



Northgate Link Extension Safety Certification Audit

Audit Profiles 4000, 6000, 7000 and 8000

May 27, 2022

Prepared by



Safety Certification Audit Report - (Audit Project Code 2021-15)

Safety Certification Audit Report Issued May 27, 2022

Project: Northgate Link Extension (NGL)

Contract: RTA/RP 0063-16

Audit: Audit Project Code 2021-15

PREPARED BY (TALSON):

Norman Jones – Auditor

Date: *November 9, 2021*

APPROVED BY (TALSON):

Kenneth Brzozowski – Project Manager

Date: *December 3, 2021*
May 27, 2022 (REVISED)

APPROVED FOR ISSUE (SOUND TRANSIT):

Patrick Johnson – ST Director, Audit Division

Date: *December 3, 2021*
May 25, 2022 (REVISED)

Safety Certification Audit Report - (Audit Project Code 2021-15)

Contents

I. EXECUTIVE SUMMARY 4

II. SCOPE AND METHODOLOGY 6

III. FINDING 9

IV. OBSERVATIONS 9

V. CONCLUSIONS / REQUIREMENTS 10

VI. AUDIT FINDING REPORT (AFR)..... 11

VII. DISTRIBUTION 11

Safety Certification Audit Report - (Audit Project Code 2021-15)

I. EXECUTIVE SUMMARY

From September 15 through October 14, 2021, Talson Solutions, LLC (Talson) performed a Safety Certification Audit (SCA) of the Northgate Link (NGL) Project. The audit was performed on behalf of the Sound Transit Audit Division and focused on assessing compliance activities related to Integrated Testing, Pre-Operational Testing, Operational, Maintenance and System Readiness, Fire/Life Safety Requirements, Safety Certification and specific overall Safety and Security and Pre-Revenue Operations. The SCA assessment corresponds to Sound Transit Audit Profiles 4000, 6,000, 7,000 and 8,000. Talson previously conducted Audit Profiles 1000, 2000 and 3000 focused on assessing preliminary hazard analysis and design and construction conformance verifications.

The current audit was conducted to ensure the appropriate conformance documentation and Safety and Security Certificates issued for the NGL Project conform to agency requirements. Testing was performed to assess the adequacy and completeness of conformance documentation retention within Sound Transit's Safety and Security Information Management System (SSIMS) database. Talson audited Certifiable Items (CIs) specific to integration testing, along with its corresponding hazards and mitigations within SSIMS for the NGL Contract Nos. N125, N140, N150, N160, N180 & N830. A closeout briefing was facilitated on October 14, 2021 with select project team members, senior Sound Transit management and representatives from the Washington Department of Transportation (WSDOT) State Safety Oversight Program.

Notable documentation referenced during the audit included:

- Agency Safety and Security Management Plan (SSMP), dated February 2017, Rev. 2
- Agency Safety and Security Certification Plan (SSCP), dated February 2017, Rev. 6
- State and Local Approved Codes & Standards
- NGL Design Drawings, Specifications, Calculations, Inspection Daily Reports and Inspection Test Reports
- Commissioning Reports
- Training Records (including attendee listings)
- Certificates of Conformance
- Rail Activation Plans
- Pre-Revenue Start-Up Plans (draft)

Talson found that the overall safety certification process is generally conforming to the Agency's SSCP. Pending at the time of the audit was issuance of the final SSCVR and acceptance of the SSCVR by WSDOT which was to be finalized within 120 days of revenue service. Additional observations have been noted that would enhance the certification process and possibly increase the duration of time needed for safety and security conformance activities.

The overall safety and security certification process is inclusive of complex projects which has resulted in a lengthy and not yet fully completed certification process as of October 2021. A

Safety Certification Audit Report - (Audit Project Code 2021-15)

more cohesive and earlier use of SSIMS to upload conformance documentation would be beneficial to future certification processes and pre-revenue operation activities which would allow for a timelier obtainment and review of conformance documentation and eventual acceptable retention into SSIMS. Further, the uploading of construction, testing and integration documents for various elements (e.g., stations, guideway, tractions, signaling, etc.) as they are substantially completed in lieu of delaying until all element testing documents are available will allow for an enhanced steady state of review and conformance verification.

Although not uncommon to have unresolved or open conformance activities pending prior to revenue operations, Talson noted exceptions and workarounds within the Certificates of Conformance documents that still needed to be addressed by Sound Transit. The exceptions and workarounds were noted by Sound Transit as inconsequential to the safety criticality of pre-revenue operations and were the result of lagging satisfactory documenting closure of already accepted testing activities.

As part of the SSIMS testing, Talson noted that eight (8) CIs sampled relating to integrated testing resulted in an "Acceptable" rating, contained all relevant documentation, and were adequately referenced and uploaded into SSIMs as required in the Agency SSCP. Six (6) integrated testing CIs were classified as "Conditionally Acceptable" due to lacking details or missing documentation references.

The audit resulted in four (4) observations that were related to SSCP compliance, SSIMs lacking finalized certification documentation and noted exceptions and workarounds yet to be completed which were anticipated to be verified in the near term.

Subsequent to the audit activities referenced above, supplemental Safety and Security Certification documentation and status to noted exceptions was provided by Sound Transit through May 2022. References to receipt and dates of the certification documentation and the current status of observations are noted within this report and the corresponding Audit Response Form (ARF). Although management provided interim responses to the noted observations, three of the initial four (4) observations have not fully been addressed and require management corrective actions or further responses.

Although not performed as part of the current audit, in March 2021 Talson and its subconsultant, Transportation Resource Associates, Inc. (TRA), participated with Sound Transit representatives, along with coordination with their regional partners, a tabletop training exercise (TTX) to test the system readiness of the North Gate Link Extension. The TTX consisted of two (2) scenarios. Eight (8) recommendations were provided to Sound Transit as a result of the observance that included ensuring familiarity with power and de-energizing procedures, awareness of venting system operations, reinforcement of incident leadership roles, and suggested enhancements for future TTXs.

Safety Certification Audit Report - (Audit Project Code 2021-15)

II. SCOPE AND METHODOLOGY

The purpose of the SSCP is to ensure that the appropriate construction conformance documentation is provided to support each identified CI, along with its hazards and mitigations. The thoroughness and completeness of the construction conformance documentation was assessed. Talson's audit activities included the following procedures:

Performance of Audit Profile 4000

Assess the application and effectiveness of compliance focused on Integrated Testing and Pre-Operational Testing activities. Specific focus will include documents for Level 4 testing that are available in SSIMS (14 Integrated Testing Certifiable Items were tested for conformance and adequacy of testing documentation:

- 1) Performance of tests as defined in the System Integration Test Plan;
- 2) Safety and security requirements have been adequately tested;
- 3) Documentation supporting verification of the test requirement has been reviewed, approved and subsequently submitted for retention, including:
 - System Integration Test Plan
 - Approved test program/plans/procedures
 - Test results
 - Audit records

As part of the Audit Profile 4000, verification testing, through the use of SSIMS, conducted by Talson utilized the following ratings as part of the verification process.

- **Acceptable:** No deviation from the implemented SSCP.
- **Conditionally Acceptable:** Minor deviation of the implemented SSCP process 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 14 CIs sampled: eight (8) Acceptable, zero (0) were deemed Unacceptable and six (6) Conditionally Acceptable. The below chart summarizes CIs tested within each contract and the correlating audit ratings. Detailed testing results for each CI sampled is found on the attached AP 4000 Plan & Checklist:

Safety Certification Audit Report - (Audit Project Code 2021-15)

A-SCA-LLR-NGL-20-01 Summary of Preliminary Audit Findings							
Contract	Total CIs	IDs Sampled	Acceptable	Unacceptable	Conditionally Acceptable	Not Applicable	Comments
N125	28	0					
N140	82	1	1				
N150	81	1			1		Missing Documents
N160	84	1			1		Missing Documents
N180	15	0					
N830	46	11	7		4		Missing Documents
Total	346	14	8	0	6	0	

Talson noted that of the 346 CIs applicable to the contracts, only 14 required integration testing (all other testing was done as Level 1 & 2 testing within construction conformance)

Performance of Audit Profile 6000

Assess the application and effectiveness of compliance and execution of Operations and Maintenance Readiness. Specific focus will include assessing:

- 1) Contracted and internal training is sufficiently planned and progressing for completion to minimize risk and mitigate system safety hazards (*specific focus included reviewing emergency exercise schedules and plans, as well as the corrective action plan process, through the rail activation plan and the draft SSCVR. Other documents included Fire/Life Safety Committee Meeting Minutes, Rail Activation Manager briefs which covered topics including emergency exercises and various exercise design team meeting minutes;*
- 1) The Rule Book, Standard Operating Procedures, and Standard Maintenance Procedures are updated or developed as required to support system safety certification;
- 2) Relevant Safety Plans and Procedures are updated as required to support system safety certification.

Performance of Audit Profile 7000

Assess the application and effectiveness of compliance and execution of Systems Readiness, Fire/Life Safety Requirements, and Safety Certification Reports. Specific focus will include assessing:

- 1) Relevant Certificates of Occupancy to assess the status of temporary provisions and

Safety Certification Audit Report - (Audit Project Code 2021-15)

- resolutions of issues related to Fire Department requirements;
- 2) Select Fire/Life Safety Committee meeting minutes and other relevant documents to ensure project issues are incorporated into Committee activities (*specific focus included assessing notable meeting minutes (assessed November 2020) and other select meeting along with other relevant documents maintained in SSIMS*);
 - 3) General Safety Certification documentation.

Performance of Audit Profile 8000

Assess Pre-Revenue Operations Readiness. Specific activities will include focus on compliance to FTA's Oversight Procedure 54 (OP54) and requirements for Safety & Security and Pre-Revenue Operations as well as review the process for addressing remaining issues through near and long-term corrective actions. Additional focus will include:

- 1) Randomly test that all Fire/Life Safety, Emergency Preparedness, Safety and Security requirements have been met (*review of the NGLC Master Test Matrix inclusive of SSC Nos., completion percentages, issue disposition and comments pertaining to test activities was assessed specifically for certain OP54 type of requirements*)
- 2) Ensure there is a clear transfer of responsibilities to Operations and that staffing and training timelines are aligned (*prior recommendations were provided during a March 2021 observance of a TTX to test the system readiness of the NGLC project.*)

Results of March 2021 TTX observance provided by TRA included reference that participants were knowledgeable of the North Gate Link Extension emergency procedures and their application to the scenario and that the facilitator was efficient in explaining the TTX, keeping the exercise on track, and stimulating conversation. However, understanding Sound Transit's fiscal needs and responsibilities, the facilitator had too many responsibilities and seemed somewhat overwhelmed at times. Recommendations included:

- 1) The exercise could have run more efficiently if the facilitator had another person(s) to assist him with the administrative responsibilities.
- 2) Ensure that personnel are familiar with power de-energize and restoration processes.
- 3) Ensure that responding agencies are familiar with tunnel ventilation system operations.
- 4) Consider providing first responders with the power and tunnel ventilation policies.
- 5) Consider color-coded line schematics showing what breakers de-energize what sections of contact wire and that these should be available to emergency services personnel.
- 6) Reinforce NIMS/ICS awareness for all Sound Transit personnel.
- 7) Review supervisor's role in incident investigation.
- 8) To execute the TTX more efficiently, each of the designated groups could have been assigned a spokesperson and a scribe. A pre-designated spokesperson will be required to take over the responsibility of the group and report with their findings.
- 9) The participating groups could have included an enhanced mix of Sound Transit, Law Enforcement, Fire Service, KC Metro, WSDOT, and other Observers.

Safety Certification Audit Report - (Audit Project Code 2021-15)

III. FINDING

The audit resulted in no findings.

IV. OBSERVATIONS

The audit resulted in the following observations:

Observation No. 1:

In accordance with SSCP requirements (Section 3.1.10.1), the project as of October 15, 2021 has yet to issue a formal conditional SSCVR (to date only an interim draft outline has been prepared). The formal SSCVR should also include reference to WSDOT acceptance. This document should be provided as part of the formal responses to this audit.

Management Update: On December 17, 2021, a WSDOT Memo detailed that a draft SSCVR, including appropriate appendices and CEO signature in the memorandum, was received. The WSDOT acceptance was signed and dated October 1, 2021. The draft SSCVR was uploaded into SSIMs on October 13, 2021. The final SSCVR was signed and dated October 15, 2021.

Per Auditor (May 2022): *This Observation has been adequately addressed.*

Observation No. 2:

Due to stringent time limitations, the SSIMs database has not been utilized in a manner prescribed in the SSCP, specifically for timely document retention to address hazard and conformance testing and integration activity verification. Although documentation and evidence for necessary processes exists, as of October 2021, they were not yet finalized and uploaded with appropriate approvals to achieve expected conformance. Sound Transit may wish to provide a management response noting potential future actions, including the consideration of uploading construction and testing documents as elements are substantially completed (e.g., stations, guideway, tractions, signaling, etc.) in lieu of delaying until all elements are fully tested.

Per Auditor (May 2022): *This Observation requires a management response.*

Observation No. 3:

Talson was unable to obtain/review the Transition to Operations Checklist (to be prepared by Sound Transit) as referenced in the Rail Activation Plan. This document should be provided as part of the formal responses to this audit.

Management Update: These were provided to Talson on December 17, 2021. They were dated September 2 and October 2, 2021. As of May 2022, these have not yet been uploaded into SSIMs.

Per Auditor (May 2022): *This Observation requires a management response.*

Safety Certification Audit Report - (Audit Project Code 2021-15)

Observation No. 4:

Although approved at the managerial level, Talson noted within the Certificate of Conformance package, numerous tests/certification items with remaining open exceptions and workarounds. Proper support and evidence of each exception and workaround completion should be documented within SSIMS. Formal management responses should include anticipated timing, as applicable for resolution of the open items. Open Exception and Workaround items include:

Certifiable Element	Contract	Exception	Workaround
Element 1 - Stations	N140	1	
Element 1 - Stations	N150	1	
Element 1 - Stations	N160	1	
Element 3 - Guideway	N150	1	
Element 3 - Guideway	N830	1	
Element 5 - Traction	N830	3	6
Element 6 - Signaling	N830		1
Element 7 - Communication	N830	7	2
Element 10 - Fire/Life	N830	1	
Element 10 - Fire/Life	N830		1
Total:		16	10

Management Update: Provided to Talson on December 17, 2021 was the Certificate Update Memo (dated October 12, 2021) and uploaded into SSIMS on October 18, 2021. This document is an appendix to the SSCVR and shows that there are 4 open items related to contract N830 with an expected completion date of December 13, 2021. As of May 2022, two (2) workarounds remain open within Element 7 – N830 Communications.

Per Auditor (May 2022): This Observation requires a management response as to the status of the open workarounds.

NOTE: Observations from previous audits have been adequately addressed or appropriate management responses were provided. They included:

- **AP 1000 (May 23, 2018 SCA)** - Creation of archive file for each contract and retention of critical project documents into SSIMS
- **AP 2000 (May 23, 2018 SCA)** - Supplementation and/or correction of notes and references within required documents (e.g., specifications, drawings and/or calculations)
- **AP 3000 (August 5, 2020 SCA)** - Select construction conformance documents included inaccurate or dated references for mitigation activities as well as there was either missing or incomplete testing and verification documents populated in SSIMS

V. CONCLUSIONS / REQUIREMENTS

Talson found that the overall safety certification process is generally conforming to the Agency’s Safety and Security Certification Plans appropriately. SSIMSs documentation verifying

Safety Certification Audit Report - (Audit Project Code 2021-15)

construction conformance was generally uploaded and available or was reviewed by other means with several exceptions noted. Consideration for commitment a more streamlined approach for verification process relating to Safety and Security Certification obtainment should be considered for future projects. Sound Transit clarification comments regarding the noted observations should be provided within thirty (30) days after the submission of the Audit Report.

VI. AUDIT RESPONSE FORM / CORRECTIVE ACTIONS

The audit resulted in four (4) observations. One (1) has adequately been addressed and three (3) require further response from Sound Transit staff. Observations should be addressed utilizing the Audit Response Form (AFR). Verification of conforming corrective action and root cause explanation will be reviewed by Talson and/or Sound Transit upon submission of the AFR.

VII. DISTRIBUTION

Safety Audit No.:	2021-15	<i>(S Audit No.)</i>
Safety Audit Dates:	September 15 – October 14, 2021 <i>(through May 2022)</i>	
Organization:	Sound Transit	<i>(Auditee)</i>
Responsible Party:	Branden Porter, Director, Transportation Safety & Security <i>(Auditee)</i>	
Talson Auditor(s):	Ken Brzozowski, Dan Hauber and Norman Jones	<i>(Auditor)</i>
Report To:	<ul style="list-style-type: none"> • Branden Porter, Director, Transportation Safety & Security 	
Distribution List:	<ul style="list-style-type: none"> • Mary Cummings, ST DCEO & Chief Administrative Officer • Kimberley Farley, ST DCEO & Chief Systems Officer • Ron Lewis, ST Executive Director, DECM • Rick Capka, ST Deputy Project Director, Northgate Link • David Wright, ST Chief Safety Officer, Safety Department • Eric Beckman, Acting ST Executive Director, PSO • Kerry Pihlstrom, ST Chief Engineer, PSO • Patrick Johnson, ST Director, Audit Division • Michael Flood, ST Senior Auditor, Audit Division • Molly Hughes, WSDOT Safety Oversight Program Administrator 	
Attachments:	<ul style="list-style-type: none"> • NGL AP 4000 Checklist, dated September 23, 2021 • NGL SCA AFR 	