SOUNDTRANSIT

Audit Report

Work Order Process Audit

Report Number: 2020 - 003 | Report Date: June 24, 2020

Executive Summary

Audit Report No.: 2020 - 003 **June 24, 2020**

WE AUDITED the current work order process conducted at the Operations and Maintenance Facility (OMF) for both Link Light Rail Operations (Central Link), contracted to King County Metro (KCM) on our behalf; and Tacoma Link Light Rail's Operations and Maintenance Facility (OMF), which is operated and maintained by Sound Transit.

AUDIT OBJECTIVE was to determine whether the agency has effective controls in place to ensure work orders are:

- Adequately captured in Enterprise Asset Management (EAM) system;
- Scheduled timely and completed;
- Properly monitored in accordance with agency policies and procedures

The audit examined management controls of the work order process from January 2017 to September 2019 and management controls in place.

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WHAT WE FOUND?

Sound Transit owns the Link Light Rail (Central Link) Operations & Maintenance Facility (OMF) and Tacoma Link OMF; however, contracts the prevision of Operations & Maintenance for Link Light Rail to KCM, with the Agency's role as management oversight in accordance with Intergovernmental Agreement (IGA).

In order to comply with Agency Asset Management Policy 44, ST Operations Division is responsible for establishing, implementing, and maintaining detailed maintenance plans for all asset classes and ensures assets meet their prescribed functions within defined service parameters.

Pursuant to the IGA, dated, April 2019, Sound Transit (ST or the Agency) contracts King County Metro (the County or KCM) for the Operations and Maintenance of Link Light Rail systems (also known as Central Link). As capital projects are designed, built, completed, and brought into revenue service under ST2 and ST3 plans, respectively, there is an expectation that the number of 'work orders' in the current management system will experience an upward trend due to the additional maintenance and service work expected.

The Agency and the County utilize work orders to service and maintain the assets of six major areas vital for the safe operation of our transit system, which are comprised of: Link Light Rail Vehicles (LRVs), rail tracks, power systems, signals, Supervisory Control and Data Acquisition (SCADA) system, and facilities.

Within ST Operations, the Central Link OMF contained the highest volume of work orders; estimated at 139,918 (or 68%) of total work orders for both Link and Tacoma Link over the last five years; which will be expanded upon further in this report.

Our audit concluded that the agency does not have effective controls in place to adequately capture work order information in the Enterprise Asset Management (EAM) system; to ensure work orders are timely scheduled and completed; and properly monitored in compliance with agency policies and procedures. See **Finding #1**.

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Background

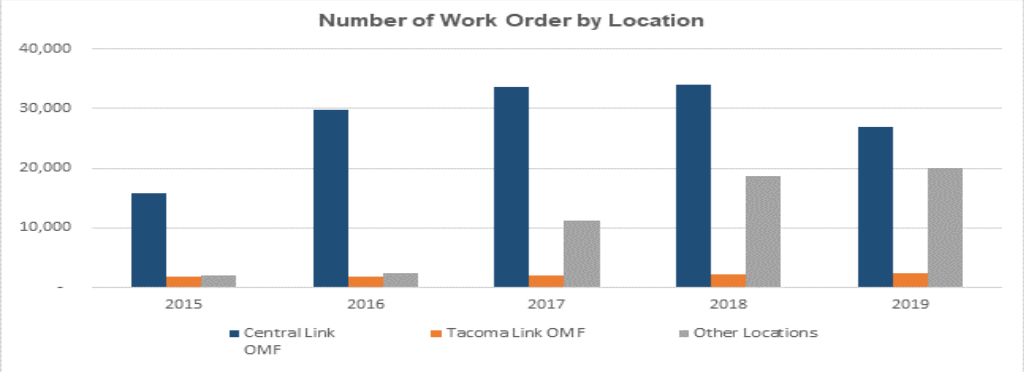
Sound Transit owns the Link Light Rail (Central Link) Operations & Maintenance Facility (OMF) and Tacoma Link OMF; however, contracts the prevision of Operations & Maintenance for Link Light Rail to KCM, with the Agency's role as management oversight in accordance with Intergovernmental Agreement (IGA).

Pursuant to the IGA[1], Sound Transit (ST or the Agency) contracts King County Metro (the County or KCM) for the Operations and Maintenance of its assets for Link Light Rail (Central Link). Tacoma Link Light Rail is operated and maintained by Sound Transit employees.

In order to comply with the Agency Asset Management Policy 44[2], ST Operations Division is responsible for establishing, implementing, and maintaining detailed maintenance plans for all asset classes and ensures assets meet their functions within defined service parameters.

As capital projects are designed, built, completed, and brought into revenue service under ST2 and ST3 plans, respectively, there is an expectation that the number of 'work orders' in the current management system will experience an upward trend due to the additional maintenance and service work expected.

Within ST Operations Department, Central Link OMF – the agency's largest facility – contained the highest volume of work orders, approximately 139,918 or 68% of total work orders within the last five years. This is largely due to the high number of assets managed at this facility compared to other facilities (i.e., 62 link light vehicles, over 21 miles of double rail tracks, 17 traction power substations, 18 overhead catenary system sections, and 25 facilities[3]).



Source: Enterprise Asset Management System (as of 12/31/19). [4]

[1] Intergovernmental Agreement (IGA) between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, Initial and Airport Segments, May 2003 (Revised December 2009), also referred as "December 2009 Revision". The Parties administratively extended the term of the December 2009 Revision from time to time through July 17, 2019. Latest IGA is between Sound Transit and King County for the Operations & Maintenance of the Link Light Rail System, dated April 2019

[2] Agency Asset Management Policy No. 44, dated 07/03/13

[3] Facilities in Central Link OMF had the highest work order volume in the last 5 years, specifically, 35% of the total work orders were related to facilities. Total 2019 work order volume decreased due to Facilities re-scheduling the interval for preventive maintenance schedules sometime in 2019.

[4] Other Locations include facilities (north, central, south), Ticket Vending Machines, Sounder, and small projects. These locations are out of scope for this audit.

Maintenance services of such assets is achieved through the 'work order' process (i.e., documented maintenance/repair work) and is performed in six major areas to ensure the safe operation of our transit system; which is comprised of: LRVs, rail tracks, power systems, signals, Supervisory Control and Data Acquisition (SCADA) system, and facilities.

Maintaining an effective work order process is vital to ensure the reliability of critical information about needed repairs (e.g., nature of the problem, identification of the piece of equipment, and the resources required); prioritization of tasks; and establishment of a systematic record of repairs that can be leveraged for data insights into understanding trends, planning of resources, budgeting, etc.

Pursuant to IGA[5], the County tracks and maintain records for all ST assets including vehicles, facilities, equipment, and systems using the Enterprise Asset Management (EAM) system that is currently owned and managed by ST. Tacoma Link OMF and Central Link OMF implemented EAM system in 2013 and 2015, respectively, in tracking and maintaining ST assets including recording work order information.

[5] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, Section 8.2.1, Enterprise Asset Management System

Audit Objectives

To determine whether the agency has effective controls to ensure work orders are:

1. Adequately captured in Enterprise Asset Management (EAM) system
2. Scheduled timely and completed
3. Properly monitored in accordance with agency policies and procedures

Scope and Methodology

We conducted this performance audit in accordance with Generally Accepted Government Auditing Standards (GAGAS) and the International Standards for the Professional Practice of Internal Auditing. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained, and reported upon below provides a reasonable basis for our findings and conclusions based on our audit objectives.

Over the course of the audit, we gained an understanding of Work Order processes at ST Operations and Maintenance Facilities (OMF) through documentation reviews, data analysis, analytical procedures, and personnel interviews. We identified risks in the processes and assessed management controls in place to mitigate those risks. Based on our assessment, we determined we needed to focus on the adequacy of work order information captured in the EAM system, timely scheduling and completion of preventive maintenance work order, and proper monitoring of work orders in accordance with agency policies and procedures.

The audit reviewed work order processes from January 2017 to September 2019 and management controls in place. Based on our audit objectives above, we examined the following:

Objective 1: To determine whether the agency has the effective controls to ensure work orders are adequately captured in the EAM system, we performed the following procedures:

a. Reviewed all relevant agency policies & procedures related to maintenance and work order processing. The following agency policies and procedures were reviewed:

- Agency Policy #44: Asset Management Policy
- Agency Standard Maintenance Procedures (SMP) for various parts and equipment (e.g., SMP 26.16 Route Locking Test Procedures dated December 11, 2015, SMP 21.16 LRV 15,000 Mile Preventative Maintenance, etc.)
- Link Maintenance Management Plan (e.g., ST Link Light Rail Project, System Wide Maintenance Management Plan: Lynnwood to Federal Way & Lynnwood to Downtown Redmond, Rev.5.1, December, 20, 2018)

- Rail Fleet Management Plan (e.g., ST Link Light Rail Project, Central Link Rail Fleet Management Plan 2010 to 2019: University of Washington to SeaTac/Airport With an Extension to S.200th Street, Revision 9.1-Final, February 4, 2015)
- Standard Operating Procedures (e.g. SOP 3.1 Light Rail Vehicle (LRV) Pre-Departure Checkout, SOP 4.1 Documenting Rail Accidents and Incidents)
- Work order procedures for EAM system (e.g. Create New from the Calendar (PM's and Inspection), Work-Completing Checklists, Posting- Labor)

b. Reviewed Intergovernmental Agreement (IGA) Between Sound Transit and King County Metro for the Operations and Maintenance of the Link Light Rail System, Initial and Airport Segments, May 2003 (Revised December 2009), also referred as "December 2009 Revision" and related extensions.

c. Reviewed IGA between Sound Transit and King County for the Operations & Maintenance of the Link Light Rail System, dated April 2019.

d. Over the period of the audit's review, analyzed of over 85,000 work orders from the EAM for Central Link OMF (80,217 work orders) and Tacoma Link OMF (5,592 work orders) review to ensure the following information was adequately captured in the EAM system:

   I. Warranty claims were initiated in the EAM system.

   II. Work Accomplish Code were properly captured.

   III. Condition, Cause, and Correction were documented for preventative maintenance and repair work orders.

   IV. Accident, Incident, Insurance claims information were documented in work orders.

Objective 2: To determine whether the agency has the effective controls to ensure work orders are timely scheduled and completed.

a. Analyzed 61,434 preventive maintenance (PM) services work order (3,255 link light rail vehicles, 2,859 track, 4,838 power, SCADA 1,123, signal 4,121, facility 39,344 and Tacoma Link OMF 5,894 PM services work orders) to determine:

   I. PM services were timely scheduled and completed

   II. PM services for components of link light rail vehicles and power were tracked in EAM system

Objective 3: To determine whether the agency has the effective controls to ensure work orders are properly monitored in accordance with agency policies and procedures

a. Reviewed the preventive maintenance (PM) completion report in the EAM system to determine whether the report has a valid PM completion ratio.

b. Reviewed the process of PM services review/oversight by Sound Transit Operations

Conclusion

The audit concluded that the agency does not have effective controls in place to adequately capture work order information in the EAM system, that it doesn't have effective controls to ensure work orders are timely scheduled and completed, and lastly, that work orders are properly monitored in compliance with agency policies and procedures. See **Finding #1**

Findings and recommendations

Finding #1: Agency lacks clear guidance and procedures for work orders

Preventative maintenance of assets such as LRVs, tracks and structure, power systems, stations, facilities, etc. is of paramount importance to both Sound Transit and KC to ensure reliability, safety, reduction of overall maintenance costs, and to increase overall life span of the assets.

Preventative maintenance schedules are established usually by the manufacturer but subsequently modified to reflect actual operating experience[6]. As noted in Exhibit D of IGA, Link Maintenance Matrix, frequencies and intervals of asset PM services differ some needing daily, weekly, monthly, quarterly, annual, or "as needed" services. Having differing maintenance intervals and frequencies is expected; however, the agency lacks clear criteria/guidance for work order processing, EAM system requirements/criteria, and oversight.

The lack of standard procedures for work orders creation increases inconsistency, the risk of scheduling inadequate preventive maintenance services, and possible negative ramifications to safety and security of passengers.

Based on our review, we found that criteria for Link Light Rail OMF work order process is not clearly defined, resulting in a combination of deficiencies to include: (1) PM services were inconsistently performed and checklists were inconsistent in EAM system; (2) inability to track critical components[7] in the EAM system (i.e., Brake caliper); and (3) inadequate monitoring of the work order completion.

PM services were inconsistently performed and checklists were inconsistent in EAM system

The previous version of the IGA, dated December 2009[8], indicated that the County implements and maintains standard maintenance procedures (SMP) and manuals for ST. Furthermore, the IGA states "The procedures and any updates will be provided to Sound Transit for approval. A process will be in place for joint review of maintenance procedures by both agencies." The recent IGA dated April 2019[9] also sets the expectation that the County will implement and update SMPs and preventive maintenance schedules. Preventative maintenance schedules are incorporated into checklists and accompanied to SMPs.

[6] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, Exhibit D

[7] For the purpose of this audit, internal audit defined 'critical components' (e.g., break caliper, DC Breaker, etc.) as being crucially important for operations and wherein the lack of continued maintenance and/or failure would have catastrophic impacts to the agency and the public.

[8] IGA is between Sound Transit and King County for the Operations & Maintenance of the Link Light Rail System, dated December, 2009, Section 8.2.8 SMPs and Manuals

[9] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, 8.1, Overall Services

KCM develops preventative maintenance checklists[10]and frequencies for incorporation into the EAM System. Based on maintenance procedures and checklists, the mechanic initiates, executes, closes-out work order schedules in EAM system. As such, the County's main responsibility over maintenance is to track and maintain accurate records of all ST assets including vehicles, facilities, equipment and systems using EAM System[11].

We analyzed over 60,000 preventive maintenance (PM) services work orders for the audit period for link light rail vehicles, rail track, power systems, SCADA, signal, facility at Central Link OMF. Based on our review, we found (1) certain PM for power system and signal were not performed due to outdated/undeveloped checklists; and (2) PM services for Link Light Rail vehicles contained inconsistent checklists in EAM system compared to SMPs.

PM services not performed due to outdated checklists:

Work Order at Central Link OMF	Work Order Type	Frequency	Condition
Power System	Power System PM	5-year, 10-year[12]	PM services not performed for 16 locations, 2017-2019
Signal	Route Lock PM	Quarterly, Annual, 4-year	PM services not performed in 2019

Inconsistent PM checklists:

Work Order at Central Link OMF	Work Order Type	Frequency	Condition
Link Light Rail	PM	5K, 15K, 30K, and 60K miles	30% of tasks in EAM checklist (or 62 tasks out of 206 tasks) do not agree with SMP checklist (dated March 2013)

According to management, the cause of not performing the PM services were related to undeveloped checklists as management is evaluating the need. For "Power System" 5—year and 10-year PM services, it appears that PM services were scheduled and closed without the necessary services performed for 16 locations from 2017 through 2019. Management is evaluating the statement of work whether the PM services are necessary and the services should be performed under category "overhaul".

Regardless, whether it is an overhaul or PM services, the services were not performed due to outdated/undeveloped checklist whereas in the meantime mechanics are opening and closing the work order in EAM without clear guidance and creating inefficiencies. Especially with a "living" checklist and maintenance procedures as there are many factors considered, there has to be clear criteria established for work orders. As of audit date, there is no clear guidance how long it takes for a checklist and/or SMP approval by ST and KCM and whether the change is approved in a joint committee meeting or not.

[10] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, Exhibit G

[11] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, Section 8.2.1

[12] Per management response on 3/4/2020, 5-year and 10-year maintenance is part of overhaul work. At time of audit, audit was not able to find evidence that overhaul work was done.

While KCM prepared SMPs when central link opened in late 2009[13](revenue service date), we noted that KCM has not updated majority of the SMPs when Central Link OMF implemented EAM system in 2015.

As a result, we noted inadequate records and maintenance of PM services performed and inconsistent EAMS checklists compared to SMPs, which pose safety and financial risks to the agency. Thus, developing, implementing, and maintaining SMP, manuals, and checklists and updating as new systems are integrated is important to a successful quality control system (e.g., standardization).

Inability to track critical components in EAM system

Pursuant to IGA Section 8.6[14], the County provides preventive maintenance services for all Light Rail Vehicles (LRV) systems and components such as trucks, propulsion, suspension, braking, communications, doors, cab, etc. In addition, Standard Maintenance Procedures (SMP), Section 4.0[15] states that for each preventive maintenance of assets the inspection for components in an asset should be performed during the preventive maintenance services.

We examined 5,000 PM services and 'critical components[16]' for link light rail and traction power substation assets to determine traceability of maintenance history to EAMs for proper monitoring and tracking. Based on our review, we found 1,169 critical component (e.g. DC Breaker) from total 5,000 PM services tested, maintenance history could not be traced to the EAM system.

Type of Asset	Critical Component Asset	PM services NOT traceable in EAM
Link Light Rail Vehicle	Motor Truck Axle/Brake Caliper /Motor Truck	1,048
Traction Power Substation	DC Breaker including DC Feeder Breaker with Truck/DC Main Breaker	121
Total		**1,169**

The lack of 'traceability' was primarily due to: (1) lack of system criteria (i.e., types of work orders, hierarchy relationship, fields/attributes to complete, level of maintenance, etc.) for EAM system; and (2) systems limitations during work order creation.

[13] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, Exhibit G

[14] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, 8.6, Vehicle Maintenance (Light Rail, Other Vehicles, and Equipment)

[15] Standard Maintenance Procedures (SMP), 28.9 Annual Traction Power Sub Station, Section 4.0

[16] Internal Audit defined components that need to be inspected in accordance with IGA 8.6 and SMP 4.0 as critical components.

Currently, PM work orders are created against one individual asset (e.g., LRV 101) using "parent/child" relationship that includes multiple components[17] in EAM system. Upon the completion of a work order, the mechanic checks-off the components that were inspected as part of PM checklist. While the checklist provides high-level summary, it lacks sufficient detail (e.g., equipment ID) as the mechanic is unable perform the necessary inputs during work order creation in EAM system.

However, management asserted and we were able to validate the assertion (i.e., brake caliper) that component history against individual serialized component performed during unscheduled repairs and overhaul activities is traceable; audit was not able to trace such component PM services history. It would be unreasonable to be creating work orders for each component PMs; however, without having component unique identifier such as equipment ID, there is no valid traceability whether components received "needed" PM services in accordance with IGA and SMP.

As such, management was unable to immediately discern from the checklist if PM services were performed for critical components in EAM system, further impeding the agency's readiness required to deter potential accidents and/or equipment failures.

Inadequate monitoring of work order completion

Ultimate responsibility over maintenance plan, guidelines and protocols lies with ST Operations per Agency Asset Management Policy #44, Section 3.6, Maintenance Plans. Further outlined in Rail Fleet Management Plan and Maintenance Management Plan, ST as the owner shall perform ongoing oversight of KCM and contractor maintenance performance including a comprehensive maintenance auditing program. It further states that ST shall conduct quality oversight of state-of-good repair, quality control, etc. ST as owner has fiscal and performance oversight for the contract.

To ensure PM services are performed in a timely manner and accurately reported ST Operations at Central Link OMF utilizes a 'PM completion report' to monitor the performance of work orders. Such metrics include number of scheduled PM work orders, the number of completed work orders, and the percentage of timely completion of work orders.

For the purpose of our audit, we tested the PM completion report for 'completeness' of all six major areas identified. We analyzed the population of PM work order for the report to determine whether all PM work orders were reported, and the criteria for the report was defined.

Based on our examination, we found that although ST Operations – Central Link OMF periodically generates this report for management's review, the information provided was not reliable, indicative of inadequate monitoring the performance of work orders.

- Specifically, we found that of total 18,703 PM work orders in the population of the report from January 2019 to December 2019, 3,834 (or 20%) were not recorded in the report. Of the 3,834 PM in question, 3,408 (or 18%) had no set criteria.

[17] IGA between Sound Transit and King County for the Operations and Maintenance of The Link Light Rail System, April 2019, Exhibit A: General Definitions: "Component also known as a repairable item, is for the purposes of this Agreement, an assembly consisting of one or more parts. A component may retain value even when it is unserviceable. Components are repairable, re-buildable, remanufactured or requalified."

The conditions above may be attributed to lack of established criteria in existing standard maintenance procedures required for the proper design, implementation and review of the PM report.

Consequently, there is a heightened risk of insufficient monitoring of work order completion, further impeding the agency's ability to detect irregularities (e.g., incomplete work orders) and/or leverage data reporting for proactive scheduling of PMs for recurring services and/or defective items.

Recommendations:

We recommend that ST Operations[18] management:

- Develop clear guidance, manuals and procedures for work order management

The following specific procedures are suggested for management consideration:

1. Update Standard Maintenance Procedures to meet the requirements of asset maintenance.
    - Ensure scheduled PM services are performed in accordance with requirements (i.e., IGA, SMP, etc.).
    - Update the maintenance checklist to meet the maintenance requirements.
    - Ensure SMPs are compatible with EAM system
    - Provide clarity as to when checklists and SMPs need to be updated (i.e., timeframe).
2. Develop EAM system policies & procedures manual as required by IGA
    - Define EAM system hierarchy for work orders (i.e., repair, preventative maintenance, overhaul, inspections, etc.).
    - Revisit work order detail or attributes to be tracked in EAM System (i.e., equipment ID, warranty, etc.).
    - Define the level of tracking for part/component repair of assets in EAM system.
    - Include capability function to track the maintenance records of “critical” components in EAM system
3. Define the criteria for the review of work order performance in the maintenance procedures.
    - Develop and implement procedures for the detailed review of work orders
    - Update the criteria for setting up the oversight reports in EAM system
4. Develop routine information sharing and communication paths with cross-functional teams (i.e., EAM) to ensure successful implementation of the recommendations above.

[18] Certain areas might require ST Operations to work with the agency counterparty, KCM, to develop, implement, update, and maintain SMPs and checklists

Management Response:

Management agrees in part with the recommendations made in this audit report. We agree that improved processes, procedures and tools used at Link will further enhance asset management and oversight.

A collaborative effort by staff across the agency (Agency Goal 5.3 Team, EAMS Governance Group) are working to improve the business process, enhance policies and procedures, increase staff trainings and system usability, so that the overall work order accuracy and completeness is improved and ST's oversight capability is strengthened. These areas of improvement are vital to the oversight effort and would require end users to enter essential data resulting in qualitative reporting tools to enhance Sound Transit's oversight capabilities and standardization of processes.

Efforts to improve EAMS functionality began in 2017 and the work being produced will lay the foundation of the asset management system and define controls, taxonomy and other essential functions needed. These efforts will result in clearer guidance, manuals and procedures for work order management to maintain a "best-in-class" asset management system that ensures physical assets, including all facilities and equipment, are maintained in a state of good repair.

Finding 1: Agency lacks clear guidance and procedures for work orders

Management Response / Action Plan:

Management partially agrees with this recommendation. While management agrees that improved EAMS process and procedure will enhance overall asset and maintenance program, there are risks in developing procedures based on current EAMS systems functionality and limitations which may not be the most beneficial solution for Sound Transit. The Agency as part of its Strategic Priorities has set an agency goal 5.3 "Implement and maintain a "best-in-class" asset management system that ensures physical assets, including all facilities and equipment, are maintained in a state of good repair". This effort began early this year and the work being produced by this team will lay the foundation of the asset management system and define controls, taxonomy and other essential functions needed. This team will also assist with the re-write of the Sound Transit asset management policy #44 to reflect a holistic approach to asset management. Target date of completion to revise Agency Policy #44 is Q4, 2022.

Additionally, the ST Asset Management Division has identified an EAMS Improvement Program Manager who will lead a cross department initiative to effectively refine EAMS capabilities and drive process & procedure improvements required to achieve the goals set by Agency Executive Leadership. This effort is also assisted by the recently formed EAMS governance board, whose purpose is to oversee the EAMS group for the following but not limited to:

- Decision making body for policies and procedures.
- To ensure decisions and priorities are aligned
- Oversight of EAMS team work
- Arbitrator of conflicting requests

- Change board for major requests
- Authorization agent for new or elimination of capabilities within the EAMS system.
- EAMS Users group – working group to analyze and test EAMS specific end user functions.

Management does disagree in respect to; existing guidance in areas such as Standard Maintenance Procedure SMP 21.36 “LRV Maintenance Manual updates” provides the process to perform updates to maintenance procedures relative to preventive maintenance activities and SMP 25.20 “MMIS Administrative Guidelines” provides direction to maintenance staff in the creation and management of EAMS work orders.

Timeframe for completion: Aligned with the ST Strategic Plan and Agency Goals 4.2 and 5.3. The work to undertake and fully develop this program will be ongoing.

Recommendation 1: Update Standard Maintenance Procedures to meet the requirements of asset maintenance.

Management Response / Action Plan:

Management partially agrees with this recommendation. Currently, existing guidance in areas such as Standard Maintenance Procedure SMP 21.36 “LRV Maintenance Manual updates” provides the process to perform updates to maintenance procedures relative to preventive maintenance activities and SMP 25.20 “MMIS Administrative Guidelines” provides direction to maintenance staff in the creation and management of EAMS work orders. Additionally, as new capital projects are transitioned to operations, and as part of the agency’s safety certification process, all SMP’s are reviewed for content and applicability to the requirements of the new transit system expansions. In accordance with the IGA, both ST Operations and KCM Rail Division continue to evaluate current and new SMP’s through the Link Rules and Procedures Committee (LRPC) as is defined within SOP 1.1.

Specific areas of recommendation made by the internal audit group include the following:

- **Ensure Scheduled PM Services are performed in accordance with requirements (i.e. IGA, SMP etc.).**
  The agency uses FTA guidelines to establish allowable levels of completion for preventive maintenance on time performance. EAMS reporting provides monthly reports to determine the effectiveness of KCM ability to complete preventive maintenance activities. The IGA requires a 90% Preventive Maintenance on-time completion rate. Monthly reports are available with the EAMS database and support Sound Transit’s quarterly performance reporting metrics.

  Timeframe to completion: Management feels that no actions are required on this item.

- **Update the maintenance checklist to meet the maintenance requirements**

PM Checklist updates are performed for rolling stock inspections in accordance with SMP 21.36. This SMP will be updated to specifically reference PM checklist updates.

Time of completion: Q1, 2021

- **Ensure SMPs are compatible with EAM System**
  SMPs with EAMS PM Checklist Appendances are considered as reference documents. To prevent confusion regarding latest checklist revisions within SMP's; all referenced checklists will be removed and a statement added to refer to EAMS electronic checklists for latest versions and applicability.

  Time of completion: Q1, 2021

- **Provide clarity as to when checklists and SMPs need to be updated (i.e. timeframe)** SMP 21.36 defines the process and procedure to perform documentation updates. In accordance with the IGA, both ST Operations and KCM Rail Division continue to evaluate current and new SMP's through the Link Rules and Procedures Committee (LRPC) as is defined within SOP 1.1.

  Timeframe to completion: Management feels that no actions are required on this item.

Recommendation 2: Develop EAM system policies & procedures manual as required by IGA.

Management Response / Action Plan:

Management agrees that improved EAMS process and procedure will enhance overall asset and maintenance program. EAM Policies and Procedure development is part of the overall Agency Strategic Priority, Agency Goal 5.3 "Implement and maintain a "best-in-class" asset management system that ensures physical assets, including all facilities and equipment, are maintained in a state of good repair".

Timeframe for completion: Aligned with the ST Strategic Plan and Agency Goal 5.3. The work to undertake and fully develop this program will be ongoing.

Recommendation 3: Define the criteria for the review of work order performance in the maintenance procedures.

- Develop and implement procedures for the detailed review of work orders
- Update the criteria for setting up the oversight reports in EAM system

Management Response / Action Plan:

Management partially agrees with this recommendation. Currently, ST Link Operations follow the Link Light Rail Oversight process to perform Oversight reviews of KCM. These

reviews include but are not limited to scope of work, work practices, safety and EAMS data.

EAMS in its current configuration does not fully utilize the mandatory field/cells which require users to input critical data into the work order before it can be completed, closed or move on to the next step. This creates issues with users having the ability to create and or close work orders causing the data to be inconsistent or nonexistence. Overall enhancement efforts outlined within Finding 1 above will include refinement of built-in data controls further enhancing overall system and user interface efficiencies. Improving data consistency will allow for improved reporting capabilities of work order data allowing for the enhancement of work order completion oversight.

Timeframe for completion: Aligned with the ST Strategic Plan and Agency Goal 5.3. The work to undertake and fully develop this program will be ongoing.

Recommendation 4: Develop routine information sharing and communication paths with cross-functional teams (i.e., EAM) to ensure successful implementation of the recommendations above.

Management Response / Action Plan:

Management agrees with this recommendation. As described in the Management Response / Action Plan in Finding 1; ST Asset Management Division has identified an EAMS Improvement Program Manager who will lead the effort to effectively refine EAMS capabilities and drive process & procedure improvements required to achieve the goals set by Agency Executive Leadership. This effort is also assisted by the recently formed EAMS governance board.

Timeframe for completion: Aligned with the ST Strategic Plan and Agency Goal 5.3. The work to undertake and fully develop this program will be ongoing.