ZERO EMISSION BUS ROLLOUT PLAN

EASTERN CONTRA COSTA TRANSIT AUTHORITY

dba: Tri Delta Transit
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TRI DELTA TRANSIT
Eastern Contra Costa Transit Authority
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Introduction

In accordance with the California Air Resource Board's Innovative Clean Transit (ICT) regulation, the following plan serves as ECCTA's zero-emission bus (ZEB) rollout plan to transition its bus fleet to 100% ZEB by 2040.

Background

The ICT regulation became effective October 1, 2019, and requires all public transit agencies to gradually transition their bus fleets to zero-emission technologies. The ICT regulation applies to all transit agencies that own, operate, or lease buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds. It covers standard, articulated, over-the-road, double decker, and cutaway buses. The ICT regulation requires a percentage of new bus purchases to be ZEBs. The ZEB percentage increases gradually with time. The ZEB purchase requirements begin in 2026 for small transit agencies.

ECCTA is considered a small transit agency by the ICT regulation's definition (13 CCR§ 2023(b)(30)) because it meets the following criteria: ECCTA operates less than 100 buses excluding demand response vehicles. Starting in 2029, 100% of all transit agencies' new fixed route bus purchases must be ZEBs, with a goal of complete transition to ZEBs (all buses in each transit agency's fleet to be ZEBs) by 2040.

Scope

This rollout plan is a living document and a guide to the implementation of ECCTA's zero emission bus fleet. The plan provides estimated timelines based on ECCTA's fleet replacement plan. As outlined in the ICT guidance, the following sections are included as required:

Section A: Transit Agency Information
Section B: Rollout Plan General Information
Section C: Technology Portfolio
Section D: Current Bus Fleet Composition and Future Bus Purchases
Section E: Facilities and Infrastructure Modifications
Section F: Providing Service in Disadvantaged Communities
Section G: Workforce Training
Section H: Potential Funding Sources
Section I: Start-Up and Scale-Up Challenges

SECTION A

TRANSIT AGENCY INFORMATION

Eastern Contra Costa Transit Authority (ECCTA), also known as Tri Delta Transit, provides public transit services in a 225 square mile area approximately 40 miles east of San Francisco, California. Its current zero emission fleet includes 4 battery electric buses (BEB), which comprise 6% of the fixed route fleet. ECCTA is committed to transitioning its entire bus fleet to zero-emission in accordance with the Innovative Clean Transit (ICT) Regulation.

ECCTA's service includes local fixed route, paratransit, non-emergency medical transportation, and a microtransit service called Tri My Ride. Tri Delta Transit service area includes:

- Antioch
- Pittsburg
- Oakley
- Brentwood
- Bay Point
- Unincorporated areas of Eastern Contra Costa County

ECCTA was formed in 1977 as a Joint Powers Agency (JPA) consisting of the cities of Antioch, Brentwood, Pittsburg and the county of Contra Costa. Oakley incorporated as a city and joined in 1999. ECCTA is governed by an eleven-member board of directors composed of two appointed members from each city of Antioch, Brentwood, Oakley, and Pittsburg, two appointed members by the Contra Costa County Board of Supervisors, and one member at large.

ECCTA operates fixed-route and paratransit service under the name "Tri Delta Transit" and contracts with a private company, First Transit, for the operation of buses.

ECCTA provides nearly 2 million trips each year to a population of approximately 356,100 residents in the 225 square miles of Eastern Contra Costa County. Tri Delta Transit operates 16 local bus routes Monday-Friday, 5 local bus routes on weekends and holidays, door-to-door bus service for senior citizens and people with disabilities and an on-demand microtransit service called "Tri MyRide."

Transit Agency's Name	Eastern Contra Costa Transit Authority (Tri Delta Transit)
Mailing Address (number, street, city, county, zip code)	801 Wilbur Ave. Antioch, CA 94509 Contra Costa County
Name of Transit Agency's Air District(s)	Bay Area Air Quality Management District
Name of Transit Agency's Air Basin(s)	San Francisco Bay Area
Total number of buses in Annual Maximum service	52
Population of the urbanized area a transit agency is serving as last published by the Census Bureau before December 31, 2017	356,100
Contact information: A) Contact Name (Last Name, First Name) B) Title C) Phone number D) Email Address	Krieg, Jeanne Chief Executive Officer (925)754-6622 jkrieg@eccta.org
Is your transit agency part of a Joint Group?	No

Section B
Rollout Plan General Information

ECCTA's Rollout Plan was developed to transition the agency's fixed route bus fleet to 100% zero-emission 2036, which is four years ahead of the deadline set in the ICT Regulation. All buses will operate for their expected useful life to avoid early retirement of any vehicle. To achieve this, ECCTA will build off past success deploying BEBs and incorporate FCEB technology.

Starting in 2025, all new fixed route vehicle purchases will be zero-emission buses (ZEB). Since each bus will operate for their entire useful life of 12-14 years, the last diesel buses purchased will dictate the year in which the fleet is fully transitioned to zero-emission.

The paratransit cutaway buses will be replaced on-schedule with the ICT regulation. The turnover of these vehicles is quicker because they are designed to have a shorter lifespan. This will enable the paratransit gasoline vehicles to be phased out of the fleet by 2036.

ECCTA's existing BEB charging infrastructure was designed to enable future growth of their fleet. In early 2022, Tri Delta Transit installed two 125 kWh chargers with four dispensers per charger to increase our BEB charging infrastructure. The additional chargers increase our charger count to 12.

Does your transit agency's Rollout Plan have a goal of full transition to zero-emission technologies by 2040 that avoids early retirement of conventional transit buses (13 CCR § 2023.1(d)(1)(A))?	Yes
The ICT regulation requires 100% ZEB purchase in 2029. Conventional transit buses that are purchased in 2028 could be delivered in or after 2029. Please explain how your transit agency plans to avoid potential early retirement of conventional buses in order to meet the 2040 goal.	Starting in 2025, all new fixed route vehicle purchases will be zero-emission buses (ZEB).
When did your transit agency's board or governing body approve the Rollout Plan?	March 23, 2022 Resolution #220323A See Appendix 1 for copy of Resolution

Contact information for CARB to follow up on details of the Rollout Plan	Kevin Moody Director of Maintenance (925) 754-6622 kmoody@eccta.org
Who created the Rollout Plan?	Transit agency employees

Section C
Technology Portfolio

ECCTA will deploy both FCEBs and BEBs as the fleet is transitioned to 100% zero-emission. The final fleet composition will be 30 fixed route FCEBs, 32 fixed route BEBs and 44 paratransit FCEBs. This was determined by using speed and route length data from Tri Delta Transit's current routes/blocks, daily operating energy and peak power requirements for BEBs and FCEBs. will be modelled to determine which technology is most appropriate for each route. Additional constraints will be considered such as infrastructure footprint limitations and available electrical capacity.

Section D

Current Bus Fleet Composition and Future Bus Purchases

Table 1: Individual Bus Fleet Composition

Number of Buses	Engine Model Year	Bus Model Year	Fuel Type	Bus Type
8	2009	2009	Diesel	Standard 40' low floor
25	2013	2013	Diesel	Standard 40' low floor
20	2016	2016	Diesel	Standard 40' low floor
5	2018	2018	Diesel	Standard 40' low floor
4	2018	2018	BEB – depot charging	Standard 40' low floor
30	2018	2018	Unleaded gasoline	Cutaway
6	2018	2018	Unleaded gasoline	Minivan
8	2019	2019	Unleaded gasoline	Cutaway

Table 2a: Future Bus Purchases – Fixed Route (Conventional Buses)

		ZEB Purchases				Conventional Purchases			
Year	Total # of Buses to Purchase	#	% of Buy	Bus Type	Fuel Type	#	% of Buy	Bus Type	Fuel Type
2023	8	2	25%	Standard	BEB	6	75%	Standard	Diesel
2025	25	25	100%	Standard	FCEB	0	0%	n/a	n/a
2028	20	20	100%	Standard	FCEB (5) BEB (15)	0	0%	n/a	n/a
2030	9	9	100%	Standard	BEB	0	0%	n/a	n/a
2035	8	8	100%	Standard	BEB	0	0%	n/a	n/a

Table 2b: Future Bus Purchases – Paratransit (Cutaways and Minivans)

		ZEB Purchases				Conventional Purchases			
Year	**Total # of Buses to Purchase**	**#**	**% of Buy**	**Bus Type**	**Fuel Type**	**#**	**% of Buy**	**Bus Type**	**Fuel Type**
2024	36	0	0%	n/a	n/a	36	100%	Cutaway (30) Minivan (6)	Unleaded gasoline
2025	8	0	0%	n/a	n/a	8	100%	Cutaway	Unleaded gasoline
2029	36	0	0%	n/a	n/a	36	100%	Cutaway (30) Minivan (6)	Unleaded gasoline
2030	8	0	0%	n/a	n/a	8	100%	cutaway	Unleaded gasoline
2036	44	44	100%	Cutaway (38) Minivan (6)	FCEB	0	0%	n/a	n/a

Schedule of Converting Conventional Buses to Zero-Emission Buses

ECCTA is not considering converting any of the conventional buses in service to zero-emission buses.

Section E

Facilities and Infrastructure Modifications

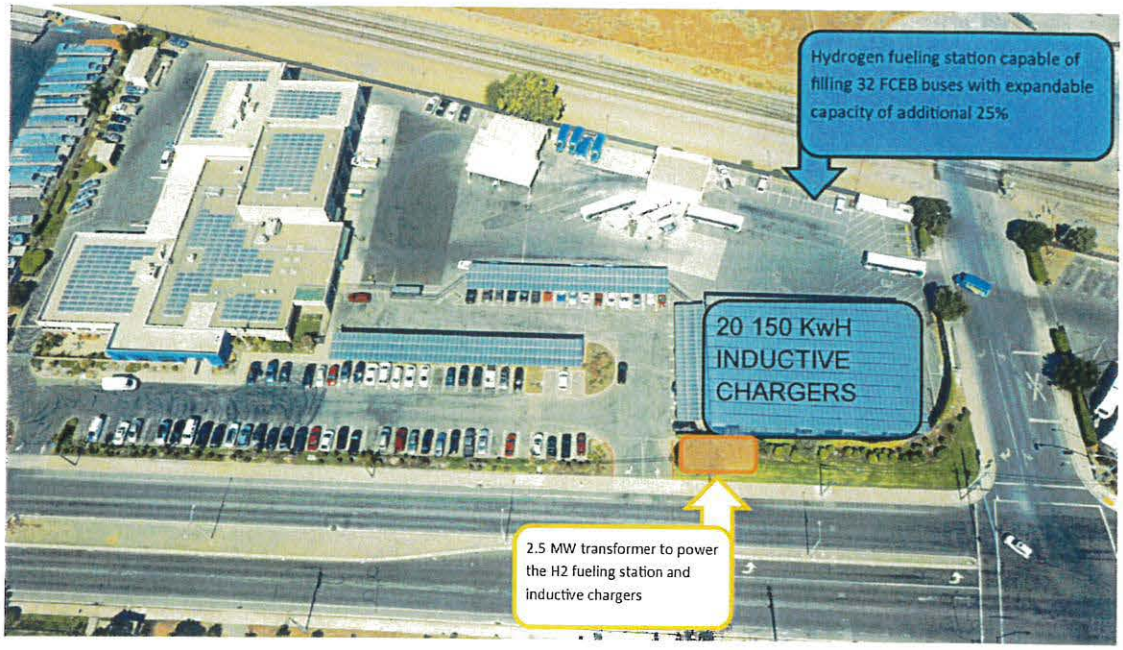
Tri Delta Transit's facilities have sufficient space to install a hydrogen fueling station and battery electric charging equipment without impacting existing operations.

Table 3: Facilities Information and Construction Timeline

Division/Facility Name	ECCTA West Lot	ECCTA East Lot
Address	801 Wilbur Avenue Antioch, CA 94509	1001 Minaker Avenue Antioch, CA 94509
Main Function(s)	Bus maintenance/fueling, bus parking	Bus parking, overnight charging
Type(s) of Infrastructure	Hydrogen fuel cell fueling station, 20 inductive chargers @150kW	12 plug-in changers (2@ 50kW & 10 @125kW)
Service Capacity	• 480 3 phase 2.5mW transformer • 20 inductive chargers • hydrogen fueling station	3-phase @ 2000 amp 4 total plug in chargers
Needs Upgrade?	Yes	No
Estimated Construction Timeline	• Hire A&E to design hydrogen fueling station, scheduled completion: spring 2023 • Construct hydrogen fueling station, scheduled completion: fall 2024 • Install 20 inductive chargers, scheduled completion: fall 2027 • Upgrade hydrogen fuel station for extra storage capacity, scheduled completion: summer 2035	Install transformer, conduits, switch gear, completed: February 2022

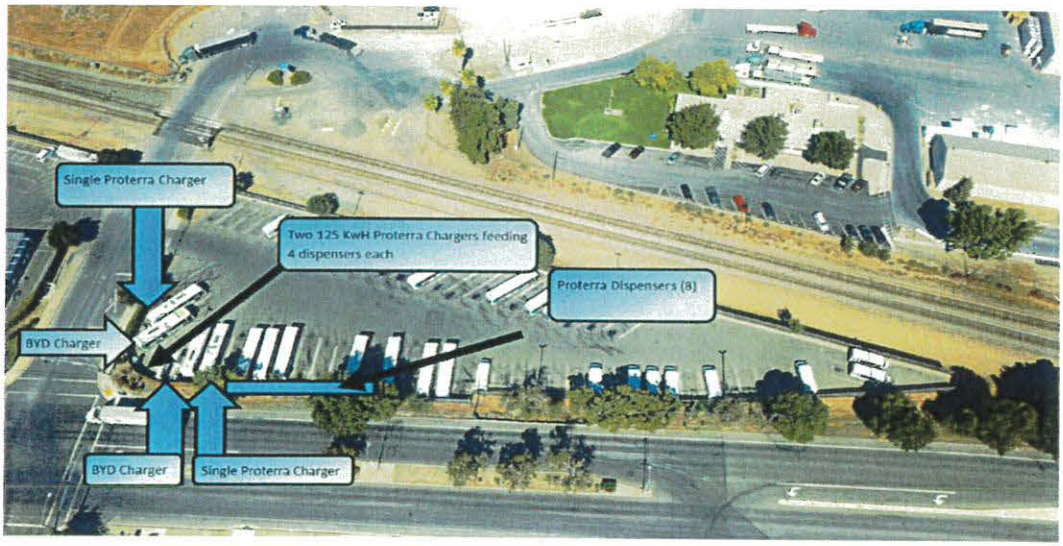
ECCTA West Lot has parking for 46 total revenue vehicles. The planned 20 inductive chargers will not take away any vehicle parking. The planned hydrogen fueling station will result in no loss of parking. The first phase of the hydrogen fueling station will have a capacity of 9,000 kg of trucked-in storage capacity for the first 30 FCEB. In 2035, the storage capacity will be doubled to 18,000kg of trucked-in storage capacity for a total of 74 FCEB buses completing the final build out of the zero-emission bus plan.

ECCTA West Lot

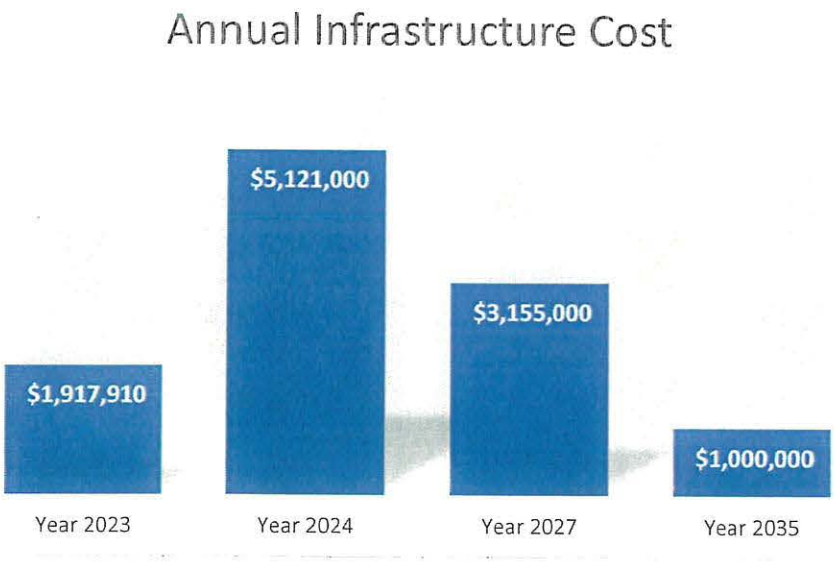


ECCTA East Lot has parking for 65 total revenue vehicles and will not require additional improvements. It has charging ports for 12 buses. The remaining 53 parking spaces will be used for FCEBs.

ECCTA East Lot



Anticipated Infrastructure Costs



Section F

Providing Service in Disadvantaged Communities

ECCTA's routes serve one or more disadvantaged communities, as listed in the latest version of CalEnviroScreen and will continue to for the foreseeable future. ECCTA will deploy zero-emission buses in disadvantaged communities.

As ECCTA's buses are transitioned from diesel and unleaded gasoline to zero emission, the buses will be rotated throughout the service area based on mileage. ECCTA will operate the zero-emission buses on routes providing service within disadvantaged communities providing cleaner, quieter service to the local ridership.

Section G

Workforce Training

ECCTA will receive training provided by vehicle OEMs, technology suppliers and infrastructure providers as equipment is deployed onsite. Additional training will be provided by other transit agencies and/or outside programs, such as the West Coast Center of Excellence in Zero-Emission Technology.

ECCTA will use a "train the trainer" approach by which key operations and maintenance personnel, such as lead technicians and supervisors, will take part in the OEM and vendor training programs to bring the technical expertise and knowledge in-house.

Fuel Cell Electric Bus Training: Training will be provided by the selected OEM in the following areas:

1. General hydrogen safety awareness training for onsite staff.
2. Bus driver and operations staff training
3. FCEB maintenance and repair training
4. General bus overview introduction training
5. Maintenance, troubleshooting, and repair of the fuel cell system.
6. Emergency first responder training for fire department representatives as well as ECCTA onsite first responder staff

Hydrogen Fueling Infrastructure Training: Training will be provided by the selected equipment vendor in the following areas:

1. General hydrogen safety awareness training for onsite staff
2. Fueler specific training on safe fueling procedures
3. Maintenance, troubleshooting, and repair training
4. Emergency first responder training for fire department representatives as well as ECCTA onsite first responder staff

Battery Electric Bus Training: Training will be provided by the selected OEM in the following areas:

1. Charging infrastructure maintenance training
2. General bus overview introduction training
3. High voltage safety training
4. Bus maintenance, troubleshooting, and repair training
5. Emergency first responder training for fire department representatives as well as ECCTA onsite first responder staff

Section H

Potential Funding Sources

Pre-Infrastructure
Funding:

- ECCTA secured a LCTOP grant and a TDA grant for the design and installation of the electric portion of the electrification process. ($1,917,910)
- ECCTA was awarded a $3,998,543 FTA Bus and Bus Facilities grant to purchase infrastructure and equipment to support hydrogen fuel cell electric buses.
- ECCTA secured a $817,000 STP/CMAQ grant to upgrade the maintenance facility so hydrogen buses can be maintained.

These grants will allow ECCTA to perform the following:

- Install the electric transformer for final build-out
- Install conduit for the inductive chargers and hydrogen fueling station
- Install switch gears that will enable ECCTA to individually record the amount of electricity powering the hydrogen fueling station and the 20+ inductive chargers.
- Contract with an A&E firm to complete the hydrogen fueling station design that will include a build-ready scope of work
- Build a hydrogen fueling station.
- Re-work the existing solar system to attach to the new electric transformer so the power used to charge and fuel buses will be renewable energy
- Upgrade the maintenance facility for hydrogen buses,

This pre-work will enable ECCTA to connect the charging ports and the hydrogen station to the pre-installed infrastructure at a later date.

Inductive Charging
Funding Required: Discretionary Low-No grant of $2,555,000 with a $600,000 TDA local match

The conduit and wiring installed in the pre-infrastructure phase will be plumbed to the power stations for the inductive chargers and the switch gear (power box with meter) will be located so when the grant for the inductive charging stations is secured, the inductive chargers will be installed and connected to the switch gear for power.

Hydrogen Fueling Station Capacity Increase
Funding Required: TDA funds: $1,000,000

The first phase of the hydrogen fueling station will have a capacity of 9,000 kg of trucked-in storage capacity for the first 30 FCEB. In 2035, the storage capacity will be doubled to 18,000kg of trucked-in storage capacity for a total of 74 FCEB buses completing the final build out of the zero-emission bus plan.

Plug-in Chargers
Funding: LCTOP and TDA funds. (Project completed.)

ECCTA procured and installed 14 plug-in charger units in the East Yard. These chargers will enable ECCTA to purchase 8 additional plug-in buses. The future purchases for BEB will include the option of inductive charging as well as plug-in charging.

Charge Management
Funding: TDA funds

ECCTA is under contract for charge management services. As an early BEB adopter, the charge management service has resulted in a savings of over 40% on electricity charges while increasing ECCTA's LCFS credits by 10%. Charge management services will be used for all of ECCTA's bus charging. infrastructure.

Vehicle Replacement
Funding:

• HVIP	$12,720,000
• TDA local share	$5,408,000
• LCFS credits	$1,000,000
• AB 464 local share	$6,408,000
• 5307 Federal share	$51,264,000
TOTAL	$76,800,000

ECCTA plans to replace all of its revenue vehicles with zero emission buses by 2036. The replacement plan is located on page 8 of this plan.

COST:

- 32 BEB's @ $1,000,000 = $32,000,000
- 30 FCEB's @ $1,200,000 = $36,000,000
- 44 paratransit buses at $200,000 = $8,800,000

The total cost of replacement for all of the revenue vehicles will be $76,800,000

Section I

Start-up and Scale-up Challenges

Considerable funding will be required to complete the ZEB transition, which presents a significant challenge to ECCTA. ZEBs are more expensive to purchase than conventional vehicles and new infrastructure is required to operate and maintain the vehicles. The increased capital and operating budgets will necessitate financial support from the federal, state, and local governments.

The cost to the agency could be reduced through a state-led initiative to purchase ZEBs in bulk on behalf of multiple agencies. This would decrease the per-vehicle cost since the price is tied to procurement volumes.

To ensure successful integration of ZEBs into ECCTA's fleet, the agency will be required to provide quality workforce training to staff. Maintenance and operations courses will be required relating to both the ZEBs and accompanying infrastructure. The efficiency of ZEBs is strongly linked to driver behavior, which requires a shift from current driving practices so that the benefits of regenerative braking are realized. The range of BEBs can be reduced by as much as 10-20% if the vehicles are driven ineffectively. In addition to training, it will be critical to solicit feedback on the ZEBs from the entire labor force through outreach and education activities.

While the ZEB Rollout Plan will serve as a useful guide for the ZEB transition, there are many unknowns that will impact implementation. ZEBs have not been on the road in great numbers for long enough to fully understand and predict performance, reliability and robustness, and the technology is improving all the time. ECCTA will regularly evaluate ZEBs and fueling infrastructure purchases based on product availability and performance data. Access to information demonstrating how ZEBs perform under a range of conditions including high heat conditions and near end-of-life operation will help guide future purchasing decisions.

ECCTA will track and evaluate performance of their own vehicles, but it would be useful to share data between agencies so that decisions can be informed by as much data as possible. It is critical that CARB support funding initiatives to reduce the financial burden to the agencies as fleets transition to zero-emission. Funding will be required to support capital expenditure for vehicles, fueling/charging infrastructure, maintenance facility upgrades, and workforce training. Funding should also be made available to study performance of ZEBs under a range of conditions and the results should be widely available. CARB is well positioned to facilitate the sharing of information between agencies about ZEB performance through educational outreach.

APPENDIX 1

Board of Directors Resolution #220323A

Approving ECCTA's Zero Emission Bus (ZEB) Rollout Plan
and
Authorizing the CEO to submit the ZEB Rollout Plan to the California Air Resources Board in accordance with the Innovative Clean Transit Regulations

TRI DELTA TRANSIT
Eastern Contra Costa Transit Authority
801 Wilbur Avenue • Antioch, California 94509
Phone 925.754.6622 Fax 925.757.2530

RESOLUTION #220323A
EASTERN CONTRA COSTA TRANSIT AUTHORITY (TRI DELTA TRANSIT)
ZERO EMISSION BUS ROLLOUT PLAN

Resolution #220323A approves Eastern Contra Costa Transit Authority's Zero Emission Bus (ZEB) Rollout Plan and authorizes the CEO to submit the ZEB Rollout Plan to the California Air Resources Board in accordance with the Innovative Clean Transit Regulations.

WHEREAS, the Innovative Clean Transit (ICT) regulations were adopted by the California Air Resources Board (CARB) in December 2018 and became effective on October 1, 2019; and

WHEREAS, Title 13 of the California Code of Regulations § 2023 (13 CCR § 2023.1 through 2023.11) requires all public transit agencies to gradually transition their bus fleet to zero-emission technologies; and

WHEREAS, beginning in 2029, 100% of new fixed route purchases by transit agencies must be ZEBs, with a goal for full transition by 2040; and

WHEREAS, each transit agency must adopt and submit a complete Zero Emission Bus Rollout Plan that is approved by its governing body; and

WHEREAS, careful planning is essential to ensure the synchronization of vehicle procurement, infrastructure build out, and fuel cost management; and

WHEREAS, ECCTA's goal is to fully transition to zero-emission technologies by 2036, avoiding early retirement of diesel buses; and

WHEREAS, ECCTA's ZEB Rollout Plan must be submitted to CARB by July 1, 2023.

NOW, THEREFORE, BE IT RESOLVED, by the Board of Directors of the Eastern Contra Costa Transit Authority to adopt Resolution #220323A approving ECCTA's ZEB Rollout Plan and authorizes the CEO to submit it to CARB in accordance with the Innovative Clean Transit Regulations.

PASSED AND ADOPTED THIS 23rd day of March, by the following votes:

EASTERN CONTRA COSTA TRANSIT AUTHORITY

Ken Gray, Chair

Jeanne Krieg, CEO

AYES: 8
NOES: 0
ABSENT: 3
ABSTENTIONS: 0