Safety Certification Audit Report
Issued: July 20, 2022

Project: **Downtown Redmond Link Extension – AP 1000**

Contract: **RTA/RP 0063-16**

Audit ID: **2022-01**

PREPARED BY (TALSON):

Norman Jones – Auditor	Date:	*May 6, 2022*
Robert Farrow – Auditor		*May 6, 2022*

APPROVED BY (TALSON):

Kenneth Brzozowski – Project Manager	Date:	*June 17, 2022*

APPROVED FOR ISSUE (SOUND TRANSIT):

Patrick Johnson – ST Director, Audit Division	Date:	*July 12, 2022*

Contents

I. EXECUTIVE SUMMARY

Commencing in December 2021 through May 2022, Talson Solutions, LLC (Talson) performed a desktop Safety Certification Audit of the Downtown Redmond Link Extension (DRLE) Project. The audit was performed on behalf of the Sound Transit Audit Division and focused on Preliminary Hazard Identification and Analysis - Audit Profile 1000. The audit was conducted to ensure that system hazards are effectively identified from preliminary engineering to revenue services inclusive of certifiable items traceability and mitigation efforts. Prior to the closeout briefing, a preliminary meeting was held with key project personnel affording the opportunity for confirmation and collaborative agreement on preliminary findings and observations. A formal closeout briefing was facilitated on January 28, 2022 with select project team members, senior Sound Transit management and the Washington Department of Transportation State Safety Oversight Program Administrator.

Talson found that the overall safety certification process is not conforming to the project specific Safety and Security Management Plan (SSMP). As part of testing Sound Transit's Safety and Security Information Management System (SSIMS) database, Talson noted that a significant number of certifiable items were not correctly referenced to the Preliminary Hazard Analysis and traceable to SSIMS. As a result, the audit noted one (1) Finding and three (3) Observations which were inclusive of a non-conformance finding to alignment with Project Specific SSMP requirements and observations related to naming nomenclature and incomplete certifiable item details within SSIMS. Subsequent to the closeout briefing, further discussions were facilitated with Sound Transit's Senior System Safety and Security Specialist to further discussion potential corrective actions and steps being taken by contractor staff to remediate noted deficiencies.

<u>Notable documentation referenced during the audit included:</u>

- Agency Safety and Security Management Plan (SSCP), dated February 2017, Rev. 2
- Agency Safety and Security Certification Plan (SSMP), dated February 2017, Rev. 6
- Project Specific Safety and Security Management Plan (PS SSMP)
- Preliminary Hazard Analysis – July 2020
- Verification Matrices – December 2021 Versions
- Safety and Security Information Management System (SSIMS) Project Dashboard

Safety certifiable items related to various elements listed within the SSIMS database were selected for conformance testing specific to the following DRLE R200 Contracts: CIV, COMMs, Electric, Guideway, Land, LRV, OCS, Parking, SIG, Station, Stray, Structural, TPS, Traffic, Utility, and Revenue Ops. Talson selected 120 (fifteen-percent) of the 790 closed safety certifiable items that were uploaded into SSIMs for sampled testing. To ensure that all mitigation efforts from the Preliminary Hazard Analysis were listed in SSIMs, 100% of the certifiable items were traced between the Verification Matrices and Preliminary Hazard Analysis.

II. SCOPE AND METHODOLOGY

The purpose of a Safety Certification Audit profile 1000 is to ensure the completeness and integrity of SSIMs certifiable items for predefined hazards located in the Preliminary Hazard Analysis including potential causes, effects, and mitigation efforts ensuring that all are listed in SSIMs for resolution.

Specifically the audit ensures system hazards are effectively identified from preliminary engineering to revenue service. Inclusive of:

- Tracing of certifiable item identification numbers from the Preliminary Hazard Analysis Checklist → Verification Matrices → SSIMs
- Detailed review of selected CIs that hazard mitigation activities are identified in the Preliminary Hazard Analysis Checklist and include appropriate mitigation actions and efforts in their respective fields

Audit activities included the following procedures for performance of the audit:

- Review of certifiable items within SSIMS
- Prepare Safety Certification Audit Checklist inclusive of 15% stratified sampling of certifiable items
- Assess relevant documentation including SSCP, SSMP, and PS SSMP
- Identify method of verification within the SCA Checklist along with audit results
- Communicate preliminary findings with Sound Transit
- Conduct a closeout / exit meeting
- Produce draft and final reporting

Verification testing of certifiable items populated in SSIMS conducted by Talson utilized the following ratings as part of the audit process and are noted within the audit checklist:

- **Acceptable:** No deviation from the implemented SSCP.
- **Conditionally Acceptable:** Minor deviation of the implemented SSCP and unlikely to result in a nonconforming product or service. In most cases the deviation related to an incorrect document reference, a missing noted attachment, or a required clarification to the hazard mitigation.
- **Unacceptable:** A significant breakdown or partial breakdown in processes that resulted in a nonconforming product or service. Corrective action must be documented formally and include a root cause analysis.

Talson concluded that, of the 120 certifiable items sampled, all were deemed *Unacceptable* due to the inability to properly trace them between the Preliminary Hazard Analysis and SSIMs. The below chart summarizes the certifiable items tested within each contract and the correlating audit ratings:

A-SCA-LLR-DRLE-20-01 Summary of Preliminary Audit Findings							
Contract	Total CIs	IDs Sampled	Acceptable	Unacceptable	Conditionally Acceptable	Not Applicable	Comments
R200-CIV	33	5		5			Untraceable
R200-COMMs	54	8		8			Untraceable
R200 - Electric	30	5		5			Untraceable
R200 - Guideway	108	18		18			Untraceable
R200 - Land	22	3		3			Untraceable
R200 - LRV	40	6		6			Untraceable
R200 - OCS	63	9		9			Untraceable
R200 - Parking	120	18		18			Untraceable
R200 - SIG	55	8		8			Untraceable
R200 - Station	113	17		17			Untraceable

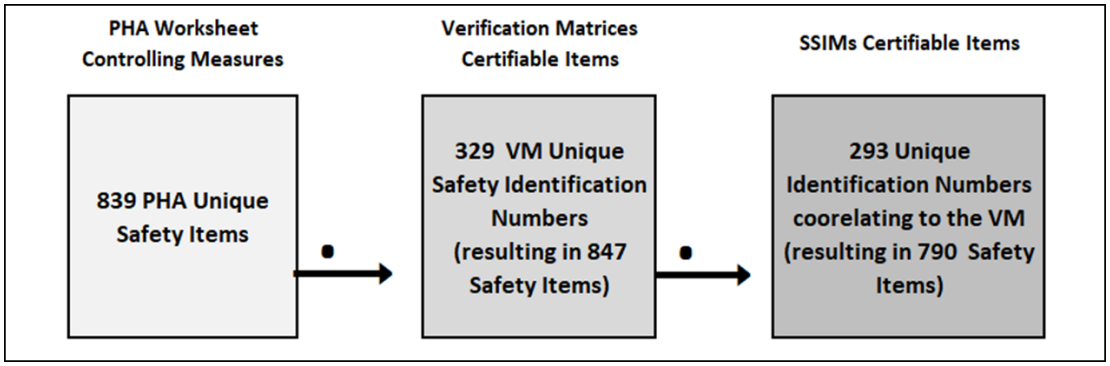
A-SCA-LLR-DRLE-20-01 Summary of Preliminary Audit Findings							
Contract	Total CIs	IDs Sampled	Acceptable	Unacceptable	Conditionally Acceptable	Not Applicable	Comments
R200 - Stray	34	5		5			Untraceable
R200 - Structural	11	2		2			Untraceable
R200 - TPS	76	11		11			Untraceable
R200 - Traffic	22	3		3			Untraceable
R200 - Utility	8	1		1			Untraceable
R200 – Revenue Ops	**1**	**1**		**1**			**This appears to be a security item mislabeled as safety. There is no hazard information in the SSIMs.**
Total	**790**	**120**	**0**	**120**			

Specific details regarding audit findings and noted discrepancies are further listed within the DRLE AP 1000 Audit Plan and Checklist documents.

III. FINDINGS

The audit resulted in one finding:

Finding No. 1:
Talson was unable to adequately trace, through clear and concise mapping, selected certifiable items within SSIMS the identification numbers depicted in the Preliminary Hazard Analysis. The identification numbers were not adequately replicated onto the transitional Verification Matrix spreadsheets used for uploading.



Nonconformance was noted to the project specific SSMP, which requires the following creation and trackability of certifiable elements and items within SSIMS:

- Section 4.3.1 (Bullet No. 5) **Hazard Identification Strategies** – "*document the hazard analyses results in a clear and concise manner…"*
- Section 5.1.6 **Conformance Checklists / SSIMS Database** – *"conformance checklists will be created to track and document the certification process and outcomes and list all certifiable elements and hazard analysis item…"*
- Section 7.5 **Hazard and Vulnerability Resolution Verification** – *"checklists will incorporate all identified safety and security certifiable elements and will be managed through SSIMS."*

IV. OBSERVATIONS

The audit resulted in the following observations:

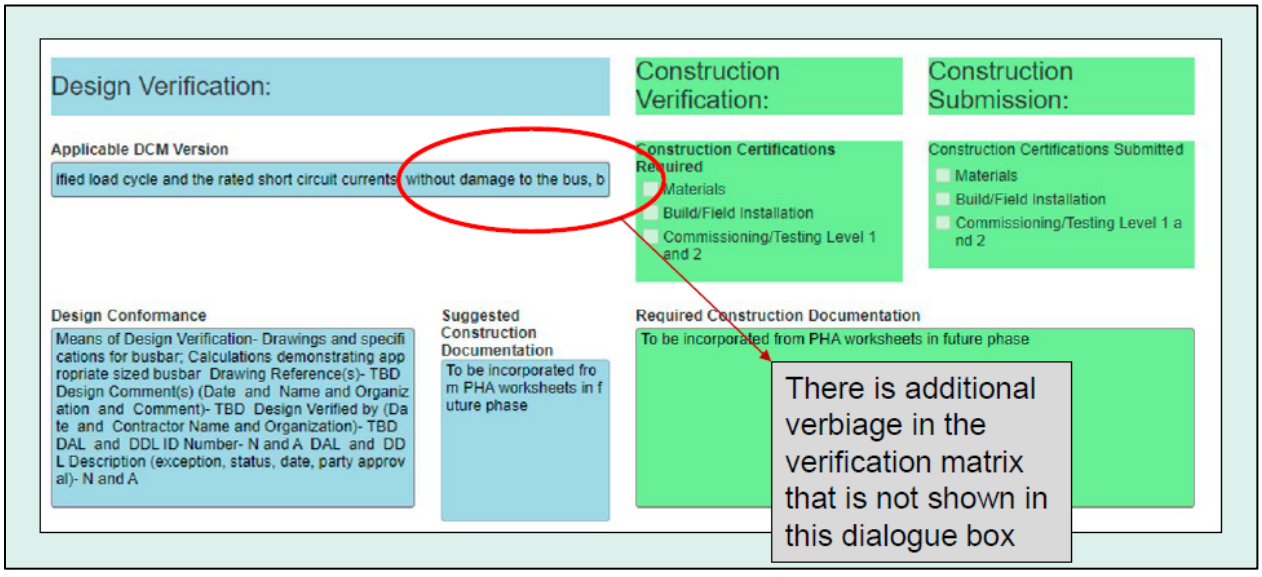
Observation No. 1:
The sub-element names used in the Verification Matrices are incompatible with what was already programmed into SSIMs. Although SSIMs has the same sub-element names programmed within, the corresponding SSIMs sub-element numbers were not marked down on the Verification

Matrices prior to upload which would have ensured its data integrity as the output. The 33 total items noted in the Verification Matrix (VM) did not align with the items listed in SSIMS.

R200 - Civil Engineering			
VM Elements		**SSIMs Elements**	
Civil Engineering	15	Guideway	13
Landscapining	1	Signaling	3
Traffic Control	17	Stations	17

Observation No. 2:
The Verification Matrices had 57 certifiable items that were not uploaded into SSIMs (847 were noted in the Verification Matrices and 790 in SSIMS). Talson was able to eventually identify the missing certifiable items based on advanced data analytic techniques, but many were almost indistinguishable from each other and lacking a unique identification reference for proper tracking/matching.

Observation No. 3: The "Applicable DECM Version" field in SSIMs cuts off after a certain number of characters during uploading. Many of the DECM revisions noted in SSIMs are incomplete midway through a sentence. See below example:



V. CONCLUSIONS / REQUIREMENTS

Talson found that the overall safety certification process is not conforming to the project specific SSMP appropriately. Safety Certifiable Items were not referenced appropriately, did adequately correlate to the Preliminary Hazard Analysis and were missing details in SSIMs. Sound Transit clarification comments regarding the noted observations should be provided within thirty (30) days after the submission of the Audit Report to Sound Transit.

VI. AUDIT RESPONSE FORM (ARF)

This audit report identified one (1) finding and three (3) observations that requires a response from the appropriate Sound Transit staff.

Finding No. 1: The SSIMS certifiable items were not adequately referenced to the Preliminary Hazard Analysis ID numbers

Observation No. 1: The sub-element names were not correctly translated into SSIMs during the uploading process

Observation No. 2: There were 57 missing certifiable items from SSIMs that were identified in the Verification Matrices

Observation No. 3: The "Applicable DECM Revision" field in SSIMs cuts off after a certain amount of characters after upload and is left incomplete

Observations can be addressed separately, but a management corrective action should be submitted within **30** days of the final distribution of this report and corresponding ARFs.

Verification of conforming corrective action and root cause explanation will be reviewed by Talson upon submission of the ASFR by Sound Transit.

Safety Certification Audit Report

DISTRIBUTION:

Safety Audit Dates: December 2021 – May 2022

Organization: Sound Transit *(Auditee)*

Responsible Party: Branden Porter, Director, Transportation Safety & Security *(Auditee)*

Talson Auditor(s): Ken Brzozowski, Norman Jones, and Robert Farrow *(Auditor)*

Report To:

- Branden Porter, Director, Transportation Safety & Security

Distribution List:

- Brooke Belman, *Interim* CEO
- Mary Cummings, ST DCEO & Chief Administrative Officer
- Kimberley Farley, ST DCEO & Chief Systems Officer
- David Wright, Chief Safety Officer, Safety Department
- Rick Capka, Deputy Project Director, DECM
- Ron Lewis, Executive Director, DECM
- Eric Beckman, *Acting* Executive Director, PSO
- Jodi Mitchell, Deputy Director, Business Process & Projects, Safety
- Kerry Pihlstrom, Chief Engineer, PSO
- Matthew Preedy, Director, Construction Management - DECM
- Michael Flood, Senior Auditor, Audit Division
- Molly Hughes, WSDOT State Safety Oversight Program Administrator

Attachments:

- DRLE AP 1000 Plan and Checklist
- DRLE SCA ARFs (4)

TALSON SOLUTIONS LLC

Safety Certification Audit Plan	**Audit No:**
	Date: December 6, 2021- January 21, 2022

Project	Redmond Link (DRLE)	**Contract:** ***A-SCA-LRR-DRLE-20-01***
Organization/Individual:	SQA	
Activity to be Audited:	Preliminary Hazard Analysis (PHA)	
Reference Documents:	Audit Profile 1000 (Hazard Analysis)	
Notification:	SA No. 2015	
Audit Schedule:	December 6, 2021 – December 22, 2021	
Pre-Audit Entrance Meeting:	N/A	
Conduct Audit:	December 06, 2021	**Through:** January 21, 2022
Post-Audit Exit Meeting:	January 28, 2022 (12:00 PM –12:30PM	
Audit Team:	Ken Brzozowski, Norman Jones, Robert Farrow	
Special Concerns:	**The PHA references in SSIMs are confirmed as mostly incorrect. CIs cannot be traced to the PHA based on mitigation efforts.**	
Written Checklist Attached:	[X] Yes	[ ] No
Prepared By:	Norman Jones **Talson Auditor**	January 2022 **Date**
Concurred By:	Ken Brzozowski **Talson Project Manager**	January 2022 **Date**
Approved By:	Mike Flood **Sound Transit Safety Audit Manager**	January 2022 **Date**

TALSON SOLUTIONS LLC

Safety Certification Audit Checklist

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SCA-LRR-DRLE-20-01	***R200-Civil***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	**Key Contacts:**	**Audit Team Members:**	**Audit Location:**
AP 1000 for various CIs within Civil	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1717 (PHA.CIV.01) R200-Civil (Station) Lines of Sight at Pedestrian Crossing	D via SSIMS	Impeded sight distance for pedestrians and bicycles at at-grade crossings where track is present at- South Redmond Station.
2.	SSIMS ID-1861 (PHA.CIV.13) R200-Civil (Guideway) Guideway Downspouts	D via SSIMS	Flooding of tracks during extreme weather events. 4 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-1868 (PHA.CIV.23) R200-Civil (Guideway) Soil	D via SSIMS	Subsurface conditions do not meet soil specifications. 4 CIs in the VM SSIMs have the same hazard description.
4.	SSIMS ID-2331 (PHA.CIV.01) R200-Civil (Signaling) Flashing Visual Warning Device	D via SSIMS	Impeded sight distance for pedestrians, bicycles and road vehicles at at-grade crossings where track is present at- South Redmond Station. 11 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-2340 (PHA.01) R200-Civil (Signaling) Audible Warning Device	D via SSIMS	Pedestrian or bicyclist not aware of approaching train or train crossing at- South Redmond Station. 7 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

Results: Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

TALSON SOLUTIONS LLC

Safety Certification Audit Checklist

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-Comms***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	**Key Contacts:**	**Audit Team Members:**	**Audit Location:**
AP 1000 for various CIs within Communications	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-2431 (PHA.Com.01) R200-Comms (Communications) Customer Emergency Stations	D via SSIMS	No direct link to Control Center. 3 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID-2437 (PHA.Com.05) R200-Comms (Communications) Radio System Alarm	D via SSIMS	Insufficient radio coverage within enclosed spaces covered by BDA or DAS. Failure of BDA or DAS. 5 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-2443 (PHA.Com.13) R200-Comms (Communications) Camera Locations	D via SSIMS	Pedestrian traffic not monitored. 2 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID-2449 (PHA.Com.21) R200-Comms (Communications) Timing and Synchronization	D via SSIMS	SCADA system fails. 7 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-2455 (PHA.Com.21) R200-Comms (Communications) Open Systems	D via SSIMS	SCADA system provides false indication and controls. 6 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID-2461 (PHA.Com.35) R200-Comms (Communications) BMS	D via SSIMS	Loss of or degraded ability to contact emergency services. 6 CIs in the VM and SSIMs have the same hazard description.
7.	SSIMS ID-2467 (PHA.Com.48) R200-Comms (Communications) Ad Hoc Messages	D via SSIMS	Loss of public address capability (e.g., failed Public Address System and or Passenger Information System). 5 CIs in the VM and SSIMs have the same hazard description.

8.	SSIMS ID-2478 (PHA.Com.58) R200-Comms (Communications) Alarms	D via SSIMS	Loss of SCADA monitoring of LRV and loss of signal, switches, or environmental controls that interface with LRV. 8 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

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Safety Certification Audit Checklist

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Electric***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***
Activity to be Audited: ***AP 1000 for various CIs within Electrical***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1749 (PHA.ELE.22) R200-Electric (Station) Wiring	D via SSIMS	Patrons experience electric shock from exposed wires in stations and garage.
2.	SSIMS ID-1754 (PHA.ELEC.04) R200-Electric (Station) Demand Factor Ventilation	D via SSIMS	Unsafe, unreliable HVAC. 6 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-1760 (PHA.ELEC.19) R200-Electric (Station) Illuminance	D via SSIMS	Lack of emergency power sources.

			7 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID-1765 (PHA.ELEC.16) R200-Electric (Station) Power	D via SSIMS	Unsafe, unreliable, intermittent emergency power and lighting. 4 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-2546 (PHA.ELEC.07) R200-Electric (Fire Life Safety) Quad Receptacles	D via SSIMS	Unsafe, unreliable fire pumps. 2 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

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Safety Certification Audit Checklist

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Guideway***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 20221***
Activity to be Audited: ***AP 1000 for various CIs within Guideway***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1775 (PHA.TRK.GW.04) R200-Guideway (Stations) Lines of Sight at Pedestrian Crossing	D via SSIMS	Pedestrian within ROW. 23 CIs in the VM and SSIMs have the same hazard description.

2.	SSIMS ID-1919 (PHA.TRK.002) R200-Guideway (Guideway) Floodplain Management Criteria	D via SSIMS	Improper Horizontal Track Alignment; Improper Vertical Track Alignment; Improper Track Cross Level; Improper Rail Cant; Improper Track Tolerance. 8 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-1925(PHA.TRK.GW.05) R200-Guideway (Guideway) Security Fencing	D via SSIMS	Vehicle within ROW where track sits below roadway.
4.	SSIMS ID-1931(PHA.TRK.GW.45) R200-Guideway (Guideway) Fall Protection Guard Rail	D via SSIMS	Passenger evacuation on elevated guideway. 8 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-1937(PHA.TRK.GW.01) R200-Guideway (Guideway) Placement	D via SSIMS	Tracks and guideway blocked by fallen trees and large branches. 3 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID-1943(PHA.TRK.009) R200-Guideway (Guideway) Civil Design Speed	D via SSIMS	Excessive Rail Wear. 6 CIs in the VM and SSIMs have the same hazard description.
7.	SSIMS ID-1949(PHA.TRK.039) R200-Guideway (Guideway) Rail Structure Interaction	D via SSIMS	Broken and Deficient Rail Weld or Joint. 6 CIs in the VM and SSIMs have the same hazard description.
8.	SSIMS ID-1955(PHA.TRK.039) R200-Guideway (Guideway) Bolted Joints	D via SSIMS	Broken and Deficient Rail Weld or Joint. 6 CIs in the VM and SSIMs have the same hazard description.
9.	SSIMS ID-1961(PHA.TRK.021) R200-Guideway (Guideway) Switch Points	D via SSIMS	Broken or damaged switch point. 2 CIs in the VM and SSIMs have the same hazard description.
10.	SSIMS ID-1967(PHA.TRK.024) R200-Guideway (Guideway) Power Operated and Manual Switch Machines	D via SSIMS	Defective powered track switch. 3 CIs in the VM and SSIMs have the same hazard description.
11.	SSIMS ID-1973(PHA.TRK.GW.34) R200-Guideway (Guideway) Utility Management Plan	D via SSIMS	Hazardous materials in the ROW. 6 CIs in the VM and SSIMs have the same hazard description

12.	SSIMS ID-2365(PHA.TRK.027) R200-Guideway (Signaling) Locking Functions	D via SSIMS	Defective manual track switch. 4 CIs in the VM and SSIMs have the same hazard description
13.	SSIMS ID-2370 (PHA.TRK.033) R200-Guideway (Signaling) Signal Control Circuit	D via SSIMS	Switch moves under LRV. 4 CIs in the VM and SSIMs have the same hazard description
14.	SSIMS ID-2549 (PHA.TRK.GW.31) R200-Guideway (Fire Life Safety) Emergency Access Gate	D via SSIMS	Fire and smoke and fumes on the ROW. 4 CIs in the VM and SSIMs have the same hazard description
15	SSIMS ID-2555 (PHA.TRK.GW.46) R200-Guideway (Fire Life Safety) Emergency Access Gate	D via SSIMS	Passenger evacuation on elevated guideway. 8 CIs in the VM and SSIMs have the same hazard description.
16.	SSIMS ID-2561 (PHA.TRK.GW.43) R200-Guideway (Fire Life Safety) Emergency Walkway	D via SSIMS	Passenger evacuation on elevated guideway. 8 CIs in the VM and SSIMs have the same hazard description.
17.	SSIMS ID-2563 (PHA.TRK.GW.44) R200-Guideway (Fire Life Safety) Emergency Walkway Lighting	D via SSIMS	Passenger evacuation on elevated guideway. 8 CIs in the VM and SSIMs have the same hazard description.
18.	SSIMS ID-2565(PHA.TRK.055) R200-Guideway (Fire Life Safety) Elevated Emergency Access Gate	D via SSIMS	Structural deficiency of track, or excessive deterioration due to poor material quality, manufacturing flaws, dynamic loading, defective welds, or improper installation and maintenance actions.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

TALSON SOLUTIONS LLC

Safety Certification Audit Checklist

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-Land***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	**Key Contacts:**	**Audit Team Members:**	**Audit Location:**
AP 1000 for various CIs within Land	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1721 (PHA.LAND.01) R200-Land (Stations) Landscape Planting	D via SSIMS	LRV operator has a blocked view of pedestrians. 4 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID-1726 (PHA.LAND.01) R200-Land (Stations) Landscape Planting	D via SSIMS	Pedestrian and Bicyclist has a blocked line of sight. 4 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-1736(PHA.06 06) R200-Land (Stations) Security Fencing	D via SSIMS	Pedestrian has access to deep water and may drown. 2 CIs in the VM and SSIMs have the same hazard description.

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Safety Certification Audit Checklist

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-LRV***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	**Key Contacts:**	**Audit Team Members:**	**Audit Location:**
AP 1000 for various CIs within LRV	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
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- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1886 (PHA.VEH.01) R200-LRV (Guideway) Dynamic Envelope	D via SSIMS	LRV comes into contact with fixed facility. 8 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID-1892 (PHA.VEH.01) R200-LRV (Guideway) Dynamic Envelope	D via SSIMS	LRV collides with LRV. 6 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-1897 (PHA.VEH.01) R200-LRV (Guideway) Pantograph Clearance Envelope	D via SSIMS	Pantograph comes into contact with fixed facility. 10 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID-1903 (PHA.VEH.01) R200-LRV (Guideway) Pantograph Clearance Envelope	D via SSIMS	Pantograph comes into contact with fixed facility. 10 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-1909 (PHA.VEH.01) R200-LRV (Guideway) Station Platform Interface	D via SSIMS	LRV collides with pedestrian.

			6 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID-2579 (PHA.VEH.16) R200-LRV (Light Rail Vehicle) Wheel-to-Rail Interface	D via SSIMS	LRV wheels not trued to proper tolerances.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

Results: Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

Safety Certification Audit Checklist

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-OCS***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***
Activity to be Audited: ***AP 1000 for various CIs within OCS***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-2115 (PHA.OCS.01) R200-OCS (Traction Electrification System) OCS Cables and Conductors	D via SSIMS	Catenary wires and feeder cables damaged by high voltage transient. 4 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID-2121 (PHA.OCS.05) R200-OCS (Traction Electrification System) Wire Height	D via SSIMS	Contact wire comes into contact with passengers, employees, contractors. 2 CIs in the VM and SSIMs have the same hazard description.

3.	SSIMS ID-2128 (PHA.OCS.19) R200-OCS (Traction Electrification System) Pole Foundation	D via SSIMS	Foundation fails to support pole moments and loads. 4 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID-2135 (PHA.OCS.31) R200-OCS (Traction Electrification System) Pole	D via SSIMS	Pole fails to support loads. 4 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-2142 (PHA.OCS.34) R200-OCS (Traction Electrification System) Cantilevers	D via SSIMS	Span wires or cantilever fail to support contact wire or cause contact wire to sag (single contact wire) 11 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID-2149 (PHA.OCS.35) R200-OCS (Traction Electrification System) Wire Tension	D via SSIMS	Span wires or cantilever fail to support contact wire or cause contact wire to sag (single contact wire) 11 CIs in the VM and SSIMs have the same hazard description.
7.	SSIMS ID-2156 (PHA.OCS.38) R200-OCS (Traction Electrification System) Staggers	D via SSIMS	Wire fails and breaks. 6 CIs in the VM and SSIMs have the same hazard description.
8.	SSIMS ID-2163 (PHA.OCS. 42) R200-OCS (Traction Electrification System) Wire Tension	D via SSIMS	Contact wire comes into contact with utility lines, streetlights, traffic signals, fixed facility. 2 CIs in the VM and SSIMs have the same hazard description.
9.	SSIMS ID-2172 (PHA.OCS.46) R200-OCS (Traction Electrification System) Double Insulated	D via SSIMS	Electrical fire sparked by OCS. 2 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

TALSON SOLUTIONS LLC

Safety Certification Audit Checklist

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-Ops Procedures***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	**Key Contacts:**	**Audit Team Members:**	**Audit Location:**
AP 1000 for various CIs within OPS Procedures	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-2426 (N/A) R200-Ops Procedures (Communications) Communication Transmission System	D via SSIMS	Although marked as Safety, this item appears to have been intended for Security given the lack of hazard description and PHA number.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

Results: Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

TALSON SOLUTIONS LLC

Safety Certification Audit Checklist

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-Parking***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	**Key Contacts:**	**Audit Team Members:**	**Audit Location:**
AP 1000 for various CIs within Parking	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1742 (PHA.PG.57) R200-Parking (Stations) Backup Generator Location	D via SSIMS	Toxic fluids or hazardous materials in parking garage. 6 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID-2021 (PHA.PG.07) R200-Parking (Parking Garage) Illuminance	D via SSIMS	Vehicle to vehicle collision. 7 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-2035 (PHA.PG.01) R200-Parking (Parking Garage) Illuminance	D via SSIMS	Fire in garage (including elevator, stairway). 28 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID-2042 (PHA.PG.07) R200-Parking (Parking Garage) Pedestrian Zones	D via SSIMS	Vehicle to vehicle collision. 7 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-2049 (PHA.PG.19) R200-Parking (Parking Garage) Pedestrian Sidewalks	D via SSIMS	Pedestrian struck by vehicle. 7 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID-2056 (PHA.PG.27) R200-Parking (Parking Garage) Parking Facility	D via SSIMS	Structural failure. 3 CIs in the VM and SSIMs have the same hazard description.

7.	SSIMS ID-2063 (PHA.PG.31) R200-Parking (Parking Garage) Egress	D via SSIMS	Charging station smoke and fire. 18 CIs in the VM and SSIMs have the same hazard description.
8.	SSIMS ID-2070 (PHA.PG.37) R200-Parking (Parking Garage) Traffic Lanes	D via SSIMS	Pedestrian struck by bus. 7 CIs in the VM and SSIMs have the same hazard description.
9.	SSIMS ID-2077 (PHA.PG.44) R200-Parking (Parking Garage) Pedestrian Zones	D via SSIMS	Bus to bus collision 7 CIs in the VM and SSIMs have the same hazard description.
10.	SSIMS ID-2084 (PHA.PG.54) R200-Parking (Parking Garage) Floor Material	D via SSIMS	Flooding at parking garage. 4 CIs in the VM and SSIMs have the same hazard description.
11.	SSIMS ID-2091 (PHA.PG.66) R200-Parking (Parking Garage) Overhead Clearance Bar	D via SSIMS	Motor vehicle collides with garage. 2 CIs in the VM and SSIMs have the same hazard description.
12.	SSIMS ID-2098 (PHA.PG.73) R200-Parking (Parking Garage) Derailment Load	D via SSIMS	LRV derails and collides with fixed garage facility.
13.	SSIMS ID-2105 (PHA.PG.12) R200-Parking (Parking Garage) Pedestrian Pathways	D via SSIMS	Walkway condition hazardous (e.g. slips, trips, falls). 5 CIs in the VM and SSIMs have the same hazard description.
14.	SSIMS ID-2112 (PHA.PG.51) R200-Parking (Parking Garage) Slip Resistant Surface	D via SSIMS	Slippery surface at parking garage. 10 CIs in the VM and SSIMs have the same hazard description.
15.	SSIMS ID-2497 (PHA.PG.1) R200-Parking (Communications) Communications Backbone	D via SSIMS	Fire in garage (including elevator, stairway). 28 CIs in the VM and SSIMs have the same hazard description.
16.	SSIMS ID-2537 (PHA.PG.01) R200-Parking (Fire Life Safety) Fire and Life Safety System	D via SSIMS	Fire in garage (including elevator, stairway). 28 CIs in the VM and SSIMs have the same hazard description.
17.	SSIMS ID-2542 (PHA.PG.01) R200-Parking (Fire Life Safety) Fire and Life Safety System Access	D via SSIMS	Fire in garage (including elevator, stairway). 28 CIs in the VM and SSIMs have the same hazard description.

18.	SSIMS ID-2544 (PHA.PG.31) R200-Parking (Fire Life Safety) Non-combustible material	D via SSIMS	Charging station smoke and fire. 18 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity
****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

Safety Certification Audit Checklist

There are 90 CIs/Line Items listed in the Verification Matrix, yet 55 total CIs in SSIMs for R200-Signal. 35 CIs are not uploaded.

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Sig***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***
Activity to be Audited: ***AP 1000 for various CIs within Signals***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID-1713 (PHA.SIG.04) R200-Sig (Station) Lines of Sight at Pedestrian Crossing	D via SSIMS	Impeded sight distance for pedestrians and bicycles at at-grade crossings where track is present at- South Redmond Station at- EB 5120+96.24.
2.	SSIMS ID-1850 (PHA.SIG.10) R200-Sig (Guideway) Elevated emergency Access Gate	D via SSIMS	Unauthorized or unknown access to LRV right of way via elevated emergency access point gate at- STA 5084+50 or STA 5150+10.

			4 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID-2293 (PHA.SIG.17) R200-Sig (Signaling) Circuit Design	D via SSIMS	Dark signal. 4 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID-2300 (PHA.SIG.30) R200-Sig (Signaling) Locking Functions	D via SSIMS	Loss of LRV detection. 4 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID-2307 (PHA.SIG.39) R200-Sig (Signaling) Fail Safe Logic	D via SSIMS	Operator violates stop signal into occupied route. 4 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID-2314 (PHA.SIG.45) R200-Sig (Signaling) Locking Functions	D via SSIMS	Switch moves under LRV. 3 CIs in the VM and SSIMs have the same hazard description.
7.	SSIMS ID-2326 (PHA.SIG.61) R200-Sig (Signaling) Snowmelter	D via SSIMS	Loss of broken rail detection. 4 CIs in the VM and SSIMs have the same hazard description.
8.	SSIMS ID-2490 (PHA.SIG.76) R200-Sig (Communications) Timing and Synchronization	D via SSIMS	Train exceeds speed limits defined for specified area. 6 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

Safety Certification Audit Checklist			
Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Station***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***

Activity to be Audited:	Key Contacts:	Audit Team Members:	Audit Location:
AP 1000 for various CIs within Stations	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID 1777 (PHA.STA.016) R200-Station (Stations) Illuminance	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID 1784 (PHA.STA.079) R200-Station (Stations) Illuminance	D via SSIMS	Loss or degradation of the station's AC power 2 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID 1791 (PHA.STA.05) R200-Station (Stations) Wiring	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID 1798 (PHA.STA.05) R200-Station (Stations) Construction Material	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID 1805 (PHA.STA.141) R200-Station (Stations) Lines of Sight	D via SSIMS	Road vehicle and pedestrian collision at station pick-up, drop off, or parking areas. 7 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID 1812 (PHA.STA.061) R200-Station (Stations) Track Cross walk	D via SSIMS	Unsafe patron to vehicle interaction at stations- EB 5125+26.23
7.	SSIMS ID 1823 (PHA.STA.054) R200-Station (Stations) Architectural	D via SSIMS	Walking hazard at stations.

8.	SSIMS ID 1829 (PHA.STA.015) R200-Station (Stations) Wayfinding	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
9.	SSIMS ID 1836 (PHA.STA.117) R200-Station (Stations) Wayfinding	D via SSIMS	Pedestrian slips and falls from elevated station onto pedestrian or area below. 5 CIs in the VM and SSIMs have the same hazard description.
10.	SSIMS ID 1843 (PHA.STA.033) R200-Station (Stations) Windscreens	D via SSIMS	Police and Emergency Responder has a blocked view of patrons and pedestrians and station area due to vegetation and and or station glass type. 4 CIs in the VM and SSIMs have the same hazard description.
11.	SSIMS ID 2287 (PHA.STA.019) R200-Station (Traction Electrification System) Coordination	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
12.	SSIMS ID 2505 (PHA.STA.128) R200-Station (Communications) Cameras	D via SSIMS	Object falls from elevated station onto pedestrian areas below. 5 CIs in the VM and SSIMs have the same hazard description.
14,	SSIMS ID 2512 (PHA.STA.014) R200-Station (Communications) Ad Hoc Messages	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
15.	SSIMS ID 2519 (PHA.STA.120) R200-Station (Communications) Intrusion Detection	D via SSIMS	Pedestrian enters guideway from station access point.
16.	SSIMS ID 2567 (PHA.STA.010) R200-Station (Fire Life Safety) Fire Code Compliance	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform. 35 CIs in the VM and SSIMs have the same hazard description.
17,	SSIMS ID 2574 (PHA.STA.05) R200-Station (Fire Life Safety)Fire Detection and Suppression	D via SSIMS	Fire, smoke, toxic and flammable and hazardous fumes at station platform.

			35 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

Safety Certification Audit Checklist

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Stray***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***
Activity to be Audited: ***AP 1000 for various CIs within Stray***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID 1877 (PHA.SCCC.36) R200-Stray (Guideway) Track Drain Inlets	D via SSIMS	Free-standing water accumulates on rails and rail appurtenances. 4 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID 2181 (PHA.SCCC.08) R200-Stray (Traction Electrification System) Cathodic Protection	D via SSIMS	Improper soil corrosion protection materials. 7 CIs in the VM and SSIMs have the same hazard description.
3.	SSIMS ID 2187 (PHA.SCCC.27) R200-Stray (Traction Electrification System) Electrical Continuity	D via SSIMS	Corrosive effects of stray earth traction currents from LRV operation on stations and structures. 7 CIs in the VM and SSIMs have the same hazard description.

4.	SSIMS ID 2194 (PHA.SCCC.02) R200-Stray (Traction Electrification System) Buried Conduct	D via SSIMS	Piping and conduits are exposed.
5.	SSIMS ID 2207 (PHA.SCCC.42) R200-Stray (Traction Electrification System) Grounding and Monitoring	D via SSIMS	Loss of corrosion control measure and loss of grounding.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Application

Safety Certification Audit Checklist

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Structural***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***
Activity to be Audited: ***AP 1000 for various CIs within Structural***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID 1978 (PHA.STR.1) R200-Structural (Structural) Aerial Guideway	D via SSIMS	Fire and smoke condition on and under elevated structure on which rail fixed guideway operates.
2.	SSIMS ID 1985 (PHA.STR.22) R200-Structural (Structural) Elevated Building Structure	D via SSIMS	Architectural element (i.e. screening on tail track, panels along guideway) comes loose from trail tracks and falls into pedestrian area.

			2 CIs in the VM and SSIMs have the same hazard description.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicabl

Safety Certification Audit Checklist

There are 97 CIs/Line Items listed in the Verification Matrix, yet 77 total CIs in SSIMs for R200-TPS. 20 CIs are not uploaded.

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-TPS***	***Norman Jones***	***December 6 – Jan 21, 2022***
Activity to be Audited:	Key Contacts:	Audit Team Members:	Audit Location:
AP 1000 for various CIs within TPS	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID 2208 (PHA.TPSS.041) R200-TPS (Traction Electrification System) Lightning Arresters	D via SSIMS	DC feeder cable contacts accessible metal part. 3 CIs in the VM and SSIMs have the same hazard description.
2.	SSIMS ID 2215 (PHA.TPSS.068) R200-TPS (Traction Electrification System) Fiber Optic Cable	D via SSIMS	Difference of potential between surge arrester grounding. 2 CIs in the VM and SSIMs have the same hazard description.

3.	SSIMS ID 2222 (PHA.TPSS.105) R200-TPS (Traction Electrification System) Circuit Breakers	D via SSIMS	Protective circuit breaker trips at too high a limit. 6 CIs in the VM and SSIMs have the same hazard description.
4.	SSIMS ID 2229 (PHA.TPSS.014) R200-TPS (Traction Electrification System) DC Feeder Subsystem	D via SSIMS	DC voltage energizes AC switchgear enclosure 6 CIs in the VM and SSIMs have the same hazard description.
5.	SSIMS ID 2236 (PHA.TPSS.072) R200-TPS (Traction Electrification System) DC Feeder Subsystem	D via SSIMS	AC supply current damages cable. 10 CIs in the VM and SSIMs have the same hazard description.
6.	SSIMS ID 2242 (PHA.TPSS.023) R200-TPS (Traction Electrification System) Deadfront Enclosure	D via SSIMS	Rectifier door opened while rectifier is energized. 3 CIs in the VM and SSIMs have the same hazard description.
7.	SSIMS ID 2249 (PHA.TPSS.117) R200-TPS (Traction Electrification System) Enclosures	D via SSIMS	Electrical shock from exposed energized parts of electrical equipment and arcs, smoke or fire from foreign materials causing short circuit resulting from- Inadequate design of the electrical system Inadequate protection of electrical equipment subject to adverse weather, vandalism and unauthorized operation. 6 CIs in the VM and SSIMs have the same hazard description.
8.	SSIMS ID 2256 (PHA.TPSS.130) R200-TPS (Traction Electrification System) Conduit Geometry	D via SSIMS	Smoke, toxic fumes and and or fire from overheated electrical cable as a result of- Cable undersized for purpose intended Corroded or high resistance connection at junction point Conductors partially broken due to mechanical stress Electrical fault resulting in excessive current flow. 9 CIs in the VM and SSIMs have the same hazard description.
9.	SSIMS ID 2263 (PHA.TPSS.059) R200-TPS (Traction Electrification System) Protective Relays	D via SSIMS	Negative return open while rectifier positive is connected to system. 3 CIs in the VM and SSIMs have the same hazard description.

10.	SSIMS ID 2270 (PHA.TPSS.001) R200-TPS (Traction Electrification System) AC Switchgear Enclosure Ground	D via SSIMS	AC supply flashes or shorts to switchgear enclosure. 6 CIs in the VM and SSIMs have the same hazard description
11.	SSIMS ID 2548 (PHA.TPSS.144) R200-TPS (Fire Life Safety) Smoke Detector	D via SSIMS	Smoke and heat detector inoperable in traction power substation.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

Safety Certification Audit Checklist

Safety Certification Audit No.: ***A-SC-LLR-20-00***	Organization/Contract No.: ***R200-Traffic***	Talson Auditor: ***Norman Jones***	Audit Date(s): ***December 6 – Jan 21, 2022***
Activity to be Audited: ***AP 1000 for various CIs within Traffic***	Key Contacts: ***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	Audit Team Members: ***Ken Brzozowski, Norman Jones, Robert Farrow***	Audit Location: ***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID 1744 (PHA.TC.01) R200-Traffic (Stations) Lines of Sight at Pedestrian Crossing	D via SSIMS	Pedestrian trespasses on dedicated rail fixed guideway right of way. All 22 CIs have the same hazard description in both VM and SSIMs.
2.	SSIMS ID 2346 (PHA.TC.01) R200-TPS (Signaling) Tactile Warning Strip	D via SSIMS	Pedestrian trespasses on dedicated rail fixed guideway right of way. All 22 CIs have the same hazard description in both VM and SSIMs.
3.	SSIMS ID 2358 (PHA.TC.01) R200-TPS (Signaling) Flashing Visual Warning Device	D via SSIMS	Pedestrian trespasses on dedicated rail fixed guideway right of way. All 22 CIs have the same hazard description in both VM and SSIMs.

Method of Verification: I = Interview; D = Documentation Review; O = Observe Activity

****Results:** Include explanation and the following: A = Acceptable; U = Unacceptable: C = Conditional Acceptable; N = Not Examined; or N/A = Not Applicable

Safety Certification Audit Checklist

There are 9 CIs/Line Items listed in the Verification Matrix, yet 8 total CIs in SSIMs for R200-Utility. 1 CI is not uploaded.

Safety Certification Audit No.:	Organization/Contract No.:	Talson Auditor:	Audit Date(s):
A-SC-LLR-20-00	***R200-Utility***	***Norman Jones***	***December 6 – Jan 21, 2022***

Activity to be Audited:	Key Contacts:	Audit Team Members:	Audit Location:
AP 1000 for various CIs within Utility	***Patrick Johnson, Matthew Mitchell, Teresa Graziani***	***Ken Brzozowski, Norman Jones, Robert Farrow***	***Talson Solutions Offices, Philadelphia, PA***

Audit Profile Type

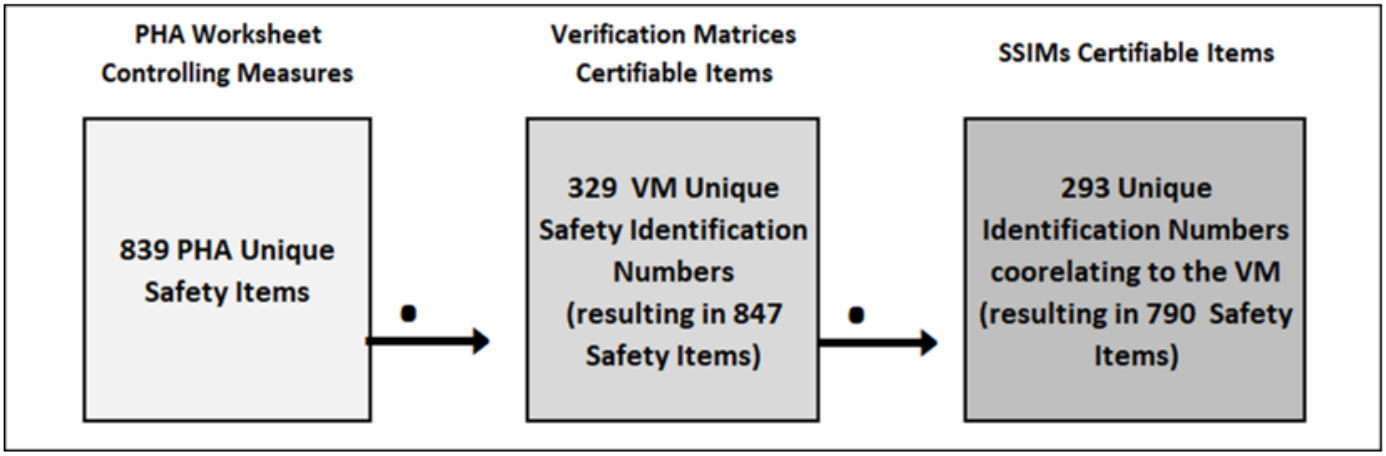
- [x] 1000 Hazard Analysis
- [ ] 2000 Design Verification
- [ ] 3000 Construction Verification
- [ ] 4000 Integration Testing
- [ ] 5000 Vehicle Configuration
- [ ] 6000 Training/Procedures
- [ ] 7000 Systems Readiness/Fire Life Safety/SS Certification Report

Item	Audit Element (ID#/Contract/Element/ Title)	Method of Verification	Results
1.	SSIMS ID 1874 (PHA.UTL.03) R200-Utility (Guideway) Track Drains	D via SSIMS	Loss of operations and maintenance capabilities of transit system; loss or property damage to utility owner and and or transit system (i.e. LRV, track system), injury or death for patrons or personnel. 5 CIs in the VM and SSIMs have the same hazard description.

Blocks 1 thru 12 to be completed by Auditors			
1. Audit Type: Safety Certification	2. Mode/System: SCR	3. Audit Title / Number/Reference: Downtown Redmond Link Extension AP 1000	4. Classification (Finding/Obsv): **FINDING**
5. Finding/Observation Ref. # (ST File #): Finding No. 1	6. Auditor, Email & Phone: Mike Flood, Sr. Compliance Auditor (206) 398-5075 michael.flood@soundtransit.org		7. Issued Date: 7/20/2022

8. Description: (of Finding or Observation)

Talson was unable to adequately trace, through clear and concise mapping, selected certifiable items within SSIMS the identification numbers depicted in the Preliminary Hazard Analysis. The identification numbers were not adequately replicated onto the transitional Verification Matrix spreadsheets used for uploading.



Nonconformance was noted to the project specific SSMP, which requires the following creation and trackability of certifiable elements and items within SSIMS:

- Section 4.3.1 (Bullet No. 5) **Hazard Identification Strategies** – "*document the hazard analyses results in a clear and concise manner…"*
- Section 5.1.6 **Conformance Checklists / SSIMS Database** – *"conformance checklists will be created to track and document the certification process and outcomes and list all certifiable elements and hazard analysis item…"*

Section 7.5 **Hazard and Vulnerability Resolution Verification** – *"checklists will incorporate all identified safety and security certifiable elements and will be managed through SSIMS."*

8a. Recommendation (For Observations Only)

8b. Reference:

Audit Division **Audit Response Form**

9. Risk Rating	10. Owner/Assigned Responsible Individual:	11. Assigned Responsible Division:	12. Response Due Date:
N/A	Greg Dwidjaya	Safety	9/6/2022

Blocks 13 thru 18 will be completed by the individual responding to the Finding/Observation

13. Finding/Observation Response:

13a. Root Cause (Findings Only):

14. Finding/Observation Implementation Plan

15. Audit Response Form Completed By: (Name and Title)	16. Today's Date:	17. Est. Implementation Date:	18. SAIR / CAP #
	Click or tap to enter a date.	Click or tap to enter a date.	

Blocks 22-27 to be completed by Auditors

19. Finding/Observation Implementation Plan Review	20. Auditor Name / Signature: Date:
☐ Accept ☐ Reject	
21. Finding/Observation Implementation Verification	22. Auditor / Signature: Date:
☐ Accept (CLOSE) ☐ Reject (Remain OPEN)	

23. Description of Verification of Finding/Observation implementation:

24. Reasons for Implementation Plan or Implementation Verification Rejection by Auditors:

25. Auditor Director Name / Signature: Date:

Blocks 1 thru 12 to be completed by Auditors

1. Audit Type:	2. Mode/System:	3. Audit Title / Number/Reference:	4. Classification (Finding/Obsv):
Safety Certification	SCR	Downtown Redmond Link Extension AP 1000	**OBSERVATION**

5. Finding/Observation Ref. # (ST File #):	6. Auditor, Email & Phone:	7. Issued Date:
Observation No. 1	Mike Flood, Sr. Compliance Auditor (206) 398-5075 michael.flood@soundtransit.org	7/20/2022

8. Description: (of Finding or Observation)

The sub-element names used in the Verification Matrices are incompatible with what was already programmed into SSIMs. Although SSIMs has the same sub-element names programmed within, the corresponding SSIMs sub-element numbers were not marked down on the Verification Matrices prior to upload which would have ensured its data integrity as the output. The 33 total items noted in the Verification Matrix (VM) did not align with the items listed in SSIMS.

Example:

R200 - Civil Engineering

VM Elements		SSIMs Elements	
Civil Engineering	15	Guideway	13
Landscapining	1	Signaling	3
Traffic Control	17	Stations	17

8a. Recommendation (For Observations Only)

8b. Reference:

9. Risk Rating	10. Owner/Assigned Responsible Individual:	11. Assigned Responsible Division:	12. Response Due Date:
N/A	Greg Dwidjaya	Safety	9/6/2022

Blocks 13 thru 18 will be completed by the individual responding to the Finding/Observation

13. Finding/Observation Response:

13a. Root Cause (Findings Only):

14. Finding/Observation Implementation Plan			
15. Audit Response Form Completed By: (Name and Title)	16. Today's Date: Click or tap to enter a date.	17. Est. Implementation Date: Click or tap to enter a date.	18. SAIR / CAP #

Blocks 22-27 to be completed by Auditors

19. Finding/Observation Implementation Plan Review	20. Auditor Name / Signature: Date:
☐ Accept ☐ Reject	
21. Finding/Observation Implementation Verification	22. Auditor / Signature: Date:
☐ Accept (CLOSE) ☐ Reject (Remain OPEN)	

23. Description of Verification of Finding/Observation implementation:
24. Reasons for Implementation Plan or Implementation Verification Rejection by Auditors:
25. Auditor Director Name / Signature: Date:

Audit Division **Audit Response Form**

Blocks 1 thru 12 to be completed by Auditors

1. Audit Type:	2. Mode/System:	3. Audit Title / Number/Reference:	4. Classification (Finding/Obsv):
Safety Certification	SCR	Downtown Redmond Link Extension AP 1000	**OBSERVATION**

5. Finding/Observation Ref. # (ST File #):	6. Auditor, Email & Phone:	7. Issued Date:
Observation No. 2	Mike Flood, Sr. Compliance Auditor (206) 398-5075 michael.flood@soundtransit.org	7/20/2022

8. Description: (of Finding or Observation)

The Verification Matrices had 57 certifiable items that were not uploaded into SSIMs (847 were noted in the Verification Matrices and 790 in SSIMS). Talson was able to eventually identify the missing certifiable items based on advanced data analytic techniques, but many were almost indistinguishable from each other and lacking a unique identification reference for proper tracking/matching.

8a. Recommendation (For Observations Only)

8b. Reference:

9. Risk Rating	10. Owner/Assigned Responsible Individual:	11. Assigned Responsible Division:	12. Response Due Date:
N/A	Greg Dwijaya	Safety	9/6/2022

Blocks 13 thru 18 will be completed by the individual responding to the Finding/Observation

13. Finding/Observation Response:

13a. Root Cause (Findings Only):

14. Finding/Observation Implementation Plan

15. Audit Response Form Completed By: (Name and Title)	16. Today's Date:	17. Est. Implementation Date:	18. SAIR / CAP #
	Click or tap to enter a date.	Click or tap to enter a date.	

Blocks 22-27 to be completed by Auditors

19. Finding/Observation Implementation Plan Review	20. Auditor Name / Signature: Date:

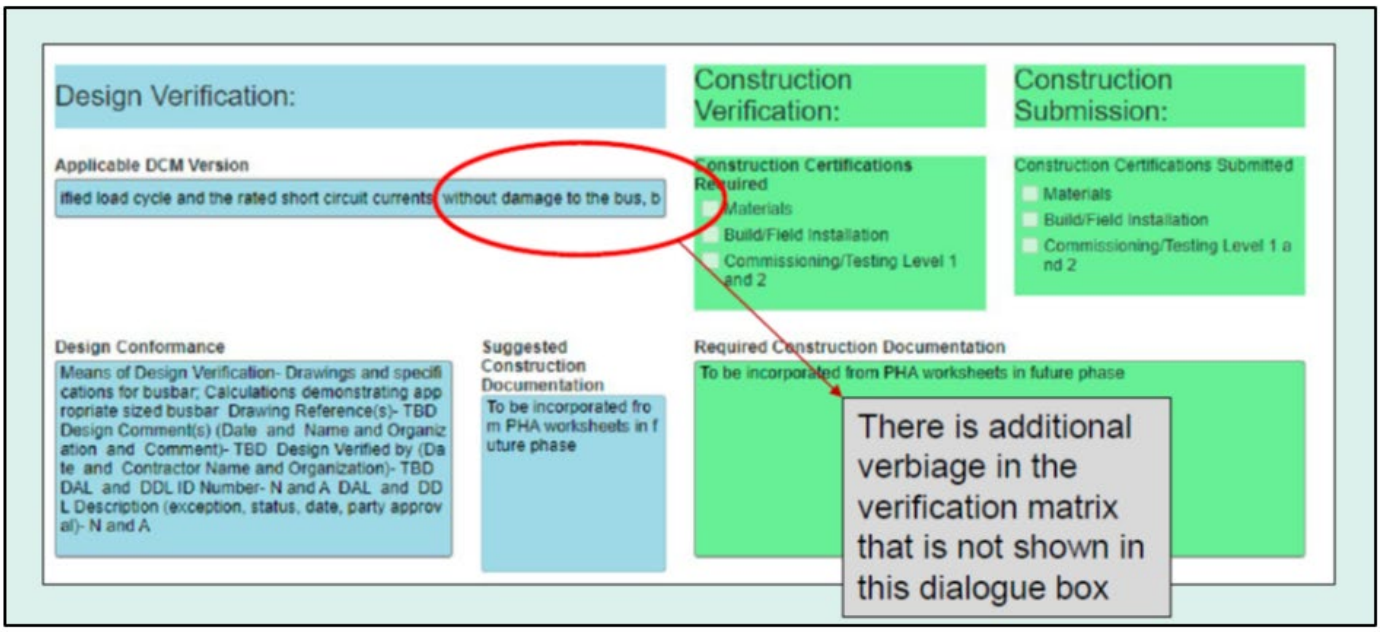
☐ Accept ☐ Reject	
21. Finding/Observation Implementation Verification ☐ Accept (CLOSE) ☐ Reject (Remain OPEN)	22. Auditor / Signature: Date:
23. Description of Verification of Finding/Observation implementation:	
24. Reasons for Implementation Plan or Implementation Verification Rejection by Auditors:	
25. Auditor Director Name / Signature: Date:	

Blocks 1 thru 12 to be completed by Auditors			
1. Audit Type: Safety Certification	2. Mode/System: SCR	3. Audit Title / Number/Reference: Downtown Redmond Link Extension AP 1000	4. Classification (Finding/Obsv): **OBSERVATION**
5. Finding/Observation Ref. # (ST File #): Observation No. 3	6. Auditor, Email & Phone: Mike Flood, Sr. Compliance Auditor (206) 398-5075 michael.flood@soundtransit.org		7. Issued Date: 7/20/2022

8. Description: (of Finding or Observation)

The "Applicable DECM Version" field in SSIMs cuts off after a certain number of characters during uploading. Many of the DECM revisions noted in SSIMs are incomplete midway through a sentence.

Example:



8a. Recommendation (For Observations Only)

8b. Reference:

9. Risk Rating	10. Owner/Assigned Responsible Individual:	11. Assigned Responsible Division:	12. Response Due Date:
N/A	Greg Dwijaya	Safety	9/6/2022

Blocks 13 thru 18 will be completed by the individual responding to the Finding/Observation

13. Finding/Observation Response:

13a. Root Cause (Findings Only):

14. Finding/Observation Implementation Plan

15. Audit Response Form Completed By: (Name and Title)	16. Today's Date:	17. Est. Implementation Date:	18. SAIR / CAP #
	Click or tap to enter a date.	Click or tap to enter a date.	

Blocks 22-27 to be completed by Auditors

19. Finding/Observation Implementation Plan Review	20. Auditor Name / Signature: Date:
☐ Accept ☐ Reject	
21. Finding/Observation Implementation Verification	22. Auditor / Signature: Date:
☐ Accept (CLOSE) ☐ Reject (Remain OPEN)	

23. Description of Verification of Finding/Observation implementation:

24. Reasons for Implementation Plan or Implementation Verification Rejection by Auditors:

25. Auditor Director Name / Signature: Date: