.55	1,020	$188,894	$0	$188,894
1.3	2	HNTB	Metcalf, Aaron	Contract Administration & Accounting		$115.56	29-Mar-21	31-Mar-22	231	0.05	90	$10,400	$0	$10,400
1.3	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545
1.4 Program Resources					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.10**	**180**	**$42,443**	**$545**	**$42,988**
1.4	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.06	110	$24,724	$0	$24,724
1.4	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.04	70	$17,719	$0	$17,719
1.4	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545
1.5 Project Delivery Assessments					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.25**	**460**	**$106,691**	**$14,645**	**$121,335**
1.5	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.06	100	$22,477	$0	$22,477
1.5	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.14	260	$63,282	$0	$63,282
1.5	3	HNTB	Rankin, Ryan	Quality Manager/Civil Inspection		$182.44	29-Mar-21	31-Mar-22	231	0.01	20	$3,649	$0	$3,649
1.5	3	HNTB	Rasmussen, Corrine	Document Controls		$104.76	29-Mar-21	31-Mar-22	231	0.01	20	$2,095	$0	$2,095
1.5	6	HNTB	Libberton, Sean	Grants Management Lead		$349.85	29-Mar-21	31-Mar-22	231	0.00	0	$0	$5,700	$5,700
1.5	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.03	60	$15,188	$0	$15,188
1.5	2	HNTB	Farley, David	Systems & Signals Engineering Lead		$356.20	29-Mar-21	31-Mar-22	231	0.00	0	$0	$8,400	$8,400
1.5	3	HNTB	Paxton, Brett	Construction Management Lead		$157.25	29-Mar-21	31-Mar-22	231	0.00	0	$0	$0	$0
1.5	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545

1.6 Success Management & Team Building					**3**		**29-Mar-21**	**31-Mar-22**	**264**	**0.35**	**650**	**$201,168**	**$7,295**	**$208,462**
1.6	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.04	80	$17,981	$0	$17,981
1.6	1	HNTB	Hawks, Dal	Success Management/Team Building		$392.18	29-Mar-21	31-Mar-22	231	0.04	70	$27,453	$0	$27,453
1.6	2	Jacques & Assoc.	Jacques, Sydne	Success Management/Team Building	DBE	$192.17	29-Mar-21	31-Mar-22	231	3.9%	70	$13,452	$0	$13,452
1.6	2	COCO Consulting	Meyer, Steve	Strategic Advisor	DBE	$350.00	29-Mar-21	31-Mar-22	231	4.8%	90	$31,500	$0	$31,500
1.6	1	COCO Consulting	Robertson, Mike	Strategic Advisor	DBE	$350.00	29-Mar-21	31-Mar-22	231	5.6%	100	$35,000	$0	$35,000
1.6	1	Mgrodner LLC	Grodner, Mike	Strategic Advisor		$240.00	29-Mar-21	31-Mar-22	231	5.2%	100	$24,000	$2,400	$26,400
1.6	1	Kimley-Horn	Hedayat, Leyla	Strategic Advisor		$346.74	29-Mar-21	31-Mar-22	231	3.9%	70	$24,272	$2,250	$26,522
1.6	1	ARUP	Anderson, Bill	Strategic Advisor		$393.00	29-Mar-21	31-Mar-22	231	3.9%	70	$27,510	$2,100	$29,610
1.6	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545
1.7 PM Administration (progress reporting, invoicing, document control, etc.)					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.46**	**850**	**$114,458**	**$545**	**$115,003**
1.7	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.05	100	$22,477	$0	$22,477
1.7	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.03	50	$12,170	$0	$12,170
1.7	2	HNTB	Metcalf, Aaron	Contract Administration & Accounting		$115.56	29-Mar-21	31-Mar-22	231	0.32	600	$69,335	$0	$69,335
1.7	3	HNTB	Rasmussen, Corrine	Document Controls		$104.76	29-Mar-21	31-Mar-22	231	0.05	100	$10,476	$0	$10,476
1.7	22		ODC's				29-Mar-21	31-Mar-22	264				$ 544.57	$545
2.0 Capital Program Development Support					**1**		**29-Mar-21**	**31-Mar-22**	**264**	**2.18**	**4,030**	**$765,010**	**$200,029**	**$965,038**
2.1 - Evaluate 5-Year Capital Plan					**1**		**29-Mar-21**	**31-Mar-22**	**264**	**0.13**	**250**	**$63,497**	**$428**	**$63,924**
2.1	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.03	60	$13,486	$0	$13,486
2.1	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.03	60	$15,188	$0	$15,188
2.1	6	HNTB	Libberton, Sean	Grants Management Lead		$349.85	29-Mar-21	31-Mar-22	231	0.02	30	$10,496	$0	$10,496
2.1	4	Fehr & Peers	Vyas, Maria	Planning Lead		$172.12	29-Mar-21	31-Mar-22	231	3.0%	60	$10,327	$0	$10,327
2.1	2	COCO Consulting	Meyer, Steve	Strategic Advisor	DBE	$350.00	29-Mar-21	31-Mar-22	231	2.2%	40	$14,000	$0	$14,000
2.1	22		ODC's				29-Mar-21	31-Mar-22	264				$ 427.50	$428
2.2 - Capital Financial Planning					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.18**	**330**	**$98,944**	**$3,056**	**$102,000**
2.2	2	HNTB	Guilmino, Brad	Financial Planning & Modeling		$381.81	29-Mar-21	31-Mar-22	231	0.06	120	$45,817	$2,628	$48,445
2.2	1	HNTB	Kopp, Chris	Financial Planning & Modeling		$246.36	29-Mar-21	31-Mar-22	231	0.04	70	$17,245	$0	$17,245
2.2	1	HNTB	Brown, Steve	Economic Cost Benefit Analysis		$162.76	29-Mar-21	31-Mar-22	231	0.04	70	$11,393	$0	$11,393
2.2	6	HNTB	Libberton, Sean	Grants Management Lead		$349.85	29-Mar-21	31-Mar-22	231	0.04	70	$24,490	$0	$24,490
2.2	22		ODC's				29-Mar-21	31-Mar-22	264				$ 427.50	$428
2.3 - Horizon Program Management Controls System					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**1.86**	**3,450**	**$602,569**	**$196,546**	**$799,114**
2.3	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.01	20	$4,495	$0	$4,495
2.3	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.04	80	$19,471	$0	$19,471
2.3	1	HNTB	Ford, Aaron	PM Controls System Developer		$214.82	29-Mar-21	31-Mar-22	231	0.15	280	$60,150	$6,984	$67,134
2.3	1	HNTB	Pareja, Carlos	Technology Project Manager		$188.36	29-Mar-21	31-Mar-22	231	0.22	400	$75,346	$0	$75,346
2.3	1	HNTB	Rolfes, Linda	Business Process and Intelligence Lead		$251.65	29-Mar-21	31-Mar-22	231	0.25	460	$115,758	$0	$115,758

UTA PMSC Fee Estimate Detail

2.3	1	HNTB	Welch, Darin	Geospatial Lead		$207.84	29-Mar-21	31-Mar-22	231	0.15	280	$58,194	$0	$58,194
2.3	1	HNTB	Doshi, Ria	Lead Developer		$153.02	29-Mar-21	31-Mar-22	231	0.34	630	$96,403	$0	$96,403
2.3	1	HNTB	Gambrel, Matthew	Buisness Process and Controls Analyst		$108.57	29-Mar-21	31-Mar-22	231	0.02	40	$4,343	$0	$4,343
2.3	1	HNTB	Copeland, Paul	Business Process and Intelligence Developer		$113.23	29-Mar-21	31-Mar-22	231	0.13	240	$27,175	$0	$27,175
2.3	1	HNTB	LeBeau, Hannah	Graphic Design Lead		$78.28	29-Mar-21	31-Mar-22	231	0.04	80	$6,263	$0	$6,263
2.3	1	HNTB	Sukavasi, Swathi	Sr. Design/Developer		$142.65	29-Mar-21	31-Mar-22	231	0.20	370	$52,780	$0	$52,780
2.3	1	HNTB	Townsend, Anthony	Sr. Design/Developer		$157.89	29-Mar-21	31-Mar-22	231	0.18	330	$52,103	$0	$52,103
2.3	1	HNTB	Cozzens, William	Geospatial Developer		$157.89	29-Mar-21	31-Mar-22	231	0.02	40	$6,316	$0	$6,316
2.3	1	HNTB	Tiller, Scott	BIM/CAD Designer		$99.69	29-Mar-21	31-Mar-22	231	0.02	40	$3,987	$0	$3,987
2.3	1	HNTB	Grasshoff, Ian	Geospatial Developer		$140.32	29-Mar-21	31-Mar-22	231	0.02	40	$5,613	$0	$5,613
2.3	1	HNTB	Medina, Earl	Geospatial Developer		$115.14	29-Mar-21	31-Mar-22	231	0.02	40	$4,605	$0	$4,605
2.3	1	HNTB	Xiang, Aster	Geospatial Developer		$131.01	29-Mar-21	31-Mar-22	231	0.02	40	$5,240	$0	$5,240
2.3	1	HNTB	Quinlan, Dennis	Geospatial Developer		$108.15	29-Mar-21	31-Mar-22	231	0.02	40	$4,326	$0	$4,326
2.3	22		ODC's				29-Mar-21	31-Mar-22	264				$189,562	$189,562
3.0 Project Support					0		29-Mar-21	31-Mar-22	264	2.24	4,140	$ 887,402	$ 20,250	$ 907,652
3.1 Project Management/Project Associate Project Support					0		29-Mar-21	31-Mar-22	264	1.87	3,450	$729,969	$20,250	$750,219
3.1	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.16	300	$67,430	$0	$67,430
3.1	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.00	0	$0	$0	$0
3.1	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.22	410	$103,783	$0	$103,783
3.1	2	Kimley-Horn	Witzig, Jeanne	NEPA/Environmental Lead		$289.25	29-Mar-21	31-Mar-22	231	17.3%	320	$92,560	$17,460	$110,020
3.1	4	Fehr & Peers	Vyas, Maria	Planning Lead		$172.12	29-Mar-21	31-Mar-22	231	57.4%	1,060	$182,447	$0	$182,447
3.1	2	HNTB	Kalafatis, Katrina	Rail/Track Engineer		$154.50	29-Mar-21	31-Mar-22	231	0.32	600	$92,701	$0	$92,701
3.1	2	HNTB	Farley, Kevin	Civil/Transportation Engineer		$248.26	29-Mar-21	31-Mar-22	231	0.30	560	$139,026	$0	$139,026
3.1	2	HNTB	Balle, Mitch	Structures Engineer		$260.11	29-Mar-21	31-Mar-22	231	0.11	200	$52,023	$0	$52,023
3.1	3	Stanton	Pala, Marko	Cost Estimating Lead		$168.82	29-Mar-21	31-Mar-22	231	0.0%	0	$0	$0	$0
3.1	4	Stanton	Pala, Pam	Scheduling Lead		$148.56	29-Mar-21	31-Mar-22	231	0.0%	0	$0	$0	$0
3.1	6	HNTB	Libberton, Sean	Grants Management Lead		$349.85	29-Mar-21	31-Mar-22	231	0.00	0	$0	$0	$0
3.1	2	HNTB	Gallagher, Vincent	FTA Strategy		$486.79	29-Mar-21	31-Mar-22	231	0.00	0	$0	$0	$0
3.1	22		ODC's				29-Mar-21	31-Mar-22	264				$ 2,790.00	$2,790
3.2 General Project Management Support					0		29-Mar-21	31-Mar-22	264	0.37	690	$157,433	$0	$157,433
3.2	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.07	130	$29,220	$0	$29,220
3.2	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.07	130	$31,641	$0	$31,641
3.2	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.09	160	$40,501	$0	$40,501
3.2	0	Stanton	Pala, Marko	Cost Estimating Lead		$168.82	29-Mar-21	31-Mar-22	231	4.3%	80	$13,506	$0	$13,506
3.2	0	Stanton	Pala, Pam	Scheduling Lead		$148.56	29-Mar-21	31-Mar-22	231	3.7%	70	$10,399	$0	$10,399
3.2	0	HNTB	Libberton, Sean	Grants Management Lead		$349.85	29-Mar-21	31-Mar-22	231	0.00	0	$0	$0	$0
3.2	0	HNTB	Gallagher, Vincent	FTA Strategy		$486.79	29-Mar-21	31-Mar-22	231	0.02	40	$19,471	$0	$19,471
3.2	3	HNTB	McNally, Ryan	Safety & Security		$161.70	29-Mar-21	31-Mar-22	231	0.02	40	$6,753	$0	$6,753
3.2	4	HNTB	Elder, Joel	Safety & Security		$240.22	29-Mar-21	31-Mar-22	231	0.02	40	$5,942	$0	$5,942
3.2	22		ODC's				29-Mar-21	31-Mar-22	264					$0

4.0 Planning					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.56**	**1,040**	**$199,230**	**$14,123**	**$213,352**
4.0	4	Fehr & Peers	Vyas, Maria	Planning Lead		$172.12	29-Mar-21	31-Mar-22	231	4.3%	80	$13,770	$0	$13,770
4.0	1	Fehr & Peers	Jewel, Paul	Transit Planning		$294.21	29-Mar-21	31-Mar-22	231	4.9%	90	$26,479	$0	$26,479
4.0	1	HNTB	Hage, Sara	Transit Planning		$195.56	29-Mar-21	31-Mar-22	231	0.05	90	$17,600	$0	$17,600
4.0	1	MIG	Barrett, Rick	Transit Planning		$225.00	29-Mar-21	31-Mar-22	231	6.5%	120	$27,000	$4,200	$31,200
4.0	1	MIG	Pheanis, Jon	Transit Planning		$150.00	29-Mar-21	31-Mar-22	231	4.9%	90	$13,500	$0	$13,500
4.0	1	Fehr & Peers	Brown, Natalia	Travel Demand Model/Traffic Operations		$107.40	29-Mar-21	31-Mar-22	231	4.9%	90	$9,666	$0	$9,666
4.0	1	Fehr & Peers	Yamagata, Seishi	Travel Demand Model/Traffic Operations		$112.54	29-Mar-21	31-Mar-22	231	4.9%	90	$10,129	$0	$10,129
4.0	1	HNTB	Gormely-Barnes, Diane	TOD Planning		$186.04	29-Mar-21	31-Mar-22	231	0.05	90	$16,743	$0	$16,743
4.0	1	Leland Consulting	Zahas, Chris	TOD Planning		$223.56	29-Mar-21	31-Mar-22	231	6.5%	120	$26,827	$4,800	$31,627
4.0	1	Kimley-Horn	Chester, Steven	TOD Planning		$152.92	29-Mar-21	31-Mar-22	231	4.9%	90	$13,763	$0	$13,763
4.0	1	HNTB	Siegel, Jeff	GIS		$263.92	29-Mar-21	31-Mar-22	231	0.05	90	$23,753	$0	$23,753
4.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 5,122.50	$5,123
5.0 Engagement and Outreach					**1**		**29-Mar-21**	**31-Mar-22**	**264**	**0.22**	**400**	**$71,233**	**$4,215**	**$75,448**
5.0	4	Fehr & Peers	Vyas, Maria	Planning Lead		$172.12	29-Mar-21	31-Mar-22	231	2.2%	40	$6,885	$0	$6,885
5.0	1	Kimley-Horn	Andrews, Amalia	Public Outreach		$195.52	29-Mar-21	31-Mar-22	231	8.7%	160	$31,283	$0	$31,283
5.0	1	Fehr & Peers	Croshere, Cheryl	Equity		$125.06	29-Mar-21	31-Mar-22	231	4.3%	80	$10,005	$0	$10,005
5.0	2	Jacques & Assoc.	Jacques, Sydne	Success Management/Team Building	DBE	$192.17	29-Mar-21	31-Mar-22	231	6.5%	120	$23,060	$0	$23,060
5.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 4,215.00	$4,215
6.0 Grants Management Services					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.16**	**290**	**$101,563**	**$880**	**$102,443**
6.0	6	HNTB	Libberton, Sean	Grants Management Lead		$349.85	29-Mar-21	31-Mar-22	231	0.10	190	$66,472	$0	$66,472
6.0	1	HNTB	Schruth, Susan	FTA Strategy		$450.17	29-Mar-21	31-Mar-22	231	0.03	50	$22,509	$0	$22,509
6.0	1	HNTB	Tyson, Cheryle	FTA Strategy		$251.65	29-Mar-21	31-Mar-22	231	0.03	50	$12,582	$0	$12,582
6.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 880.00	$880
7.0 NEPA/Environmental Services					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**0.38**	**700**	**$173,551**	**$3,140**	**$176,691**
7.0	2	Kimley-Horn	Witzig, Jeanne	NEPA/Environmental Lead		$289.25	29-Mar-21	31-Mar-22	231	11.9%	220	$63,635	$0	$63,635
7.0	1	HNTB	Demuth, Kimberly	NEPA Environmental		$271.12	29-Mar-21	31-Mar-22	231	0.08	140	$37,957	$0	$37,957
7.0	1	HNTB	Hill, Staci	NEPA Environmental		$211.65	29-Mar-21	31-Mar-22	231	0.19	340	$71,960	$0	$71,960
7.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 3,140.00	$3,140
8.0 Pre-Construction Services					**1**		**29-Mar-21**	**31-Mar-22**	**264**	**2.53**	**4,670**	**$789,399**	**$23,101**	**$812,500**
8.0	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.09	160	$35,963	$0	$35,963
8.0	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.12	220	$55,688	$0	$55,688
8.0	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.09	160	$38,943	$0	$38,943
8.0	2	HNTB	Kalafatis, Katrina	Rail/Track Engineer		$154.50	29-Mar-21	31-Mar-22	231	0.13	240	$37,080	$0	$37,080
8.0	1	HNTB	Wheeler, Justin	Rail/Track Engineer		$261.38	29-Mar-21	31-Mar-22	231	0.03	50	$13,069	$0	$13,069

8.0	2	RailPros	Marshall, Jim	Rail/Track Engineer		$235.24	29-Mar-21	31-Mar-22	231	7.0%	130	$30,581	$0	$30,581
8.0	1	HNTB	Handzel, Chris	Bus Rapid Transit		$222.65	29-Mar-21	31-Mar-22	231	0.09	170	$37,851	$12,000	$49,851
8.0	1	HNTB	Huffer, Mark	Bus Rapid Transit		$260.54	29-Mar-21	31-Mar-22	231	0.02	40	$10,421	$0	$10,421
8.0	2	HNTB	Farley, Kevin	Civil/Transportation Engineer		$248.26	29-Mar-21	31-Mar-22	231	0.05	90	$22,343	$0	$22,343
8.0	1	HNTB	Holzkamp, Stephanie	Civil/Transportation Engineer		$105.19	29-Mar-21	31-Mar-22	231	0.06	120	$12,623	$0	$12,623
8.0	1	CRSA	Gillman, Kelly	Transit Stations		$213.14	29-Mar-21	31-Mar-22	231	9.2%	170	$36,234	$0	$36,234
8.0	1	HNTB	Chen, Anko	Transit Stations		$243.18	29-Mar-21	31-Mar-22	231	0.04	70	$17,023	$0	$17,023
8.0	1	HNTB	Trautmann, John	Bus Facilities		$251.22	29-Mar-21	31-Mar-22	231	0.04	70	$17,586	$4,200	$21,786
8.0	2	HNTB	Balle, Mitch	Structures Engineer		$260.11	29-Mar-21	31-Mar-22	231	0.04	70	$18,208	$0	$18,208
8.0	1	Terracon	Chesnut, Rick	Geotechnical Engineer		$212.90	29-Mar-21	31-Mar-22	231	24.9%	460	$97,934	$0	$97,934
8.0	1	Johnson Const.	Johnson, Joe	Utility Coordination		$120.00	29-Mar-21	31-Mar-22	231	49.8%	920	$110,400	$0	$110,400
8.0	1	Redcon	Yates, Bryan	Survey	DBE	$133.00	29-Mar-21	31-Mar-22	231	24.4%	450	$59,850	$0	$59,850
8.0	1	HNTB	Marsh, Teri	Value Engineering		$176.30	29-Mar-21	31-Mar-22	231	0.06	120	$21,156	$0	$21,156
8.0	2	HNTB	Project Accountant	Project Accountant		$185.19	29-Mar-21	31-Mar-22	231	0.13	240	$44,446	$0	$44,446
8.0	1	B2 Land Services	Bachman, Maurine	ROW Acquisition		$100.00	29-Mar-21	31-Mar-22	231	39.0%	720	$72,000	$0	$72,000
8.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 6,901.00	$6,901
9.0 Construction Management, Administration and Oversight Services					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**2.01**	**3,710**	**$649,626**	**$2,680**	**$652,306**
9.0	3	HNTB	Paxton, Brett	Construction Management Lead		$157.25	29-Mar-21	31-Mar-22	231	0.71	1,320	$207,574	$0	$207,574
9.0	3	HNTB	Rankin, Ryan	Quality Manager/Civil Inspection		$182.44	29-Mar-21	31-Mar-22	231	0.77	1,420	$259,063	$0	$259,063
9.0	2	RailPros	Marshall, Jim	Rail/Transit Inspection & CM		$235.24	29-Mar-21	31-Mar-22	231	16.2%	300	$70,572	$0	$70,572
9.0	1	Consultant Eng.	Osman, Maher	Rail/Transit Inspection & CM		$164.62	29-Mar-21	31-Mar-22	231	11.9%	220	$36,216	$0	$36,216
9.0	2	HNTB	Heaton, Kelly	Systems Inspection		$185.83	29-Mar-21	31-Mar-22	231	0.05	90	$16,724	$0	$16,724
9.0	1	Infinity Corrosion	Llewellyn, Erik	Corrosion Control Testing		$155.00	29-Mar-21	31-Mar-22	231	15.2%	280	$43,400	$0	$43,400
9.0	2	HNTB	McNally, Ryan	Safety & Security		$161.70	29-Mar-21	31-Mar-22	231	0.02	40	$6,468	$0	$6,468
9.0	2	HNTB	Elder, Joel	Safety & Security		$240.22	29-Mar-21	31-Mar-22	231	0.02	40	$9,609	$0	$9,609
9.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 2,680.00	$2,680
10.0 Project Controls Services					**0**		**29-Mar-21**	**31-Mar-22**	**264**	**1.08**	**1,990**	**$399,987**	**$2,445**	**$402,432**
10.1	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.23	430	$104,659	$0	$104,659
10.1	3	Stanton	Pala, Marko	Cost Estimating Lead		$168.82	29-Mar-21	31-Mar-22	231	13.0%	240	$40,517	$0	$40,517
10.1	4	Stanton	Pala, Pam	Scheduling Lead		$148.56	29-Mar-21	31-Mar-22	231	13.0%	240	$35,654	$0	$35,654
10.1	1	Consultant Eng.	Elias, Daniel	Cost Estimating		$164.62	29-Mar-21	31-Mar-22	231	3.2%	60	$9,877	$0	$9,877
10.1	1	HNTB	Seneviratne, Asitha	Cost Estimating		$234.72	29-Mar-21	31-Mar-22	231	0.03	60	$14,083	$0	$14,083
10.2	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.15	270	$68,345	$0	$68,345
10.2	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.15	270	$60,687	$0	$60,687
10.3	2	HNTB	Guilmino, Brad	Financial Planning & Modeling		$381.81	29-Mar-21	31-Mar-22	231	0.04	80	$30,545	$0	$30,545
10.4	3	HNTB	Rasmussen, Corrine	Document Controls		$104.76	29-Mar-21	31-Mar-22	231	0.18	340	$35,620	$0	$35,620
10.4	22		ODC's				29-Mar-21	31-Mar-22	264				$ 2,445.00	$2,445

11.0 Systems and Signals Engineering Oversight					1		29-Mar-21	31-Mar-22	264	0.68	1,260	$299,956	$3,925	$303,881
11.0	2	HNTB	Farley, David	Systems and Signals Engineering Lead		$356.20	29-Mar-21	31-Mar-22	231	0.10	180	$64,116	$0	$64,116
11.0	1	HNTB	Hettinger, Craig	Rail Systems/Signals		$206.14	29-Mar-21	31-Mar-22	231	0.05	90	$18,553	$0	$18,553
11.0	1	PineTop	Wright, Mike	Traffic/Transit Signals and ITS		$140.26	29-Mar-21	31-Mar-22	231	4.9%	90	$12,623	$0	$12,623
11.0	1	HNTB	Kelly, Alex	Rail Communications		$241.70	29-Mar-21	31-Mar-22	231	0.10	180	$43,506	$0	$43,506
11.0	1	HNTB	Abdel Basit, Zac	Traction Power		$165.51	29-Mar-21	31-Mar-22	231	0.05	90	$14,896	$0	$14,896
11.0	1	TRES	Romo, Eduardo	Rail Operation & Simulation Analysis	DBE	$230.00	29-Mar-21	31-Mar-22	231	15.2%	280	$64,400	$0	$64,400
11.0	2	HNTB	Heaton, Kelly	PTC Management		$185.83	29-Mar-21	31-Mar-22	231	0.05	90	$16,724	$0	$16,724
11.0	1	Deutsche Bahn	Harris, Lynn	Asset & Fleet Management		$212.44	29-Mar-21	31-Mar-22	231	6.5%	120	$25,493	$2,200	$27,693
11.0	1	HNTB	Allen, Patrick	Vehicle Engineering		$256.73	29-Mar-21	31-Mar-22	231	0.05	90	$23,105	$0	$23,105
11.0	1	HNTB	Schlick, John	OCS		$330.80	29-Mar-21	31-Mar-22	231	0.03	50	$16,540	$0	$16,540
11.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 1,725.00	$1,725
12.0 Quality Assurance and Consultant Performance Evaluation					0		29-Mar-21	31-Mar-22	264	0.23	420	$80,262	$1,210	$81,472
12.0	3	HNTB	Rankin, Ryan	Quality Manager/Civil Inspection		$182.44	29-Mar-21	31-Mar-22	231	0.13	240	$43,785	$0	$43,785
12.0	14	HNTB	Bleyl, Jason	Program Manager		$224.77	29-Mar-21	31-Mar-22	231	0.04	70	$15,734	$0	$15,734
12.0	11	HNTB	Livingston, Laren	Project Controls Lead		$243.39	29-Mar-21	31-Mar-22	231	0.02	40	$9,736	$0	$9,736
12.0	3	HNTB	Paxton, Brett	Construction Management Lead		$157.25	29-Mar-21	31-Mar-22	231	0.04	70	$11,008	$0	$11,008
12.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 1,210.00	$1,210
13.0 Adjunct Services					1		29-Mar-21	31-Mar-22	264	0.24	440	$94,358	$1,420	$95,778
13.0	10	HNTB	Thorpe, Greg	Pre-Construction Engineering Lead		$253.13	29-Mar-21	31-Mar-22	231	0.05	90	$22,782	$0	$22,782
13.0	1	Connetics	Rosales, Susan	Operations and Cost Modeling	DBE	$208.71	29-Mar-21	31-Mar-22	231	9.74%	180	$37,568	$0	$37,568
13.0	1	HNTB	Marciante, Loreana	Alternative/Mirco Transit		$196.62	29-Mar-21	31-Mar-22	231	0.05	90	$17,696	$0	$17,696
13.0	1	Fehr & Peers	Jacobson, Daniel	Alternative/Mirco Transit		$172.12	29-Mar-21	31-Mar-22	231	2.16%	40	$6,885	$0	$6,885
13.0	1	Kimley-Horn	Crowther, Brent	Alternative/Mirco Transit		$235.70	29-Mar-21	31-Mar-22	231	2.16%	40	$9,428	$0	$9,428
13.0	22		ODC's				29-Mar-21	31-Mar-22	264				$ 1,420.00	$1,420

***The pricing contained in the table above represents an estimate of costs based on projected workload. Actual costs shall be based upon the actual work performed as directed by UTA. The contract contains no guaranteed minimum hours. Actual work performed will be based upon the needs of UTA. The loaded labor rates shown in the table above are inclusive of overhead, subconsultant handling, and profit and shall be used as the full up contract billing rates.**

Exhibit C – Exhibit C – Office Co-Location Expectation

Office Co-Location Expectations

1 UTA will provide the following items to help facilitate the office co-location arrangement:

- 1.1 Cubicle space for the Program Manager, Consultant's Team Member #1 and Consultant's Team Member #2.
- 1.2 A desk for Program Manager, Consultant's Team Member #1 and Consultant's Team Member #2.
- 1.3 An internet connection for all three.
- 1.4 A storage room for minor equipment and supplies

2 HNTB Corporation will provide the following to help facilitate the office co-location arrangement

- 2.1 Own computers and computer maintenance
- 2.2 Own printer
  - 2.2.1 Any supplies needed for the printer
  - 2.2.2 Printer maintenance
- 2.3 Any wireless routers or other computer hardware deemed necessary.

Exhibit D – Forms

Declaration & Federal Forms

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Mary DeLoretto, Chief Service Development Officer
PRESENTER(S): Mary DeLoretto, Chief Service Development Officer
Manjeet Ranu, Director of Capital Projects

TITLE:

Change Order: Program Management Services Contract Extension (WSP)

AGENDA ITEM TYPE:	Procurement Contract/Change Order
RECOMMENDATION:	Approve the change order and associated disbursements for the WSP Program Management contract extension in the amount of $1,271,600, allowing for continued capital program management services as the agency transitions to a new Program Management Services contractor in early 2021.
BACKGROUND:	To successfully deliver the Capital Program at UTA, specialty services and additional labor are needed at times to complete specific tasks and projects. These services include, but are not limited to, project management, construction inspection and oversight, right-of-way acquisition services, surveying, public involvement assistance, stray current identification, ridership and on-time modeling, vehicle overhaul assistance, project controls, design reviews, etc. The original contract for program management services with WSP was signed on March 3, 2014 to provide services for a 5-year period. The contract also reserves the option for three 1-year options following the original 5-year contract period. Last year, UTA opted to execute the second of the 1-year options which expired on March 3, 2021. A "time only" change order was executed on March 3, 2021 allowing WSP to continue working on specific projects. Executing the third of the 1-year options extended the WSP contract to March 3, 2022.

DISCUSSION:	UTA recently advertised a new Capital Program Management contract and selected a new consultant group, HNTB, who will soon be under contract, subject to Board approval. However, there are still some projects and tasks that WSP is involved with that would benefit from their continued involvement to ensure a successful completion or timely handoff. The decision to extend WSP's contract another year was determined by evaluating each project currently receiving program management assistance from WSP. There are several projects in which it would be more efficient for WSP to complete certain milestones or get to a specified hand-off point. As such, there will be some overlap between WSP and HNTB with the Program Management program. However, this overlap will ensure an efficient transition between Program Managers and ensure no projects are hindered in the process. The proposed amendment is for $1,271,600.
CONTRACT SUMMARY:	
Contractor Name:	WSP USA, Inc.
Contract Number:	UT13-064GL
Base Contract Effective Dates:	03/03/2014 to 03/03/2021
Extended Contract Dates:	03/03/2021 to 03/03/2022
Existing Contract Value:	$25,073,909
Amendment Amount:	$1,271,600
New/Total Amount Contract Value:	$26,345,509
Procurement Method:	Change Order #18 to add funding to Option No. 3 covering 03/03/21 to 03/02/22
Funding Sources:	UTA Capital and Operating Budgets
ALTERNATIVES:	Should a contract value increase for the contract extension not be authorized, current work with WSP would cease upon draw down of the existing budget and all work would be transferred to the new contractor and staff. This would create inefficiencies and schedule delays for certain projects that would not have the benefit of a transitional period.
FISCAL IMPACT:	Funds for this amendment are provided in the adopted 2021 capital and operating budget across the multiple business units that utilize capital program management services.
ATTACHMENTS:	1) Contract Change Order

Utah Transit Authority
669 West 200 South
Salt Lake City, Utah 84101
Phone: (801) 741-8885
Fax: (801) 741-8892

CHANGE ORDER
No. 18

TITLE: Authorization of additional budget for WSP's Program Management Services Contract

DATE: 4/14/2021

PROJECT/CODE: MUL2014 - Multi Year Prof Services Contracts

This is a change order to CONTRACT No: UT13-064GL

TO: WSP USA, Inc.

ATTN: Dana Meier

DESCRIPTION OF CHANGE: Brief scope, references to scope defining documents such as RFIs, submittals, specified drawings, exhibits, etc.

The original contract with WSP was signed on March 3, 2014 to provide services for a 5-year period. The contract also reserves the option for three 1-year options following the original 5-year contract period. Last year, UTA opted to execute the second of the 1-year options which expires on March 3, 2021.

To successfully deliver the Capital Program at UTA, specialty services and additional labor are needed at times to complete specific tasks and projects. These services include, but are not limited to, project management, construction inspection and oversight, right-of-way acquisition services, surveying, public involvement assistance, stray current identification, ridership and on-time modeling, vehicle overhaul assistance, project controls, design reviews, etc. there are still some projects and tasks that WSP is involved with that would benefit from its involvement to ensure a successful completion or timely handoff.

A "time only" change order was executed on March 3, 2021 allowing WSP to continue working on specific projects. Executing the third of the 1-year options extended the WSP contract to March 3, 2022.

Direction or Authorization to Proceed (DAP) previously executed: YES _____ NO __X__

It is mutually agreed upon, there is a schedule impact due to this Change order: YES _____ NO __X__

The amount of any adjustment to time for Substantial Completion and/or Guaranteed Completion or Contract Price includes all known and stated impacts or amounts, direct, indirect and consequential, (as of the date of this Change Order) which may be incurred as a result of the event or matter giving rise to this Change Order. Should conditions arise subsequent to this Change Order that impact the Work under the Contract, including this Change Order, and justify a Change Order under the Contract, or should subsequent Change Orders impact the Work under this Change Order, UTA or the Contractor may initiate a Change Order per the General Provisions, to address such impacts as may arise.

Current Change Order

Lump Sum:	$1,271,600
Unit Cost:	-
Cost Plus:	-
Total:	$1,271,600

Contract

Original Contract Sum:	$2,889,187
Net Change by Previously Authorized Changes:	$22,184,722
Previous Project Total:	$25,073,909
Net Change This Change Order:	$1,271,600
Current Project Total:	$26,345,509

Schedule

Final Completion Date Prior to This Change:	3/3/2022
Contract Time Change This Change Order (Calendar Days):	0
Final Completion Date as of This Change Order:	3/3/2022

ACCEPTED:
By:
Date:
Dana Meier
WSP USA, Inc.

By:
Date:
Grey Turner
Project Manager <$10,000

By:
Date:
Manjeet Ranu
Director of Capital Projects <$50,000

By:
Date:
Mary DeLoretto
Chief Service Dev Officer <$100,000

By:
Date:
Vicki Woodward
Procurement

By: DocuSigned by: Mike Bell
Date: 3/23/2021
Michael Bell
Legal Review

By:
Date:
Carolyn M. Gonot
Executive Director >$100,000

UTA

Change Order Summary Worksheet

Previously Authorized Changes

Contract	UT13-064GL PB

Change Order No	Date	Amount of CO	Running Contract Total	Subject
Original Contract			$2,889,187	
1	11/21/2014	$2,288,471	$5,177,658	2015 Contract Extension
2	3/20/2015	($383,054)	$4,794,604	Deductive Change Order for 2014 remaining contract amount
3	12/18/2015	$4,297,976	$9,092,580	2016 Contract Extension
4	3/18/2016	($128,577)	$8,964,003	Deductive Change Order for 2015 Remaining Contract Amount
5	12/16/2016	$4,415,361	$13,379,364	2017 Contract Extension
6	4/21/2017	($973,056)	$12,406,308	Deductive Change Order for 2016 Remaining Contract Amount
7	12/15/2017	$4,711,673	$17,117,981	Year Five Contract Scope and Budget for 2018
8	2/16/2018	($173,983)	$16,943,998	Deductive Change Order for 2017 Remaining Contract Amount
9	12/21/2018	$3,999,316	$20,943,314	One Year Contract Extension with 2019 Scope and Budget
10	3/15/2019	($399,286)	$20,544,028	Deductive Change Order for 2018 Remaining Contract Amount
11	2/12/2020	$3,997,717	$24,541,745	One Year Contract Extension with 2020 Scope and Budget
12	3/20/2020	($1,007,467)	$23,534,278	Deductive Change Order for 2019 Remaining Contract Amount
13	8/21/2020	$515,332	$24,049,610	Prepare and provide the RFP Documents for Traction Power Sub-Stations Replacements
14	10/16/2020	$258,000	$24,307,610	Financial Planning Services
15	10/16/2020	$89,923	$24,397,533	Downtown Salt Lake City Rail Feasibility Study
16	11/20/2020	$676,376	$25,073,909	Scope and Budget for 2021 Work through 3/3/2021
17	1/15/2021	$0	$25,073,909	One Year Contract Extension
Total to Date		$ $22,184,722		

Program Management Services Consultant UT13-064GL
Budget
1/2/2021 - 12/31/2021

3/22/2021

Billing Period #	Billing Period	Project Manager (Matt Carter)	PM support (Airport, FM/LM, Other BRT) (Kristi Shinal)	PM support (Airport, FM/LM, Other BRT) (Jeremy Harbaugh)	Construction Oversight (Von Larson)	Vehicle Engineer (LRT) (Tim Holden)	Vehicle Engineer (CR) (David Dolan)	Systems Engineer (Adam Lewis)	Systems Specilist (Michael Laurence)	ROW Specialist (Todd Hopkins)	ROW Specialist (Tammy Evans)	Planning Support (Financial Plan, Midvalley BRT, NEPA)	Small Project Support (TBD)	Other Technical Specialist (TBD)	Box Elder Co Support (Lavar Webb)	PineTop	Knowles	Infinity	Johnson Construction	Padgett Properties	FDG	Krebs	Coco	FTE's	TOTAL
	Year 2021																								
1	January																							-	#REF!
2	February																							-	#REF!
3	March																							-	#REF!
4	April	95%	65%	35%	100%	50%	100%	50%	10%	35%	60%	100%		50%	13%		30%			100%	80%	30%		7.63	#REF!
5	May	95%	65%	35%	100%	50%	100%	50%		35%	60%	100%		50%	13%		30%			100%	80%	30%		7.53	#REF!
6	June	95%	65%	35%	80%	25%	50%	50%		35%	60%			20%	13%		30%			100%	40%	30%		5.28	#REF!
7	July	95%	65%	35%	80%			20%			60%						30%			100%	20%	30%		3.55	#REF!
8	August	65%	30%	10%	80%			20%			60%						30%			100%		20%		2.65	#REF!
9	September	65%	30%	10%	80%			10%			60%						30%			100%		20%		2.55	#REF!
10	October	65%	30%	10%	80%			10%			60%						30%			100%		20%		2.55	#REF!
11	November	65%	30%	10%	60%			10%									30%			100%				1.75	#REF!
12	December	65%	30%	10%	60%												30%			100%				1.65	#REF!
	Labor Expense	$ 95,132	$ 40,317	$ 23,305	$ 89,363	$ 19,200	$ 19,381	$ 25,205	$ 1,573	$ 11,398	$ 27,772	$ 22,960	$ -	$ 18,696	$ 6,076	$ -	$ 75,276	$ -	$ -	$ 101,844	$ 55,924	$ 50,184	$ -		$ 683,607
	Overhead Rate	100.0%	134.0%	134.0%	100.0%	134.0%	100.0%	134.0%	134.0%	134.0%	134.0%	134.0%	134.0%	134.0%	134.0%										
	Overhead Expense	$ 95,132	$ 54,025	$ 31,228	$ 89,363	$ 25,728	$ 19,381	$ 33,775	$ 2,108	$ 15,273	$ 37,215	$ 30,766	$ -	$ 25,053	$ 8,142										$ 467,190
	Fee 11% : 4% markup on Subs	$ 20,929	$ 10,378	$ 5,999	$ 19,660	$ 4,942	$ 4,264	$ 6,488	$ 405	$ 2,934	$ 7,149	$ 5,910	$ -	$ 4,812	$ 1,564	$ -	$ 3,011	$ -	$ -	$ 4,074	$ 2,237	$ 2,007	$ -		$ 106,762
	Total Cost of Labor+Overhead+Fee	$ 211,193	$ 104,720	$ 60,531	$ 198,386	$ 49,871	$ 43,025	$ 65,469	$ 4,087	$ 29,605	$ 72,136	$ 59,636	$ -	$ 48,561	$ 15,782	$ -	$ 78,287	$ -	$ -	$ 105,918	$ 58,161	$ 52,191	$ -		**$ 1,257,559**
	Hours per period	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	
	Field Overhead (project office)	X			X		X																		
	General Service Office Overhead (area		X	X		X		X	X	X	X	X	X	X	X										
	Direct Expense	**$ 5,000**	**$ 500**	**$ 500**	**$ 500**	**$ -**	**$ -**	**$ 500**	**$ -**	**$ 500**	**$ 500**	**$ 500**	**$ -**	**$ 5,000**	**$ 500**										**$ 14,000**

FAR Field OH Rate 100.0%
FAR GSO OH Rate 134.0%

Hours/Period
2080 HR/YR - 120 HR vacation = 1960 HR/12 periods = 164HR/Period

Total 2021 Contract Budget from April-Dec $ 1,271,559

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Eddy Cumins, Chief Operating Officer
PRESENTER(S): Eddy Cumins, Chief Operating Officer
Kyle Stockley, Rail Infrastructure Project Manager

TITLE:

Change Order: On-Call Infrastructure Maintenance - Task Order #10 - Redwood Road Trax Grade Crossing Replacement (Stacy and Witbeck Inc.)

AGENDA ITEM TYPE:	Procurement Contract/Change Order
RECOMMENDATION:	Approve task order #10 to the on-call infrastructure maintenance contract and authorize the Executive Director to execute a task order and associated disbursements for Stacy and Witbeck in the amount of $304,203
BACKGROUND:	In October 2020, UTA released a request for procurement (RFP) for an on-call maintenance contractor focused specifically on infrastructure assets. Bids were received and evaluated, and Stacy and Witbeck Inc. was selected as the winner based on overall scoring using the best value format. The UTA Board of Trustees approved the contract and authorized the Executive Director to execute the contract with Stacy and Witbeck Inc. on January 27, 2021. This contract is for three-years with two one-year options. UTA's rail infrastructure is at an age where yearly rehabilitations and replacements need to occur to maintain the infrastructure in a state of good repair. These projects typically address three concerns: 1) Passenger ride quality 2) Automobile cross-traffic ride quality 3) Potential stray current issues

DISCUSSION:	To maintain UTA's rail lines, the agency needs to replace or rehabilitate approximatel 5-7 crossings per year. In 2021, UTA plans to complete 8 grade crossing projects. These projects typically involve removal and replacement or rehabilitation of the rail, crossing panels, and tubs, as well as earth stabilization efforts. The useful life of a grade crossing is approximately 10 years. UTA Staff is requesting approval of task order #10 with Stacy and Witbeck, Inc. to complete one grade crossing replacement project in the amount of $304,203. This task order is for the second crossing replacement project this year. The scope of this request includes full replacement of the Redwood Road Crossing on the Red Line.
CONTRACT SUMMARY:	
Contractor Name:	Stacy and Witbeck Inc.
Contract Number:	20-03349-10
Base Contract Effective Dates:	February 2, 2021 through December 31, 2023
Extended Contract Dates:	N/A
Existing Contract Value:	$1,998,524.00
Amendment Amount:	$304,203.00
New/Total Amount Contract Value:	$2,302,727.00
Procurement Method:	Task order to existing maintenance contract
Funding Sources:	SGR and Capital Projects 2021 Budget
ALTERNATIVES:	The only alternative is to delay this grade crossing project until a later date.
FISCAL IMPACT:	This budget is included in the 2021 Capital Program under project code SGR393.
ATTACHMENTS:	1) Task Order #10

TASK ORDER NO. 10

TASK ORDER NAME: Redwood Road Embedded Grade Crossing

PROJECT CODE: SGR393 40-7393.68912

This is Task Order No. 10 to the On Call Maintenance Contract entered into by and between Utah Transit Authority (UTA) and Stacy and Witbeck, Inc. (Contractor) as of February 2nd, 2021.

This Task Order is part of the On Call Maintenance Contract and is governed by the terms thereof.

The purpose of this Task Order is to specifically define the scope, schedule, lump sum price, and other terms applicable to the work identified herein.

UTA and Contractor hereby agree as follows:

1.0 SCOPE OF SERVICES

The scope of work for the Task Order #10 is hereby attached and incorporated into this Task Order.

2.0 SCHEDULE

The Substantial Completion Date for this Task is December 31st, 2021. The Final Acceptance Date for this Task is December 31st, 2021.

3.0 LUMP SUM PRICE

The price for this task order is a not to exceed $304,203.00. Invoices will be billed on monthly basis for work completed to date.

4.0 APPLICABILITY OF FEDERAL CLAUSES

This Task Order does ☒ does not ☐ [Check Applicable] include federal assistance funds which requires the application of the Federal Clauses appended as Exhibit D to the On Call Maintenance Contract.

IN WITNESS WHEREOF, this Task Order has been executed by UTA and the Contractor or its appointed representative

UTAH TRANSIT AUTHORITY:

By: _____
Carolyn M Gonot, Executive Director Date
> $100,000

By: _____
D. Eddy Cumins, Chief Operating Officer Date
< 100,000

By: _____
David Hancock, Director of Asset Mgt. Date
< $50,000

By: _____
Kyle Stockley, Project Manager Date
< $10,000

DocuSigned by:
Mike Bell
361F16F838704A9...
Legal Review

Procurement Review

STACY AND WITBECK, INC.:

By: _____

Date: _____

Stacy and Witbeck

March 23, 2021 On Call Services

Mr. Dave Hancock
Director of asset Management
Utah Transit Authority
2264 South 900 West
Salt Lake City, UT 84119

Reference: On-Call Transit Infrastructure Construction, Maintenance and Repair
Project No: 20-03349VW

Subject: 21-606-R2 - Redwood Road Embedded Grade Crossing

Dear Dave:

We are pleased to provide the attached cost estimate to remove and replace the at-grade crossing at Redwood Road on the TRAX Mid-Jordan Line with 248 TF of embedded track crossing. The existing 133# rail will be replaced with 115# rail due to the unavailability of Rail Boot for 133# rail. Stacy and Witbeck has assumed the replacement will take place during one continuous shutdown, with a bus bridge in affect and no trains running through the intersection. Because of the nature of this crossing, SWI also plans to complete the crossing by building the first half in the NB lanes, and the second half of the crossing in the SB lanes. A complete power down of the overhead contact wires throughout the work limits will be required to safely perform this work. We look forward to constructing this project for UTA this year at a mutually agreed upon schedule.

Exclusions:

- Railroad Flagging
- Track to Earth Testing
- Sales Tax on Permanent Materials
- Certified Payrolls
- On Track Materials (boot, ties, hardware)
- Roadway Pavement Demo & Installation

Clarifications:

- Please see detailed list of each bid item below.
- 115# rail to be provided by UTA.
- SWI has assumed the replacement will take place during one continuous shutdown, with a bus bridge in affect and no trains running through the intersection.
- The unit costs for each bid item includes the costs of insurance, bond, and risk at the agreed upon rates.
- We are excluding all utility relocations and conflicts from our pricing. Any conflicts or relocations will need to be addressed as a change of condition.
- The scope of work is inclusive of only the items and scope that are listed below. Any other items of work or changes to the below scope will need to be repriced.

1958 West North Temple
Salt Lake City, UT 84116
801.666.7840 (office) 801.432.7849 (fax)

Bid Item 1000 – Field Engineering and Project Controls – 1 LS – Total of $32,643.00 – This bid item includes Stacy and Witbeck field support from field engineer to manage construction. The field engineer will also perform pre-task planning and coordination with UTA. This item also includes office manager time for payroll and accounts payable.

Bid Item 1100 – Permits and Regulatory Approvals – 1 LS – Total $1,985.00 – This bid item includes the cost to obtain all necessary city permits required to perform the work.

Bid Item 2000 – Safety Program and Administration – 1 LS – Total of $4,444.00 – Cost of Safety Supplies, safety personnel to visit the site, and incidental drug testing.

Bid Item 2500 – Key Personnel Travel & Subsistence – 1 LS – Total $10,801.00 – This bid item includes cost to provide travel arrangements and subsistence for 2 key track personnel for the duration of the work.

Bid Item 3000 – QC Program & Testing – 1 LS – Total $9,916.00 – This bid item includes cost for SWI QC manager and Consolidated Engineering Laboratories to provide field and lab technicians to test and monitor materials. Also includes their management personnel to oversee testing and documentation. Includes weld testing performed by Quality Testing & Inspection (QTI).

Bid Item 5000 – Traffic and Pedestrian Control – 1 LS – Total of $1,135.00 – This bid item includes the cost to provide traffic Control drawings for the closure and detours on Redwood Road.

Bid Item 6000 – Construction Survey and Layout – 1 LS – Total $4,537.00 – This bid item includes the cost for construction layout survey.

Bid Item 7000 – Redwood Road Embedded Grade Crossing – 248 TF - $719.50 Per TF – Total $178,436.00 – This bid item includes the following items.

- Item 7010 – Traffic and Pedestrian Control - Includes full closure and detours of Northbound and Southbound lanes on Redwood Road to facilitate constructing the crossing in halves.
- Item 7020 – Demo Existing Crossing - Includes saw cutting, removal, haul off and dump fees for track panels, curb, sidewalk, and excavation.
- Item 7030 – Aggregate Base with Fabric - Includes geo-grid fabric and aggregate base course under the embedded track, and curb.
- Item 7050 – Concrete Sidewalk and Curb - Includes subgrade prep for 541 SF of sidewalk and 74 LF of curb on both sides of the street as required to complete the work.
- Item 7060 – Handle Track Materials - Includes loading and hauling of rail boot and steel ties for the embedded track. Includes loading and hauling of UTA provided rail. (purchase of boot and ties excluded)
- Item 7070 – Thermite Welding - Includes 4 regular welds and 8 comp welds from 133# to 115# rail. Excludes weld testing. Weld testing included in Bid Item 3000
- Item 7080 – Embedded Track Construction - Includes construction of 248 TF of embedded rail per the Sugar House Streetcar details. The dimensions of the track slab will vary from the Sugar House detail by using a 96”x 15” track slab, rather than an 84” x 15” track slab.

1958 West North Temple
Salt Lake City, UT 84116
801.666.7840 (office) 801.432.7849 (fax)

- Item 7090 – Ballasted Track Construction - Includes 15 TF (60 TF total) of construction and hand dressing of ballasted track on each end of the embedded track sections.

Bid Item 7100 – Stabilization Rock/Fabric – 110 CY - $285.00 Per CY – Total $31,350.00 – Includes 55 CY of stabilization rock and geo-grid fabric to stabilize grade beneath tracks. This also includes the removal and disposal of stabilization excavation.

Bid Item 10000 – Mobilization – 1 LS – Total $7,733.00 – This bid item includes the cost for mobilizing heavy equipment to and from the project site prior to each shutdown, and final project cleanup. includes street sweeping, field sanitary expenses, temporary site lighting, field office supplies, and jobsite dumpster.

Bid Item 100000 – Fee (7.5%) – 1 LS – Total of $21,223.00 – This is the agreed to 7.5% GMGC fee.

The total price for this scope of work is **$304,203.00**

If you have any questions, please contact me.

Sincerely,
Stacy and Witbeck, Inc.

Collin Christensen
Project Manager

1958 West North Temple
Salt Lake City, UT 84116
801.666.7840 (office) 801.432.7849 (fax)

03/09/2021 7:47
21-606-R1 Redwood Road Embedded Crossing
*** Collin Christensen, CC **BID TOTALS**

Biditem	Description	Quantity	Units	Unit Price	Bid Total
1000	Field Engineering & Project Controls	1.000	LS	32,643.00	32,643.00
1100	Permits & Regulatory Approvals	1.000	LS	1,985.00	1,985.00
2000	Safety Program & Administration	1.000	LS	4,444.00	4,444.00
2500	Key Personnel Travel & Subsistence	1.000	LS	10,801.00	10,801.00
3000	QC Program & Testing	1.000	LS	9,916.00	9,916.00
5000	Traffic & Pedestrian Control	1.000	LS	1,135.00	1,135.00
6000	Construction Survey/Layout	1.000	LS	4,537.00	4,537.00
7000	Redwood Road Embedded Grade Crossing	248.000	TF	719.50	178,436.00
7100	Stabilization Rock/Fabric - 18 inch depth	110.000	CY	285.00	31,350.00
10000	Mobilization	1.000	LS	7,733.00	7,733.00
		Subtotal			$282,980.00
100000	Fee (7.5%)	1.000	LS	21,223.00	21,223.00
		Bid Total	========>		$304,203.00

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Todd Mills, Director of Supply Chain
PRESENTER(S): Todd Mills, Director of Supply Chain

TITLE:

Pre-Procurement:
- Motorola Integrated Digital Enhanced Network (IDEN) Support
- Multiple Buildings Roof Replacement
- 3300 S. Bus Stop Design and Property Acquisition

AGENDA ITEM TYPE:	Pre-Procurement
RECOMMENDATION:	Informational report for discussion
BACKGROUND:	Utah's Public Transit District Act requires all contracts valued at $200,000 or greater be approved by the UTA Board of Trustees. This informational report or upcoming procurements allows Trustees to be informed and provide input on upcoming procurement projects. Following the bid solicitation and contract negotiation process, final contracts for these projects will come before the board for approval.
DISCUSSION:	The following projects, services, or products have an approved requisition by the Executive Director and are ready for bid solicitation: • ***Motorola Integrated Digital Enhanced Network (IDEN) support.*** This is a sole source procurement to establish a 5-year contract with Motorola to continue support of our Integrated Digital Enhanced Network (IDEN). The IDEN system was originally procured through a competitive bid in 2011 and it is the Radio system UTA has been using in our entire fleet since then. The Motorola IDEN system uses cellular technology over an IP based network on a scaled down version of Nextel's push to talk platform. This allows for quick, reliable contact with our operators throughout our service territory. This sole source contract will continue to provide support to our current system while UTA explores alternatives to replace it. Funding for this support is included in the IT 2021 operating expense budget. (Req. 9070, Kyle Brimley) • ***Multiple buildings roof replacement.*** This procurement is to contract with a firm(s) to replace the roof

	membrane and asphalt on the Midvale Rail Service Center, Timpanogos buildings 3 & 4, and Warm Springs facility. The current roof was installed over 20 years ago and is well past it's expected life. Facilities crews have been patching the roofs over the years as needed but the roofs have deteriorated to the point of needing new asphalt and membrane. Funding for these projects was included in the approved 2021 budget. This procurement will be conducted as an IFB where award of the contract will be given to the lowest bidder for each building. (Req. 9223, 9218, Kevin Anderson) • ***3300 S. Bus stop design and property acquisition.*** This procurement is to contract with a firm for the design services, property acquisition, right-of-way & topo survey services for the 3300 S CMAQ Bus Stop Project. This will be for a total of 36 bus stops along 3300 S. These services need to be completed as soon as possible in 2021 before construction of the bus stops can begin in 2022. Funding for this contract will be provided by CMAQ grant and a 6.77% UTA match. This procurement will be conducted as an RFP where selection criteria will be evaluated and scored in addition to price. (Req. 9200, Brandon Heath)
ALTERNATIVES:	N/A
FISCAL IMPACT:	N/A
ATTACHMENTS:	None

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Nichol Bourdeaux, Chief Planning & Engagement Officer
PRESENTER(S): Megan Waters, Community Engagement Manager;
Kensey Kunkel, Manager of Business Development & Sales

TITLE:

Complimentary Fare: Art in Transit Complimentary Passes

AGENDA ITEM TYPE:	Service or Fare Approval
RECOMMENDATION:	Approve provision of complimentary passes to Art in Transit student participants.
BACKGROUND:	This year marks the first annual My BeUTAHful Community Student Art in Transit Competition. From February 1 through March 16, 2021, UTA collected student artwork depicting the theme "Meet Your Neighbor." We received 645 total student art submissions (643 participants). This program has been an excellent opportunity to build new community partnerships with schools/education sector, art organizations, transit districts and multicultural offices, including the Division of Multicultural Affairs and the Division of Indian Affairs. Additionally, it's provided connection with communities across and outside of our service area, particularly young people.
DISCUSSION:	Student artwork will be displayed on UTA's system in the spring, summer, and fall of 2021, in addition to other community locations. Providing group transit passes to the students would allow them to bring their families to see student artwork showcased on UTA's vehicles. Distribution of group passes to these participants would also support increased ridership during 2021 and provide an introduction to UTA and public transit for new riders.
ALTERNATIVES:	N/A
FISCAL IMPACT:	The total complimentary pass value for the art passes is $12,000. The fiscal impact to the agency's operations is negligible.
ATTACHMENTS:	None

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Kimberly S. Ulibarri, CPO
PRESENTER(S): Kimberly S. Ulibarri, CPO

TITLE:

UTA Policy UTA.05.02 - Paid Time Off - Administrative Employees

AGENDA ITEM TYPE:	UTA Policy
RECOMMENDATION:	Approve UTA Policy UTA.05.02 - Paid Time Off - Administrative Employees as presented.
BACKGROUND:	UTA has previously addressed administrative paid time-off through three separate policies. The executive vacation benefit was also documented separately.
DISCUSSION:	A consolidated UTA policy on administrative paid time-off benefits is clearer for employees using the benefits and more efficient to administer. The proposed policy also clarifies pay scenarios when they interact with job protected leaves. The policy also includes an update to the executive vacation benefit that better aligns with the current accrual schedule updated in 2018.
ALTERNATIVES:	Continue with several policies regarding administrative paid time off, needlessly addressing each single benefit individually.
FISCAL IMPACT:	There is no fiscal impact with this policy.
ATTACHMENTS:	1. UTA Policy 05.02 Paid Time Off - Administrative Employees

UTAH TRANSIT AUTHORITY POLICY

No. UTA.05.02

PAID TIME OFF - ADMINISTRATIVE EMPLOYEES

1) Purpose.
Utah Transit Authority offers several types of Paid Time Off for administrative employees, including Sick Leave, Vacation time, Floating Holidays, Holidays, Bereavement Leave, Court Attendance/Jury Duty Leave, Military and Parental Leave.

2) Definitions.
For purposes of this policy and the associated Standard Operating Procedures, the following terms shall have the definitions and meanings set forth below:

"Administrative Employee" means an employee who is not subject to the Collective Bargaining Agreement.

"Authority" means the Utah Transit Authority.

"Dependent" means a spouse, a child under 19, or other legal dependent as defined by Internal Revenue Code § 152.

"Exempt Employee" means an employee who is exempt from the overtime provisions of the Fair Labor Standards Act.

"Floating Holiday" means up to two days per payroll year, in addition to the nine Holidays recognized by UTA, for the employee's use.

"FML" means family medical leave as defined by the Family and Medical Leave Act (FMLA) of 1993.

"Full-Time Employee" means an employee who is regularly scheduled to work thirty (30) hours or more per week.

"Holiday" means one of the nine recognized Holidays listed in this policy.

"Incidental Illness" means an illness other than a serious illness as defined under the Family and Medical Leave Act of 1993.

"Introductory Period" means the first 90 calendar days of employment with Utah Transit Authority.

"Non-Exempt Employee" means an employee who is not exempt from the overtime provisions of the Fair Labor Standards Act.

"Other Medical Leave" means a leave of absence for an employee who does not qualify for FML for the employee's or dependent's illness as defined in this Policy.

"Part-Time Employee" means an employee who is regularly scheduled to work less than thirty hours per week.

"Safety-Sensitive Job" means a job which includes one or more of the following duties:

a. operating a revenue service vehicle, including when not in revenue service.
b. operating a non-revenue service vehicle, when required to be operated by a holder of Commercial Driver's License.
c. controlling dispatch or movement of a revenue service vehicle; and
d. maintaining (including repairs, overhaul, and rebuilding) a Revenue Service Vehicle or equipment used in revenue service; and
e. carrying a firearm for security purposes.

"Serious Health Condition" means an illness, injury impairment, or physical or mental condition that involves an overnight stay in a medical care facility, or continuing treatment by a health care provider for a condition that either prevents the employee from performing the functions of the employee's job or prevents the qualifying family member from participating in school or other daily activities.

"Sick Leave" means an Administrative Employee time-off benefit for use in the event of an employee's or dependent's illness, injury, or medical appointment.

"Scheduled Sick Leave" means leave scheduled at least 48 hours in advance for an illness or injury of the employee or the employee's dependent.

"Vacation" means paid time accrued by the employee for their use.

3) Policy.

UTA provides various types of paid time-off for employee's absence from work for personal reasons. These leaves are detailed below:

A. Sick Leave.

1. Sick leave is provided for employees as insurance against loss of income when an employee is unable to perform assigned duties because of illness or injury. Sick Leave may be used for the employee's own, or their Dependent's, illness, injury, or medical appointment. Regular full- and part-time Administrative Employees who have completed their Introductory Period and have accrued Sick Leave may use sick leave. Employees using Sick Leave must directly notify their supervisor, providing as much notice as practicable.
2. Sick Leave is accrued at a rate of nine days per year (2.769 hours biweekly). Regular part-time Administrative Employees will accrue Sick Leave on a pro-rated basis based on the number of hours worked in each pay period.
3. All exempt-employees Sick Leave deductions will be charged against full day increments only in accordance with the Fair Labor Standards Act. No partial days will be deducted except as allowed under FMLA.
4. The Authority may request written medical certification of an illness or injury necessitating Sick Leave.
5. After five consecutive days of Sick Leave, employees must submit a medical note.
6. While on FML, employees use all available sick leave.

B. Vacation.

1. Accrued vacation time is provided to Regular full and part-time Administrative Employees. Employees who have completed their Introductory Period, have accrued Vacation time, and have received approval from their immediate supervisor may take Vacation. Employees who have an emergency need or pre-authorized reason to take vacation prior to the conclusion of the Introductory Period may seek prior approval with management.
2. Vacation time accrues according to an employee's date of hire and length of service with the Authority (except as outlined in section B.10):

Length of Service	Vacation Days Accrued
Date of Hire up to 3 years	13 days per year (104 hours)
3 up to 7 years	15 days per year (120 hours)
7 up to 9 years	17 days per year (136 hours)
9 up to 12 years	19 days per year (152 hours)
12 up to 16 years	21 days per year (168 hours)
16 up to 23 years	23 days per year (184 hours)
23 years or more	25 days per year (200 hours)

*The maximum accrual is 360 hours.

4. All exempt-employees vacation deductions will be charged against full day increments only in accordance with the Fair Labor Standards Act. No partial days will be deducted except as allowed under FMLA. All non-exempt employees vacation deductions must be used in one-hour increments.
5. Vacation pay is calculated based on using an employee's base rate of pay and is paid on regular paydays. Vacation pay is not considered hours worked for overtime calculation.
6. While on FML, employees must use available vacation after exhausting sick leave. However, employees may save 40 hours of vacation, provided they have used 40 hours of vacation in the last rolling calendar year.
7. Vacation pay will not accrue during an unpaid leave of absence, while receiving worker's compensation, short- or long-term disability payments, or other insurance payments.
8. Employees who accrue 168 hours or more per year may elect to sell back up to 40 hours of vacation per year.
9. Providing an employee does not owe the Authority any money, an employee that terminates or retires from employment will be paid for all accrued, unused vacation time. The accrual amount paid cannot exceed 360 hours.
10. Executive Schedule: Board Trustees, the Executive Director, and department Chief Officers will receive an additional 7 days (56 hours) of allotted vacation days per year, not to exceed 30 days in total of vacation per year. This allotment will be deposited into the executive's vacation bank with the first paycheck of each year. Executives with a start date on or before July 1st will receive seven (7) allotted vacation days, an executive with a starts date after July 1st they will receive 3.5 allotted vacation days.

C. Holidays. The following are paid Holidays:

New Year's Day	Labor Day
President's Day	Thanksgiving Day
Memorial Day	Day after Thanksgiving
Christmas Day	Independence Day
Two Floating Holidays	Pioneer Day

Full-Time Administrative Employees will be paid eight (8) hours pay at their regular hourly rate for the holiday. Regular Part-Time Administrative Employees who are regularly scheduled to work 20 hours a week or less will receive (4) hours of holiday pay. Regular Part-Time Administrative Employees who are regularly scheduled to work more than 20 hours per week will receive (5) hours of holiday pay. Temporary Part-Time Employees and Interns are not eligible for holiday pay.

When a holiday falls within an employee's scheduled vacation, the employee will receive Holiday pay rather than vacation pay for that day.

Employees must work their assigned shift on the last scheduled day before and the first scheduled day after the holiday, except when the employee is on vacation or using a Floating Holiday.

Employees who are requested to work on a holiday or have a business need to work will be paid as a normal day worked and in addition, will receive another day off with pay for holiday worked or will be paid for hours worked as approved by management. The day off in lieu of a holiday worked must be taken during the week in which the holiday occurs.

D. Floating Holidays. Eligible Full-Time and Part-Time Administrative Employees will be allowed two (2) Floating Holidays each payroll year. Full-Time Employees will receive two (2) eight-hour Floating Holidays, Part-Time Employees will receive two (2) four-hour Floating Holidays. Employees will choose the days they wish to use the Floating Holidays and provide at least twenty-four (24) hour notice. The use of a Floating Holiday will be subject to approval by the employee's supervisor. If the Floating Holidays are not used during the payroll year, they cannot be carried over into the next year. Eligible employees hired on or after January 1st but before July 1st will be entitled to two (2) Floating Holidays during the payroll year. Eligible employees with a start date on or after July 1st but before October 1st will be entitled to one (1) Floating Holiday during that payroll year. Eligible employees with a start date after October 1st will not be entitled to Floating Holidays during that payroll year.

E. Bereavement Leave.

1. Administrative Full- and Part- time employees may use Bereavement Leave associated with the death of an immediate family member without the loss of pay for a maximum of three (3) working days per instance of death.
2. For the purposes of Bereavement Leave "immediate family member" means a spouse, child (including step and foster), parent (including step and in-law), grandparent, sibling (including step and in-law), grandchild, and a child's spouse.

F. Court Attendance Leave. Administrative Employees are entitled to paid leave when required by a subpoena or at the request of the Authority to provide testimony at a trial or deposition as to matters relating to their employment at the Authority. While on Court Attendance Leave, employees will be paid at their regular rate of pay, less any reimbursement received for such appearance.

G. Jury-Duty Leave. Full- and part-time Administrative Employees will be granted leave as needed to perform Jury-duty services in any municipal, county, state, or federal court, or before an administrative tribunal. Employees will be paid at their regular rate of pay, less any reimbursement received by the employee for Jury Duty service.

H. Military Leave. A Military Leave of Absence will be granted if an employee is absent to serve in the Uniformed Service of the United States for a period of up to five years (not including certain involuntary extensions of service).Employees will be reimbursed for the difference between the military rate of pay and their regular rate of pay up to a maximum period of six months each time the employee is called to active duty or required military training but no more than the actual number of days on active duty.

I. Parental Leave. Parental leave will be provided to Full-Time Administrative Employees who have completed 12 months of employment prior to the birth of a child or adoption of a child to care for and bond with a newborn or a newly adopted or newly placed child. Four (4) weeks of approved paid Parental Leave may be taken within the six-month period immediately following the birth, adoption, or placement of a child with the employee Parental Leave shall run concurrently with any Family and Medical Leave (FML) the employee has available.

J. Critical Incident Debriefing. Any employee who, while working, observes or is involved in an incident which involves serious injury or death will be required to go through critical incident debriefing. The employee will remain off work during the critical incident debriefing and will be paid at their regular rate of pay. Pay received for critical incident debriefing is not considered hours worked for overtime calculation.

K. Exceptions. Any exceptions or deviations from this policy require a written business case to be evaluated and approved by both the Chief People Officer as well as the department's Chief Officer. The Board of Trustees will be notified of the exception, along with a summary of the business case, within five business days of the exception decision. Exception or deviations applying to the Executive Director will be approved by the Board of Trustees.

L. Policy Review. This policy will be reviewed annually as required in Utah Code Section 17B-1-802.

4) Cross-References.

- Corporate Policy 6.1.12 Leave of Absence
- Corporate Policy 6.7.1.2 Administrative Employee Work Week and Schedule
- Uniformed Services Employment and Reemployment Rights Act (USERRA) (38 U.S.C. 4301-4335)
- Review of personnel policies (UCA 17B-1-802)
- The Public District Transit Act (UCA 17B-2a-808.1)

This UTA Policy was reviewed by UTA's Chief Officers on March 3, 2021 by the Board of Trustees on _____ and approved by the Executive Director on _____. This policy takes effect on the latter date.

_____
Carolyn M. Gonot
Executive Director

Approved as to form:

DocuSigned by:
Mike Bell
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Counsel for the Authority

History

Date	Action	Owner
12/6/2005	Revised – 1.030 Sick Leave Policy	Chief People Officer
12/20/2005	Approved – Corporate Policy 6.7.74 Sick Leave Supersedes – 1.030 Sick Leave Policy	Chief People Officer
1/11/2007	Revised – Corporate Policy 6.7.74 Sick Leave	Chief People Officer
4/26/2011	Revised – Corporate Policy 6.7.7.4 Sick Leave – Administrative Employees	Chief People Officer
8/23/2011	Revised – Corporate Policy 6.7.7.4 Sick Leave – Administrative Employees	Chief People Officer
8/2/2016	Revised – Corporate Policy 6.7.7.4 Sick Leave – Administrative Employees	Chief People Officer
	Rescinded – Corporate Policy 6.7.7.2 Administrative Employee Holidays; Corporate Policy 6.7.7.3 Vacation - Administrative Employees; Corporate Policy 6.7.7.4 Sick Leave - Administrative Employees	Chief People Officer
	Adopted – UTA Policy UTA.05.02 Paid Time Off – Administrative Employees	Chief People Officer

669 West 200 South
Salt Lake City, UT 84101

Utah Transit Authority

MEETING MEMO

Board of Trustees **Date:** 4/14/2021

TO: Board of Trustees
THROUGH: Carolyn Gonot, Executive Director
FROM: Carolyn Gonot, Executive Director
PRESENTER(S): Chair Carlton Christensen

TITLE:

Strategy session to discuss pending or reasonably imminent litigation

AGENDA ITEM TYPE:	Closed Session
RECOMMENDATION:	Approve moving to closed session for discussion of pending or reasonably imminent litigation
DISCUSSION:	Utah Open and Public Meetings Act allows for the Board of Trustees to meet in a session closed to the public for various specific purposes. The purpose for this closed session is: • Strategy session to discuss pending or reasonably imminent litigation