ALAMEDA-CONTRA COSTA TRANSIT DISTRICT

STAFF REPORT

MEETING DATE: 2/13/2019 **Staff Report No.** 19-040

TO: **AC Transit Board of Directors**

FROM: **Michael A. Hursh, General Manager**

SUBJECT: **State of the District's Bus Fleet**

BRIEFING ITEM

RECOMMENDED ACTION(S):

Consider receiving a report on the State of the District's Bus Fleet for AC Transit Fixed Route Services.

BUDGETARY/FISCAL IMPACT:

There are no current direct fiscal impacts related to the State of the District's Bus Fleet Report.

BACKGROUND/RATIONALE:

The State of the District's Bus Fleet Report is a briefing item that provides an overview of the current bus fleet including: the age of the fleet, maintenance activities, a summary of quality assurance and warranty programs, zero emission bus program, and new bus procurements.

Bus Fleet Age

During calendar year 2018, the District maintained the operation of 637 buses in the fleet. The District introduced into service the Alexander Dennis 42-foot Double Decker buses on Transbay routes FS and J. A total of 39 buses were decommissioned and replaced by 44 new buses. The average age of the fleet increased slightly from approximately 7.68 years in 2017 to 7.75 years in 2018. The following fleet changes transpired during 2018:

Decommissioned
29 VanHool 60-foot Diesel
10 MCI 45-foot Diesel

New Buses
29 New Flyer 60-foot Diesel
10 Alexander-Dennis 42-foot Diesel

The District is scheduled to replace 77 vehicles that are beyond the end of useful life with the following new buses that will be placed in service during the year 2019:

- 35 Gillig 40-foot Diesel

- 10 New Flyer 40-foot Fuel Cell
- 1 New Flyer 60-foot Fuel Cell (Pilot Program)
- 5 New Flyer 40-foot Battery Electric
- 27 New Flyer 60-foot BRT Hybrid Diesel

To achieve the District's Transit Asset Management (TAM) performance targets, the District will need to continue replacing buses that have exceeded the Federal Transit Administration's (FTA) end of useful life. At the end of 2018, the District had 195 buses exceeding the end of useful life. With the current bus procurements arriving in 2019, the District will have 118 buses past the useful life. A Request For Proposals (RFP) for (31) 45-foot Commuter Buses will be released the first quarter of 2019. Considering the commuter bus RFP, the current projection for 2021 is that the District will increase to 163 buses beyond the useful life of a revenue vehicle.

During calendar year 2018, miles traveled by the bus fleet increased to approximately 23.8 million miles from 23.5 million miles in 2017, which represents an increase of more than 300,000 additional miles. The mileage increase directly impacts the quantity and frequency of the maintenance program activities.

Bus Maintenance Programs

The District's Maintenance programs are designed to sustain the equipment in a state of good repair, which is a requirement of the FTA, emphasizing safety, reliability and cleanliness for the useful life of the bus fleet. Preventative maintenance inspections and maintenance scheduled tasks are the foundation of the District's fleet maintenance programs. There are multiple scheduled maintenance activities required for each bus to meet Original Equipment Manufacturer (OEM) recommended maintenance intervals, along with safety and regulatory compliance. Preventative Maintenance Inspections (PMI) and Deep Cleaning are the base programs to sustain a safe, clean and reliable bus fleet.

During the PMI, mechanics identify components or systems requiring further maintenance. A corrective maintenance work order is created to address the defects identified. Using data from the Ellipse enterprise asset management system, preventative maintenance inspection reports, road call failure analysis, and other equipment performance data resources, several safety and reliability campaigns were initiated. Warranty and Quality Assurance campaigns accounted for 837 work orders. The department completed 39,293 scheduled and 78,822 non-scheduled work orders this past year. In total, Maintenance completed approximately 118,115 work orders in 2018.

Results of the work performed by the maintenance team is evident by the fleet reliability measured by the District with miles between chargeable road calls (MBCRC). Attachment 1, Chart 1: District Miles Between Chargeable Road Calls shows the monthly performance for this Key Performance Indicator (KPI) in 2018. During the past year, miles between chargeable road calls were above the established goal 9-months with an average performance of 6,362 MBCRC for the 12-month period. This is higher than the District goal of 5,700 MBCRC.

Quality Assurance Program

The primary function of the Quality Assurance program is to advocate and establish benchmark standards which are the framework and foundation for a quality fleet. By enhancing maintenance programs and optimizing the quality of work performed by staff, the District can achieve financial and operational targets of having a fleet that meets daily pullout requirements and provides high quality reliable service. A strong Quality Assurance Program ensures that the fleet is exceeding customer expectations, both internally and externally. In addition, the Federal Transit Administration (FTA) requires that the District have a quality program established to ensure continuous improvement in the quality of service. AC Transit's Quality Assurance Program consists of the following primary sub-programs:

- Bus Cleanliness Inspection (BCI)
- California Highway Patrol (CHP) Simulated Inspection
- Preventative Maintenance Inspection (PMI) Audit

Bus Cleanliness Inspection (BCI)

Quality Assurance performs monthly Division Bus Cleanliness Inspections (BCI) using a grading criterion focused on 19 areas of the bus (14 internal and 5 external) to allow Division staff to align resources and programs to improve the overall cleanliness and appearance of the fleet. Ratings of 1-4 are listed as unsatisfactory, 5-7 is Satisfactory, and 8-10 is Excellent.

Quality Assurance inspected 960 buses as part of the BCI program during the year 2018. This period covered FY2018 Q3/Q4 and FY2019 Q1/Q2. Attachment 1, Chart 2: Bus Cleanliness Scores - Quarterly Average depicts the District's average BCI scores for the past 12-month period by quarters. The District wide average score was 7.84 out of 10.0 during the past 12-month period which is on the high end of the good rating but below the excellent goal. Maintenance continues to evaluate this Key Performance Indicator (KPI) to implement enhanced training and bus cleanliness initiatives geared towards sustaining a BCI rating of 8.1.

California Highway Patrol Simulated Inspection Program

Quality Assurance performs a quarterly inspection in accordance with the California Highway Patrol (CHP) Motor Carrier Safety Unit Terminal Inspection guidelines at each of the Division's transportation and maintenance departments. The buses, maintenance records, and transportation records are audited to identify the work processes that are in compliance and those needing improvement. The Quality Assurance staff evaluates the results of each inspection and recommends a course of action to improve compliance. All Divisions have consistently received a "Satisfactory" rating on the annual California Highway Patrol (CHP) Motor Carrier Safety Unit Terminal Inspection, which is the highest rating awarded by the agency.

Preventative Maintenance Inspection (PMI) Audit Program

The Quality Assurance Preventative Maintenance Inspection Audit Program is designed to audit one PMI at each Division and evaluate the consistency and quality of preventive maintenance inspections. Randomly selected Buses are inspected after the PMI is performed by Division mechanics. A comparison of the findings

from Quality Assurance staff and Division mechanics is performed to evaluate variations in identified defects and calculate a score for each category and an overall accuracy percentage. Feedback includes best practices and recommendations to improve the PMI program and enhance the quality of inspections performed on the bus fleet. Attachment 1, Chart 3: PMI Audit Program Sample provides an example of the results of a PMI audit at a Division.

Audit of Preventative Maintenance Inspection (PMI) Repairs

Buses inspected during the Preventative Maintenance Inspection Audits are inspected after Division maintenance staff have completed repairs and cleared defects reported during scheduled Preventative Maintenance Inspections.

Quality Assurance staff evaluates each of the defects reported by the inspection mechanic and compares it to the repair(s) made by the floor mechanic. A review of work orders created is performed to verify if labor, material and work performed is properly documented for each defect reported on the PMI. Any discrepancies are recorded and shared with maintenance staff. An example of the Quality Assurance preventative maintenance inspection review report is depicted in Attachment 1, Chart 4: Quality Assurance Preventative Maintenance Inspection Review Sample.

Oil Analysis Program

During scheduled preventative maintenance intervals, maintenance staff takes a sample of engine and transmission oil. Oil samples are sent to a laboratory for analysis and detailed reports are provided to identify impurities or other oil contaminates that indicate abnormal operating conditions of the engine and transmission. Quality Assurance staff evaluates results of the oil analysis reports and provides recommendations to Division staff for corrective action.

Warranty Program

The FTA requires AC Transit to have a system established for identifying warranty claims, recording claims, and enforcing claims against manufacturers. Recipients of grant funds from the FTA are also required to have an aggressive warranty recovery program to ensure that the cost of a defect is borne properly by the equipment manufacturer. FTA guidelines require that the warranty program needs to include procedures clearly identifying repairs, claims, submission to the manufacturer, and reconciliation of unpaid claims. During a triennial audit, an FTA representative reviews how timely and aggressive the District has been in pursuing warranty while comparing claim records submitted to received settlements.

The warranty program coordinates repairs to the bus fleet and getting reimbursed for repairs performed by District employees. This year the District has begun capturing the data on the facilities to conform to the FTA Transit Asset Management requirements.

The warranty program currently monitors 290 of 637 buses that contain warranty coverage in the revenue fleet. A total of 427 claims have been processed in the first two quarters of this fiscal year with a total recovery of $422,744.73. The warranty program has recovered $7.2 million in claims between FY2010 and FY2019. Attachment 1, Chart 5: Fiscal Warranty Recovery shows the amount warranty reimbursement recovered per fiscal year.

Zero Emission Bus Program

AC Transit currently operates thirteen VanHool 40-foot hydrogen fuel cell buses, which is the largest and longest deployment of hydrogen fuel cell buses in the world. Twelve of the thirteen hydrogen fuel cell buses are part of the Zero-Emission Bay Area (ZEBA) Advanced Demonstration project and have been in service since 2010. The National Renewable Energy Laboratory (NREL) collects and analyzes performance and reliability data on the fuel cell buses and provides an annual report on the performance of the fleet.

To assess the commercial viability of hydrogen fuel cell buses, the United States Department of Energy (DOE) and the FTA established interim performance targets for fuel cell buses. Attachment 1, Chart 6: Summary of FCEB Performance Compared to DOE/FTA Targets through December 2018 details the DOE/FTA targets as reported by NREL, hydrogen fuel cell power plant operating hours, and fuel cell bus miles traveled.

Attachment 1, Chart 7: Fuel Cell Bus Hours and Miles summarizes the total number of fuel cell power plant operating hours and bus miles achieved by the current FCEB. Twelve of thirteen fuel cell power plants have now achieved the 2016 target of 18,000 hours of fuel cell power plant operation, and six baseline fuel cells reached the ultimate target of 25,000 hours of operation in 2018. One of the original fuel cell power plants, and highest performer, achieved the ultimate target of 25,000 hours of operation in June 2017 and currently has 31,210 hours. Collectively the current fuel cell bus fleet has logged over 297,488 fuel cell power plant operating hours and 2,732,282 zero emission miles. Combined with the earlier fuel cell bus demonstration, AC Transit has operated over 3,005,849 zero emission miles since 2006. With enactment of the Innovative Clean Transit (ICT) Regulation by the California Air Resources Board (CARB) in December 2018, the Zero-Emission Bay Area (ZEBA) Advanced Demonstration project is no longer required. Staff is working with CARB to conclude the ZEBA project and will provide an update to the Board once more details have been confirmed with CARB.

In 2019, the District will introduce sixteen new Zero Emission Buses (ZEBs) to the fleet. The District will have the opportunity to compare Fuel Cell and Battery Electric ZEB technology in a true side-by-side comparison by operating ZEBs from the same bus manufacturer, in the same service environment, by the same transit agency.

ADVANTAGES/DISADVANTAGES:

This report does not recommend a course of action with notable advantages or disadvantages.

ALTERNATIVES ANALYSIS:

This report is being provided to inform the Board of the status of the District's bus fleet.

PRIOR RELEVANT BOARD ACTION/POLICIES:

None.

ATTACHMENTS:

1. State of the Bus Fleet Supplemental Charts and Graphs

Approved by:

Salvador Llamas, Chief Operating Officer

Reviewed by:
William Tonis, Director of Project Controls & Systems Analysis
Stuart Hoffman, Technical Services Manager

Prepared by:
Cecil Blandon, Director of Maintenance