



# **INTERNAL AUDIT**

## **Follow-up Report of Fleet Engineering**

**R-22-04**

**August 30, 2024**

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## Rating Matrix

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Descriptor	Guide
<b>High</b>	Matters considered being fundamental to the maintenance of internal control or good corporate governance. These matters should be subject to agreed remedial action within three months.
<b>Medium</b>	Matters considered being important to the maintenance of internal control or good corporate governance. These matters should be subject to agreed remedial action within six months.
<b>Low</b>	Matters considered being of minor importance to the maintenance of internal control or good corporate governance or that represents an opportunity for improving the efficiency of existing processes. These matters should be subject to agreed remedial action and further evaluation within twelve months.

## Distribution List

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Title	For Action <sup>1</sup>	For Information	Reviewed prior to release
Executive Director		*	*
Chief Operating Officer		*	
Director of Fleet Engineering	*		
Fleet Engineering Supervisors	*		

<sup>1</sup>For Action indicates that a person is responsible, either directly or indirectly depending on their role in the process, for addressing an audit finding

# Executive Summary

## Introduction

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The Audit Committee directed Internal Audit (IA) to perform an audit to determine if controls over Fleet Engineering are designed adequately and operating effectively to ensure compliance with federal regulations, state laws, and internal policies and procedures as well as to support the achievement of management objectives. The Audit Plan was approved by the Audit Committee on January 31, 2022

The preliminary assessment phase was concluded in September, 2022. IA completed follow-up work on August 28, 2024. We completed both phases of work in accordance with the International Standards for the Professional Practice of Internal Audit, published by the Institute of Internal Auditors.

## Background and Functional Overview

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### *Initial Background Information:*

Fleet Engineering (FE) consists of two different functional divisions, bus, and rail. UTA has multiple models of buses and rails that each have their own maintenance requirements. FE is responsible for taking the Original Equipment Manufacturers manuals (OEM manuals) for different vehicle models and components and translate those into Preventive Maintenance checklists and forms (PM forms) to be used by UTA mechanics to perform required maintenance at the correct service intervals.

Currently UTA has 499 long buses currently being operated. This fleet consists of buses from three manufacturers, Gillig, MCI, and New Flyer. Gillig is the most common bus brand making up 86% of the fleet. The Bus Division of FE also creates PM forms and schedules for the fleet of 122 Paratransit buses and many aftermarket components that are installed on the bus fleet such as lifts for handicapped patrons, air conditioning units, fuel monitoring systems, and others. For this Preliminary Assessment we focused on the long bus fleet and emphasized the Gillig buses because they make up the bulk of the long buses in the fleet.

The Rail Division has three primary models of rail: S70, SD100, and SD160 which are used on UTA's light rail system. The light rail OEM manuals state that the cars are designed by Siemens Transportation Systems specifically for the UTA rail system. As such all three of the rail cars have very similar service intervals which has allowed FE to develop repeatable PM schedules.

### *Follow-up Background Information:*

During the follow up phase IA did not gather new data regarding UTA's bus fleet since we determined that it was not necessary to properly conduct our follow up work. As such, the data noted from the initial phase is no longer accurate because UTA has added multiple bus models from both Gillig and other manufacturers to the current fleet.

## Objectives and Scope

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### *Initial Phase Scope:*

The primary areas of focus for the Fleet Engineering preliminary assessment were to determine if the Preventative Maintenance Forms designed by FE coincide with OEM manuals issued by the manufacturers. To accomplish this, we divided the assessment into the three primary areas of:

- Governance

- Bus Division forms
- Rail Division forms

IA reviewed internal policies and procedures, legal and regulatory requirements, interviewed personnel, department leadership, and evaluated control documents to conduct this preliminary assessment.

*Follow-up Phase Scope:*

We reviewed management's progress on action plans during the follow-up phase of the engagement. We tested additional processes and procedures which Fleet Engineering had developed to improve the control environment ensuring that the bus manufacturers' recommended maintenance schedules are addressed within UTA's maintenance inspection forms.

## Summary

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*Initial Phase Summary:*

Although we note opportunities and recommendations for improvement emphasized in this report, we observed numerous strengths, best practices, and accomplishments within Fleet Engineering. Developing the maintenance schedules for the large fleet of vehicles UTA is not an easy task, and often times they have managed to extend the life of our equipment beyond both the manufacturers' [sic] and FTA's anticipated life cycle.

IA appreciates the assistance offered by Fleet Engineering management and staff in completing this preliminary assessment.

*Follow-up Phase Summary:*

Management implemented new procedures for analyzing the OEM manuals for any changes or updates for each model of bus that UTA utilizes within the fleet. Management uses the data gathered through this process to develop accurate inspection forms for each model. This is an ongoing process as UTA continually purchases new bus models to better serve the public. IA performed sample testing for number of updates made by the bus manufacturer Gillig. Our testing included a sample of changes to the OEM Manual for four separate models of bus. While we noted one exception, we determined the item was broadly addressed within the inspection form, and we noted the difference verbally with management and consider the item inconsequential.

Management also explained that at times UTA has developed a process of "Best Practices" for some maintenance recommendations made by the manufacturers. In general, the difference of maintenance timing is for high mileage maintenance issues as recommended by the manufacturer when a bus hits 100,000 to 200,000 miles or more. In these situations, Fleet Engineering now has an improved process of documenting a Best Practices Memo which they retain for reference. IA reviewed these memos, and we judged that this is an appropriate control and consider the recommendation closed on its merits. We encourage management to continue to emphasize these and other process and control improvements.

Management demonstrated significant improvement to the control environment in this follow-up phase from the initial phase. In large part, the improvements made to the control environment were possible because management committed added resources to this area, which included additional staff. Due to the improvements to the control environment IA will be closing the initial phase action plan..

We would like to express our appreciation to the Fleet Engineering staff and management for their assistance in completing this audit process and commend them for their innovative work developing the procedures now in place.

## Attachment A: Details of Recommendations

Preliminary Assessment Finding R-22-04-01 Gillig Bus PM forms 2018 – 2021 Models

Risk Level:

### Preliminary Assessment Status

#### Details:

Buses received between 2017 and 2021 have many changes to their recommended maintenance intervals as compared to the prior OEM Manuals. The changes within the OEM Manuals often occurs earlier than PM forms that were developed, or in some cases they do not appear to be noted on the PM forms that were developed. *See table below for changes noted.*

**Table 1 OEM Manual Changes**

Year(s) of Change	Repair recommendation	OEM Mile Mark	Prior OEM Mile Scheduling
2017	Check for excessive hub end play	100,000	None
2017 - 2020	Clean and inspect brake valve, treadle, plunger boot, and mounting plate every	25,000	100,000
2017 - 2020	Check, clean replace rotor Spinner II auxiliary oil filter every	50,000	None
2017 - 2020	Inspect suspension components for damage, looseness, and wear/cracks every	50,000	None
2017 - 2020	Inspect wheel end hub bearings at	100,000	None
2018 - 2020	Check air piping and air cooler charge	3,500	6,000
2018 - 2020	Change secondary fuel filter, Coolant SCA level, change coolant filter	7,000	12,000
2018 - 2020	Check belt tension, drive belts	14,000	28,000
2018 - 2020	Flush cooling system	14,000	28,000
2018 - 2020	Steam clean engine compartment	28,000	48,000
2018 - 2020	Change crankcase breather element	28,000	48,000
2018 - 2020	Inspect Vibration damper	28,000	48,000
2018 - 2020	Clean air compressor lines	28,000	48,000
2018 - 2020	Clean EGR sensors and DPF	70,000	150,000
2018 - 2020	Adjust Engine brake assembly and overhead se	70,000	150,000
2018 - 2020	Change DEF dosing unit filter	91,000	200,000
2019 - 2020	Inspect lines for cuts, cracks, swelling kinks, melted and chaffing.	Every 6,000	None
2019 - 2020	Inspect connections, retaining clips, ties, grommets	Every 6,000	None

#### Criteria:

At the beginning of Chapter 2 of each Gillig Service Manual there the Standard Limited Warranty & Extended Coverage certificate which states,

*“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 preventative maintenance as outlined in Gillig’s Service Manual, nor does it cover components or assemblies not originally provided by Gillig.”*

**Underlying Cause:**

IA noted that when creating PM forms FE would group the forms by bus use as well as by year. For example, there is a grouping called *Gillig Ski Bus 2007-2013*, meaning that this PM form covers that group of buses. Through testing IA found that the most recent groupings dealing with buses received from 2016 - 2021 had the highest number of changes to the recommended preventative maintenance schedules. These more recent buses have reduced the recommended timing for many of the preventative maintenance items.

While meeting with FE management the internal auditor learned that prior to buses being manufactured FE works directly with the company and establishes extended warranty terms. Certain components such as the transmission receive extended warranties for an additional 24-36 months, while the structural frame of the bus is often extended out to 168 months (or 12 years). IA reviewed the ages of the buses and compared the OEMs to the PM forms to determine how many buses in the active fleet still have extended warranty items available.

**Potential Risks:**

- IA noted that 186, or 37% of the bus fleet is aged 5 years or less. These buses would have most warranty items still active and available. There is a risk that the warranty would no longer apply through not meeting the manufacturer’s recommended preventative maintenance schedules.
- We also noted the highest number of differences between recommended maintenance is the OEM manuals for this age group of buses. Due to the way the PM forms are organized we risk missing the recommended maintenance schedules.

**Recommendations:**

1. All bus preventative maintenance forms should be reviewed to ensure that key maintenance intervals match what is recommended by the manufacturer.
2. Consideration may be given to creating a one-to-one PM form for each bus kept within the UTA fleet.

**Management Response and Action Plan:**

Fleet Engineering will review all PM inspections for warranty requirements as lined out by OEM. During this process any deviations from OEM specifications that fleet engineering has determined are best for our fleet are documented following the current Fleet Engineering standards. Currently this will consist of creating a fleet engineering memo outlining the reasoning and qualifications for the deviation.

**Target Completion Date:**

March 31, 2023

**Current Status:** Completed

IA conducted preliminary follow up work in early 2024. At that time, we confirmed that Fleet Engineering had developed a process for reviewing maintenance inspection forms, and they identified many items within the OEM which they needed to add to the inspection forms.

Through additional testing IA confirmed that Fleet Engineering has developed and completed a process of controls for organizing and creating more accurate FE Inspection forms. Fleet Engineering uses the latest information from the manufacturer's OEM to develop the current inspection forms.

**Preliminary Assessment Finding R-22-04-02 High Mileage Preventative Maintenance Risk Level: Low**

**Preliminary Assessment Status**

**Details:**

The PM forms we received covered 6,000-mile intervals from 6,000 to 48,000 miles. All OEM manuals contain recommended maintenance items beyond 48,000 miles, but we could not identify some of these items in the regularly scheduled maintenance or daily maintenance, such as changing transmission fluid at around 150,000 miles.

**Criteria:**

At the beginning of Chapter 2 of each Gillig Service Manual there the Standard Limited Warranty & Extended Coverage certificate states,

*“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 preventative maintenance as outlined in Gillig’s Service Manual, nor does it cover components or assemblies not originally provided by Gillig.”*

Additionally, UTA Fleet Engineering Maintenance Instructions No. FE-ALL-009 Inspections Section D states,

*“The Preventative Maintenance Manuals (PM forms) for each vehicle model will include detailed descriptions or each preventative maintenance inspection (whether it be mileage or time-based) and will include intranet locations of all Preventative Maintenance Inspection documents and schedules.”*

**Underlying Cause:**

Not applicable.

**Potential Risks:**

- There is the risk that higher mileage maintenance may not be performed causing the useful life of the bus to be shortened.
- Regular maintenance should also be performed to ensure the safe operation of all UTA vehicles. All maintenance performed needs to be tracked and easily understood to reduce the risk of liability should any safety problems arise.

**Recommendations:**

1. We recommend that PM forms be developed and tracked for the higher mileage intervals listed with the OEM manuals.

**Management Response and Action Plan:**

Fleet Engineering will review making sure there are not any independent higher milage or time-based inspections that are not accounted for. Fleet Engineering standard has to keep as much of the inspections tied to our regular A, B, C, D inspections. Currently we are using the electronic inspection program, developed by IT, for the shops to access the inspection paperwork for completing inspection and record

retention. If there are inspection items not already accounted for in an inspection Fleet Engineering will create additional inspections to cover the gap.

**Target Completion Date:**

March 31, 2023

**Current Status:** Closed

IA is closing this finding based on the mitigating controls which management has developed. Management tracks all changes for bus models, with an emphasis on high mileage OEM recommendations. The manufacturer recognizes that they may need to update OEM manuals and they actively contact customers with needed updates. IA also found that Fleet Engineering now maintains a memo as record of any deviation from the original OEM provided by the manufacturer. IA has will not perform any additional follow up due to the degree to which the control environment has changed.

Preliminary Assessment Finding R-22-04-03 FE Staffing and Travel Issues

Risk Level: Low

**Preliminary Assessment Status**

**Details:**

UTA sends an engineer and a member of the mechanics team to the factory for every bus that is being built for UTA. Because Gillig is our primary manufacturer UTA has two employees travel to their assembly line in Hayward, CA nearly every week of the year.

**Criteria:**

The Federal Transit Authority (FTA) provides grants and other funding for the purchase of buses and other capital assets. This funding may be applied for both prior to and after ordering or delivery of a revenue vehicle. As part of the FTA's Federal Transit Laws, codified at 49 U.S.C. chapter 53, the FTA provides the following guidance on their website\* for any post-delivery application, bold lettering was added for emphasis:

*The requirements for and process of complying with the **post-delivery purchaser's requirement certification** depend on the number of buses purchased. **The recipient has more demanding responsibilities when procuring more than ten buses** or modified vans than when procuring ten or fewer buses or modified vans, or any number of unmodified vans.*

*The purchaser's requirements certification is meant to help safeguard the recipient by ensuring that the buses are built to contract specifications. **To demonstrate compliance with the purchaser's requirement certification requirement when procuring more than ten buses or more than ten modified vans, the recipient, or its duly appointed analyst, must (1) Send a resident inspector to the manufacturer's final assembly facility and (2) visually inspect and road test the buses and/or vans.***

\*For full text see - <https://www.transit.dot.gov/regulations-and-guidance/buy-america/post-delivery-review-requirements>

**Underlying Cause:**

While UTA has not recently purchased buses with FTA funding we do adhere to this guidance so that we could seek FTA funding if needed. To meet the FTA's "Post-Delivery Purchaser's Requirements Certification Requirement", UTA is currently sending an engineer as the inspector from our headquarters in Utah.



**Potential Risks:**

Because a member of the Fleet Engineer team is not present in Salt Lake City much of the time other duties they could perform while traveling are not accomplished. Additionally, there is a high cost for travel when sending employees to an out of state facility on a regular basis. Through a separate analysis IA estimated the weekly cost of sending an employee to the Gillig facility is between \$1200 – 1,350 per week; we further estimated that UTA’s annual cost of sending an employee to this facility is between \$37,000 and \$66,000 per employee per year if sent 30 times or 45 times each year.

**Recommendations:**

1. We recommend that FE work with our attorney and an official from the FTA to determine if there is another means for meeting the post-delivery purchaser’s requirement. Possible suggestions might include employing an inspector who resides near the manufacturer’s facility or hiring a contractor to perform those duties.
2. We recommend that FE and the UTA Board determine if adherence to the inspection requirements from the FTA is still within the best interest and financial goals of UTA.

**Management Response and Action Plan**

We disagree with this assessment for the reasons listed below.

1. The inconsistency of the bus build over the last 20 years, as well as the future. Moving forward this recommendation would make it too expensive to hire an employee who would live near each of the bus Original Equipment Manufacturing (OEM) facilities for the time the buses are being built.
2. As the OEMs are located in several locations across the country, we would be required to hire an inspector or pay wages for that local area. Our current contract is with Gillig who is located in Livermore, CA. This could cause a discrepancy between what we are paying our Fleet Engineers versus what we would have to pay an inspector in that location.
3. Currently we are able to share different views on the inspection which improves the final project having multiple Fleet Engineers look over the buses being built after they have been working on the buses at UTA as well as at the OEM.

**Target Completion Date:**

Not applicable

**Current Status:** Closed – management declined to accept the recommendations and implement an action plan.