

Evaluating State of Good Repair procedures and assessments for Northgate Link Extension

Report #: 2023-09

Executive Summary

State of Good Repair (SoGR) is the Federal Transit Administration's (FTA's) grant program that funds transit agencies for maintaining assets. To enhance safety and reduce maintenance costs, the FTA suggests using Transit Asset Management (TAM) practices and requires public transportation agencies to develop and implement a formal Transit Asset Management Plan (TAMP).

Audit Objective

We audited SoGR procedures of the 1 Line alignment at Northgate to ensure they align with federal and local requirements, covering the period from January 2021 to June 2023. We selected this time and area because the segment recently opened, providing us with accessible records to review.

To accomplish our objective, we reviewed federal and state requirements for SoGR and Asset Management, along with familiarizing ourselves with current agency procedures to better understand how staff conduct assessments and inspections of our assets.

Audit Results

Regarding Asset Management, board and agency policies are in place, R2015-32 (from December 17, 2015) and Agency Policy 610 (from March 6, 2022) have been approved at the agency.

The agency replaced the TAMP with a SAMP (Strategic Asset Management Plan), the recent version is dated February 2021.

Inventories and assessments are required to be completed for facility and linear assets. Facility assets are stations and platforms. Linear Assets are the length of track.

Finding(s):

We found that besides having a board and agency policy on asset management, the contents of the SAMP do not meet the requirements for a TAMP, as set by the FTA under 49 CFR (Code of Federal Regulations) 625.25 Parts C & D.

While facility inventories and assessments are being completed, track inventories and conditions assessments are not being completed.

Observation:

We identified opportunities for improving the agency's SGR policy to better align with federal guidelines and industry standards. It should also provide a clear definition of asset hierarchy and breakdown structure.

Audit Results

The following table summarizes the analysis performed during fieldwork portion of the audit and the associated exceptions:

Criteria	Tests Performed	Results	Finding or Observation
CFR § 625.25 Transit Asset Management Plan (TAMP) Requirements	Reviewed asset listings and associated documentation for Northgate facilities and linear assets to verify the completeness of key information, e.g., cost values, serial numbers, etc.	Linear asset inventory and condition assessments are not properly set up in accordance with applicable state and federal regulations.	Finding 1
		Sound Transit has not updated the TAM Plan.	Finding 2
Resolution No. R2015-32	Performed data analytics for those listings and other source data, e.g., Enterprise Asset Management System (EAMS) work orders, to identify trends and inconsistencies.	Asset hierarchy can be improved to align better with Federal Guidelines and Industry Standards.	Observation 1
Agency Policy 610			
Key asset management plans, i.e., TAMP and Strategic Asset Management Plan (SAMP)	Examined 10 additional linear data workbooks to substantiate remediation progress.		
ST Link Maintenance Management Plan (MMP) and Link Operations Oversight Plan			

Table 1. Summary Table of Audit Finding (see [Findings and Observations](#) for details).

Positive Practices

During the audit, we observed additional positive practices and continuous improvements including:

- Facility Inventory and Condition Assessments across the system continue to be performed in compliance with applicable regulations; however, Sound Transit performs its Facility Conditions Assessments using a combination of in-house and external consultants, and the results are rated under FTA guidelines.¹

¹ Retrieved from: FTA Facility Condition Assessment Guidebook

Although these ratings are used to calculate the SGR and provide an overall property condition indication, it's worth noting that these assessments do not cover linear assets.

- Documentation for these visual asset inspections, conditions assessments, and performance characteristics are stored within a central repository owned by the Asset Planning Team.
- The agency has established an Asset Project Team comprised of Operations management, Portfolio Services Office (PSO), and Strategic Business Services (SBS). This team meets monthly to strengthen data governance practices around asset data collection. Specific projects they are currently working on include the formal adoption of asset data specification requirements and the implementation of data collection tools to ensure information is obtained in a consistent format.

Additionally, Sound Transit has established the Asset Transition Office. This office will house the Activation and Systems Integrated Testing groups, currently under the PSO, along with the Operations Readiness and Transition (ORAT) and Transit Expansion groups, currently within Operations.

The consolidation of these functions will establish a single source of truth regarding the advancement of activating new assets and increase collaboration and divisional support needed to improve Sound Transit's data governance practices around its assets.

Background

Overview of Northgate Link Extension (NGLE)

The Northgate Link Extension (NLGE) consists of 4.3 miles of light rail extending the '1 Line' from the University of Washington (UW) to Northgate. Since its completion and opening for revenue service in 2021, NGLE has been included as part of the capital program. The project allocation at that time was \$1.9 billion (B) of the total \$14.6B.²

As part of our risk-based audit plan, "State of Good Repair (SGR) processes – Northgate Link Extension" was rated initially as an area of significant potential risks around several categories including Service Delivery, Reputational, Financial and Safety risks.

Overview of State of Good Repair (SoGR)

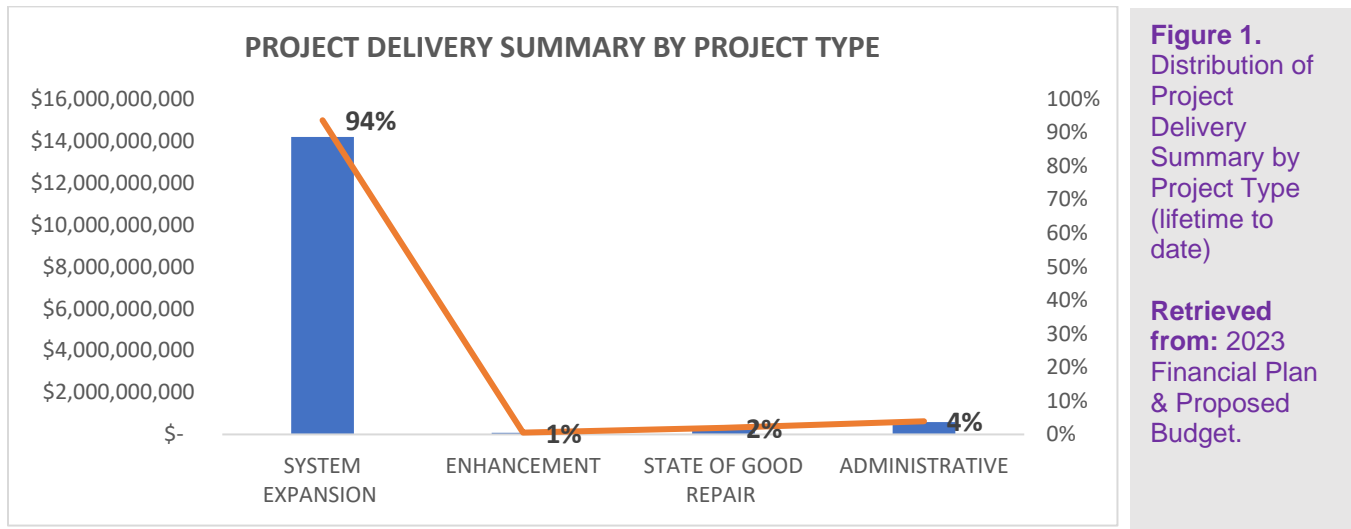
Sound Transit is committed to investing in, maintaining, and managing its physical assets and infrastructure to ensure safe, cost-effective, and sustainable on-going provision of regional high-capacity transit services to the Puget Sound region.

The agency will operate and maintain its assets in a state of good repair that meets the Federal Transportation Administration (FTA) Transit Asset Management and other regulatory

² Retrieved from: Agency Progress Report Capital Programs (dated, November 2021)

requirements, environmental requirements, safety and security standards, and high customer service standards.

The agency’s State of Good Repair (SGR) program only accounts for approximately **2%** [or \$297 million (M)] of the total project budget (lifetime to date) when compared to System Expansion, which accounted for the majority at 94% [or \$14.2 billion (B)]. This was followed by administrative costs of 4% (or \$ 592M) of the total \$15.2B.



As recipient of federal funds, Sound Transit, to date, has expended a total of \$51.4M in federal awards primarily received from FTA grants (SGR Program).³

Organizational structure of SGR

SoGR oversight resides within two business functions: (1) Asset Planning Team (APT) under Operations Department and (2) Asset Management Division under the Portfolio Services Office (PSO), as shown in Figure 2 below.

The Asset Planning Team leads the development and implementation of the SoGR program across the Agency (OPS modal teams, PSO, Finance, etc.) to optimize the performance and cost-effectiveness of the operational assets.⁴ The work performed by APT is measured by asset management framework designed by Asset Management Team, which integrates asset management principles into every part of the organization and at every level of the business.

³ Grants Report (internal report) and 2022 Financial Statement & Single Audit.

⁴ Key programmatic objectives of the APT include: (1) Managing the Facility Triennial condition assessment program used to measure and report facility conditions to FTA, WSDOT, and other TAM-related reports; (2) Collaborating with OPS modal teams and PSO on the development and implementation of condition assessment procedures for collecting condition data into EAMS system and reporting performance and condition data; (3) Maintaining the OPS asset data standards; and (4) overseeing the development and administration of the Asset data collection and registration process.

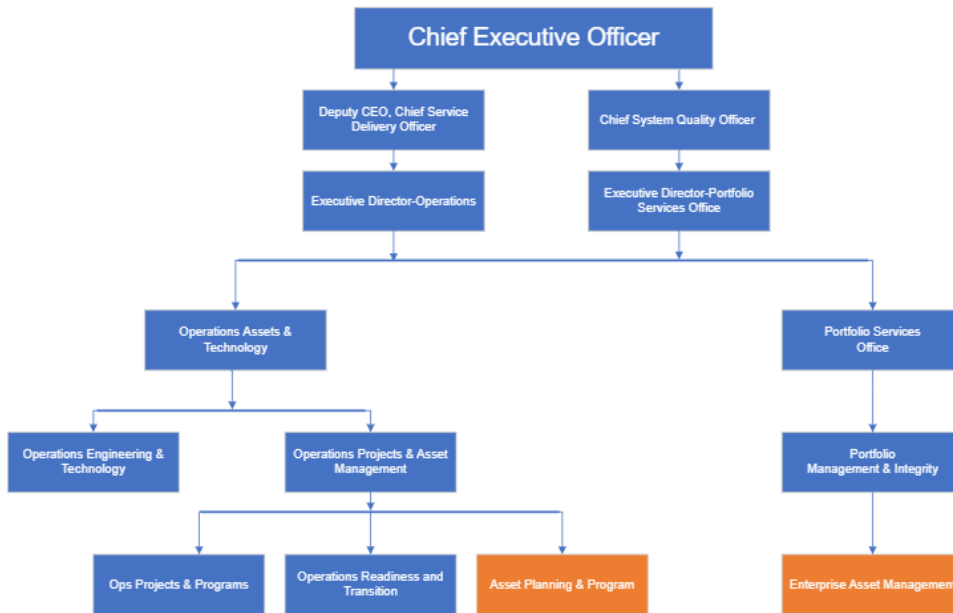


Figure 2. Operations and PSO Organizational Charts (combined by Audit for purposes of understanding audit subject matter ownership of the two subject areas (shown in orange). Retrieved from: ST HUB internal website (version as of 7/27/2023, retrieved by auditor on 11/3/2023)

Current State of Assets at NGLE

In line with FTA guidelines and applicable agency policies,⁵ the agency’s Facility Condition Assessment process is performed on a triennial basis (every three years) by the Asset Planning Team in coordination with external consultants.⁶

Sound Transit uses a 1-5 rating scale for asset condition, following the FTA’s Transit Economic Requirements Model (TERM), with 1 indicating poor condition and 5 indicating like-new.

The assessment of building systems and their related components is usually categorized into one of five conditions: Excellent, Good, Adequate, Marginal, or Poor. See **Table 2** below:

Condition Rating:		Description:
5.0 to 4.8	Excellent	New asset; no visible defects.
4.7 to 4.0	Good	Asset showing minimal signs of wear; some (slightly) defective or deteriorated component(s).
3.9 to 3.0	Adequate	Asset has reached its mid-life (condition 3.5); some moderately defective or deteriorated component(s).
2.9 to 2.0	Marginal	Asset reaching or just past the end of its useful life; increasing number of defective or deteriorated component(s) and increasing maintenance needs.

⁵ Asset Planning and programming Procedures: Condition Assessment – Facilities (dated, 12/15/15). This procedure

⁶ ST Property Condition Assessment Structural Report – Northgate Parking Garage (dated, 07/14/21) and Property Condition Assessment Structural Report (dated, 07/26/21).

Condition Rating:		Description:
1.9 to 1.0	Poor	Asset is past its useful life and is in need of immediate repair or replacement; may have critically damaged component(s).

Table 2. Property Condition Report – SGR Rating (Retrieved from: Facility Condition Assessment worksheet).

Property conditions assessments performed at Northgate Station and Garage indicated cumulative ratings of “5 – Excellent” and “4.62 – Good (Slightly lower than the Asset Age Rating)” for each respectively.

Lastly, even though the 2018 TAM Plan mentions that condition assessment reporting for the agency’s infrastructure is performance based, it was discovered that such assessments for linear asset infrastructure, including substations, signals, overhead contact systems (OCS), track, etc., are not fully being utilized to inform the overall operability to achieve a state of good repair.

Asset Data Collection Process

In 2018, the agency had self-identified the need to collect linear asset data which was not captured. These assets are generally associated with a length of track by contract and are assets that are necessary for the function and operation of rail systems including:

1. Train Track, Elevated Guideways and Bridges, Linear Tunnel Bores including Cross Passages, and Ventilation Shafts
2. SCADA Systems
3. Overhead Contact Systems
4. Traction Power
5. Signaling Systems and Communication Systems

In response to the lack of linear assets information collected, a “cross department working group” comprised of Operations, PSO, and DECM was formed in 2021 to develop an asset data collection specification to better reflect the needs of Sound Transit today.⁷

The agency categorizes its infrastructure assets into two asset types: (1) linear assets (such as Track power substations, guideway, etc.) and (2) facility assets (e.g., stations and platforms).

Once asset information is verified, more information needs to be collected, such as photos, PM schedules, conditions assessments, and EAMS asset categories. See **Figure 3** below for a diagram of the process flow.

⁷ Contract Spec Project Team Charter

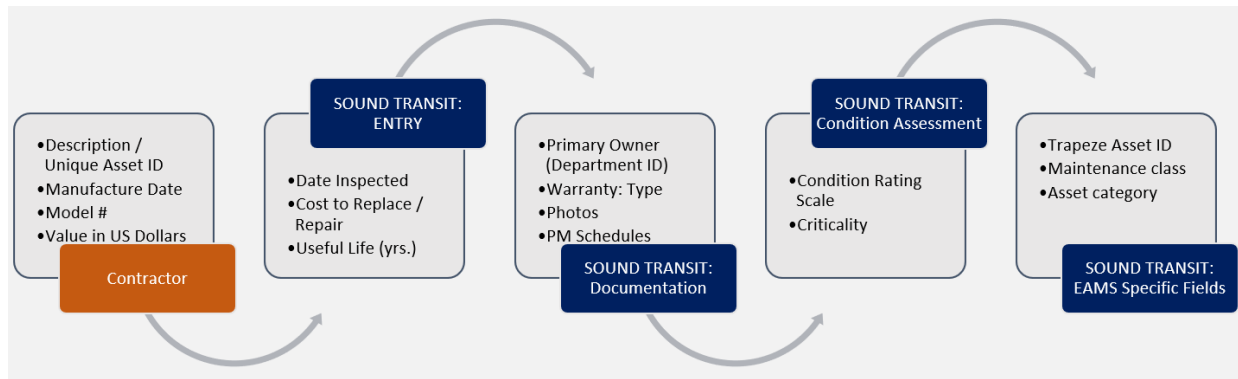


Figure 3: Snapshot of Asset Data Collection Workbook (Facilities and Linear Assets). Source: Internal Audit prepared.

A key responsibility of asset collection involves checking listings for quality and compliance with ST submission standards and specifications. This includes verifying the completeness of warrantable asset and parts information is included as part of the asset workbook for each facility and linear segment (as described above).

The obtained asset data is then used to assess the condition and performance of the asset.

Findings and Observations

While we found that facilities asset inventories and conditions assessments are in progress or completed for NGLE, linear asset inventories have not been completed.

Management is currently developing a linear asset data collection process; however, the process is manually intensive, often requiring close coordination with various divisions and contractors for major SGR activities (e.g., physical asset inventory and inspection).

These issues are expanded upon further below:

Finding #1: Linear Asset inventory and condition assessments are not in line with state and federal regulations (Rating: Serious – 3C)

49 CFR § 625.25 provides the following elements related to the TAMP, which requires ongoing updates of capital asset inventories, conditions assessments, decision support tools, budget prioritization and reporting to FTA.⁸

⁸ 49 CFR 625.25 provides the following requirements:

- (1) An inventory of the number and type of capital assets. The inventory must include all capital assets that a provider owns, except equipment with an acquisition value under \$50,000 that is not a service vehicle. An inventory also must include third-party owned or jointly procured exclusive-use maintenance facilities, passenger station facilities, administrative facilities, rolling stock, and guideway infrastructure used by a provider in the provision of public transportation [...].
- (2) A condition assessment of those inventoried assets for which a provider has direct capital responsibility. A condition assessment must generate information in a level of detail sufficient to monitor and predict the performance of the assets and to inform the investment prioritization.

In essence, having an asset inventory provides a comprehensive list of equipment owned and managed by Sound Transit. The conditions assessment involves regular visual and physical inspections of those assets to evaluate if those assets are ready for use.

While we confirmed the existence of all 10 linear asset listings and their corresponding project documentation; we observed that most of these listings are still being verified, and only two have been uploaded in the Enterprise Asset Management System (including Northgate) despite efforts dating as far back to 2018.⁹

As part of this Linear Asset Data Collection (LADC) initiative, 10 construction contract packages for current and future service projects were identified spanning East Link, Lynwood, Federal Way, Tacoma, and Central Link. Of those 10, management reported that 4 projects were “completed” (inclusive of Northgate Link).¹⁰

In the case of Northgate, approximately 10 thousand (K) known linear assets have been captured and inventoried as part of their linear workbook. However, a closer look showed that important asset data, such as TPSS historical cost values and serial numbers, was missing from the asset workbook when it was received. We also found similar conditions with incomplete data attributes for OMF East (M200) project.

Management explained that those attributes were left out due to challenges in the data collection process, including inadequate contract requirements (specifically, the absence of LADC) and because projects were well into the construction phase of the capital project process.

Ultimately, these challenges diminish asset reliability and quality, resulting in the inability to properly document agency assets service life.

Finding #2: Sound Transit has not updated the TAM Plan (Rating: Medium – 4C)

The Moving Ahead for Progress in the 21st Century Act (MAP-21) final rule required the nation’s transit agencies to establish a strategic and systematic process of operating, maintaining, and improving public transportation capital assets effectively through their entire life cycle.

Through the passage of this rule, the Federal Transportation Administration (FTA) has emphasized the degradation of the country’s transit assets and the backlog in investments needed to return all systems to a State of Good Repair. One of the key components of the

⁹ It was noted that M200 and N830 were identified as the two linear asset inventory listings that were loaded into EAMS. In addition, data migration for N830 (Northgate) resulted in only a “partial EAMS upload” due systems limitation.

¹⁰ **Completed:** (1) Contract M200 — OMF East Design Build, (2) Northgate Link N830, (3) Contract T100 — Hilltop Tacoma Link Extension (Includes OMF expansion), and (4) Puyallup Garage.

Ongoing: (1) E750 - Eastlink (ongoing / collecting additional detail - all sub projects pushed up to E750 when Mott MacDonald took over - E130, E320, E330, E335, E340, E360), (2) R200 – Redmond, (3) F200 - Federal Way, (4) L200 - Lynnwood Track, (5) L300 - Lynnwood Track, and (6) L800 - Lynnwood Systems.

MAP-21 final rule includes the requirement that grantees develop a Transit Asset Management Plan (TAMP) as part of requirements under 49 CFR § 625.25.

Sound Transit is required to update its TAM plan at least once every four years. The first compliant TAM plan was due October 2018 and should have been updated in October 2022.¹¹

However, we found that the agency has not updated its TAMP due to the issuance of its Strategic Asset Management Plan (SAMP) in February 2021. While the intent of SAMP was to outline the long-term plans and priorities for the agency's assets, we found this document does not meet the baseline requirements required of a Transit Asset Management plan.¹²

Management has indicated that efforts are well underway to reestablish the TAMP, which are noted in the management response.

Observation #1: Asset hierarchy can be improved to align better with Federal Guidelines and Industry Standards.

Leading best practices (e.g., APTA) indicate that a well-structured asset portfolio hierarchy facilitates the asset management process and provides effective support for maintenance activities. It further provides the basis for collection of costs data associated with assets.

While several examples of hierarchical relationships exist, the FTA, along with industry standards provide guidance on how to construct asset categories, asset classes, and individual assets.¹³ Shown in **Figure 4** below:

¹¹ FTA Plan Submission Requirements ([see link](#)). In addition, as a condition of receiving state funds, Sound Transit is also required to recertify their plan every two years in the form of a letter, verifying that the agency is still following its plan as approved by the Transportation Commission [...]. Retrieved from: MAP-21 & Transit Asset Management Washington State ([see link](#)).

¹² Per FTA requirement, Tier 1 and II agencies must comply with key elements of the TAM Plan to include an **inventory of asset, condition assessment of inventoried assets, description of a decision support tool, and a prioritized list of investments.**

¹³ **Example top-tier hierarchy: (1) Guideway** elements refers to the structural elements that allow for the movement of an agency's fixed-guideway vehicles; **(2) Facilities** refers to the structures that enclose or support maintenance, operations, and administrative activities; **(3) Systems** include a diverse set of monitoring and control systems that support core operational functions; **(4) Stations** provide shelter for customers. Examples include bus/rail station structures, elevators/escalators and passenger waiting areas; and **(5) Vehicles** refers to rolling stock that is used to provide revenue or nonrevenue service. Rolling stock can include heavy rail, light rail, streetcars, buses, etc.

	ASSET CLASS	INDIVIDUAL ASSET
Equipment	Construction	Crane Prime Mover
	Maintenance	Vehicle Lift Track Geometry Car
	Non-revenue Service Vehicles	Tow Truck Emergency Response Vehicle Supervisor Car Track Maintenance Vehicle
Rolling Stock	Buses	40 Foot Bus 60 Foot Articulated Bus
	Other Passenger Vehicles	Cutaway Van Minivan
	Railcars	Light Rail Vehicle Commuter Rail Locomotive
	Ferries	Ferry Boat

Figure 4. Snapshot example of asset categories, asset classes, and individual assets. Retrieved from: Appendix A to Part 625—Asset Categories, Asset Classes, and Individual Assets ([see link](#))

Once the agency has defined its high-level asset hierarchy, it must then determine the depth of the asset breakdown for each category, as the example below shows from APTA:

Top tier	Fleet	Facilities	Rail Guideway	Systems	Stations
Second tier	revenue coaches	Property (rail repair facility)	line	signaling	Hawthorne Station
Third tier	All coaches within a production group	building (service building)	tracks	audible	escalator
Fourth tier	individual coach	roofs	rail	relay	escalator motor
Fifth tier, etc.	Vehicle components (e.g., engine Cummins ISB)	adhesive system	Linear (station 02 to 03)		

Figure 5. Snapshot of Sample Asset Breakdown Structure. Retrieved from: APTA SGR-TAM-RP-003-13: Capital Asset Inventory and Condition Assessment ([see link](#))

Based on our examination of this asset workbook tool and interviews with numerous staff, we observed that the process could be improved through the adoption of a clearly defined asset hierarchy structure and standard would provide management the framework to determine the level of depth to collect and monitor information in the asset management system.

For example, in a prior audit of the agency’s Track Maintenance Scheduling, auditors analyzed EAMS data against maintenance schedules and criteria. While preventive maintenance and repair work is being performed at the recommended frequency, sampled work orders could only be traced to a section of linear track (e.g., C735-OCS) and not to a specific asset.

Recommendations:

Sound Transit should continue its efforts to improve its asset data collection process, which is designed to ensure that assets are managed effectively and operate safely in a State of Good Repair. This entails the maintenance of the agency's TAM plan and compliance with ongoing updates of capital asset inventories, condition assessments, decision support tools, budget prioritization and reporting to external authorities (WSDOT and FTA).

Currently, the agency has recognized the collaboration and divisional support needed to improve its data governance practices around its assets. Major SGR activities to achieve this span across the agency's contractors, strategic partners, and all business units.

To ensure that the agency meets its strategic objectives, we recommend the following:

1. **Provide additional resources** by hiring a SGR analyst or manager, who would conduct inspections, collect data, and analyze information to assess the condition of the assets.

Responsibility: ST Operations Leadership

2. **Develop an agency-level policy or enhance existing policies or plans** to include clearly defined roles and responsibilities of major related SGR activities. In addition, management should strengthen the design of internal controls to include:
 - a. Additional emphasis to establish an asset structure hierarchy and breakdown that is tailored to meet operational and financial reporting requirements.
 - b. Increasing awareness by providing agency-wide training at all levels and specific training for appointed SGR liaisons or asset owners to include process flows and periodic meetings focusing on data, reporting, and operational needs.

Responsibility:

- ✓ Asset Planning Team and PSO – Asset Management
- ✓ SBS Data Governance Program, ORAT and EAMS Team (consulting role)

3. **Reestablish the Transit Asset Management Plan (TAMP)** in compliance with state and federal regulations reporting requirements.

Responsibility:

- ✓ PSO – Asset Management

Methodology

Standards

We conducted this performance audit in accordance with our charter and Generally Accepted Government Auditing Standards (GAGAS or “Yellow Book”) issued by the United States Government Accountability Office (GAO) and with the International Standards for the Professional Practice of Internal Auditing” The Institute of Internal Auditors’ (IIA) International Professional Practices Framework (IPPF or “Red Book”) which includes the Core Principles for the Professional Practice of Internal Auditing, the Code of Ethics, the International Standards for the Professional Practice of Internal Auditing (the Standards), and the Definition of Internal Auditing.

These 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 provides a reasonable basis for our findings and conclusions based on our audit objectives.

Additionally, the Audit Division is also committed to following safety oversight standards set forth by the Federal Transit Administration (FTA), Federal Railroad Administration (FRA); as well as all other relevant requirements or standards for auditing.

Audit Processes

Our audits are risk-based and focus on the areas with the highest potential risk impacts or likelihood at the time of observation. Each audit starts by examining the current processes in place relative to (1) Laws or Regulatory Requirements, (2) Agency Policies and Procedures and (3) Industry Best Practices. During the “Planning” phase, we assess the engagement-specific conditions and risk, which informs the engagement objectives and scope. At this time, relevant controls to mitigate these risks are also identified.

The audit “Field Work” phase then examines the design of the identified controls to determine if the intent meets the regulations, policies, etc. If the controls are designed to adequately mitigate the risk (control environment), we move on to assess the degree to which the controls are mitigating the risk (control activities). Any areas identified where the control environment or activities do not adequately mitigate the identified risk are identified as an exception. Exceptions are then defined as Findings if they are significant or Observations if they are an opportunity for improvement.

All Findings are risk-rated based on potential likelihood and impact based on attributes outlined in *Appendix B: Risk Rating Matrix*.

Diversity, Equity, and Inclusion Review

This audit considered Diversity, Equity, and Inclusion (DEI) through the lenses of distribution of assets and workforce development.

In our review, we noted no instances of uneven distribution of assets across the system or uneven distribution of maintenance services to specific assets for reasons not related to operational or safety reasons.

Appendices

Appendix A: Sound Transit's Title VI notice of rights

Sound Transit conducts Title VI equity analyses for service and fare decisions to ensure they are made as equitably as possible.

More information on Sound Transit's Title VI notice of rights and the procedures to file a complaint may be obtained by:

- Phone: 888-889-6368; TTY Relay 711;
- Email: stdiscriminationcomplaint@soundtransit.org;
- Mailing to Sound Transit, Attn: Customer Service, 401 S. Jackson St. Seattle, Washington 98104-2826; or
- Visiting our offices located at 401 S. Jackson St. Seattle, Washington 98104.

A complaint may be filed directly with the Federal Transit Administration Office of Civil Rights, Attention: Complaint Team, East Building, 5th Floor – TCR, 1200 New Jersey Avenue, SE, Washington, DC 20590 or call 888-446-4511.

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Reviewed (QA/QC) by:

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Approved for release by:

Patrick Johnson, Director, Audit Division

Appendix B: Audit Finding Risk Rating Process

To aid process owners in prioritization of the audit findings resulting from the audit, a level of audit risk will be assigned by assessing two factors: 1.) the probability that the associated problem will occur at some point in the future, and 2.) the impact or severity of that problem in relation to the overall business process.

Using the same Risk Assessment Matrix already in used throughout the agency and based on the MIL-STD-882-E; audit findings are qualitatively assessed based on the worst credible case that is anticipated from the result of human error, design inadequacies, component failure or a malfunction.

Risk Rating Scale						
	Severity	Catastrophic (1)	Critical (2)	Major (3)	Marginal (4)	Negligible (5)
Probability	Frequent (A)	High (1A)	High (2A)	High (3A)	Serious (4A)	Medium (5A)
	Probable (B)	High (1B)	High (2B)	Serious (3B)	Serious (4B)	Medium (5B)
	Occasional (C)	High (1C)	Serious (2C)	Serious (3C)	Medium (4C)	Low (5C)
	Remote (D)	Serious (1D)	Medium (2D)	Medium (3D)	Low (4D)	Low (5D)
	Improbable (E)	Medium (1E)	Medium (2E)	Low (3E)	Low (4E)	Low (5E)
	Eliminated (F)	Eliminated				

Resolution Requirements				
Risk Score	Risk Level	Risk Rating	Minimum Actions	Risk Acceptance / Responsibility
1A, 1B, 1C, 2A, 2B, 3A	High	Unacceptable	Stop work & immediate correction required to reduce risk.	Not Acceptable. Executive Team is informed.
1D, 2C, 3B, 3C, 4A, 4B	Serious	Undesirable	Mitigation strategy required to reduce risk within 30 days of identification of risk.	Acceptable with risk controls and monitoring. Director-level committee review and approval.
1E, 2D, 2E, 3D, 4C, 5A, 5B	Medium	Acceptable w/ review	Monitor and consider actions to further reduce risks.	Acceptable with risk controls and monitoring. Technical Level committee review and approval.
3E, 4D, 4E, 5C, 5D, 5E	Low	Acceptable	Acceptable without further mitigation. May be accepted by the business unit in coordination with Audit and Safety.	Acceptable without further mitigation. May be acceptable by the business unit with coordination with Audit and Safety.
N/A	Eliminated	Eliminated	No actions needed.	N/A

Risk Matrices

Severity	Catastrophic (1)	Critical (2)	Major (3)	Marginal (4)	Negligible (5)
System Disruption / Operations	> 24 hrs. Substantial or total loss of operations	12 – 24 hrs. Partial shutdown of operation	4 – 12 hrs. Prolonged disruption of operations	1 – 4 hrs. Brief disruption of operations	<1 hour Minor to No disruption
Financial	>\$5,000,000	\$1,000,000 – 4,999,999	\$249,999 – 999,999	\$10,000 – 249,999	< \$10,000
Reputational	Prolonged negative media coverage for >30 days and / or irreparable reputational damage, resulting in government intervention	Ongoing negative media coverage for > 14 days but ≤ 30 days causing serious reputational damage, resulting in government intervention.	Ongoing negative media coverage >7 days but ≤14, causing major reputational damage and possible government intervention	Ongoing negative media coverage for ≥ 24 hours but ≤ 7 days, causing some reputational damage	Negative media coverage for ≤ 24 hours, causing minor reputational damage
Injury	Several deaths (≥3) and / or numerous (≥3) serious injuries (excluding suicides or by natural causes)	1 -2 deaths and/or 2 or more serious injuries	Multiple minor injuries and possible serious injury (Ambulance transport)	Minor injury such as bruising, abrasions, bleeding; possible medical services required	No injuries
Equipment	Total loss of equipment or system interruption requiring more than 30 days to repair.	Significant loss of equipment or system interruption requiring more than 14 days but less than 30 days to repair.	Some loss of equipment or system interruption requiring more than 24 hours but less than 14 days to repair.	Minor system loss of equipment or system interruption requiring less than 24 hours to repair.	Minor damage to equipment or minor system interruption with no immediate repair necessary.
Regulatory	Cease and desist orders are delivered by regulators. Critical assets and facilities are forced by regulators to be shut down.	Governmental, regulator investigations, and enforcement actions, lasting longer than a year. Violations that result in multiple large non-financial sanctions; OR Regulators force the removal and replacement of management positions. Regulators begin agency monitoring activities.	Violations that result in significant fines or penalties above and beyond what is codified or a regulator enforces non-financial sanctions; OR Significant new and updated regulations are enacted as a result of an event.	Violations that result in fines or penalties	Self-reported or regulator identified violations with no fines or penalties

Probability Level	Likelihood of event in specific item	MTBE in Operating Hours **	Occurrence in time
Frequent (A)	Will occur frequently.	<1,000 oh	1 per week, likely to occur several times per month
Probable (B)	Will occur several times.	1,000 – 100,000 oh	1 per month, likely to occur several times per year
Occasional (C)	Likely to occur sometime.	100,000 – 1,000,000 oh	Once per year, likely to occur several times within 10 years
Remote (D)	Unlikely but possible to occur.	1,000,000 – 100,000,000 oh	1 per 10 years or likely to occur several times within 100 years
Improbable (E)	So unlikely, occur may not be experienced.	>100,000,000 oh	1 per 100 years
Eliminated (F)	Risk removed / eliminated	Never	N/A

Appendix C: Management Response

Prepared by: Scott Bash and Shelley Xie

Date: 11/28/2023

Audit: State of Good Repair (SOGR) – Northgate Link Extension (AUD-PA-2023-09)

Management Response:

Management **partially agrees**¹⁴ with the audit report findings¹⁵ and observations.

The Sound Transit State of Good Repair (SoGR) program is still at its infancy and resources are being allocated to improve the overall process. The report's findings are not specific to Northgate Link Extension, but the audit team has pointed out the key concerns. The Agency's current asset inventory is not at the detailed structure level that is desired by Operations and there are several multi-department efforts in process as described below in the response and action plans.

Finding 1: Asset inventory and condition assessments are not in line with state and federal regulations (Rating: Serious – 3C)

Management Response / Action Plan:

The asset inventory for the Northgate Link Extension Project was our first system expansion project employing the new Linear Asset Data Collection (LADC) process. While commendable progress has been made in collecting linear system data such as traction power sub-stations (TPSS), overhead catenary systems (OCS), signals, and supervisory control and data acquisition (SCADA) assets, we acknowledge the missing crucial infrastructure asset data, including those for Bridges, Tunnels, and Tracks. This was due to the linear asset data collection launch occurring after the Northgate Link civil contractor had completed their work and left the contract prior to its completion.

The Operations Department would like a more detailed structure of asset data from the project delivery teams as noted in the audit finding, the Agency's current asset inventory is not at the comprehensive level desired by Operations to maintain the assets over their life-cycle.

Operations believes that a more robust commissioning process would improve the quality of the data and ensure that as-built drawings (and digital information) would be delivered prior to project close out.

¹⁴ If the responsible party **agrees** with the finding, an estimate timeline for corrective action is strongly suggested to be part of the response. If the responsible party **disagrees** with the finding, a statement of reason for the disagreement should be part of the response. If the disagreement represents unreasonable risk acceptance, the Audit Director will communicate the risk to Deputy CEO. If the Deputy CEO accepts the unreasonable risk acceptance by the auditee, the Director will communicate such acceptance to the Finance & Reporting Committee.

¹⁵ Each audit finding must have a management response.

The Operations Enterprise Asset Management System (EAMS) Administration team is working to implement a more comprehensive data structure and develop asset attributes to assist with improved reporting to FTA and further align with federal guidelines and industry best practices.

To rectify the deficiencies identified in the Northgate Link extension project and ensure a comprehensive asset inventory, the Operations Asset Planning team has initiated an inventory project. This project objective is to re-inventory the Central Link Linear Asset, aligning its detail with the same standards applied to system expansion projects. Notably, the scope of work for this project also includes collecting infrastructure asset data for the Northgate Link extension. The Operations Asset Planning team is currently working with the PSO GEC contract to finalize the procurement steps. We anticipate the project to commence in 2024 and conclude by the end of the same year.

The Operations Link Maintenance Division, in collaboration with King County Light Rail, conducts comprehensive condition assessments of linear assets. These assessments follow industry best practices, ensuring the continual integrity and optimal performance of our assets. The EAMS work order completion data is used to manage and record asset condition assessment.

To address additional resourcing needs, the Operations Asset Planning team has an approved 2023 budgeted full-time equivalent position for the Manager – Capital Renewal and Infrastructure. This position is intended to lead the development and execution of our State of Good Repair Program, ensuring assets are maintained in a state of good repair throughout their service life. While the position has received budget approval, it is currently pending Open Position Request approval.

Timeline for corrective action:

- The Asset Inventory Project will start in 2024 and is managed by Operations Asset Planning. The final report is expected in 1st Quarter 2025 and data updates by the EAMS Admin team will be completed by 3rd Quarter of 2025
- Condition assessment activities on going by King County Metro Maintenance Staff with a cycle of facilities assets every 3 years conducted by the Operations Asset Planning team.

Management Response (optional for Observations):

Management **partially agrees** with the audit report observation.

Observation #1: Asset hierarchy can be improved to align better with Federal Guidelines and Industry Standards.

Management Response / Action Plan:

An initial asset hierarchy has been adopted as an internal standard as is being applied to the assets and their components within the Trapeze EAM software system through new asset

attribute fields that work in parallel with current procedures. This hierarchy includes mode of operation, facility/system, and asset class fields. The asset class fields are being mapped in a crosswalk to FTA asset classes. With some detailed validation the Agency shall align with APTA recommended practices for capital asset inventory and condition assessment.

Operations is actively working with the Finance Department to align the assets in Trapeze EAM with the Capital Fixed Asset Register at the asset class level. The Agency hired a consultant in 2023 to review the State of Good Repair model, condition assessment and planning process, and the current asset hierarchy.

Timeline for corrective action:

- The Asset Hierarchy implementation is being managed by the Strategic Business Services team across the Agency. The specific configuration of the hierarchy within Trapeze EAM is scheduled to be completed by the EAMS Admin team by 4th quarter 2024.
- The alignment of the Capital Fixed Asset Register and the Trapeze EAM Asset Register will be part of the ERP/EAMS Transformation Project and no planned dates will be set until the ERP/EAMS consulting is hired and engaged. The ERP/EAMS Program Manager will manage that effort.

Audit Response: Agreed

We agree with the corrective actions provided by Operations Assets & Technology (OAT) and Operations Support Services to address the audit finding and observation in the audit report.

Prepared by: Vivian dela Rosa

Date: 21 Nov 2023

Audit: State of Good Repair (SOGR) – Northgate Link Extension (AUD-PA-2023-09)

Management Response:

Management **agrees** with the audit report finding except for this presumptive phrase on page 8, “however, there is an increased likelihood that this effort might be de-prioritized, resulting in potential future audit findings.”

Finding 2: Sound Transit has not updated the TAM Plan (Rating: Medium – 4C)

Management Response / Action Plan:

In 2019, Sound Transit decided to discontinue the Transit Asset Management (TAM) Plan, a document required by FTA. Instead, the Strategic Asset Management Plan (SAMP), a document required for ISO 55001 certification, was used in lieu of a TAM Plan.

However, the SAMP did not meet FTA requirements. In the interim, additional documents are being submitted together with the SAMP for submissions requiring a TAM Plan.

Timeline for corrective action:

The FTA TAMPLATE will be used to create the Transit Asset Management Plan.

<https://www.transit.dot.gov/regulations-and-programs/asset-management/template>

TAM Planning Asset Template (TAMPLATE) is provided as a tool in developing TAM Plans according to best practice and in alignment with requirements of FTA's Final Rule on Transit Asset Management (49 CFR Part 625).

Completion target date: Q2 2024.

Audit Response: Agreed

We agree with Asset Management Team's corrective action to leverage FTA TAMPLATE in addressing the audit finding.