

GPA/TAPA Joint Conference

October 6, 2021

Transportation Electrification in TN & GA



Liza Joffrion, AICP
CDM Smith

Susan Steffenhagen, AICP
Tennessee Dept. of Transportation

John Lancaster, AICP
Memphis Area Transit Authority

Lee Brown, CFO
Macon-Cobb County Transit Authority

**CDM
Smith**



Susan Steffenhagen, AICP
Senior Air Quality Planner
TDOT Long Range Planning Division

October 6, 2021

Planning



TDOT
Department of
Transportation

Legend

- FHWA Adjusted Urban Area
- Alternative Fuel Corridors**
- EV - Corridor Ready
- EV - Corridor Pending

0 33.3 66.7 100

Miles



Drive Electric TN

Throughout 2018, the following Key Contributors and participating organizations worked together to develop a shared vision for electric transportation in the state.

Key Contributors:

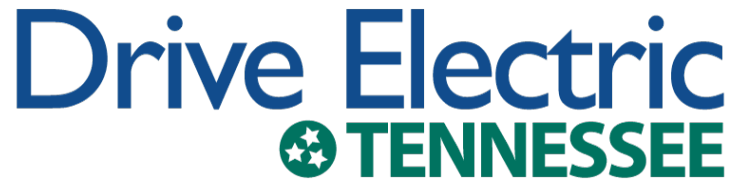


Participants:

- Atlas Public Policy
- Bridgestone
- BYD
- CDE Lightband
- ChargePoint
- City of Nashville
- City of Knoxville
- City of Chattanooga
- Cummins Filtration
- Draft Agency
- General Motors
- Greenlots
- GRIDSMART
- Local Motors
- Nissan
- Schneider Electric
- Sierra Club
- SoftServe

Drive Electric TN

In 2019, the “EV Roadmap” was published, which described the following Vision and Mission. The Mission describes, at a high level, how we will achieve the Vision.



Vision: Driving Tennessee to become an electric transportation leader in the Southeast

Mission: Collaboratively pursuing initiatives that will significantly increase EV adoption from 13,000 EVs today to 200,000 EVs by 2028, guided by shared principles that benefit all residents of Tennessee

Tennessee's Statewide Network

Primary & Secondary Corridors With Existing Electric Vehicle DC Fast Charging Infrastructure (July 2021)

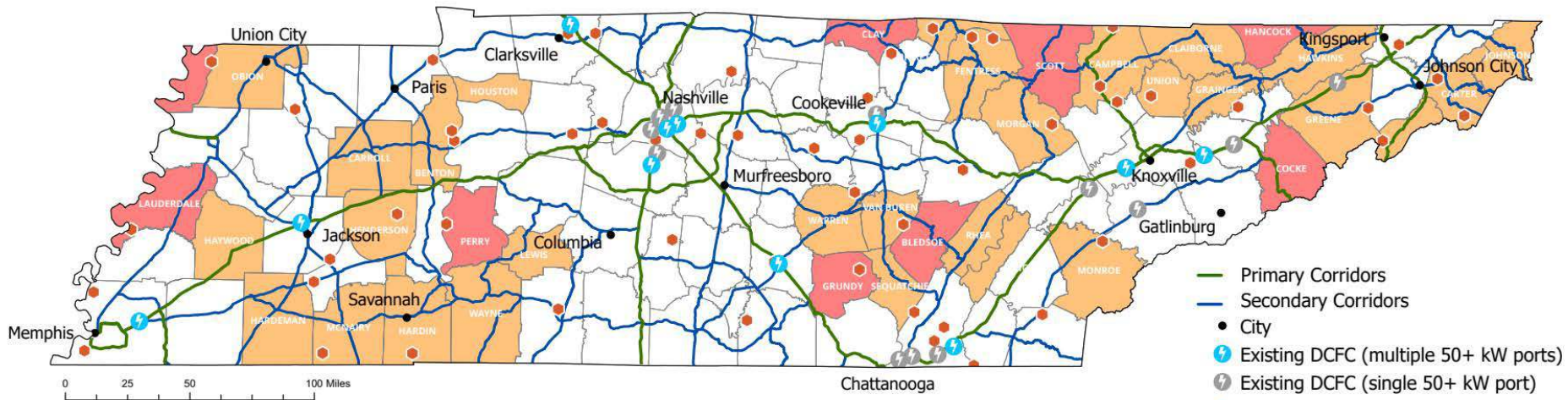


* Each location includes at least one SAE Combo and one CHAdeMO plug.



Tennessee Electric Vehicle Charging Opportunity Map

Primary & Secondary Corridors With State Parks +
Distressed & At Risk Counties (July 2021)



Funding

Funding Opportunities

- **Volkswagen Settlement Environmental Mitigation Trust**
- **Diesel Emission Reduction Act Program (DERA)**
- **Congestion Mitigation and Air Quality Improvement Program (CMAQ)**



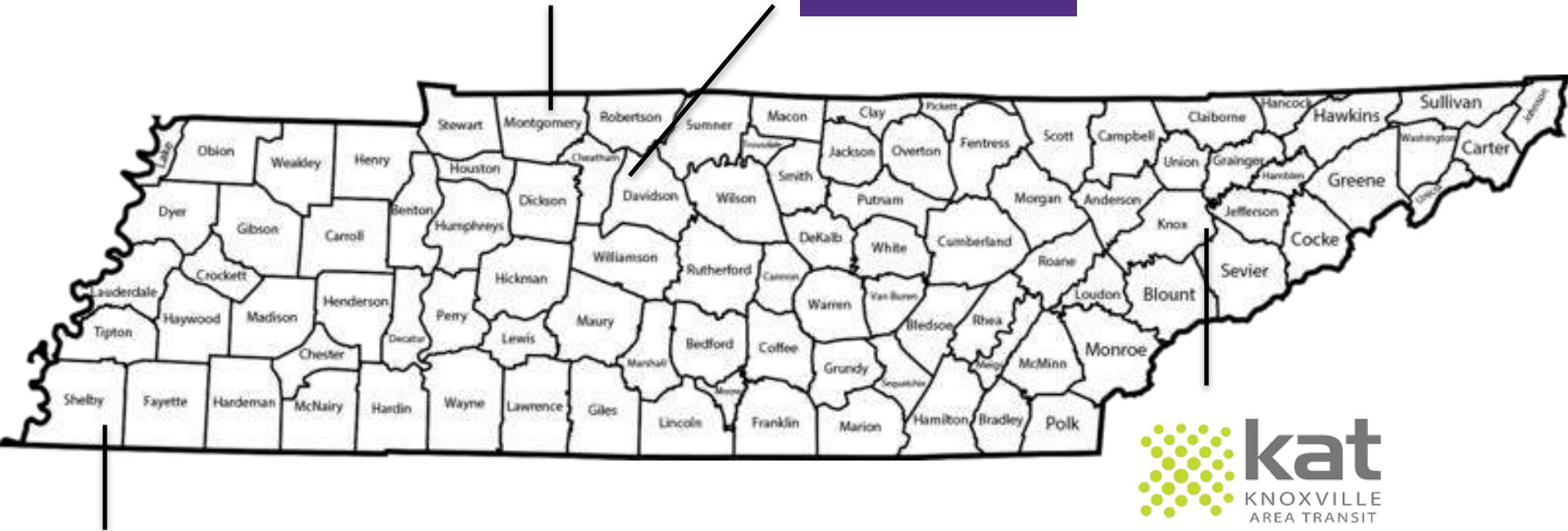
DOT Funding and Financing Programs with EV Eligibilities*

LEGEND

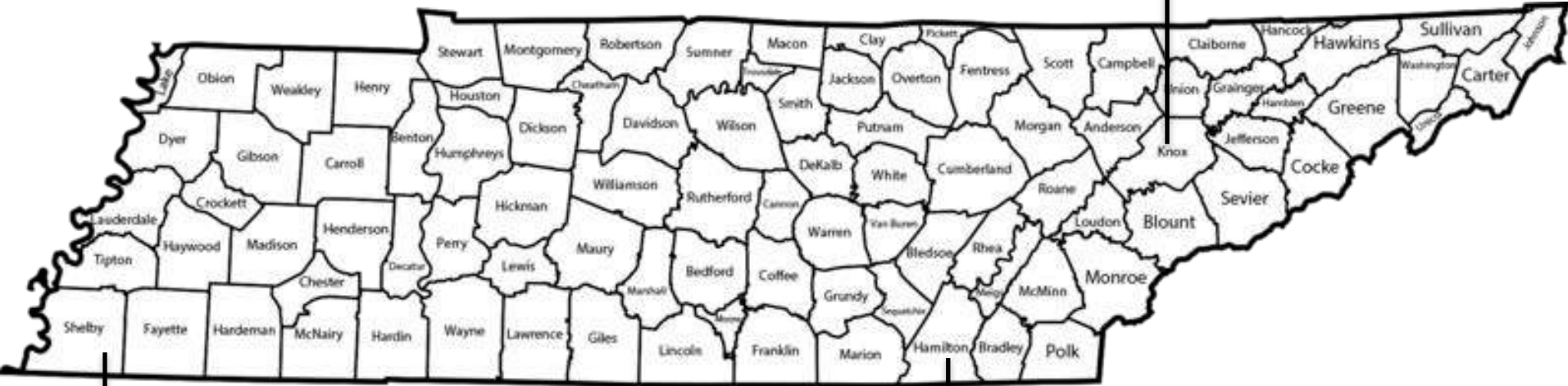
Construction and installation of EV charging infrastructure including parking facilities and utilities.	Workforce development and training related to EV infrastructure.	EV acquisitions and engine conversions - cars or trucks.	Planning for EV charging infrastructure and related projects.	Construction and installation of EV charging infrastructure to support operational, resiliency, national energy security, environmental, and community goals for freight transportation.	Installation of EV charging infrastructure as part of transit capital projects eligible under chapter 53 of title 49, United States Code.

	FY 2021 AMOUNT						
FORMULA PROGRAMS							
National Highway Performance Program (NHPP)	\$23.1 B						
Surface Transportation Block Grant Program (STBG)	\$10.2 B						
Congestion Mitigation & Air Quality Improvement Program (CMAQ)	\$2.4 B						
National Highway Freight Program (NHFP)	\$1.5 B						
State Planning and Research (SPR)	\$641.5 M						
Metropolitan Planning (PL)	\$357.9 M						
DISCRETIONARY PROGRAMS							
Rebuilding American Infrastructure with Sustainability and Equity (RAISE) (formerly known as BUILD)	\$1.0 B						
Infrastructure for Rebuilding America (INFRA) Grant Program	\$889.0 M						
Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD)	\$53.3 M						
OTHER ALLOCATED PROGRAMS							
Federal Lands and Tribal Transportation Program (FLTTP)	\$1.0 B						
Highway Infrastructure Program (HIP) (other than for bridges)	\$644.0 M						
Puerto Rico Highway Program (PRHP)	\$74.9 M						
Territorial Highway Program (THP)	\$37.3 M						
INNOVATIVE FINANCE PROGRAMS							
State Infrastructure Banks (SIBs)	Varies						
Transportation Infrastructure Financing and Innovation Act (TIFIA)	Varies						

CMAQ-Funded Bus Electrification Projects

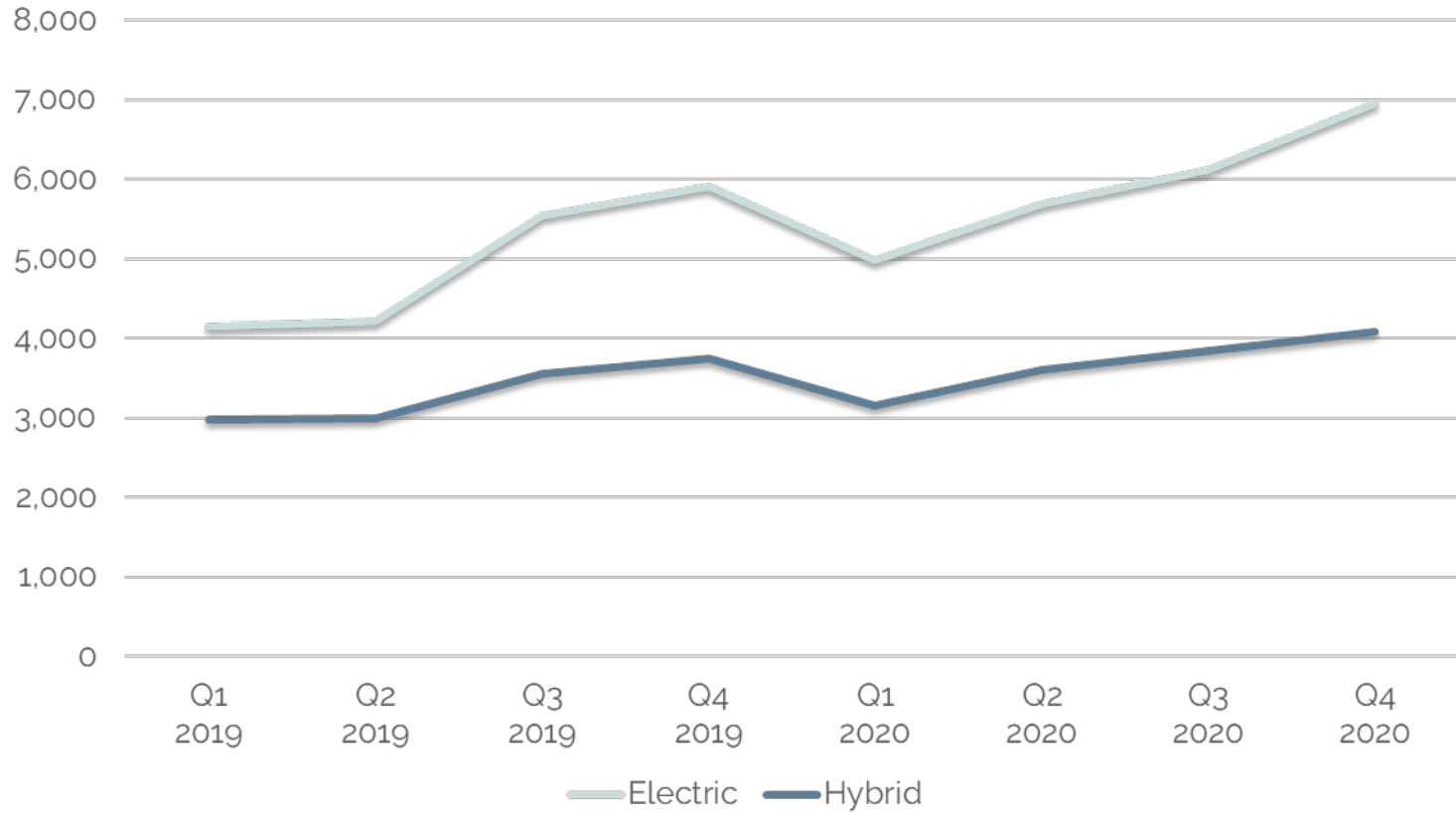


Volkswagen Settlement EMT



What's Happening Now

TN's EV Registrations



An Emerging EV Leader

Tennessee is becoming the number one location to build, own, and drive EVs

TN Registered EVs

(6/30/21):

13,812

EV Manufacturing:

#1

in the Southeast



Leaf (since 2013)
Smyrna



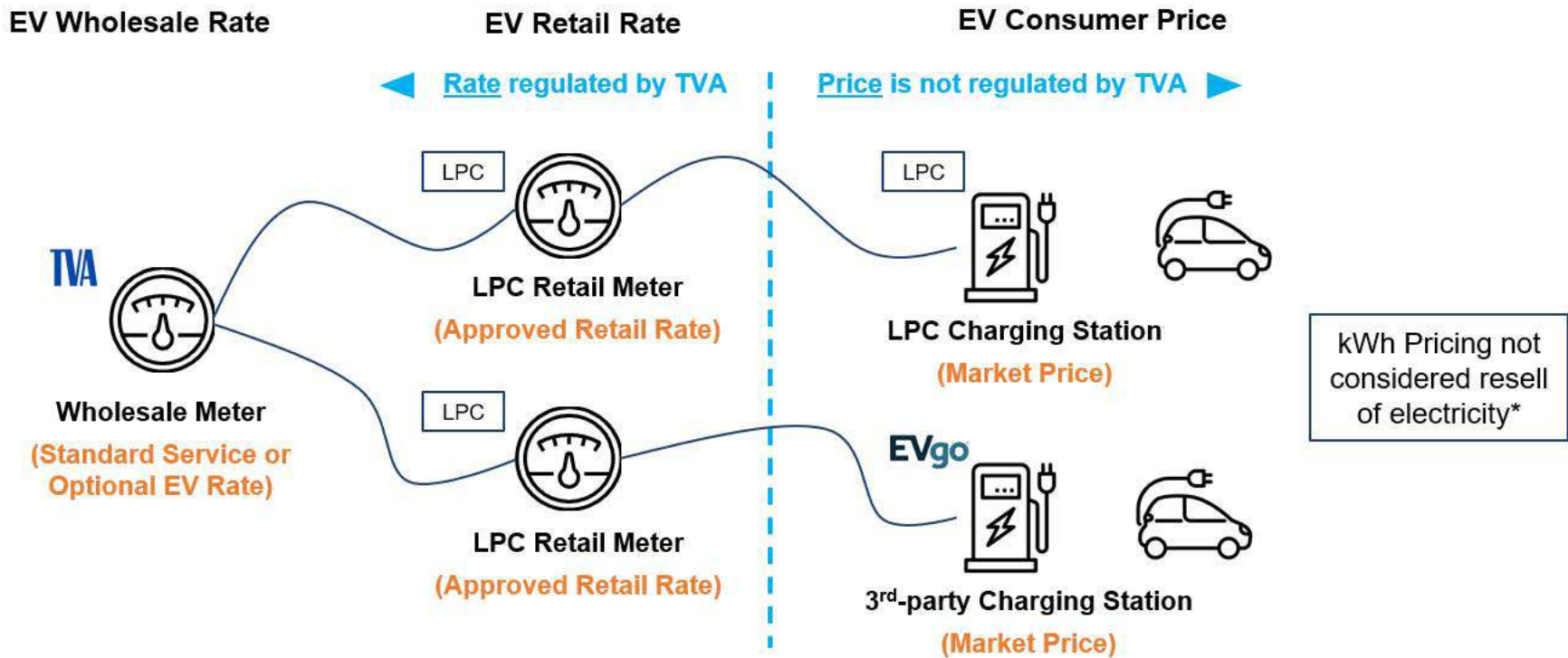
ID.4 (in 2022)
Chattanooga



Lyriq (in 2022)
Spring Hill

TVA's EV Commercial Rate Structure

EV rates are TVA regulated to the charging station meter. Station owners set the price for charging services.



TN Clean Fuels



Primary & Secondary Corridors With Existing Electric Vehicle DC Fast Charging Infrastructure (July 2021)



Drive Electric
 TENNESSEE



TN Department of
 Environment &
 Conservation



Looking Ahead

Bipartisan Infrastructure Bill

- **New Dedicated Federal Funding:**
 - **Charging and Fueling Infrastructure Grants - \$2.5B**
 - **National EV Formula Program - \$5B [FY22-FY26]**
 - **Electric/Low Emission School Buses - \$5B**
 - **Low/No Emission Transit Buses - \$5.25B**
- **Freight Alternative Fuel Corridors**
- **Federal Joint Office of Energy and Transportation**

Contact Info



Susan Steffenhagen, AICP

Long Range Planning Division
Senior Air Quality Planner

Susan.Steffenhagen@tn.gov



John Lancaster

Director of Planning & Scheduling
Memphis Area Transit Authority





Bus Electrification Panel
Joint Tennessee Georgia American Planning Association
Conference
October 6, 2021
Chattanooga, Tennessee



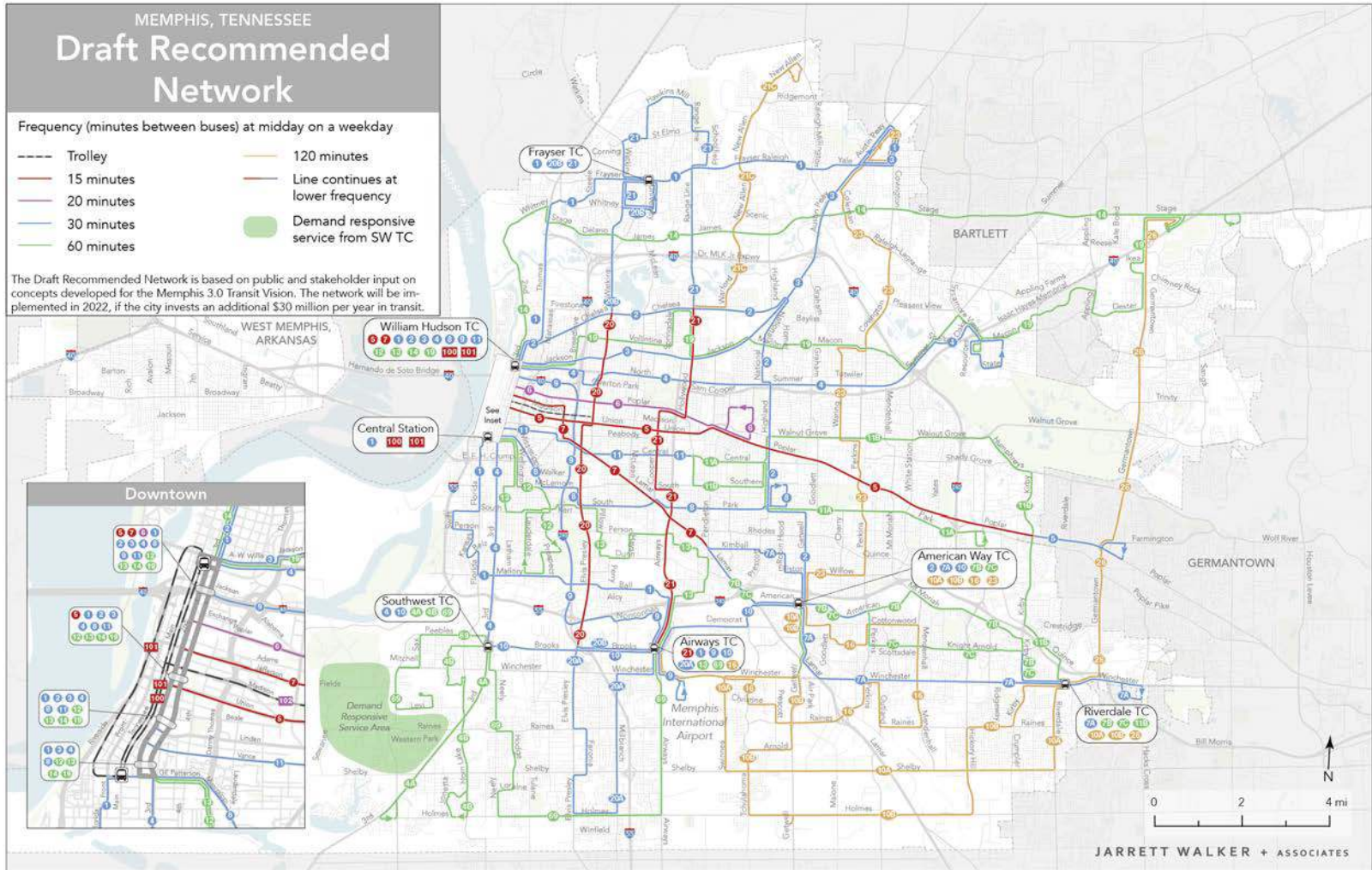
Memphis 3.0 Comprehensive Plan

MEMPHIS 3.0 *guiding memphis into our 3rd century*



- A Plan for Memphis as it enters it's Third Century
- Two-Year Comprehensive Plan Process
- Develops a Shared Vision & Master Plan for the City
- Connects Land Use with Transportation
- Produced Goals & Objectives, policies and strategies – A “to-do” list for the City

Adopted Transit Vision



MATA's Sustainability Program

- Adopted by the MATA Board February 23, 2021
- Measure and reduce Green House Gas Emissions (GHGs)
 - Fleet Vehicles and Buildings
- Track and measure fuel usage by type and cost
- Current and future actions
 - Invest in green fleets, electric buses, electric charging infrastructure
 - Set sustainability standards for MATA facilities
 - Create partnerships with local sustainability working groups or advisory committee
 - Join APTA's sustainability commitment
- Set goals for Climate Action Plan

What Goes Into the Electric Bus Decision Process?

- Vehicle Type, Size, Range
 - Grade
 - Distance
 - Span of Service
 - Available Recharging Time (3 hours?)
 - Available Recharging Locations
- Emergency Planning
 - Generators?
- Draw of ancillary equipment
 - Farebox
 - Destination Signs
 - Communications/Wi-Fi
 - HVAC
 - Counters
 - Lighting
- Infrastructure
 - Utilities

MATA's Electric Bus Program Funding

Funding Source	Quantity of Buses	Federal Funding	State Funding	Other Funding	Local Funding	Total Funding
CMAQ	10	\$ 11,120,000	\$ 0	\$ 0	\$ 2,780,000	\$ 13,900,000
BUILD Grant	9	\$ 12,000,000	\$ 0	\$ 0	\$ 5,647,000	\$ 17,647,000
VW Settlement	3	\$ 0	\$ 0	\$ 2,112,750	\$ 989,250	\$ 3,102,000
Total	22	\$ 23,120,000	\$ 0	\$ 2,112,750	\$ 9,416,250	\$ 34,649,000

MATA's Electric Bus Program Costs

Funding Source	Quantity	Cost per Unit	Total Funding
Electric Buses	22	\$ 850,000	\$ 18,700,000
Depot Chargers	15	\$ 175,000	\$ 2,650,000
Opportunity Chargers	12	\$ 175,000	\$ 2,100,000
Electric Distribution Costs	1	\$ 1,650,000	\$ 1,650,000
Installation & Construction	1	\$2,507,500	\$2,507,500
Project Contingency (20%)	1	\$5,516,500	\$5,516,500
Total Estimated Project Cost			\$33,099,000

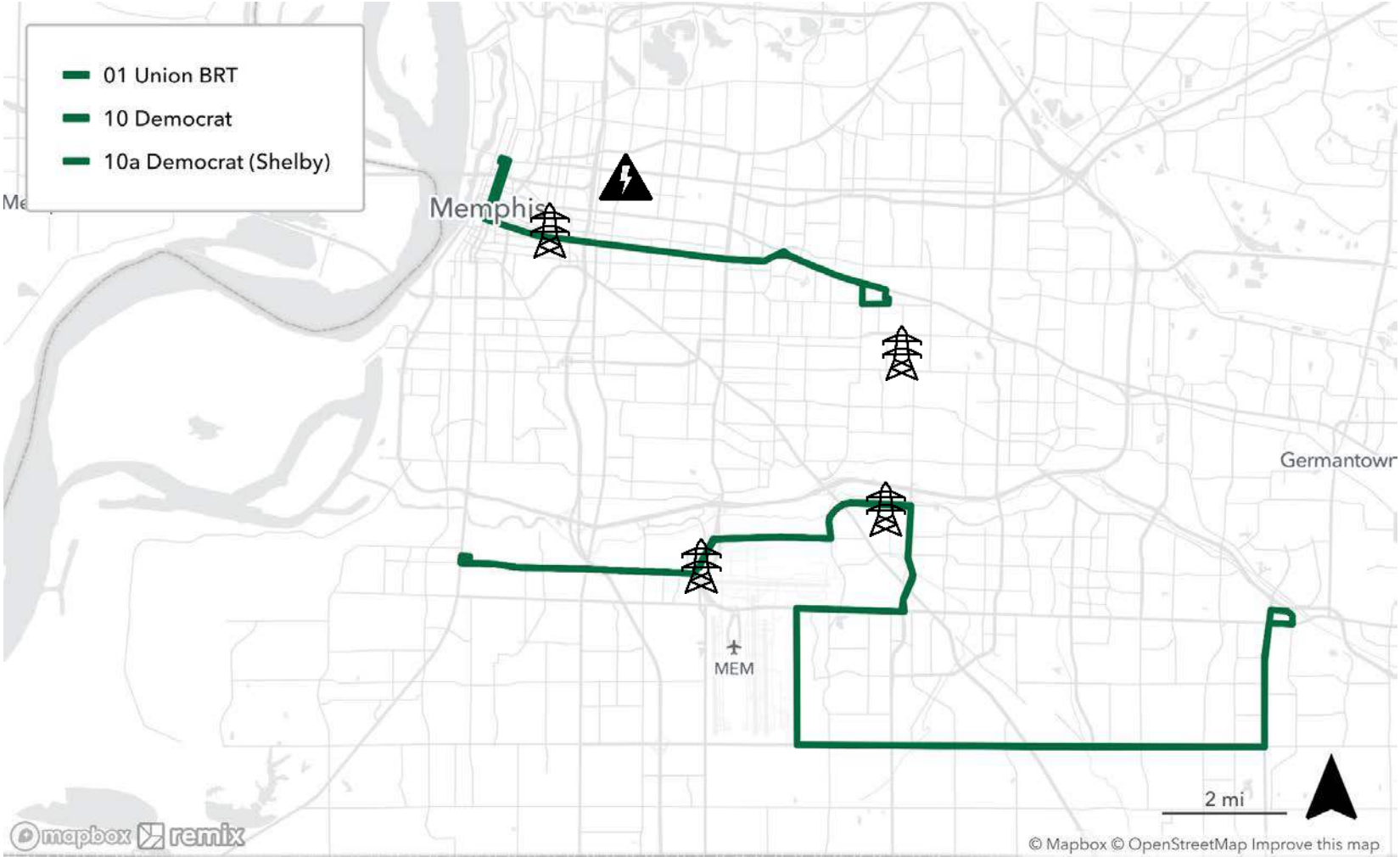
Standard Battery Electric Bus



Another Battery Powered Bus



MATA's Electric Bus Network



Electric Bus Program Consultant Scope of Work



	Tasks
Project Scope	1. Project Management to Assist MATA
	2. Develop Bus Vendor Demonstration Program
	3. Assist with Coordination of Demonstration Program
	4. Assist with MLGW and TVA Electric Demand and Power Supply for Electric Bus Program
	5. Develop Bus Charging Infrastructure Program
	6. Assist with Battery Electric Bus Procurement Specifications

Electric Bus Telemetric Data



NEW FLYER
CONNECT*



DATE	BUS	MODEL	ESS CAPACITY	TRIP
Fri, Aug 16, 2019	51944	XE40	480 kWh	1

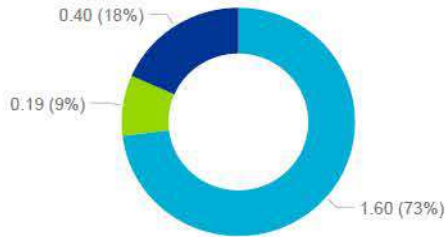


TRIP DETAILS

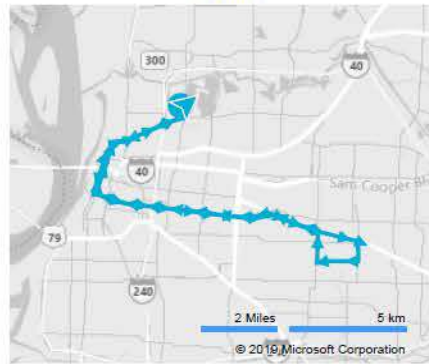
09:44 am Start Time	24.52 Mileage (miles)	73.20 SOC MAX (%)	2.19 Net Energy Consumption (kWh/mile)	24.10 Total regen energy (kWh)
11:28 am End Time	85.59 Average Temperature (°F)	62.00 SOC MIN (%)	31.00 Net Energy Consumption (kWh/hour)	0.31 Regen ratio
01:44:03 Duration	14.14 Average Speed (mph)	53.76 Net Energy Used (kWh)		

NET ENERGY CONSUMPTION BY SUB-SYSTEM (kWh/mile)

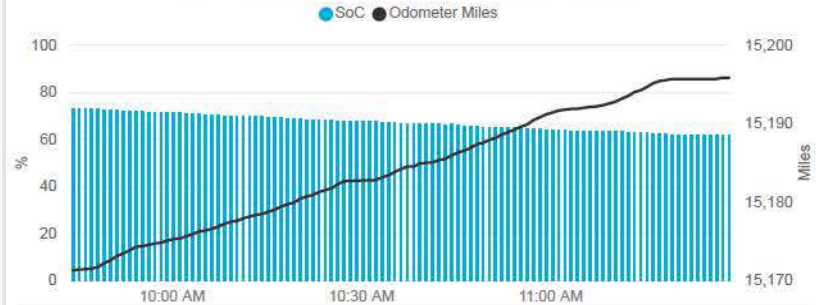
● Motor ● Elect. Heater ● LV Accessories ● HV Accessories



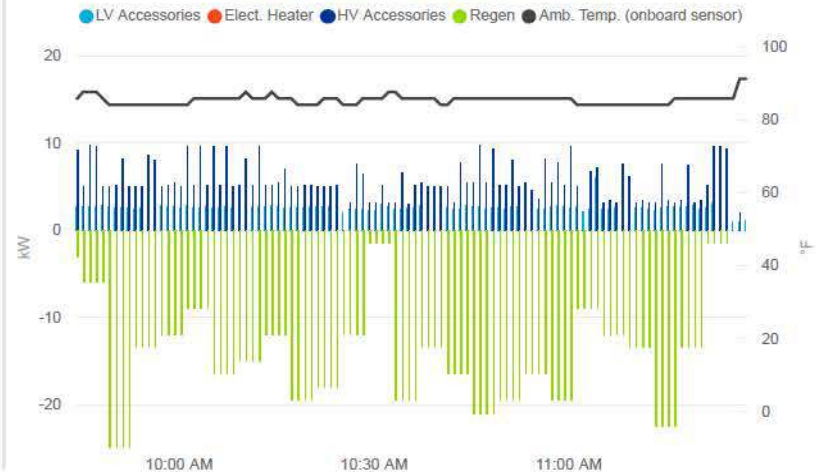
ROUTE



STATE OF CHARGE AND ODOMETER MILES



SUB-SYSTEMS AND REGEN POWER



RANGE



New Flyer Connect® Proprietary Technology and Analytics



Memphis Innovation Corridor





Electric Bus Rapid Transit (BRT) Line

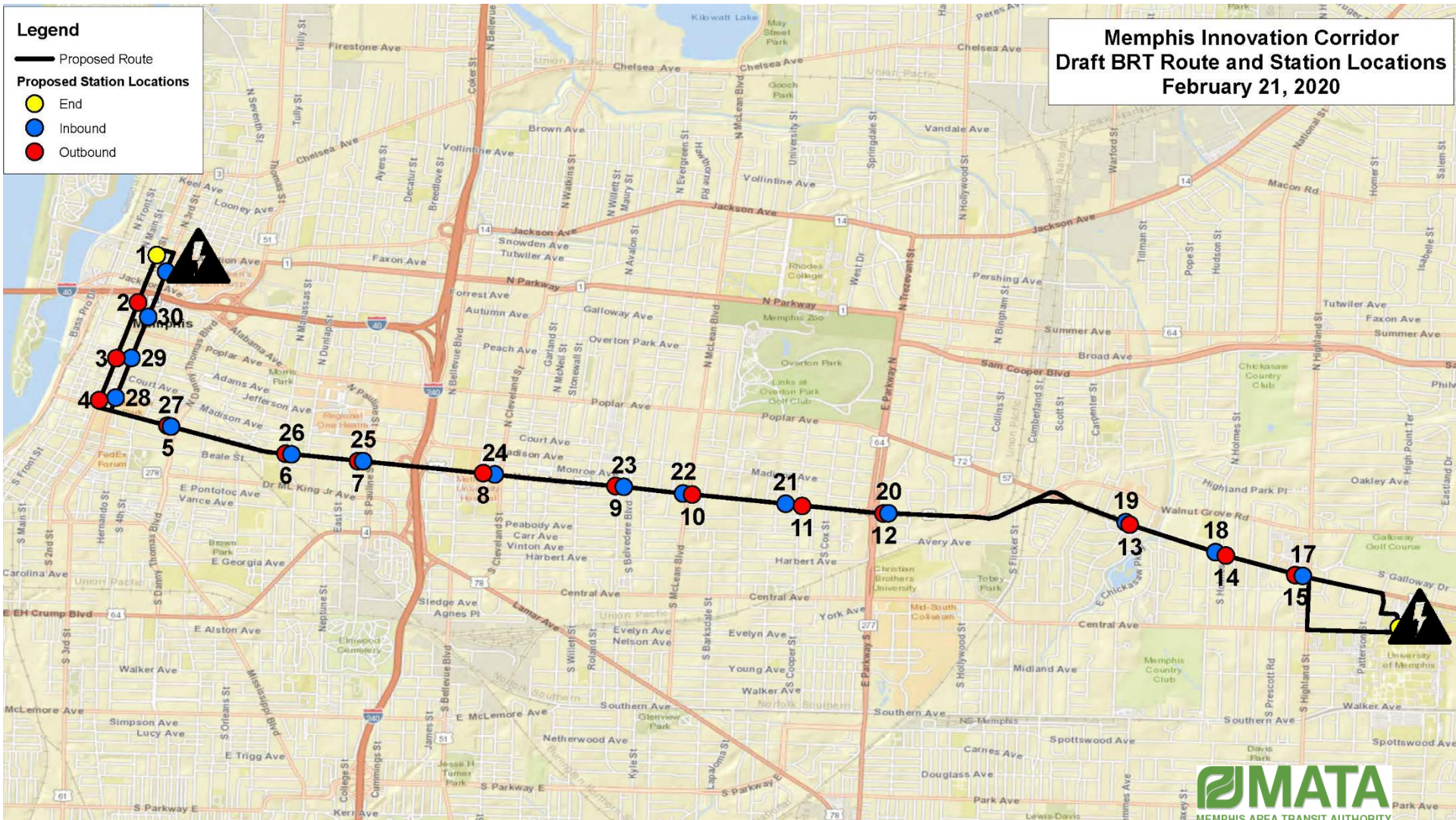


Bus Rapid Transit (BRT) Characteristics

- High Frequency Transit
- Longer Span of Service
- Dedicated Right of Way
- Branded Service
- Stations, not Stops
 - Fewer with more amenities
- Becomes a Trunk Line of the System

Memphis Innovation Corridor Draft BRT Route and Station Locations February 21, 2020

- Legend**
-  Proposed Route
 - Proposed Station Locations**
 -  End
 -  Inbound
 -  Outbound



BUILD Grant Scope

- Procurement
 - Nine electric buses
 - Charging infrastructure
 - Depot Chargers (5 total)
 - Opportunity Chargers (2 total)
 - Automatic Traffic Management System (ATMS)
 - To include Transit Signal Priority (TSP)
 - Ticket Vending Machines (41 total)
 - To be installed at Will Hudson Transfer Center and relocated shelters
- Implementation
 - Fixed Route BRT Service



BUILD Grant Funding Sources

Federal/Local	Source	Funding Amount
Federal	BUILD Grant	\$12,000,000
Local	BUILD Match	\$5,647,000
Total Federal and Local		\$17,647,000



Small Starts Capital Investment Grant (CIG) Scope

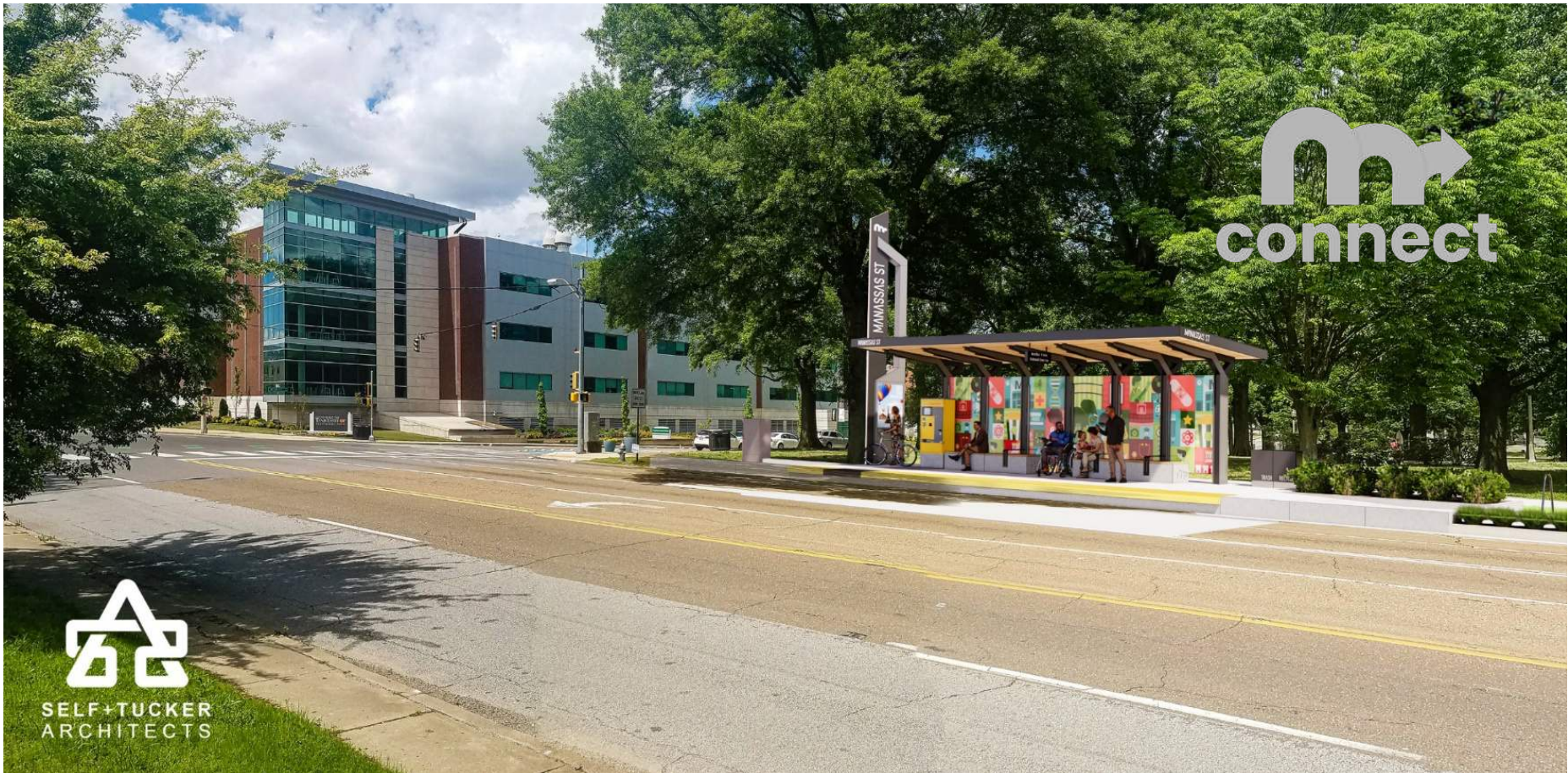
- Right-of-Way
 - ROW Acquisition (from 36 properties)
 - Easements (from 18 properties)
- Construction
 - Bus Rapid Transit Stations (31 level boarding platforms at 16 stations)
 - Bus Only Lanes
 - Laneage Reconfiguration along Union Avenue
 - Curb Extensions and Pedestrian Improvements (Downtown)
 - ADA/Accessibility Improvements
 - Traffic Signal Improvements
 - Signal Modifications/Reconstruction (41 total)
 - Pedestrian Crossings (2 total)
 - Fiber Optic Communications





Typical mConnect Station

Medical Center – Union at Health Sciences Park



Features and Amenities – BRT Stations

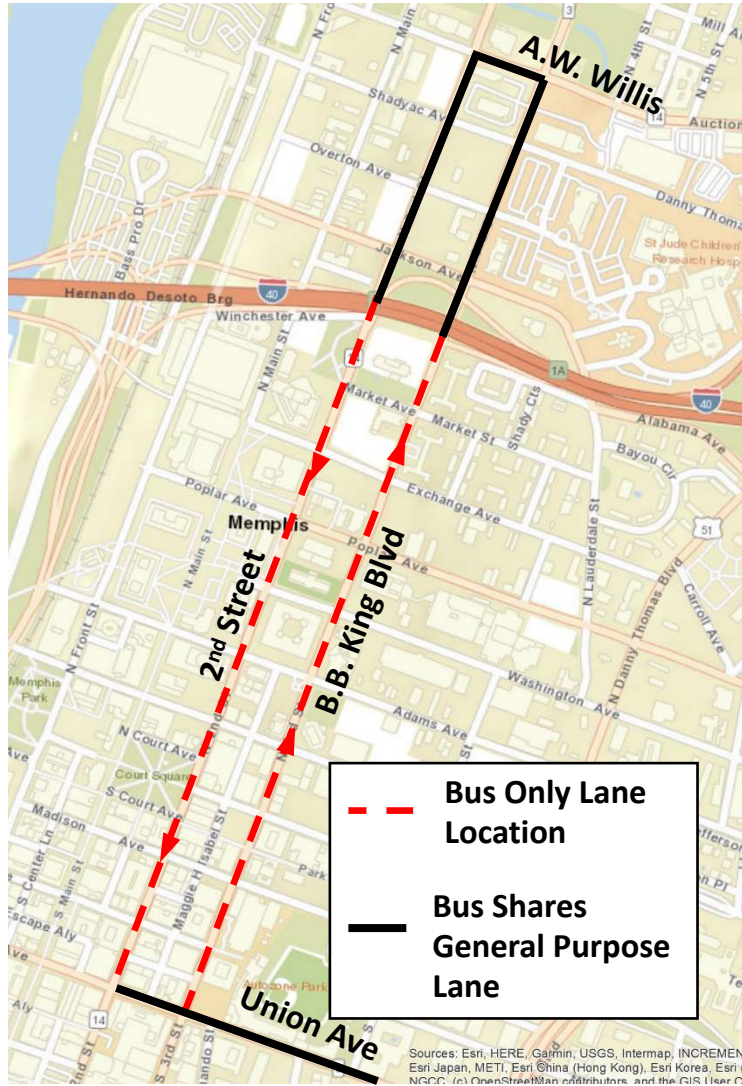


- Real-Time Bus Arrival Information
- Security
 - Cameras
 - Emergency Call Box
- Off-Board Fare Collection
- Level Boarding



Transit Only Lanes

- B.B. King Blvd Northbound
- North 2nd Street Southbound



Small Starts CIIG Funding Sources

Federal/Local	Source	Funding Amount*
Federal	Small Starts	\$45,756,000
	STBG	\$6,800,000
	Total Federal	\$52,556,000
Local	Small Starts Match	\$18,689,000
	STBG Match	\$1,700,000
	Total Local	\$20,389,000
Total Federal and Local		\$72,945,000

*Year of Expenditure Dollars



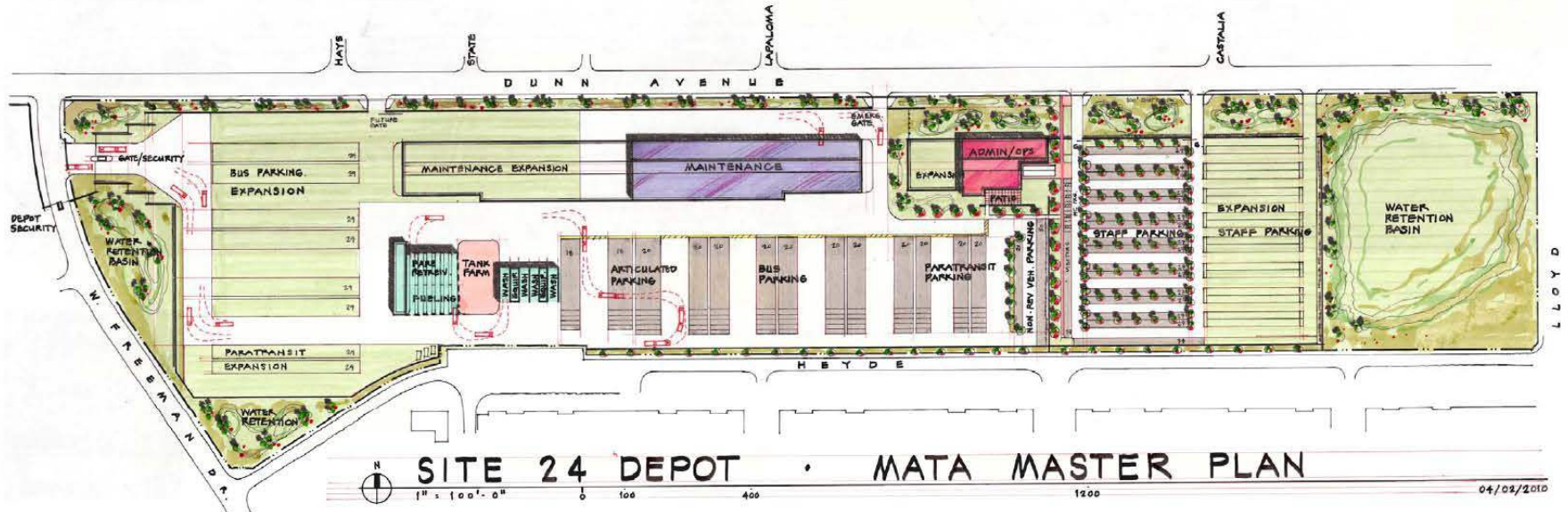
Small Starts CIG Schedule

- Notice of Funding Recommendation – March 2022
- Execute Small Starts Grant Agreement – November 2022
- Begin Right-of-Way Acquisition – March 2022
- Begin Utility Relocation – November 2022
- Begin Construction – July 2023
- Construction Complete/ Begin Revenue Service – July 2026

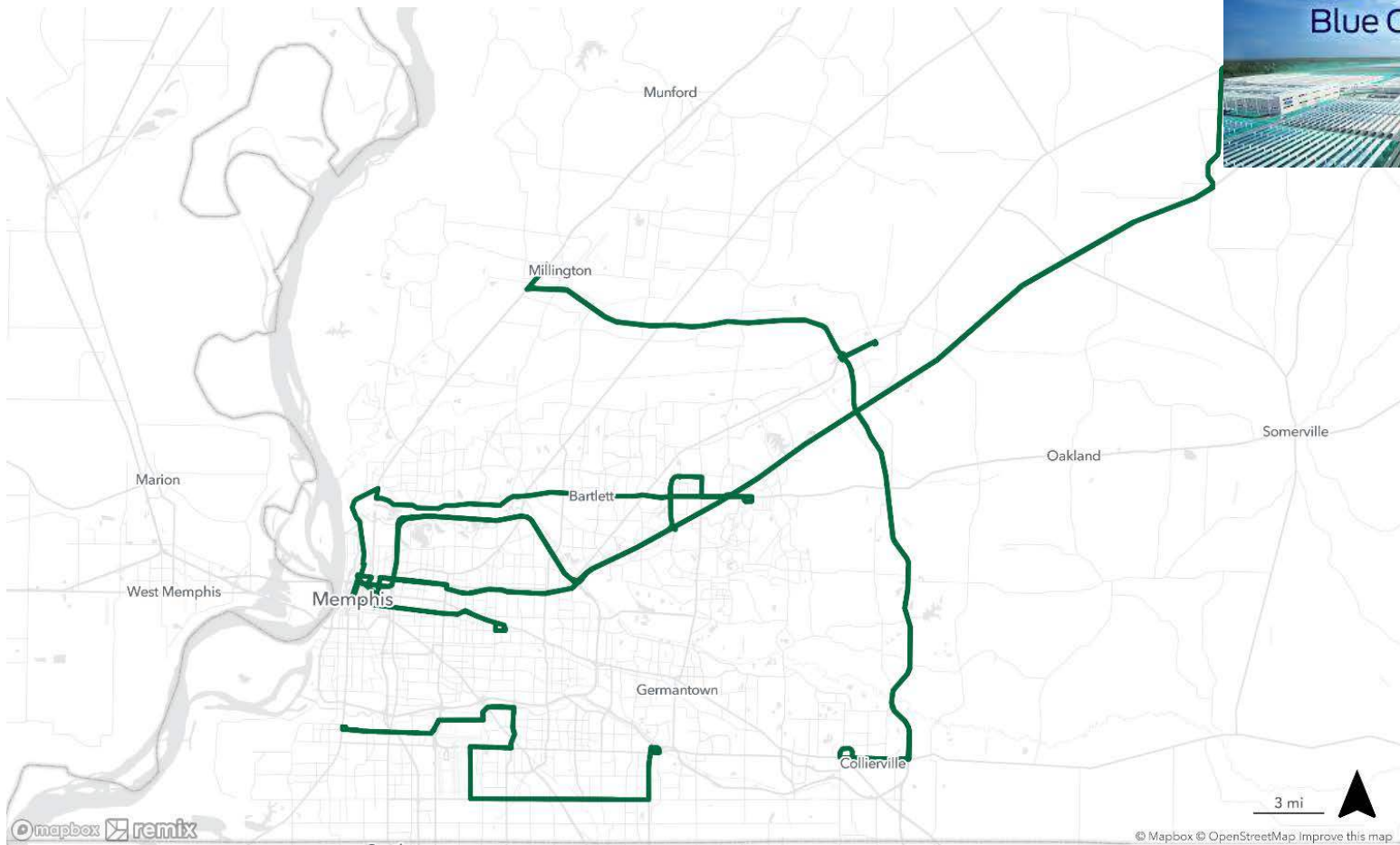


New Operations and Maintenance Facility

Exhibit 3.F - Defense Depot – Revised Site Design Option
(Master plan shows Medium Term and Long Term growth scenarios.)



Future Regional Electric Bus Network?



Thank you!

Visit us on the Web:

www.matatransit.com

www.go901transit.com



Lee Brown
Chief Financial Officer
Macon-Bibb County Transit Authority











86110

800-242-7272

SUPER

CAUTION
SAFETY
INSTRUCTIONS





TURBO DIESEL



Contact Information




Lee Brown

Chief Financial Officer

Macon-Bibb County Transit Authority

lbrown@mta-mac.com

Panel Members

<p>Susan Steffenhagen, AICP</p>	<p>John Lancaster, AICP</p>	<p>Lee Brown, CFO</p>
<p>Senior Air Quality Planner</p>	<p>Director of Planning & Scheduling</p>	<p>Chief Financial Officer</p>
		
<p>Susan.steffenhagen@tn.gov</p>	<p>jlancaster@matatransit.com</p>	<p>lbrown@mta-mac.com</p>