

California High-Speed Rail Authority



RFP No.: HSR 14-32

**Request for Proposals for Design-Build
Services for Construction Package 4**

**Book IV, Part E.1
Verification Validation and Self-Certification
Procedures**

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1 Introduction

This Construction Package is a civil/structural package, but part of the High-Speed Rail System, which incorporates trackwork, stations, storage and maintenance facilities, train sets and railroad systems. The Verification and Validation process is a critical aspect of this design workflow to provide for an integrate-able system in the future. The contractor shall provide time and resources necessary to conduct a thorough Verification and Validation, in accordance with the process specified in this procedure.

This section includes:

1. Requirements for Contractor Self-Certification (SC) to certify that the Technical Contract Submittals conform to Technical Contract Requirements as detailed in the Contract and as reasonably inferred therefrom. The Self-Certification Process is supported by Independent Checking and Site Supervision of the Project and Construction Management group as well as Due Diligence Checking on the Program side.
2. Verification and Validation (V&V) requirements for Contractor supporting the Self-Certification by provision of documented objective evidence to demonstrate compliance with the Technical Contract Requirements set forth in this Contract.

The Contract differentiates between Technical and Non-Technical Contract Requirements and Technical and Non-Technical Contract Submittals.

Technical Contract Requirements (TCR) are defined as Contract Requirements specifying the characteristics of the final infrastructure deliverable including related final design¹, construction, inspection, testing, and acceptance requirements. Technical Contract Submittals (TCS) are defined as the Contract submittals that address the Technical Contract Requirements, including, but not limited to:

- Final design drawings, specifications and reports
- Ready for construction drawings and specifications
- Inspection plans, procedures, and reports
- Test and acceptance plans, procedures, and reports
- As-built drawings and specifications

¹ Final design shall be defined as per 23 CFR 636.103 and means any design activities following preliminary engineering and expressly includes the preparation of final construction plans and detailed specifications for the performance of construction work. Any design submittal shall be considered a final design submittal, including 60%, 90%, and RFC designs.



Non-Technical Contract Requirements (NTPCR) are the remainder of the Contract Requirements such as Project Management, Commercial, Legal or other Contract Requirements. Non-Technical Contract Submittals (NTCS) are defined as Contract submittals that address Non-Technical Contract Requirements, including Project Management Plans, Schedules, Invoices, etc.

If the Contractor includes Technical Contract Requirements in Non-Technical Submittals the submittal shall be treated as a Technical Contract Submittal.

This section does not include:

- Submittal and review requirements for non-technical submittals, including management related and administrative submittals. Refer to the General Provisions for NTCS submittal requirements.
- List of individually required Contract Submittals
- Quality control/assurance requirements
- Specific inspection, and testing requirements

Refer to the applicable Contract provisions for the requirements not included in this section. Unless otherwise noted, all requirements in this document shall be performed by the Contractor.

In the event that a requirement of this section conflicts with another Contract requirement, the most stringent requirement or interpretation shall apply.

1.1 Reference Standards

- International Electrotechnical Commission (IEC)
 - IEC 10007 – Quality management system – Guidelines for configuration management (latest version)
- International Council on Systems Engineering (INCOSE)
 - INCOSE Systems Engineering Handbook

1.2 Scheduling

- Include V&V submittals listed in Section 3.5 in Contract schedule.
- Add V&V activities as defined in Contractor Verification and Validation Plan to Contract schedule.



1.3 Self-Certification Process Overview

Follow the Self-Certification Process as defined in Section 3.1.

1.4 V&V Submittal Overview

Each Technical Contract Submittal shall be accompanied by a V&V submittal as defined in Section 2.6 and shown in Figure 1, identifying the Technical Contract requirements it satisfies and explaining how each Technical Contract requirement is met, inspected, or tested by the Contractor’s final design and construction. A V&V submittal includes the Requirements Verification Traceability Matrix (RVTM), Certifiable Items List (CIL), and a V&V report explaining how the Technical Contract Submittal meets the Technical Contract Requirements.

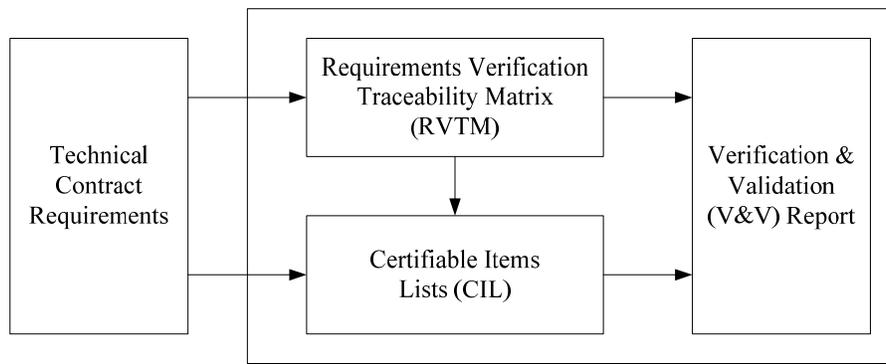


Figure 1: Contractor V&V Submittal

Additionally, Critical Items require a Certificate of Conformance Package as defined in Section 2.7. Non-Technical Contract Submittals do not require a V&V submittal.

1.5 Terms and Acronyms

Term	Definition
Authority	California High-Speed Rail Authority
Authority’s Representative	PCM, PMT or Authority
CCP	Certificate of Conformance Package
CI	Critical Item
CIL	Certifiable Items List, List of Critical Items
Contract Requirement	Any part of the Contract that requires an action or deliverable to be performed by the Contractor.
Contract Submittals	Submittals other than V&V submittals as required in this Contract
CVVP	Contractor Verification and Validation Plan
DBR	Design Baseline Report
DCAR	Design and Code Analysis Report
EIR/S	Environmental Impact Report/Statement
Fitness for Purpose	A product is suitable for the intended purpose
HSR	High Speed Rail
HST	High Speed Train



IBS	Interface Breakdown Structure
ICD	Interface Control Document
IM	Interface Management
NTP	Notice to Proceed
NTCR	Non-Technical Contract Requirement
NTCS	Non-Technical Contract Submittal
NTP	Notice to Proceed
PCM	Project and Construction Management
QA/QC	Quality Assurance / Quality Control
PHA	Preliminary Hazard Analysis
PMT	Program Management Team
RM	Requirements Management
RDW	Roadway
RFC	Ready for Construction
RVTM	Requirements Verification Traceability Matrix
ROD	Record of Decision
SC	Self-Certification
SONO	Statement of No Objection
SUB	Submittal
Subject to SONO	Submittal subject to a review by the Authority's Representative
Technical Contract Requirement	Contract Requirements specifying the characteristics of the final infrastructure deliverable including related final design, construction, inspection, testing, and acceptance requirements.
Technical Contract Submittal	Contract submittals that address the Technical Contract Requirements
TCR	Technical Contract Requirement
TCS	Technical Contract Submittal
TCSL	Technical Contract Submittal List
TSR	Type Selection Report
TVA	Threat and Vulnerability Assessment
V&V	Verification and Validation
Validation	Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use have been fulfilled
Verification	Confirmation by examination and provision of objective evidence that the specified requirements have been fulfilled

2 Products

2.1 Contractor Verification and Validation Plan

Verification & Validation in the California High-Speed Train Project is defined as a systematic engineering process based on generally accepted project management and systems engineering practices (INCOSE Systems Engineering Handbook, Rev. 3.2.2: 2011, or 4.0:2015 if available at NTP).

Develop and implement a Contractor Verification and Validation Plan (CVVP) for the project that addresses the sub-processes in the following sections.



The Contractor may choose to submit the CVVP in individual management plans. Schedule a CVVP kick-off meeting with the Authority's Representative and agree on the approach before preparing and submitting the CVVP. Each management plan shall address for each process:

- Contract life cycle stages (final design, construction, and testing/acceptance)
- Decision gates (reviews, milestones) for each life-cycle stage including decision gate criteria to move forward
- Inputs used for each stage
- Outputs (deliverables) for each stage
- Associated activities and processes for each deliverable
- Responsibility assignment matrix for deliverables and activities
- Tools and methods used
- Stakeholder coordination
- Performance metrics and reports used to measure and report progress
- Sample RVTM form populated with samples of each Contract (Source) document
- Sample CIL form populated with samples of type of Critical Item
- Annotated outlines of Certificate of Conformance Packages (CCP)
- Schedule including all V&V life-cycle stages, decision gates, deliverables and associated activities

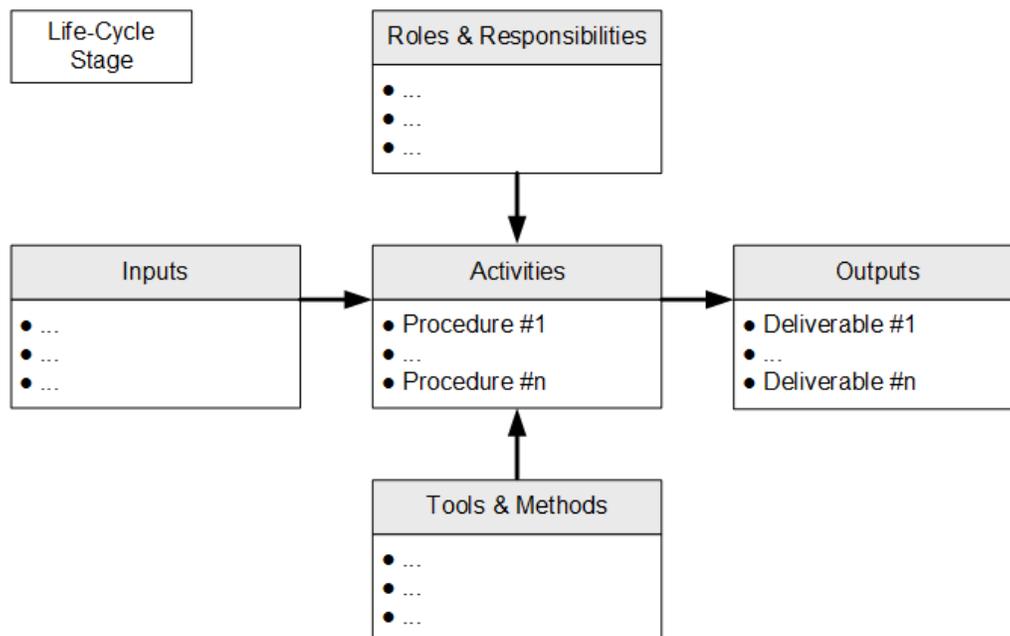


Figure 2: Contractor Verification and Validation Plan Requirements



Decision gates shall include: notice to proceed, design code analysis report (DCAR) review, design baseline report (DBR) review, type selection report (TSR) review, 60% design review, 90% design, ready for construction (RFC) review, inspection and test plan (ITP) review, inspection and test procedure review, inspection and test results review, certification and final acceptance).

Activities for each life-cycle stage shall be described as individual processes including inputs, steps performed, outputs, applicable roles and responsibilities as well as supporting tools and methods as depicted in Figure 2.

Describe the processes for the V&V activities segregated in the following subsections: Verification and Validation Process, Requirements Management, Design Management, Interface Management, Inspection and Testing Program Management, and Change Management.

Submit the CVVP as specified in Section 3.5.

2.1.1 Verification and Validation (V&V) Process

Develop and implement a comprehensive V&V process to demonstrate how each Technical Contract Requirement is met during final design, construction, inspection, testing, and certification. The V&V process shall be fully and seamlessly integrated with the Plans, Specifications and Cost Estimates approach of an infrastructure project, and shall include:

- Planning:
 - Develop Contractor Verification and Validation Plan
 - Develop Quality Program and Quality Management System as per General Provisions
 - Plan and implement Requirements Management Process, setup the Requirements Management Tool
 - Plan and implement Design Management process
 - Plan and implement Interface Management process
 - Plan and implement Inspection and Testing Program Management process
 - Plan and implement Change Control and Configuration Management process
- Execution:
 - Perform Quality Assurance activities
 - Perform Requirements Management activities
 - Perform Design Management activities
 - Perform Interface Management activities
 - Perform Inspection and Testing Program Management activities
 - Perform Change Control and Configuration Management activities



- Monitoring and Control:
 - Perform Quality Control activities
 - Perform Verification & Validation activities
 - Perform Certification activities
 - Perform Change Control and Configuration Management activities

Execution of the V&V Work shall not start before the Planning of the V&V Work has been completed.

Coordinate the V&V process with the Quality Assurance / Quality Control (QA/QC) process (Section 2.1.2).

The V&V lead person shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.1.2 Quality Assurance (QA) and Quality Control (QC)

Develop and implement a comprehensive Quality Program and Quality Management System including QA/QC processes as described in the General Provisions.

The quality management plan shall include quality procedures that fully and seamlessly integrate with the V&V process.

Quality Planning: Any design, material, inspection, testing or other checklists used shall include appropriate section references to the Contract as required for RVTMs (Section 0). Provide sample forms in the Contractor Quality Management Plan for use in implementing this V&V process.

Quality checklists shall be a subset of and be based upon the apportioned and derived Technical Contract Requirements, refer to Section 2.2 for details. Do not develop inconsistent quality checklists that are not based on Technical Contract Requirements.

Manage QA/QC checklists in the Requirements Management tool (Section 0). Allow the QA/QC checklists to be filtered and exported in Microsoft Word, Excel and Adobe PDF formats.

Quality Assurance: Develop detailed and auditable QA processes that serve to measure the effectiveness of the V&V process and include them in the Contractor's Quality Management Plan.

Quality Control: Coordinate the QA/QC checklists with RVTMs as figuratively depicted in Figure 3 below:



Contract		QC Check	V&V References
Contract Reference #1	Technical Contract Requirement #1	√	...
...
Contract Reference #n	Technical Contract Requirement #n	√	...

Figure 3: Coordination of QA/QC Checklists with RVTMs

2.1.3 Requirements Management

Develop and implement a comprehensive requirements management (RM) process, defining how the Technical Contract Requirements are parsed, captured, documented, analyzed, apportioned, derived, traced, managed, verified, and validated.

Requirements management planning shall include:

- Development of Draft and Final Requirements Management Plan
- Setup of Requirements Management Tool (Section 2.2.1)
- Parsing the Contract for Technical Contract Requirements (Section 2.2.2)
- Capturing the Technical Contract Requirements (Section 2.2.3)
- Documenting the Technical Contract Requirements (Section 2.2.4)
- Analyzing the Technical Contract Requirements (Section 2.2.5)
- Apportioning the Technical Contract Requirements (Section 2.2.6)

Requirements management execution shall include:

- Deriving the Technical Contract Requirements (Section 2.2.7)
- Tracing the Technical Contract Requirements (Section 2.2.8)
- Managing the Technical Contract Requirements (Section 2.2.9)

Requirements management monitoring and control shall include:

- Verifying the Technical Contract Requirements (Section 2.2.10)
- Validating the Technical Contract Requirements (Section 2.2.11)
- Reporting on the Requirements Management Progress (Section 2.2.12)

Manage the Technical Contract Requirements Types, including the following:

- Interface requirements
- Environmental requirements



- Safety requirements
- Security requirements
- Reliability, availability, maintainability requirements
- Operational requirements
- Functional requirements
- Performance requirements
- Physical requirements
- Expandability requirements
- Logistics, support, other requirements

Manage Technical Contract Requirements in the RM tool as specified in Section 0.

Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 0.

Demonstrate compliance to Critical Items using the CIL as specified in Section 2.4.

Certify compliance to Critical Items using the Certificate of Conformance Package as specified in Section 2.7.

The RM lead person shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.1.4 Design Management

Develop and implement a comprehensive design management (DM) process, defining how the Technical Contract Requirements are advanced into the final design.

Design management planning shall include:

- Development of Design Management Plan
- Definition of Design Submittal Types, including:
 - Design and Code Analysis Report (DCAR)
 - Design Baseline Report (DBR)
 - Type Selection Report (TSR)
 - HST At-Grade (Guideway)
 - HST Aerial Structure and/or Bridge
 - HST Trench
 - HST Tunnel



- Roadway (RDW) Overpass
 - Roadway (RDW) Underpass
 - Reports
 - Calculations
 - Other as defined in the Design Management Plan
- Definition of Design Submittal Completeness by Design Submittal Type for each decision gate. It shall be unambiguously clear which Technical Contract Requirements (TCR) and Critical Items (CI) are addressed at which stage of the design using which submittal type.

Design management execution shall include:

- Preparation of design submittals
- Performing of Quality Assurance activities

Design management monitoring and control shall include:

- Verifying the design submittals against the applicable TCRs (Section 2.2.10)
- Validating the design submittals against the applicable TCRs (Section 2.2.11)
- Performing of Quality Control activities

Develop a design breakdown structure, including the following:

- Engineering disciplines within Contract
- Design elements attributed to each engineering discipline

Apply the design management process to infrastructure engineering disciplines and associated design elements, including the following:

- General design criteria and requirements (GEN)
- Design survey and mapping (DSM)
- Clearances (CLR)
- Track geometry/alignment (ALG)
- Intrusion protection (IPR)
- Civil site design (CIV)
- Drainage (DRN)
- Utilities (UTL)
- Geotechnical design (GEO)
- Seismic design (SEI)
- Structural design (STR)



- Tunnels (TUN)
- Stations (STA)
- Support facilities (SFC)
- Mechanical, electrical and plumbing (MEP)
- Grounding and bonding (G&B)
- Corrosion control (CC)
- Traction Power (TP)
- Overhead Contact System (OCS)
- Automatic Train Control (ATC)
- Communication Systems (COM)

Use the RM process to apportion Technical Contract Requirements to the design breakdown structure. Apportion the TCRs by creating an RM tool attribute (Section 2.2.6) and assigning discipline and design element abbreviations listed above. Demonstrate in final design documents compliance with apportioned requirements.

Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 0.

Demonstrate compliance to Critical Items using the CIL as specified in Section 2.4.

Certify compliance to Critical Items using the Certificate of Conformance Package as specified in Section 2.7.

The design management lead person shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.1.5 Interface Management

This contract is part of the overall California High-Speed Train Project (the Project). Many external interfaces and dependencies exist between this contract and other Project contracts and stakeholders.

Develop and implement a comprehensive interface management (IM) process, defining how interfaces are identified, documented, specified, verified, and validated.

Interface management planning shall include:

- Development of Interface Management Plan, refer to the General Provisions for more details
- Forming an Interface Coordination Team
- Development and population of an interface register
- Planning Interface Coordination Workshops



Interface management execution shall include:

- Performing Interface Coordination Workshops
- Preparation of an Interface Control Document (ICD) for each interface including interface requirements and preliminary interface designs
- Reviewing interface requirements and preliminary design for each identified interface
- Advancing the interfaces requirements to the level required for final design
- Developing final interface designs
- Managing the changes to the interface requirements and design including agreements reached during the Interface Coordination Workshops
- Documenting the interface requirements and design in ICDs

Interface management monitoring and control shall include:

- Verifying the ICDs and applicable design submittals
- Validating the ICDs and applicable design submittals
- Certifying interfaces using ICDs (Section 0)

Create an interface register with the contents in an interface breakdown structure (IBS), including the following:

- Level 1: Future Project contracts interfacing with this Contract
- Level 2: Sub-systems of future Project contracts
- Level 3: Interface categories (e.g. loads, forces, clearances, spatial needs, etc.)
- Level 4: Actual interfaces

Manage the interfaces and the interface register in the RM tool. Use the interoperability items list provided in Appendix C as the basis for the interface register. Use the Levels identified above as the RM tool object levels. Follow the general outline of that list, and add additional interfaces as needed to address the following future project contracts:

- General / system-wide
 - Environmental, including noise & vibration, reliability, availability, maintainability, etc.
- Operations & maintenance
 - Operations, maintenance, safety, security
- Rolling stock
 - HST trainsets
- Systems



- Traction power, overhead contact system, automatic train control system, etc.
- Guideway (infrastructure), excluding trackwork
 - Engineering disciplines as defined in Section 2.1.4
- Trackwork
- Stations
- Storage and maintenance facilities (yards)
- External / third parties
 - Shared rail corridor, shared-use track, high/roadways, utilities, etc.

Manage the interfaces top-down, e.g. HST trainset axle loads shall be treated as a rolling stock interface being imposed on this Contract. Place the interface in the IBS in the future rolling stock category, see interface ID 1073 in Appendix C for more detail.

Interface coordination workshops shall be planned and performed in a structured manner and discuss interfaces as identified in the interface register. Interface coordination workshops shall be held as often as necessary to resolve interface conflicts prior to the 60% design submittals.

Create in Interface Control Document for each interface. ICDs shall be the only means of managing and documenting interface requirements and designs. ICDs shall be kept current and updated prior to the next interface coordination workshop.

Demonstrate compliance to interfaces using the CIL as specified in Section 2.4.

Certify compliance to interfaces using the Certificate of Conformance Package as specified in Section 2.7.

The IM lead person shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.1.6 Inspection and Testing Program Management

Develop and implement a comprehensive inspection and testing program, defining how the Technical Contract Requirements are validated.

Inspection and test management planning shall include:

- Development of a project inspection and test management plan, defining how TCRs are inspected, demonstrated, analyzed, and tested
- Development of individual inspection and test management plans

Inspection and test management execution shall include:

- Preparation of individual inspections and tests
- Development of inspection and tests procedures



- Execution of inspections and tests plans and procedures
- Preparation of inspection and test reports

Inspection and test management monitoring and control shall include:

- Validating the inspection and test submittals
- Certifying the inspection and test submittals

Develop individual inspection and test management plans, including the following:

- Prototype Testing
 - Use only products that have been proven in comparable high-speed-rail projects.
 - If products not used on comparable high-speed rail projects are proposed, prototypes of or incorporating those products shall be built and type-tested prior to First Article Production.
 - Retain the services of an independent test lab to demonstrate and certify product compliance to the Technical System Requirements and Final Design.
- First Article Compliance Inspection
- Production Run Testing (i.e., at supplier facility during manufacturing)
- Factory Acceptance
- Inspections
- Site Installation
- Site Acceptance
- Integration Testing²
- Interoperability Test²
- Start-Up Testing²
- Pre-Revenue Testing²
- Reliability, Availability, Maintainability Testing
- Safety and Security Certification
- Interface Certification

For each inspection and test, address the following:

- Inspection and test preparation

² As applicable to this Contract.



- Inspection and test coverage
- Inspection and test execution
- Inspection and test reports
- Inspection and test failure reporting, analysis and corrective action system
- Regression inspection and testing

Manage the inspections, testing, and acceptance in the RM tool.

Demonstrate compliance to Technical Contract Requirements and final design using the RVTM as specified in Section 0.

Demonstrate compliance to Critical Items and interfaces using the CIL as specified in Section 2.4.

Certify compliance to Critical Items using the Certificate of Conformance Package as specified in Section 2.7.

The lead person for the inspection and test program management shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.1.7 Change Control and Configuration Management

Refer to the General Provisions and Design Variance Request Procedure of the Contract for overall Change Control and Configuration Management requirements.

Develop and implement a comprehensive change control and configuration management process, defining how changes to baselines are managed. The process shall also address how new or changed information from supporting documents (Section 2.2.7) is incorporated into the requirements, design and construction baselines.

Follow the general provisions of the latest version ISO/IEC 10007 “Quality management systems–Guidelines for configuration management” and as stipulated by the standards listed in this section.

Change control and configuration management planning shall include:

- Development of a change control and configuration management plan
- Identification of Configuration Items and Configuration Baselines, including TCRs and final design baselines (such as the Design Baseline Report)

Change control and configuration management execution shall include:

- Configuration control, including impact analysis and approval procedures including Configuration Control Boards
- Configuration audits



Change control and configuration management and control shall include:

- Configuration status accounting

Apply the change control and configuration management process to ensure integrity between the Work of this Contract and conformance with the HSR program.

Manage the changes in the RM tool using the supporting documents as defined in Section 2.2.7.

The change management lead person shall meet the requirements for Contractor Key Personnel as specified in Section 3.3.1.

2.2 Requirements Management (RM) Tool

Parse, capture, document, analyze, apportion, derive, trace, manage, verify, and validate Technical Contract Requirements using an RM tool. The RM tool is foundational to maintaining programmatic visibility over implementation of TCRs. It is critical that the information contained within the RM tool is complete, correct and consistent since it provides evidence of programmatic compliance.

Follow the RM tool implementation concept as pictured in 4.

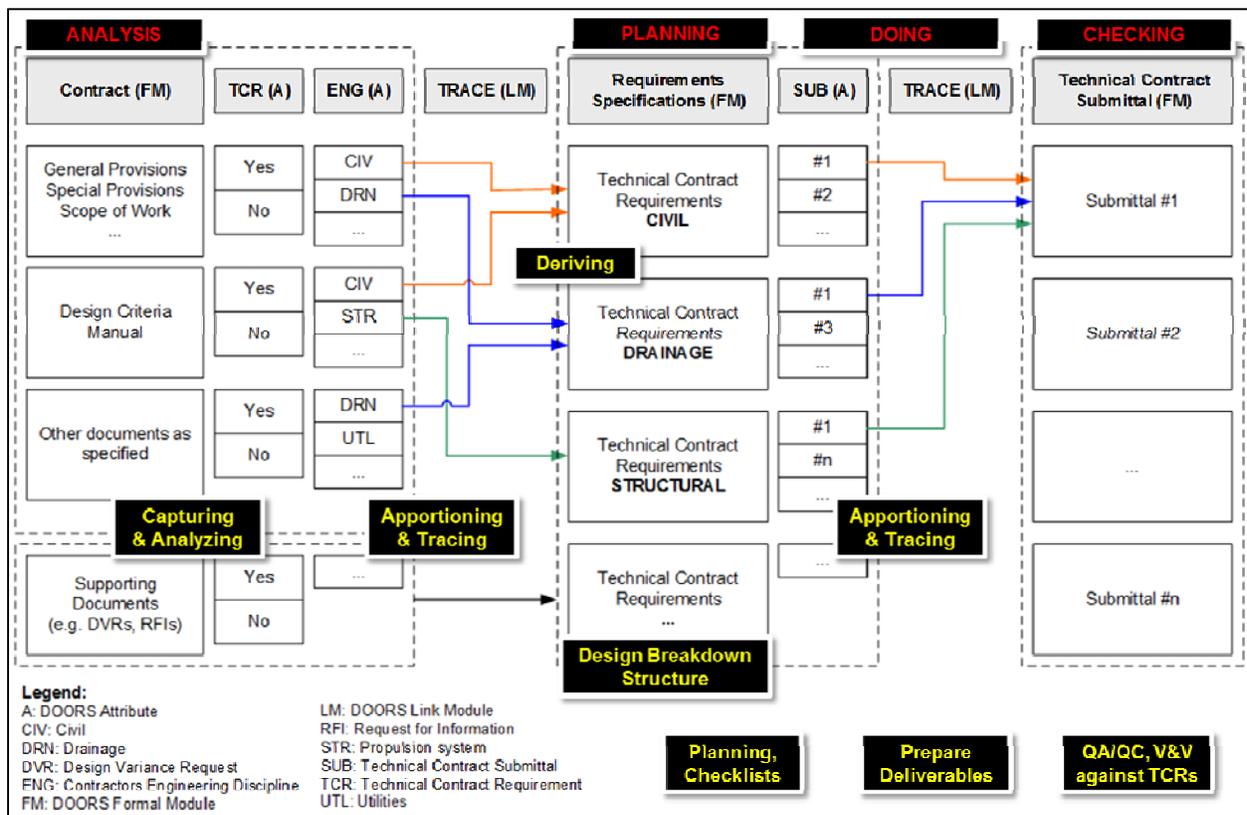


Figure 4: RM Tool Implementation Concept

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2.2.1 RM Tool Requirements

The RM tool shall be the latest IBM Rational DOORS 9.X version. Do not use IBM Rational DOORS Next Generation.

Procure and install three (3) IBM Rational DOORS Floating User Licenses (Part Number D09LELL at time of writing the Contract) along with software subscription and support by IBM for the duration of the contract within the timeframe defined in the Submittals Section 3.5. Other types of licenses such as Authorized User Licenses or Web Access Editor Licenses are not acceptable. This requirement is independent from the web access requirement stated below. The disposition of the licenses will be determined at the end of the Contract.

Additionally, enable web access to the RM tool and provide the Authority's Representative with full real-time readability access to the Contractor's RM tool database. One (1) Authority's Representative shall be able to access the RM tool at any given time using web access.

Train Authority, PCM and Contractor RM tool users in the operation and configuration of the features of the RM tool required enabling them to perform the requirements of this section.

Import and manage the final design, construction, inspection, testing, and certification documents as RM tool modules to enable tracing from the TCRs. Allow the automatic export of:

- Requirements Verification Traceability Matrices as specified in Section 0.
- Certifiable Items Lists as specified in Section 2.4.

Do not store any unnecessary, redundant or inconsistent modules. Purge deleted files.

Create Requirements Verification Traceability Matrices (RVTM) and Certifiable Items Lists (CIL) directly from the RM tool.

Submit the RM tool database as defined in Section 3.5. The RM tool database shall be provided as a project archive (.dpa) file.

2.2.2 Parse the Contract for Technical Contract Requirements

Parse the following list of Contract documents for Technical Contract Requirements:

- General Provisions, Special Provisions and Scope of Work and Appendices
- Environmental Mitigations including the Mitigation Monitoring and Reporting Program
- Third Party Agreements including from Railroads, Utilities, Cities, etc.
- Design Criteria Manual
- Directive Drawings
- Specifications
- Preliminary Engineering documents



- Other Contract documents containing Technical Contract Requirements, including manuals, reports, drawings, procedures, policies, permits, agreements
- Other supporting documents as defined in Section 2.2.7

2.2.3 Capture Technical Contract Requirements

Prepare a simple and uncluttered folder structure in the RM tool and maintain the original Contract structure and file names as shown in Figure 5.

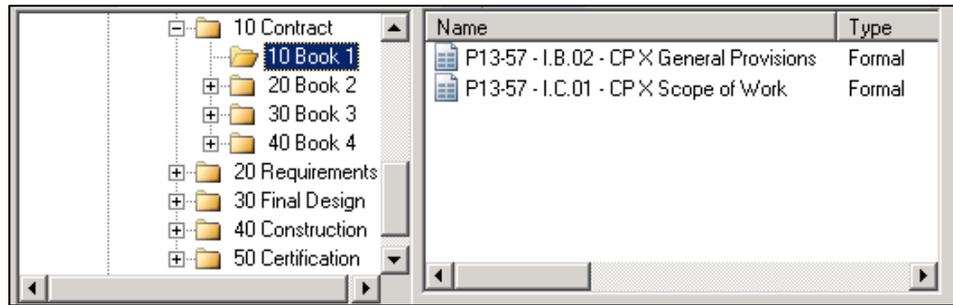


Figure 5: RM Tool Folder and File Structure

Store Contract modules in the Contract folder of the RM tool.

Create one (1) RM tool module for each Contract document. For the Design Criteria Manual (DCM), create one module for each DCM chapter as shown in Figure 6.

Capture Contract Requirements from the Contract (Source) documents as RM tool objects.

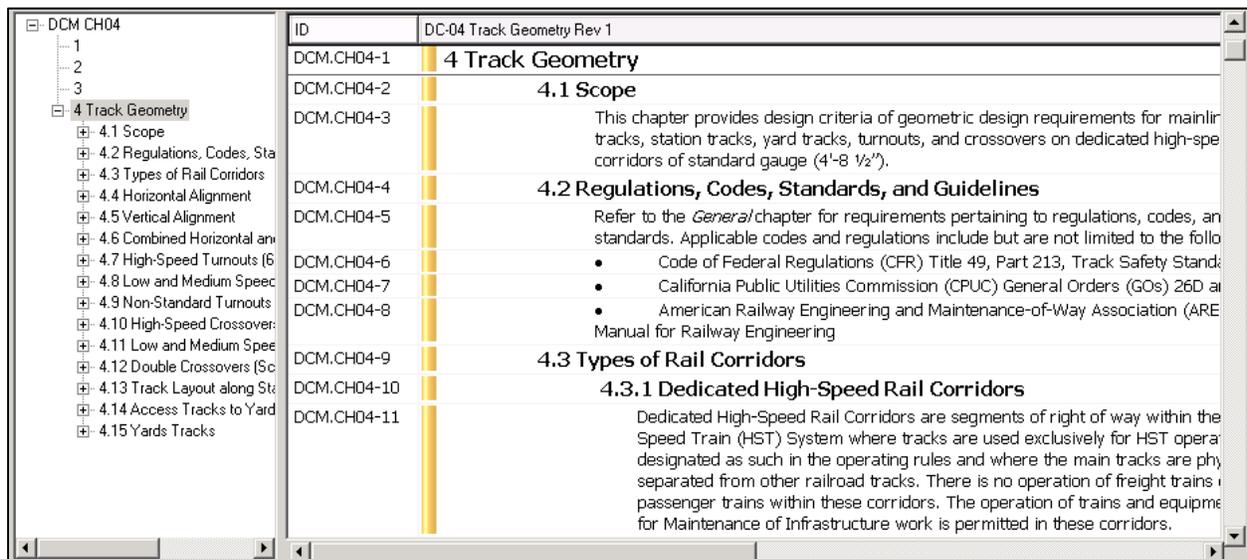


Figure 6: Captured Contract Document as RM Tool Module

For each Contract Requirement:

- Capture the Contract document reference (original file name)
- Capture the Contract document section reference



- Capture the Technical Contract Requirement language
- Assign unique but easily usable requirements identifier (ID)

Baseline the Contract documents. Do not change or edit the original Contract documents.

2.2.4 Document Technical Contract Requirements

Store and manage the Technical Contract Requirements and the Supporting Documents in the RM tool.

2.2.5 Analyze Technical Contract Requirements

Analyze each captured Contract Requirement and assign a Technical Contract Requirements (TCR) attribute and the corresponding values as shown in 4. Assess TCR applicability for each object (TCR attribute) to this Contract and set the RM tool attribute accordingly. Do not leave any attribute values empty.

Submit the RM tool database with the assigned TCR attribute value as defined in Section 3.5.

2.2.6 Apportion Technical Contract Requirements

Analyze each identified Technical Contract Requirement and assign an ENG (Engineering discipline / design element) attribute the corresponding values as shown in 4 for each applicable TCR. Attribute values are defined in Section 2.1.4. Each TCR may have several ENG attribute values assigned. Do not leave any attribute values empty.

Prepare individual requirements specification (RS) modules following the Design Breakdown Structure defined in section 2.1.4 and shown in 4. Store the requirements specifications modules in the Requirements folder of the RM tool.

Apportion (allocate) TCRs to the applicable engineering disciplines / design elements by copying the TCRs into the appropriate requirements specification while maintaining traceability.

If Technical Contract Requirements are apportioned to 2 or more engineering disciplines / design elements, the TCR shall be broken into 2 or more sub-requirements and apportioned accordingly. Refine the apportioned sub-requirement language to reflect the applicability to the engineering discipline / design element.

Analyze each apportioned TCR and assign a SUB (submittal) attribute as shown in 4. SUB attribute values are based on the Design Submittal Types defined in section 2.1.4. Each TCR may have several SUB attribute values assigned. Do not leave any attribute values empty.

No final design submittal shall be accepted before the requirements apportioning has been completed.



Submit the RM tool database with the assigned ENG and SUB attribute value as defined in Section 3.5.

2.2.7 Derive Technical Contract Requirements

Advance, clarify and refine the apportioned Technical Contract Requirements to the final design level in the RM tool, including:

- General/typical requirements
- Site specific requirements

Final design level requirements are defined as unambiguous and non-conflicting requirements that are uniquely assignable to an engineering discipline / design element. They shall be specific, measurable, achievable, and realistic requirements that can be readily verified and validated. Create sub-requirements as required.

Advanced, clarified, and refined, the apportioned TCRs shall be backed up using supporting documentation to the apportioned TCRs, including, but not limited to:

- Contract level
 - Alternative technical concepts
 - Agreements
 - Directions
 - Letters
 - Approved change orders and design variances
 - Requests for information
- Engineering level
 - Analyses and assessments, including
 - Design and code analyses
 - Site-specific hazard analyses
 - Site-specific threat and vulnerability assessment
 - Studies
 - Calculations
 - Site inspections
 - Reports, including, but not limited to
 - Design baseline reports
 - Aesthetic design and review reports
 - Value engineering reports



- Hydrology and hydraulics reports
- Geotechnical and foundation reports
- Structure reports
- Seismic design reports
- Phase II hazardous materials
- Design workshop including Interface Coordination Workshop
- Meetings minutes
- Agreed upon review comments

Treat supporting documentation as Source documents. Maintain full traceability from the supporting documents to the TCRs. Parse, capture, document, analyze, and apportion supporting documents within four weeks of receipt.

Store contract level documents in the Contract folder and engineering level documents in the Requirements folder of the RM tool.

2.2.8 Trace Technical Contract Requirements

Provide full traceability as depicted in 4 and specified below using the RM tool:

- Contract to Technical Contract Requirements³
- Technical Contract Requirements to Apportioned and Derived TCRs
- Supporting Documents to Apportioned and Derived TCRs
- Apportioned and Derived TCRs to Final Design submittals
- Apportioned and Derived TCRs to Construction submittals, including inspection and test submittals
- Apportioned and Derived TCRs to Certification submittals

Tracing shall demonstrate compliance from the TCRs to the final design, construction, and certification submittals.

Final Design, Construction, and Certification submittals shall be imported into the RM tool to enable tracing from the Technical Contract Requirements. Use the following (formal) module naming convention: “Submittal Number – Submittal Name – Decision Gate”, for example: “12345 – Underpass X – 60%”. Submittals shall be stored in the corresponding Final Design, Construction, and Certification folders in the RM tool.

³ Traceability from the Contract shall be achieved by capturing the TCRs from the Contract as described above and maintaining the file name and folder structure.



Tracing shall be accomplished by linking objects between formal modules within the RM tool. Tracing by manually copying Contract of Submittal references is not permitted.

Tracing direction shall be top-down, starting with the Technical Contract Requirements. Bottom-up tracing is not permitted.

Implement a structured approach to storing traces in RM tool link modules. Use the following (link) module naming convention: "LM 'From Module(s)' to 'To Module(s)'", for example: "LM Contract to RS CIV". Link modules shall be stored in the RM tool folder from where the traces (links) originate.

2.2.9 Manage Technical Contract Requirements

Technical Contract Requirements shall be kept current upon approved changes to the Contract using supporting documentation as defined in Section 2.2.7.

The Technical Contract Requirements and associated final design, construction and certification submittals shall be regularly baselined following the Change Control and Configuration Management plan.

Baselining shall occur at decision gates as defined in the CVVP, including:

- After capturing TCRs from Contract
- After submittal of the Preliminary and Final Design Baseline Report
- After final design submittals (60 percent, 90 percent)
- After ready for construction submittal

2.2.10 Verify Technical Contract Requirements

Demonstrate compliance to the Technical Contract Requirements by provision of objective evidence that:

- Apportioned and derived TCRs meet the Technical Contract Requirements captured from Contract and Supporting Documents
- Final design submittals meet the apportioned and derived Technical Contract Requirements
- Ready for construction submittals meet the apportioned and derived Technical Contract Requirements
- As-built submittals meet the apportioned and derived Technical Contract Requirements

Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 0.

Demonstrate compliance to Critical Items using the CIL as specified in Section 2.4.



Certify compliance to Critical Items using the Certificate of Conformance Package as specified in Section 2.7.

2.2.11 Validate Technical Contract Requirements

Demonstrate compliance to Technical Contract Requirements by provision of objective evidence that:

- Inspection and test plans and procedures meet the apportioned and derived Technical Contract Requirements and the ready for construction design
- Construction items meet the apportioned and derived Technical Contract Requirements and the ready for construction design
- Inspection and test reports meet the apportioned and derived Technical Contract Requirements and the ready for construction design

Demonstrate compliance to Technical Contract Requirements using the RVTM as specified in Section 0.

Demonstrate compliance to Critical Items using the CIL as specified in Section 2.4.

Certify compliance to Critical Items using the Certificate of Conformance Package as specified in Section 2.7.

2.2.12 Performance Metrics and Reporting

The purpose of a performance metrics and reporting shall be to measure the progress against a plan. The Contractor shall create an RM tool module of metrics that measures the following values:

- Number of (RM tool) modules, broken down by Contract, Requirement Specifications, Final Design, Construction and Certification modules
- Number of captured TCRs per Contract and Requirement Specification modules
- Number of engineering disciplines / design elements
- Number of apportioned TCRs per engineering discipline / design element module
- Number of apportioned and derived TCRs per engineering discipline / design element module
- Number of supporting documents (Section 2.2.7), broken down by type, i.e. RFIs, DVRs, etc.
- Number of submittals per submittal type
- Number of apportioned and derived TCRs per submittal type (SUB attribute, 4)
- Number of apportioned and derived TCRs planned to verified and validated by decision gate
- Number of final design, construction and certification submittals



The module of metrics shall be submitted as part of the RM tool submittal.

The Contractor shall hold monthly Technical Exchange Meetings to apprise the Authority's Representative of the progress of the V&V activities.

2.3 Requirements Verification and Traceability Matrix (RVTM)

Demonstrate compliance to Technical Contract Requirements using the RVTM. Use the RVTM template as provided in Appendix A.

Refer to Appendix D for an example (Design Criteria Manual Chapter 7) of how to apply the ENG and SUB attributes. The actual RVTM shall include all applicable Technical Contract Requirements, not only the section headers, and all RVTM columns as shown in the RVTM template. Sources of Technical Contract Requirements are described in Section 2.2.2.

Manage the RVTM only in the RM tool. The RVTM shall be based on RM tool views and traces within the RM tool. Use DOORS eXtension Language (DXL) as necessary to create the required views.

Export the RVTM directly from the RM tool prior to submittal. Do not edit the RVTM outside the RM tool. Provide the exported RVTM in an electronically searchable PDF format and in Microsoft Excel format to the Authority's Representative with every V&V submittal. Do not use scanned PDFs. The exported RVTM shall be easily readable without the need of the RM tool.

The RVTM shall identify for each Technical Contract Requirement the appropriate references to the apportioned and derived TCRs, Final Design and Construction submittals. Appropriate section references to these documents shall explain how each Technical Contract Requirement is met, inspected, and tested by the Contractor's final design and construction.

The RVTM shall provide the following information:

- Technical Contract Requirement
 - Unique requirements identifier
 - Contract document identifier
 - Contract document section reference including section number and name
 - Technical Contract Requirement language
 - TCR and ENG attributes
- Apportioned and Derived Technical Contract Requirement
 - Document identifier
 - Document section reference including section number and name
 - Technical Contract Requirement language



- SUB attributes
- Final Design and Construction Submittals
 - Unique submittal document identifier (e.g. submittal number)
 - Submittal document references (name)
 - Submittal document section reference including section number and name

When supplying the references, apply the lowest practical level of precision, for example:

- Unique drawing number
- Smallest practical numbered section in a document.

The RVTM shall be provided in an uncluttered fashion without any irrelevant information folder and path names, unrelated attributes, or similar. Do not provide any unnecessary or unverifiable references, or ranges of references if the objective evidence is shown only on a subset of the provided references.

Submit the RVTM to the Authority's Representative as defined in Section 3.5.

2.4 Certifiable Items List (CIL)

Demonstrate compliance to Critical Items using CILs. Critical Items (CI) are a subset of the Technical Contract Requirements. Use the CIL template as provided in Appendix B. The CIL shall include:

- Safety requirements including hazard mitigations
- Security requirements including threat mitigations
- Interoperability items (interfaces) with other contracts and third parties of the California High-Speed Train project

An initial set of Critical Items is provided as part of the Contract (Appendix E). Review the list for completeness and correctness against the Contract documents:

- Safety requirements including hazard mitigations: PHA, Book 4
- Security requirements including threat mitigations: TVA, Book 4
- Interoperability items: List of Interfaces, Appendix A

Use the provided CIL as a baseline. Maintain the CIL during the life of the Contract by adding additional items as directed. Any other edits require prior written approval from by the Authority's Representative.

Manage the CIL only in the RM tool. The CIL shall be based on RM tool views and traces within the RM tool. Use DOORS eXtension Language (DXL) as necessary to create the required views.



Export the CIL directly from the RM tool prior to submittal. Do not edit the CIL outside the RM tool. Provide the exported CIL in an electronically searchable PDF format and in Microsoft Excel format to the Authority's Representative with every V&V submittal. Do not use scanned PDFs. The exported CIL shall be easily readable without the need of the RM tool.

The CIL shall identify for each Critical Item the appropriate references to the apportioned and derived TCRs, Final Design, and Construction submittals. Appropriate section references to these documents shall explain how each Critical Item is met, inspected, and tested by the Contractor's final design and construction.

Develop the CIL based on the RVTM, with extra columns or fields to include the date and initials of the verifier. Use the Requirements IDs provided by the Authority's Representative to ensure consistency across the various California High-Speed Rail contracts.

Treat any Critical Item as a Technical Contract Requirement and follow directions in the RM tool as specified in Section 0, including capturing, documenting, analyzing, apportioning, deriving, tracing, managing, verifying, and validating of Critical Items.

Submit the CIL to the Authority's Representative as defined in Section 3.5.

2.5 Contractor Verification and Validation (V&V) Report

Provide a V&V report with every Technical Contract Submittal.

Use the V&V report to provide a submittal-specific executive summary and a Certificate of Compliance with Technical Contract Requirements. Provide additional explanation as necessary on how the Technical Contract Submittal meets the Technical Contract Requirements that is not readily available from the RVTM or CILs. Variances between Technical Contract Requirements and the Technical Contract Submittal shall be explicitly identified and discussed in the V&V report.

The certification of compliance within this V&V report shall include the confirmation by the Contractor's V&V Manager that the references to the objective evidence provided in the RVTM and CILs have been checked by the Contractor's QA/QC process, and have been confirmed as complete, correct and consistent.

2.6 Contractor Verification and Validation Submittal

Provide a V&V submittal with every Technical Contract Submittal. The V&V submittal includes the following:

- RVTM as defined in Section 0
- CILs as defined in Section 2.4
- Contractor V&V report as defined in Section 2.5



The Contractor V&V submittal shall assist the Authority’s Representative (Section 3.3.7) to perform a full compliance check against the Technical Contract Requirements.

2.7 Certificate of Conformance Packages (CCP)

Certificate of Conformance Packages shall be prepared and submitted to certify compliance to Critical Items by providing documented objective evidence, including:

1. Critical Item with references to the objective evidence
2. Excerpts of the Critical Item and any supporting documentation
3. Excerpts of the referenced objective evidence
4. Sign-off sheet

For item (1) above, use the template shown in Figure 7.

Critical Item				Apportioned & Derived TCRs				Technical Contract Submittal		
Req. ID	Doc. ID	Doc. Section	Doc. Language	Doc. ID	Doc. Section	App. & Der. Req. Language	SUB	DeI ID	DeI Name	DeI Section
CEHL-176	CEHL	1.1.2.7 Object thrown from overpass	Install intrusion prevention fencing at overpasses.	STR	...	Install ... fencing at ... overpass	Roadway Overpass	Overpass #1	...	..
...	...	...	Supporting documents					Overpass #2	...	..
							
								Overpass #n	...	..

Legend: Refer to V&V Book

Figure 7: CCP – Critical Item and References to Objective Evidence

A Certificate of Conformance Package shall be prepared for each Critical Item referencing all applicable submittals as a standalone package as shown in Figure 7. The CCP shall be prepared separately for Final Design and Construction. Each package shall contain the four CCP elements described above.

Submit the CCPs to the Authority’s Representative as defined in Section 3.5.

2.7.1 Safety Certification

The Safety Certificate of Conformance Package shall follow the generic CCP requirements described above and the safety specific requirements describe in the General Provisions and the Safety and Security Management Plan.

Coordinate with the Authority’s Safety Representative for the detailed implementation.



2.7.2 Security Certification

The Security Certificate of Conformance Package shall follow the generic CCP requirements described above and the security specific requirements describe in the General Provisions and the Safety and Security Management Plan.

Coordinate with the Authority's Safety Representative for the detailed implementation.

2.7.3 Interface Certification

The Interface Certificate of Conformance Package shall follow the generic CCP requirements described above and be implemented as an Interface Control Document.

Coordinate with the Authority's Interface and Integration Representative for the detailed implementation.

3 Execution

3.1 Self-Certification Process Overview

The self-certification process is different from the traditional submittal and review process where the Contractor prepares a submittal for the full Authority review, typically resulting in either approval or rejection of the submittal.

The purpose of the self-certification process is to shift submittal review responsibility from the Authority to the Contractor, whereby the Contractor has to demonstrate compliance resulting in reduced review efforts on the Authority side. This is achieved by a two-step process, a (self-) certification of compliance, supported by objective evidence (the V&V submittal) demonstrating compliance between the contract and the submittal.

The Self-Certification process applies to Technical Contract Submittals (TCS) as defined in section **Error! Reference source not found.**



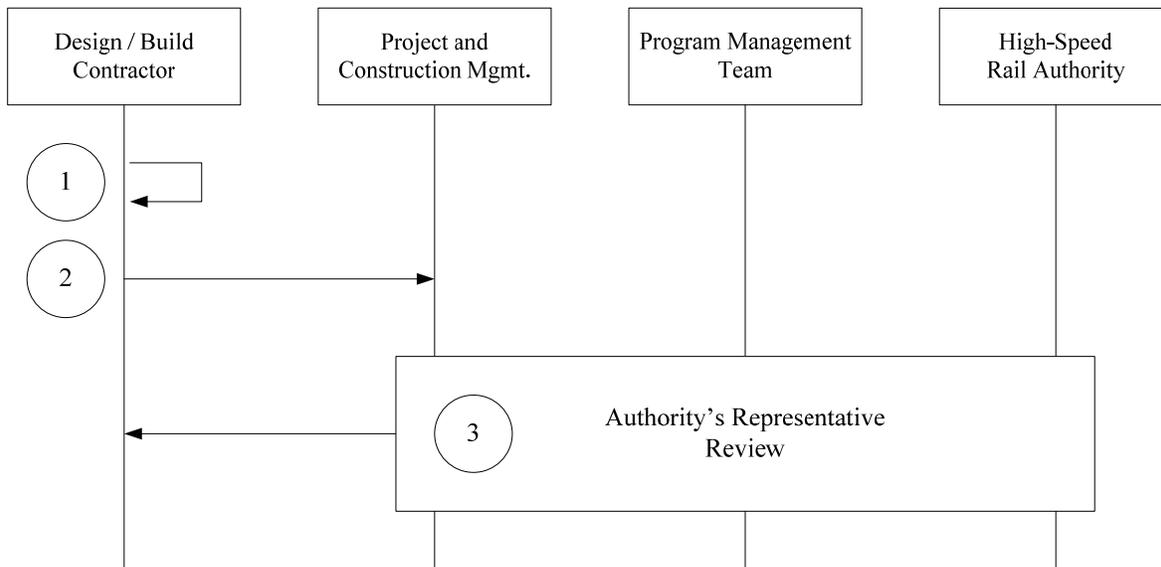


Figure 8: Self-Certification Process

Follow the self-certification process as presented in Figure 8.

1. The Contractor shall prepare Technical Contract Submittal as specified in the Contract and shall perform quality procedures as stipulated by the Contract. Contractor shall self-certify compliance with Technical Contract Requirements and fitness for purpose prior to issuing the submittal to the Authority's Representative for their review. The self-certification statement shall be provided as a Certificate of Compliance to be included in the V&V submittal.
2. Contractor shall submit Technical Contract Submittal, including the V&V submittal, for Technical Contract Submittals to the Authority's Representative for review.
3. The Authority's Representative will review the submittal as deemed necessary and issue a disposition in accordance with the General Provisions. The Authority's Representative may also perform audits of the Contractor's V&V process adherence as they deem appropriate.

Unless otherwise noted, the following steps apply to each type of Technical Contract submittal.



Technical Contract Submittal	Step 1	Step 2	Step 3
Prepared, no submittal to Authority	Yes	No	No
Submitted for Information	Yes	Yes	No
Submitted for SONO	Yes	Yes	Yes
Submitted for Approval	Yes	Yes	Yes

3.2 Self-Certification Process involving Third Party Entities

Third party entities include jurisdictional authorities (Caltrans, cities, and counties), railroads, utilities as defined in detail in the CSHTP Scope of Work and the General Provisions.

Contractor shall apply V&V and self-certification as follows:

- CHSTP Work⁴ affecting CHSTP Technical Contract Requirements (TCR):
 - Contractor shall follow full V&V and self-certification requirements
- CHSTP Work affecting third party entities and NOT affecting CHSTP TCRs:
 - Contractor shall ensure that the CHSTP Work is planned, executed, monitored, controlled and is in compliance with the CHSTP Work
 - Contractor shall demonstrate compliance to the applicable CHSTP Work using full V&V and self-certification requirements
 - Contractor and/or third party entity shall follow the third party entity requirements, policies, codes, standards, processes, delivery methods as required by the Contract
- Third party entity Work affecting CHSTP TCRs:
 - Contractor shall ensure that the third party entity Work is planned, executed, monitored, controlled and is in compliance with the CHSTP TCRs
 - Contractor shall demonstrate compliance to the affected CHSTP TCRs using full V&V and self-certification requirements
 - Contractor and/or third party entity shall follow the third party entity requirements, policies, codes, standards, processes, delivery methods as applicable
- Third party entity Work affecting other third party entities:
 - This Work is considered outside the CHSTP Work and CHSTP TCRs, CHSTP V&V and self-certification requirements do not apply
 - Contractor and/or third party entity shall follow the third party entity requirements, policies, codes, standards, processes, delivery methods as required by the Contract

⁴ As defined in the General Provisions



3.3 Contractor Verification and Validation Requirements

3.3.1 Contractor V&V Key Personnel

Employ only professionals with at least 10 years of experience in the stated field of expertise for key positions with a proven track record in the following functions as supported by their resumes:

- Federal projects with Federal Transit Administration or Federal Rail Administration oversight
- Design/Build contracts
- Systems Engineering with application to transportation and/or infrastructure industry
- Verification and Validation
- Certified Systems Engineering Professionals (CSEP) and/or membership in the International Council on Systems Engineering (INCOSE) is preferred
- Proven continuity through project delivery and commitment for the length of this contract is required
- Presence at the local project office of at least 50%

The skill sets listed below shall be required for individuals to be considered for V&V key personnel positions:

- Verification and validation management
- Quality Assurance and Quality Control
- Requirements management
- Design management
- Interface management
- Inspection and testing management
- Change Control and Configuration Management

The Authority's Representative may elect to designate other positions as V&V key positions or reduce the number of such positions required at any time during the Contract.

Key positions shall not be shared with more than 1 person. One person, however, can hold more than one key position.

Submit resumes of key employees to the Authority's Representative for review and approval if appropriate.



3.3.2 Contractor Verification and Validation Plan (CVVP)

Prepare and submit a CVVP in compliance with the requirements defined in Section 2.1.

3.3.3 Requirements Management Tool

Procure an RM tool and follow directions in compliance with the requirements defined in Section 0.

3.3.4 Requirements Verification Traceability Matrix

Prepare and submit RVTMs in compliance with the requirements defined in Section 0.

3.3.5 Certifiable Items Lists

Prepare and submit CILs in compliance with the requirements defined in Section 2.4.

3.3.6 Verification and Validation Reports

Prepare and submit V&V reports in compliance with the requirements defined in Section 2.5.

3.3.7 Verification and Validation Submittals

Prepare and submit V&V submittals in compliance with the requirements defined in Section 2.6.

3.3.8 Certificate of Conformance Packages

Prepare and submit CCPs in compliance with the requirements defined in Section 2.7.

3.4 Authority's Representative Review

Upon submittal of Technical Contract Submittals, the Authority's Representative will perform a review of the Contractor's submittal. An additional audit of the Contractor's adherence to the verification, validation and self-certification process may be performed as deemed necessary.

The Authority's Representative may require consultations with the Contractor's engineers for the various disciplines involved in the part of the work under review. The Contractor shall ensure that the relevant staff is available to participate in such consultations.

The Authority's Representative may request additional reviews as considered necessary to ensure a continued and uniform consistency in the quality and effective incorporation of revisions to submittals and/or the Contractor may request additional reviews to facilitate release of designs for construction.

3.5 Submittals

Provide the following submittals. Refer to the referenced sections for details.



Section	Submittals	Submit For	Timeframe
Mobilization			
3.2	Key Personnel Resumes	Approval	Prior to hiring
2.2.1	RM Tool – Procured Licenses	Information	30 days after NTP
2.2.1	RM Tool – Installed	Information	30 days after NTP
2.2.1	RM Tool – Web-Access	Information	30 days after NTP
Planning			
2.1	CVVP – Kickoff Meeting	Information	15 days after NTP
2.1	CVVP – Draft	Approval	45 days after NTP
2.1	CVVP – Final	Approval	90 days after NTP
2.1.4	Design Management <ul style="list-style-type: none"> Design Submittal Types Design Submittal Completeness 	Approval Approval	As part of CVVP 90 days after NTP
2.1.5	Interface Management <ul style="list-style-type: none"> Populated Interface Register Formed Interface Coordination Team Planned Interface Coordination Workshops 	SONO Information SONO	90 days after NTP 90 days after NTP 90 days after NTP
2.1.6	Inspection and Test Management <ul style="list-style-type: none"> Individual Inspection and test management plans 	SONO	Four weeks prior to inspection or testing
2.1.7	Change Control and Configuration Management <ul style="list-style-type: none"> Identified Configuration Items Identified Configuration Baselines 	Approval Approval	As part of CVVP As part of CVVP
0 2.2.2 2.2.3 2.2.4 2.2.5	RM Tool <ul style="list-style-type: none"> Parsed Captured Documented Analyzed (TCR) 	Approval	90 days after NTP
0 2.2.6	RM Tool <ul style="list-style-type: none"> Apportioned (ENG, SUB) 	Approval	120 days after NTP
2.1 2.3 2.3	RVTM <ul style="list-style-type: none"> Sample Form Populated with all TCRs Allocated Submittal Types per TCR 	Approval Approval Approval	As part of CVVP 90 days after NTP 120 days after NTP
2.1 2.4 2.4	CIL <ul style="list-style-type: none"> Sample Form Populated with all Critical Items Allocated Submittal Types per CI 	Approval Approval Approval	As part of CVVP 60 days after NTP 90 days after NTP
2.1	CCPs <ul style="list-style-type: none"> Annotated Outline 	Approval	As part of CVVP



Section	Submittals	Submit For	Timeframe
Execution			
2.1.5	Interface Management <ul style="list-style-type: none"> Resolved interface conflicts 	Information	Prior to 60% Submittals
2.1.6	Inspection and Test Management <ul style="list-style-type: none"> Preparation of inspections and test procedures Execution of inspections and test Inspection and test report 	SONO Information SONO	Four weeks prior to inspection or testing One week notification Two weeks after inspection or test
2.2.7	Supporting Documents <ul style="list-style-type: none"> Parse, capture, document, analyze, and apportion supporting documents within four weeks of receipt 	SONO	Monthly RM tool submittal
0 2.2.7 2.2.8 2.2.9	RM Tool <ul style="list-style-type: none"> Derived Traced Managed 	SONO	Monthly RM tool submittal
0 0 2.4 2.5	V&V Submittal, including: <ul style="list-style-type: none"> RVTM CIL V&V Report 	SONO	With every Technical Contract Submittal
0	RVTM – completed, including: <ul style="list-style-type: none"> Technical Contract Requirements Apportioned & Derived TCRs Referenced Contract Submittals 	SONO	With every Technical Contract Submittal
2.4	CIL – completed, including: <ul style="list-style-type: none"> Critical Items Apportioned & Derived TCRs Referenced Contract Submittals 	SONO	With every Technical Contract Submittal
2.7	CCPs <ul style="list-style-type: none"> Prepared with item (1) and (2) completed Prepared with item (3) completed Prepared with item (4) completed 	Information SONO Approval	At 60% Design At 90% Design At RFC Design
Monitoring and Control			
0 2.2.10 2.2.11	RM Tool <ul style="list-style-type: none"> Verified Validated 	SONO	Monthly RM tool submittal
2.2.12	Performance Metrics and Reporting	Information	Monthly RM tool submittal



APPENDIX A – RVTM Template

The RVTM shall contain all Technical Contract Requirements (TCR attribute) applicable for the submittal (SUB attribute) being provided.

The RVTM shall contain all TCRs across all Contract (Source) documents and across all engineering disciplines / design elements (ENG attribute).

Technical Contract Requirements						Apportioned & Derived TCRs				Technical Contract Submittal		
Req. ID	Doc. ID	Doc. Section	Doc. Language	TCR	ENG	Doc. ID	Doc. Section	Apportioned & Derived Requirements Language	SUB	Sub. ID	Sub. Name	Sub. Section
DCM.CH04-YZ	DCM	4.4.5.3 Unbalanced Superelevation	The maximum unbalanced superelevation (Eu) shall be limited to 3 inches	Yes	ALG	ALG	...	The maximum unbalanced superelevation (Eu) shall be limited to 3 inches	At-Grade (Guideway)	Submittal Number	Document Number	Section Number
DCM.CH05-YZ	DCM	5.8.2 Subballast or Asphalt Underlayment	The thickness shall be determined by analysis of the support required.	Yes	TRK	TRK	...	Design subballast thickness shall be xxx inches.	At-Grade (Guideway)	Submittal Number	Document Number	Section Number
...	Analysis, Report	...	The thickness is determined to be xxx inches.	Yes	TRK							
DCM.CH01-YZ	DCM	1.9 Climatic Conditions	Climatic conditions necessary for design, including those that are site-specific, shall be researched and considered by the designer	Yes	DRN STR ...	DRN	...	Design precipitation / rainfall shall be ...	At-Grade (Guideway)	Submittal Number	Document Number	Section Number
						STR	...	Design wind-loads shall be ...	Aerial Structure	Submittal Number	Document Number	Section Number
						Submittal Number	Document Number	Section Number
...
n

Legend: Refer to V&V Book

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APPENDIX B – CIL Template

The CIL shall be based upon the RVTM.

The CIL shall use Requirements IDs provide by the Authority’s Representative (Req. ID).

The CIL shall include extra column(s) or fields to include the date and initials of the verifier (Verified By & Date).

Critical Items						Apportioned & Derived TCRs				Technical Contract Submittal			
Req. ID	Doc. ID	Doc. Section	Requirements Text	TCR	ENG	Doc. ID	Doc. Section	Requirements Text	SUB	Sub. ID	Sub. Name	Sub. Section	Verified By & Date
CEHL-176	CEHL	1.1.2.7 Object thrown from overpass	Install intrusion prevention fencing at overpasses.	Yes	STR	STR	...	Install intrusion prevention fencing at overpasses.	Roadway Overpass	Submittal Number	Document Number	Section Number	Initial Date
TVA-2619	TVA	1.11.2.8 VBIED Collision with rail vehicle at grade ROW	K-rail, berm or other barrier where tracks are adjacent to public road	Yes	STR	STR	...	Install barrier at stationing xxx where HSR crosses road yyy.	Aerial Structure	Submittal Number	Document Number	Section Number	Initial Date
IF-885	IF-REG	3.1.2.4 Conduits & Cables	Interface between SYS TP Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	Yes	STR	STR	...	Install 12 low-voltage ductbank conduit and ...	At-Grade (Guideway)	Submittal Number	Document Number	Section Number	Initial Date
...
n

Legend: Refer to V&V Book

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APPENDIX C – Interoperability Items



CP4 Interoperability Items (IF-REG)

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IF 1233	1.1.1.1.1 Interface between GEN Reliability & Availability Targets and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable GEN RAMS targets have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Reliability • Availability • ... 	DCM [GEN] 1.4.6 Design Life DCM [GEN] 1.5 Durability 30 SoW CP01 2012-12-19 5.10.1 Reliability of the Drainage Subsystem DCM [GEO] 10.8.6 Soil Materials Used for Embankments DCM [STR] 12.4.1 Structural Design Parameters DCM [STR] 12.8.6.9 Expansion Joints DCM [STR] 12.8.6.11 Bearings DCM [STR] 12.11.3.5 Water tightness DCM [TUN] 13.6.3 Durability DCM [DRN] 8.1 Scope DCM [DRN] 8.5.3.1 Design Elements DCM [UTL] 9.5.3 Encroachment Justifications
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IF 355	2.1.1.1.1 Interface between O&M Maximum Design Speed (HST Tracks) and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M maximum design speed (HST tracks) has been applied by the INF team.	30 ConOps Rev 2 2011-12-30 4.3.1 The High-Speed Strategy from San Francisco to San Jose: The Shared Use Corridor for CHST and Caltrain 30 ConOps Rev 2 2011-12-30 4.3.2 The High-Speed Strategy from Los Angeles to Anaheim: The Shared Use LOSSAN Corridor for CHST, Metrolink, and Amtrak

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		30 ConOps Rev 2 2011-12-30 4.3.3 The High Speed Strategy from San Jose to Los Angeles: The Exclusive Use 220 MPH Central Valley Alignment 30 ConOps Rev 2 2011-12-30 4.3.4 The High Speed Strategy Extended to Sacramento and San Diego DCM [GEN] 1.2.5 Design and Operating Speeds DCM [ALG] 4.4.1 Selection of Design Speed DCM [ALG] 4.4.2 Minimum Lengths of Alignment Segments DCM [ALG] 4.4.3 Minimum Radii DCM [ALG] 4.4.5.2 Actual Superelevation DCM [ALG] 4.4.5.3 Unbalanced Superelevation DCM [ALG] 4.4.6.3 Spiral Lengths DCM [ALG] 4.5.2.2 Minimum Vertical Curve Lengths (LVC) DCM [TUN] 13.3.2 Train Operating Speed DCM [CLR] 3.3.1 Vertical Clearances DCM [CLR] 3.5 Track Center Spacing
IF 4355	2.1.1.1.2 Interface between O&M Maximum Design Speed (Special Trackwork) and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M maximum design speed (special trackwork) has been applied by the INF team.	20 Conceptual Ops Plan Ver3R1 2012-06-25 3.2 Infrastructure 30 ConOps Rev 2 2011-12-30 6.3.1.1 Turnouts and Crossovers DCM [ALG] 4.10 High-Speed Crossovers DCM [ALG] 4.14 Access Tracks to Yards and Maintenance Facilities DCM [ALG] 4.7 High-Speed Turnouts (60 mph and faster)
	2.1.1.2 Operation Simulation / Computer-Based Modeling	
IF 187	2.1.1.2.1 Interface between O&M Computer-Based Modeling and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the correct GWY track alignment configuration, track alignment features and performance criteria have been applied by the O&M team in the computer-based modeling (static simulation).	
	2.1.1.3 Visibility of Wayside/Trackside Equipment	

ID	Interface	Document Reference(s)
IF 597	2.1.1.3.1 <i>Interface between O&M Visibility of Wayside/Trackside Equipment Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the O&M visibility of wayside/trackside equipment requirements have been applied by the INF team.	30 ConOps Rev 2 2011-12-30 6.3.1 Track DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DCM [CLR] 3.7.7 Appendix 3.G All Passenger Equipment, Structure Gauge and Fixed Equipment Envelope, Open Sections DCM [CLR] 3.7.8 Appendix 3.H All Passenger Equipment, Structure Gauge and Fixed Equipment Envelope, In Tunnels
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	2.2.1 <i>Interfaces with Guideway (excl. Trackwork)</i>	
	2.2.1.1 <i>MoI Roadway Access</i>	
IF 911	2.2.1.1.1 <i>Interface between O&M MoI Infrastructure Access Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI infrastructure access requirements have been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 2 CHST Infrastructure System And Maintainability 10 MoI CnR Rev 2012-02-11 2.5 Structures 10 MoI CnR Rev 2012-02-11 9.3.1 Tunnels 10 MoI CnR Rev 2012-02-11 9.3.2 Bridges and Aerial Structures 10 MoI CnR Rev 2012-02-11 9.3.3 Depressed Structures 10 MoI CnR Rev 2012-02-11 9.4 Right of Way Access DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.7.1.1 Access Roads DD-CV-901 FENCE AND GATES LOCATIONS DD-CV-900 FENCE AND GATE DETAILS DCM [STR] 12.4.1 Structural Design Parameters DCM [STR] 12.8 Design Considerations for Bridges and Aerial

ID	Interface	Document Reference(s)
		Structures DCM [TUN] 13.15.6 Fencing DCM [TUN] 13.16.4.2 Fixed Facility Power DCM [TUN] 13.16.5 Access Road DCM [TUN] 13.16.21 Parking for Tunnel Maintenance and Traction Power Facility DD-TN-400 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN DD-TN-401 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, ELEVATION DD-TN-406 TYPICAL TUNNEL PORTAL FACILITIES-BELOW GRADE, PORTAL ARRANGEMENT SHOWING MAXIMUM FACILITIES, FOR SINGLE TRACK TWIN BORED TUNNEL, PLAN DD-TN-407 TYPICAL TUNNEL PORTAL FACILITIES-BELOW GRADE, PORTAL ARRANGEMENT SHOWING MAXIMUM FACILITIES, FOR SINGLE TRACK TWIN BORED TUNNEL, FRONT ELEVATION DD-TN-403 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN DD-TN-404 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, FRONT ELEVATION
	2.2.1.2 MoI Walkway & Stairs	
IF 843	2.2.1.2.1 Interface between O&M MoI Walkway Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI walkway spatial requirements have been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 1.2.6 CHST and PUC Standards 10 MoI CnR Rev 2012-02-11 7.6.1 California Public Utilities Commission (CPUC) DCM [CIV] 7.7.7 Walkways and Cable Trough DCM [STR] 12.8.6.17 Walkways, Parapets, and Sound Walls DCM [STR] 12.14.1 Cable Trough DCM [TUN] 13.3.6 Walkways DCM [TUN] 13.15.5 Design Requirements for Cable Troughs

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
		<p>DCM [CLR] 3.2 Regulations, Codes, Standards, and Guidelines</p> <p>DCM [CLR] 3.4 Vehicle Clearance Envelopes</p> <p>DCM [CLR] 3.4.4 Effects of Superelevation</p> <p>DCM [CLR] 3.5 Track Center Spacing</p> <p>DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section</p> <p>DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels</p> <p>DD-CV- 100 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>DD-CV- 100 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>DD-CV-102 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL</p> <p>DD-CV-103 TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT</p> <p>DD-CV-104 TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT</p> <p>DD-ST-901 TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>DD-ST-100 TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p>DD-ST-101 TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p>DD-ST-900 TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE</p> <p>DD-ST-903 TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE</p> <p>DD-ST-108 TYPICAL CROSS SECTION, AERIAL STRUCTURE, FOUR TRACK NON-BALLASTED, CROSS SECTIONS FOR BOX GIRDER</p>

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		<p>DD-ST-120 TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p>DD-ST-902 CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL</p> <p>DD-ST-904 CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-GRADE / CUT & COVER TUNNEL</p> <p>DD-ST-121 TYPICAL CROSS SECTION, TWO TRACK TRENCH, INSIDE WALKWAY</p> <p>DD-ST-122 TYPICAL CROSS SECTION, ONE TRACK TRENCH</p> <p>DD-TN-103 TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITH SEPARATION WALL</p> <p>DD-TN-105 TYPICAL CROSS SECTION, TWIN TRACK SINGLE BORED (TBM/ CIRCULAR), TUNNEL WITHOUT SEPARATION WALL</p> <p>DD-TN-200 BASIC TUNNEL CONFIGURATION, SINGLE TRACK TWIN TBM BORED TUNNEL, DOUBLE TRAIN (1312 FT)</p> <p>DD-TN-201 BASIC TUNNEL CONFIGURATION SINGLE TRACK TWIN TBM BORED TUNNEL SINGLE TRAIN (660 FT)</p> <p>DD-TN-206 BASIC TUNNEL CONFIGURATION, DOUBLE TRACK SINGLE BORED TUNNEL, WITHOUT SEPARATION WALL 1312' TRAIN</p> <p>DD-TN-207 BASIC TUNNEL CONFIGURATION, DOUBLE TRACK SINGLE BORED TUNNEL, WITHOUT SEPARATION WALL 660' TRAIN</p> <p>DD-TN-102 TYPICAL CROSS SECTION, DOUBLE TRACK MINED TUNNEL, WITH SEPARATION WALL</p> <p>DD-TN-104 TYPICAL CROSS SECTION , TWIN TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL</p> <p>DD-TN-111 TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT</p> <p>DD-TN-112 TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT</p> <p>DD-TN-113 TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS</p>

ID	Interface	Document Reference(s)
		DD-TN-203 BASIC TUNNEL CONFIGURATION DOUBLE TRACK SINGLE MINED TUNNEL WITH SEPARATION WALL SINGLE TRAIN (660 FT) DD-TN-204 BASIC TUNNEL CONFIGURATION, DOUBLE TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL, 1312' TRAIN DD-TN-205 BASIC TUNNEL CONFIGURATION, DOUBLE TRACK SINGLE MINED TUNNEL, WITHOUT SEPARATION WALL 660' TRAIN
IF 912	2.2.1.2.2 Interface between O&M MoI Access Stairway Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI access stairway spatial requirements have been addressed by the INF team.	30 ConOps Rev 2 2011-12-30 6.3.5.2 Aerial Right-of-Way 10 MoI CnR Rev 2012-02-11 9.3.2 Bridges and Aerial Structures 10 MoI CnR Rev 2012-02-11 9.3.3 Depressed Structures 10 MoI CnR Rev 2012-02-11 9.4 Right of Way Access DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.2.6 Trackway on Aerial Structure DCM [CIV] 7.8.2.7 Trackway on Retained Fill DCM [CIV] 7.7.11 Emergency Stairs DD-CV-901 FENCE AND GATES LOCATIONS DCM [STR] 12.10.8 Trench Emergency Exits DCM [STR] 12.14.7 Access Stairs DCM [STR] 12.8.8 Emergency Access DD-ST-913 AERIAL STRUCTURE, EMERGENCY EXIT STAIRWAY DETAILS 1 DD-ST-914 AERIAL STRUCTURE, EMERGENCY EXIT STAIRWAY DETAILS 2
	2.2.1.3 MoI Live Loads	
IF 3481	2.2.1.3.1 Interface between O&M MoI Walkway Floor Live Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI walkway live load requirements	10 MoI CnR Rev 2012-02-11 5 Maintenance Of Infrastructure Equipment And Vehicles

ID	Interface	Document Reference(s)
	have been addressed by the INF team.	DCM [CIV] 7.7.7 Walkways and Cable Trough DCM [STR] 12.5.2.1 Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM [STR] 12.7.1.4 Floor Load DCM [STR] 12.8.6.17 Walkways, Parapets, and Sound Walls DCM [STR] 12.11.2.9.1 Cut-and-Cover Walkway Cover Live Loads DCM [STR] 12.11.2.9 Miscellaneous Loads
IF 3839	2.2.1.3.2 Interface between O&M MoI Access Stairway Live Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI access stairway live load requirements have been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 5 Maintenance Of Infrastructure Equipment And Vehicles DCM [STR] 12.5.2.1 Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM [STR] 12.7.1.4 Floor Load
	2.2.1.4 MoI Equipment	
IF 512	2.2.1.4.1 Interface between O&M MoI Equipment Dynamic Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI equipment dynamic envelope requirements have been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 1.2.6 CHST and PUC Standards 10 MoI CnR Rev 2012-02-11 5 Maintenance Of Infrastructure Equipment And Vehicles 10 MoI CnR Rev 2012-02-11 5.1 Typical MOI Equipment DCM [CLR] 3.1 Scope DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.1 Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM [CLR] 3.7.2 Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation
IF 3691	2.2.1.4.2 Interface between O&M MoI Equipment Axle Loads Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI equipment axle loads have been	10 MoI CnR Rev 2012-02-11 5 Maintenance Of Infrastructure Equipment And Vehicles

ID	Interface	Document Reference(s)
	addressed by the INF team.	10 MoI CnR Rev 2012-02-11 5.1 Typical MOI Equipment DCM [STR] 12.5.2.1 Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM [TUN] 13.9.5 Fatigue Analysis DCM [UTL] 9.5.4.5 Placement
IF 3678	2.2.1.4.3 Interface between O&M MoI Equipment Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI equipment dynamic train-structure interaction has been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 5.1 Typical MOI Equipment DCM [STR] 12.5.2.2 Vertical Impact Effect (I) DCM [STR] 12.6 Track-Structure Interaction DCM [TUN] 13.9.3 Dynamic Analysis
	2.2.1.5 MoI Maintainability & Ease of Maintenance	
IF 2586	2.2.1.5.1 Interface between O&M MoI CIV Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M MoI CIV maintainability & ease of maintenance requirements have been addressed by the INF team.	DCM [GEN] 1.4 General Design Parameters DCM [GEN] 1.5 Durability DCM [CIV] 7.3 Grading, Side Slopes, and Retaining Walls for Roadway and Site Embankments DCM [CIV] 7.5 Slope/Surface Protection Systems Best Management Practices DCM [CIV] 7.7.4 Signage DCM [CLR] 3.5 Track Center Spacing
IF 5892	2.2.1.5.2 Interface between O&M MoI STR Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the applicable O&M MoI STR maintainability & ease of maintenance requirements have been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 2.5 Structures 10 MoI CnR Rev 2012-02-11 9.3 Structures 10 MoI CnR Rev 2012-02-11 9.3.2 Bridges and Aerial Structures 10 MoI CnR Rev 2012-02-11 9.3.3 Depressed Structures 10 MoI CnR Rev 2012-02-11 10.3.9 Replacement of Bridge Structure/Components

ID	Interface	Document Reference(s)
		DCM [GEN] 1.4 General Design Parameters DCM [GEN] 1.5 Durability DCM [STR] 12.4.1 Structural Design Parameters DCM [STR] 12.6.4 Track Serviceability Analysis DCM [STR] 12.6.4.2 Vertical Deflection Limits: Group 1a DCM [STR] 12.6.4.5 Transverse Deflection Limits DCM [STR] 12.9.3 Requirements for Highway Bridges DCM [STR] 12.8 Design Considerations for Bridges and Aerial Structures DCM [STR] 12.8.4.6 Inspection and Maintenance DCM [STR] 12.8.5.4 Maintenance and Inspection of Concrete Structures DCM [STR] 12.8.6.9 Expansion Joints DCM [STR] 12.11.3.5 Water tightness DCM [STR] 12.8.10 Maintenance of HST Aerial Structures, Bridges, and Grade Separations DCM [STR] 12.6.4.3 Vertical Deflection Limits: Group 1b DCM [CLR] 3.5 Track Center Spacing
IF 1203	2.2.1.5.3 Interface between O&M MoI DRN Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI DRN maintainability & ease of maintenance requirements have been addressed by the INF team.	10 MoI CnR Rev 2012-02-11 2.5 Structures 10 MoI CnR Rev 2012-02-11 9.2.2 Drainage 10 MoI CnR Rev 2012-02-11 9.3.1 Tunnels 10 MoI CnR Rev 2012-02-11 9.3.2 Bridges and Aerial Structures 10 MoI CnR Rev 2012-02-11 9.3.3 Depressed Structures DCM [DRN] 8.5.2.1 Open Channel Hydraulics DCM [DRN] 8.5.2.1.6 Channel Lining DCM [DRN] 8.6.1 Track Drainage Systems DCM [DRN] 8.6.3.4 Deck Drainage System DCM [DRN] 8.6.3.4.3 Pipes and Downspouts DCM [DRN] 8.6.9.2 Storm Drain Design DCM [DRN] 8.6.9.3 Inlets and Maintenance Access

ID	Interface	Document Reference(s)
		DCM [DRN] 8.6.9.4 Pipe Characteristics DCM [DRN] 8.5.2.3 Underdrain System DCM [DRN] 8.5.2.3.4 Access Holes/Cleanouts and Risers DCM [DRN] 8.5.2.5 Siphons DCM [DRN] 8.5.2.5.4 Collars and Blowoff Structures DCM [DRN] 8.5.2.6 Pump Stations SD-CD-001 TRACK DRAINAGE SYSTEM / UNDERDRAIN SYSTEM, CLEANOUT AND RISER DETAILS SD-CD-003 STORM DRAIN MANHOLES
	3 Systems	
	3.1 Traction Power	
	3.1.1 Interfaces with Operations & Maintenance	
	3.1.1.1 Maintenance	
IF 878	3.1.1.1.1 Interface between O&M MoI TP Facility Site Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI TP facility site access requirements have been addressed by the INF team.	DD-SY-010 TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES DD-TP-D101 CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH TWO HIGH-VOLTAGE TRANSFORMERS DD-TP-D102 CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH THREE HIGH-VOLTAGE TRANSFORMERS DD-TP-D201 CONCEPTUAL LAYOUT SWITCHING STATION DD-TP-D301 CONCEPTUAL LAYOUT PARALLELING STATION DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.3.2 Train Control, Communications and Traction Power Facilities DCM [CIV] 7.7.1.1 Access Roads DD-CV-901 FENCE AND GATES LOCATIONS DD-CV-900 FENCE AND GATE DETAILS

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
	3.1.2 Interfaces with Guideway (excl. Trackwork)	
	3.1.2.1 Track Alignment	
IF 80	3.1.2.1.1 Interface between SYS TP Maximum Grade @ Phase Break Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP system maximum grade @ phase break requirements have been addressed by the INF team.	DCM [ALG] 4.5.1 Maximum Grades
	3.1.2.2 Traction Power Facilities & Wayside Power Cubicles (Sites)	
IF 5597	3.1.2.2.1 Interface between SYS TP Facility & WPC Site Location Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP facility & WPC site location (where to install, not size) requirements have been addressed by the INF team.	DCM [TP] 20.7.2 Spacing of Traction Power Facilities DCM [TP] 20.7.3 Additional Location Requirements DCM [TP] 20.12.1 Wayside Power Control Cubicles DD-TP-D401 CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES DD-TC-004 STATION INTERLOCKING LAYOUT, TYPICAL TROUGHS AND CONDUITS, AND UNDERTRACK CROSSINGS DD-TC-005 UNIVERSAL INTERLOCKING LAYOUT, TYPICAL DUCTBANK AND CONDUIT DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT DCM [TUN] 13.3.10 Equipment Requirements and Tunnel Niches DCM [TUN] 13.16.4.1 Traction Power DCM [TUN] 13.16.14 Overhead Contact System Motorized Disconnect Switch
IF 4271	3.1.2.2.2 Interface between SYS TP Facility & WPC Site Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP facility & WPC site spatial (site, not location) requirements have been addressed by the INF team.	DCM [TP] 20.9.1 General Site Requirements DCM [TP] 20.9.23 Real Estate Requirements: Approximate Footprints for the TPF

ID	Interface	Document Reference(s)
		DCM [TP] 20.12.1 Wayside Power Control Cubicles DD-TP-D101 CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH TWO HIGH-VOLTAGE TRANSFORMERS DD-TP-D102 CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH THREE HIGH-VOLTAGE TRANSFORMERS DD-TP-D201 CONCEPTUAL LAYOUT SWITCHING STATION DD-TP-D301 CONCEPTUAL LAYOUT PARALLELING STATION DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.3.2 Train Control, Communications and Traction Power Facilities DCM [CIV] 7.7.1.1 Access Roads DD-CV-900 FENCE AND GATE DETAILS DCM [TUN] 13.3.10 Equipment Requirements and Tunnel Niches DCM [TUN] 13.16.14 Overhead Contact System Motorized Disconnect Switch DCM [TUN] 13.16.21 Parking for Tunnel Maintenance and Traction Power Facility DCM [DRN] 8.6.7 Critical HST Structures/Facilities DCM [IPR] 6.3 Protection of HST Operating Infrastructure from Vehicle Intrusion DCM [CLR] 3.3.2 Horizontal Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
IF 871	3.1.2.2.3 Interface between SYS TP Facility & WPC Site Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TPF & WPC site foundation requirements	DCM [TP] 20.9.3 Foundations DCM [TP] 20.12.1 Wayside Power Control Cubicles

ID	Interface	Document Reference(s)
	have been addressed by the INF team.	DD-TP-D121 TRACTION POWER SUBSTATION HIGH VOLTAGE EQUIPMENT DD-TP-D501 TYPICAL TRANSFORMER OIL CONTAINMENT SYSTEM DD-TP-E112 TYPICAL EQUIPMENT ARRANGEMENT PREFABRICATED ENCLOSURES TRACTION POWER SUBSTATION-CABLE VAULT DD-TP-E202 TYPICAL EQUIPMENT ARRANGEMENTS PREFABRICATED ENCLOSURES WAYSIDE POWER CONTROL CUBICLE-ELEVATION DD-TC-004 STATION INTERLOCKING LAYOUT, TYPICAL TROUGHS AND CONDUITS, AND UNDERTRACK CROSSINGS DD-TC-005 UNIVERSAL INTERLOCKING LAYOUT, TYPICAL DUCTBANK AND CONDUIT DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT DCM [STR] 12.5.3.2 Loads for Design of Traction Power Facility Gantry Pole Foundation DCM [STR] 12.7.2 Foundations for Equipment Enclosures DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports DCM [DRN] 8.6.7 Critical HST Structures/Facilities DCM [DRN] 8.3 Policies
	3.1.2.3 Wayside/Field Equipment	
IF 1143	3.1.2.3.1 Interface between SYS TP Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP wayside/field equipment spatial requirements have been addressed by the INF team.	DCM [TP] 20.7.3 Additional Location Requirements DD-TP-D111 TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D112 TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-D211 SWITCHING STATION MAIN GANTRY ELEVATION

ID	Interface	Document Reference(s)
		SUBSTATION SIDE VIEW DD-TP-D212 SWITCHING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-D311 PARALLELING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D312 PARALLELING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DCM [STR] 12.14.6 Trackside Equipment DCM [TUN] 13.3.5 Clearances DCM [TUN] 13.3.10 Equipment Requirements and Tunnel Niches DD-CD-003 AT-GRADE TRACK, DRAINAGE SYSTEM DCM [CLR] 3.3.1 Vertical Clearances DCM [CLR] 3.3.2 Horizontal Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DD-TP-F101 TYPICAL SINGLE CATENARY FEEDING GANTRY ARRANGEMENT DD-TP-F102 TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT DD-TP-D401 CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES DD-TP-F201 TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE DD-TP-F301 TYPICAL CATENARY FEEDING ARRANGEMENT IN OPEN TRENCH LOCATIONS DD-TN-112 TYPICAL TUNNEL NICHE DETAIL - FIXED MOTORIZED DISCONNECT
IF 5671	3.1.2.3.2 <i>Interface between SYS TP Wayside/Field Equipment Foundation Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u>	DCM [TP] 20.9.3 Foundations

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
	Ensures that the SYS TP wayside/field equipment foundation requirements have been addressed by the INF team.	DD-TP-D111 TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D112 TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-D211 SWITCHING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D212 SWITCHING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-D311 PARALLELING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D312 PARALLELING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DCM [STR] 12.5.3.2 Loads for Design of Traction Power Facility Gantry Pole Foundation DCM [STR] 12.14.6 Trackside Equipment DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports DCM [CLR] 3.3.2 Horizontal Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DD-TP-F101 TYPICAL SINGLE CATENARY FEEDING GANTRY ARRANGEMENT DD-TP-F102 TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT DD-TP-D401 CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES DD-TP-F201 TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE DD-TP-F301 TYPICAL CATENARY FEEDING ARRANGEMENT IN OPEN TRENCH LOCATIONS

ID	Interface	Document Reference(s)
	3.1.2.4 Conduits & Cables	
IF 885	3.1.2.4.1 Interface between SYS TP Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the SYS TP conduit, duct bank, cable trough & manhole requirements have been addressed by the INF team, including but not limited to:</p> <ul style="list-style-type: none"> • Overhead or duct bank from TPF to Main Gantry • Overhead from Main Gantry to Strain Gantry • Return System to Gantries • Feeder cables • Return cables • Surface conduits (multiple, large diameter) • Embedded conduits • ... 	DCM [TP] 20.10.3 Raceway DCM [TP] 20.10.5 Electrical Manholes and Pullboxes DCM [TP] 20.10.6 Cable Trenches for Power Cables DCM [TP] 20.10.7 Conductors DCM [TP] 20.10.7.1 General DCM [TP] 20.10.7.2 Segregation DCM [TP] 20.10.7.3 Sizes of Low Voltage Power and Control Cables DD-TP-D111 TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D112 TRACTION POWER SUBSTATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-D211 SWITCHING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D212 SWITCHING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-D311 PARALLELING STATION MAIN GANTRY ELEVATION SUBSTATION SIDE VIEW DD-TP-D312 PARALLELING STATION MAIN GANTRY ELEVATION TRACK SIDE VIEW DD-TP-E202 TYPICAL EQUIPMENT ARRANGEMENTS PREFABRICATED ENCLOSURES WAYSIDE POWER CONTROL CUBICLE-ELEVATION DD-TP-G101 TYPICAL SUBSTATION NEUTRAL RETURN SYSTEM DIAGRAM DD-TP-G111 TYPICAL SWITCHING STATION NEUTRAL RETURN SYSTEM DIAGRAM DD-TP-N101 TYPICAL 25KV DUCT BANK DETAIL DD-TP-N111 TYPICAL 25KV MANHOLE DETAILS

ID	Interface	Document Reference(s)
		DCM [STR] 12.14.4 Conduit Risers DCM [STR] 12.14.5 Embedded Conduits DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports DCM [TUN] 13.3.5 Clearances DCM [TUN] 13.15.3 Embedded Conduit and Cable Trough DCM [UTL] 9.4.1 Electrical DCM [UTL] 9.4.1.1 Duct Banks DCM [UTL] 9.4.1.2 Manholes and Handholes DCM [UTL] 9.5.4.5 Placement DCM [UTL] 9.5.4.6 Carrier Pipes DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DD-TP-F101 TYPICAL SINGLE CATENARY FEEDING GANTRY ARRANGEMENT DD-TP-F102 TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT DD-TP-D401 CONCEPTUAL LOCATIONS, TRACTION POWER FACILITIES DD-TP-F201 TYPICAL DOUBLE CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE DD-TP-F301 TYPICAL CATENARY FEEDING ARRANGEMENT IN OPEN TRENCH LOCATIONS
	3.1.2.5 Dead & Live Loads	
IF 3019	3.1.2.5.1 Interface between SYS TP System Dead Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS TP system dead load requirements have been addressed by the INF team.	DCM [TP] 20.9.3 Foundations DCM [STR] 12.5.3.1 Loads and Load Combinations for Design of the Surrounding Area of the Embedded Sleeves of Overhead Contact

ID	Interface	Document Reference(s)
		System Pole Foundation DCM [STR] 12.5.3.2 Loads for Design of Traction Power Facility Gantry Pole Foundation
	3.1.2.6 Utilities	
IF 2606	3.1.2.6.1 Interface between SYS TP Utility Spatial Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the SYS TP system utility spatial requirements have been addressed by the INF team, including but not limited to:</p> <ul style="list-style-type: none"> • Traction power • Electrical utility (e.g. PG&E) • Gas/fuel • Water • Sewer • Communications 	DCM [TP] 20.4.6 High-Voltage Utility Connections DCM [TP] 20.9.23 Real Estate Requirements: Approximate Footprints for the TPF DD-TP-C511 CONCEPTUAL LOCATIONS UTILITY HIGH VOLTAGE SWITCHING STATION AND TRACTION POWER SUBSTATION DCM [UTL] 9.4.1 Electrical DCM [UTL] 9.4.1.3 Service Connections DCM [CLR] 3.3.2 Horizontal Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
	3.2 Overhead Contact System	
	3.2.1 Interfaces with Guideway (excl. Trackwork)	
	3.2.1.1 Pantograph Clearances	
IF 656	3.2.1.1.1 Interface between SYS OCS Pantograph Clearance Envelope Requirements and GWY Infrastructure	
	<p><u>Purpose/Scope:</u> Ensures that the SYS OCS pantograph clearance envelope requirements have been addressed by the INF team (actual wayside equipment is addressed elsewhere).</p>	DCM [OCS] 21.6.2 Geometry of the Pantographs DCM [OCS] 21.6.3 Compliance of the Overhead Contact Line System with the Infrastructure Gauge DCM [OCS] 21.14.8 Electrical Clearances to Rail Vehicles and Structures

ID	Interface	Document Reference(s)
		DCM [OCS] 21.14.9 Clearance Envelope at Fixed Structures DCM [OCS] 21.14.10 Applicable Pantograph and OCS Clearance Envelopes DD-OC-2071 PANTOGRAPH CLEARANCE ENVELOPE OPEN ROUTE-DEDICATED TRACK-220 MPH SEGMENT DD-OC-2072 PANTOGRAPH CLEARANCE ENVELOPE TUNNEL-DEDICATED TRACK-220 MPH SEGMENT DCM [TUN] 13.3.5 Clearances DCM [CLR] 3.3.1 Vertical Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.1 Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM [CLR] 3.7.2 Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DD-CV-904 MINIMUM CLEARANCE, GRADE SEPARATED STRUCTURES
	3.2.1.2 Wayside/Field Equipment	
IF 3299	3.2.1.2.1 Interface between SYS OCS Structure & Wire Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS structure & wire spatial requirements have been addressed by the INF team.	DCM [OCS] 21.1 Scope DCM [OCS] 21.6.1 Geometry of the Overhead Contact Line DCM [OCS] 21.8.1 Contact Wire DCM [OCS] 21.8.2 Messenger Wire DCM [OCS] 21.8.3 Stitch Wire DCM [OCS] 21.8.4 Hanger Wire DCM [OCS] 21.8.5 Alternate Conductors DCM [OCS] 21.9 Other Overhead Conductors and Cables

ID	Interface	Document Reference(s)
		<p>DCM [OCS] 21.9.1 Parallel Negative Feeder</p> <p>DCM [OCS] 21.9.2 Static (Ground) Wire</p> <p>DCM [OCS] 21.9.3 Insulated 25 kV Cable</p> <p>DCM [OCS] 21.9.4 Insulated Return Cable</p> <p>DCM [OCS] 21.12 Sectionalizing and Switching</p> <p>DCM [OCS] 21.15.2 OCS Pole and Foundation Requirements</p> <p>DCM [OCS] 21.16 Traction Power Return System</p> <p>DD-OC-2041 TYPICAL JUMPER AND CONTACT WIRE CROSSING ARRANGEMENTS-220 MPH SEGMENT</p> <p>DD-OC-2042 TYPICAL 25KV HIGH SPEED SECTION INSULATOR ARRANGEMENT FOR CROSSOVER AND TURNOUT-220 MPH SEGMENT</p> <p>DD-OC-2050 TYPICAL OCS CROSSOVER ARRANGEMENT WITH AIR GAP-220 MPH SEGMENT</p> <p>DD-OC-2053 TYPICAL UNINSULATED CATENARY OVERLAP FIVE SPAN ARRANGEMENT-220 MPH SEGMENT</p> <p>DD-OC-2057 TYPICAL INSULATED CATENARY OVERLAP FIVE SPAN ARRANGEMENT-220 MPH SEGMENT</p> <p>DD-OC-2058 TYPICAL CANTILEVER ARRANGEMENT THREE SPAN INSULATED AND UNINSULATED OVERLAPS-220 MPH SEGMENT</p> <p>DCM [TUN] 13.3.5 Clearances</p> <p>DCM [CLR] 3.3.1 Vertical Clearances</p> <p>DCM [CLR] 3.3.2 Horizontal Clearances</p> <p>DCM [CLR] 3.4 Vehicle Clearance Envelopes</p> <p>DCM [CLR] 3.5 Track Center Spacing</p> <p>DCM [UTL] 9.5.5 Utility Clearances</p> <p>DCM [OCS] 21.6.2 Geometry of the Pantographs</p> <p>DCM [OCS] 21.6.3 Compliance of the Overhead Contact Line System with the Infrastructure Gauge</p> <p>DCM [OCS] 21.14.7 Clearances for Utility Lines Crossing over the Electrified Railroad</p> <p>DCM [OCS] 21.14.8 Electrical Clearances to Rail Vehicles and</p>

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
		<p>Structures</p> <p>DCM [OCS] 21.14.9 Clearance Envelope at Fixed Structures</p> <p>DCM [OCS] 21.15.1 General</p> <p>DCM [OCS] 21.15.3 OCS Poles</p> <p>DD-CV-904 MINIMUM CLEARANCE, GRADE SEPARATED STRUCTURES</p> <p>DD-OC-2011 TYPICAL OPEN ROUTE HIGH SPEED OCS CONFIGURATION - 220 MPH SEGMENT</p> <p>DD-OC-2012 TYPICAL OCS STRUCTURE FOR TANGENT TRACKS IN OPEN ROUTE - 220 MPH SEGMENT</p> <p>DD-OC-2013 TYPICAL OCS STRUCTURE FOR SUPERELEVATED TRACKS IN OPEN ROUTE - 220 MPH SEGMENT</p> <p>DD-OC-2018 TYPICAL OCS PORTAL STRUCTURE ON FOUR TANGENT TRACKS - 220 MPH SEGMENT</p> <p>DD-OC-2019 TYPICAL OCS SUPPORT STRUCTURE FOR FOUR TRACKS INTERMEDIATE STATION-220 MPH SEGMENT</p> <p>DD-OC-2014 TYPICAL OCS SUPPORT STRUCTURE ON VIADUCT-TANGENT TRACKS - 220 MPH SEGMENT</p> <p>DD-OC-2015 TYPICAL OCS SUPPORT STRUCTURE ON VIADUCT-SUPERELEVATED TRACKS - 220 MPH SEGMENT</p> <p>DD-OC-2022 TYPICAL OCS STRUCTURE FOR CUT AND COVER TUNNEL ON TANGENT TRACKS-220 MPH SEGMENT</p> <p>DD-OC-2023 TYPICAL OPEN TRENCH OCS STRUCTURE TANGENT TRACKS WITH CENTER WALKWAY-220 MPH SEGMENT</p> <p>DD-OC-2024 TYPICAL OPEN TRENCH OCS STRUCTURE SUPERELEVATED TRACKS WITH CENTER WALKWAY-220 MPH SEGMENT</p> <p>DD-OC-2025 TYPICAL OPEN TRENCH OCS STRUCTURE ON TANGENT TRACK WITH SIDE WALKWAY-220 MPH SEGMENT</p> <p>DD-OC-2026 TYPICAL OPEN TRENCH OCS STRUCTURE ON SUPERELEVATED TRACK WITH SIDE WALKWAY-220 MPH SEGMENT</p>

ID	Interface	Document Reference(s)
		DD-OC-2027 TYPICAL SINGLE OPEN TRENCH OCS STRUCTURE OCS WALL MOUNTED ON TANGENT TRACKS-220 MPH SEGMENT DD-OC-2028 TYPICAL SINGLE OPEN TRENCH OCS STRUCTURE OCS WALL MOUNTED ON SUPERELEVATED TRACKS-220 MPH SEGMENT DD-OC-2029 TYPICAL OCS PORTAL STRUCTURE OPEN TRENCH/TUNNEL PORTAL ON TANGENT TRACKS-220 MPH SEGMENT DD-OC-2037 TYPICAL CUT & COVER TUNNEL OCS STRUCTURE WITHOUT CENTER WALL ON TANGENT TRACKS-220 MPH SEGMENT DD-OC-2020 TYPICAL OCS STRUCTURE FOR CIRCULAR TUNNEL ON TANGENT TRACKS-220 MPH SEGMENT DD-OC-2035 TYPICAL CIRCULAR TUNNEL OCS STRUCTURE WITHOUT CENTER WALL ON TANGENT TRACKS-220 MPH SEGMENT DD-OC-2021 TYPICAL OCS STRUCTURE FOR MINED TUNNEL ON TANGENT TRACKS-220 MPH SEGMENT DD-OC-2036 TYPICAL MINED TUNNEL OCS STRUCTURE WITHOUT CENTER WALL ON TANGENT TRACKS-220 MPH SEGMENT
IF 5752	3.2.1.2.2 Interface between SYS OCS Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS wayside/field equipment spatial requirements have been addressed by the INF team.	DCM [OCS] 21.1 Scope DCM [OCS] 21.4 Overhead Contact System Description and General Performance Requirements DCM [OCS] 21.6.1 Geometry of the Overhead Contact Line DCM [OCS] 21.12.2 Phase Breaks DCM [OCS] 21.12.3 OCS Sectionalizing in Tunnels DCM [OCS] 21.12.4 Disconnect Switches DD-OC-2030 TYPICAL TWIN BALANCE WEIGHT

ID	Interface	Document Reference(s)
		ARRANGEMENT TERMINATION IN OPEN ROUTE-220 MPH SEGMENT DD-OC-2031 TYPICAL OCS MIDPOINT ANCHOR ARRANGEMENT IN OPEN ROUTE-220 MPH SEGMENT DD-OC-2032 TYPICAL OCS FIXED TENSION TERMINATION ARRANGEMENT-OPEN ROUTE-220 MPH SEGMENT DD-OC-2034 TYPICAL OCS SUPPORT STRUCTURE WITH DISCONNECT SWITCH-220 MPH SEGMENT DCM [TUN] 13.3.5 Clearances DCM [TUN] 13.3.10 Equipment Requirements and Tunnel Niches DCM [TUN] 13.16.14 Overhead Contact System Motorized Disconnect Switch DCM [TUN] 13.17.1 A Shorter Tunnel up to One-Half Mile in Length DCM [TUN] 13.17.3 Shorter Tunnel with Constrained Access DCM [CLR] 3.3.1 Vertical Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [OCS] 21.6.3 Compliance of the Overhead Contact Line System with the Infrastructure Gauge DCM [OCS] 21.14.8 Electrical Clearances to Rail Vehicles and Structures DCM [OCS] 21.14.9 Clearance Envelope at Fixed Structures DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DD-OC-2033 TYPICAL OCS SUPPORT WITH AUXILIARY POWER FOR TWO TANGENT TRACKS IN OPEN ROUTE-220 MPH SEGMENT DD-OC-2038 TYPICAL BORED TUNNEL OCS STRUCTURE WITH DISCONNECT SWITCH ARRANGEMENT-220 MPH SEGMENT
IF 5766	3.2.1.2.3 <i>Interface between SYS OCS Phase Break Spatial Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u>	DCM [TP] 20.7.3 Additional Location Requirements

ID	Interface	Document Reference(s)
	Ensures that the SYS OCS wayside/field equipment spatial requirements have been addressed by the INF team.	DCM [OCS] 21.4 Overhead Contact System Description and General Performance Requirements DCM [OCS] 21.12.2 Phase Breaks DD-OC-2043 TYPICAL OCS PHASE BREAK ARRANGEMENT WITH NEUTRAL SECTION-220 MPH SEGMENT DCM [CLR] 3.3.1 Vertical Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
	3.2.1.3 Foundations & Support Structures	
IF 898	3.2.1.3.1 Interface between SYS OCS Foundation & Supporting Structure Location Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS foundation & supporting structure location requirements have been addressed by the INF team.	DCM [OCS] 21.6.1 Geometry of the Overhead Contact Line DCM [OCS] 21.15.1 General DCM [OCS] 21.15.2 OCS Pole and Foundation Requirements DCM [OCS] 21.15.3 OCS Poles DD-OC-2011 TYPICAL OPEN ROUTE HIGH SPEED OCS CONFIGURATION - 220 MPH SEGMENT DCM [STR] 12.5.3.1 Loads and Load Combinations for Design of the Surrounding Area of the Embedded Sleeves of Overhead Contact System Pole Foundation DCM [STR] 12.14.8 Overhead Concrete Anchors DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports DCM [TUN] 13.15.1 Catenary Support Provisions DD-CV- 100 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT DD-CV- 100 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT

ID	Interface	Document Reference(s)
		DD-CV-102 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, RETAINED FILL DD-CV-103 TYPICAL CROSS SECTION, ONE TRACK NON-BALLASTED, EMBANKMENT AND OPEN CUT DD-CV-104 TYPICAL CROSS SECTION, FOUR TRACK NON-BALLASTED, EMBANKMENT
IF 5780	3.2.1.3.2 Interface between SYS OCS Foundation & Supporting Structure Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS foundation & supporting structure spatial requirements have been addressed by the INF team.	DCM [OCS] 21.15.1 General DCM [OCS] 21.15.2 OCS Pole and Foundation Requirements DCM [OCS] 21.15.4 OCS Foundations DCM [STR] 12.5.3.1 Loads and Load Combinations for Design of the Surrounding Area of the Embedded Sleeves of Overhead Contact System Pole Foundation DCM [STR] 12.14.8 Overhead Concrete Anchors DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports DD-ST-903 TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE DCM [TUN] 13.15.1 Catenary Support Provisions
	3.2.1.4 Conduits & Cables	
IF 886	3.2.1.4.1 Interface between SYS OCS Conduit, Duct Bank & Manhole Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS conduit, duct bank & manhole requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Traction power return • Grounding • Cross bonding • Disconnect switches 	DCM [OCS] 21.17.1 Traction Power Supply System DCM [OCS] 21.17.3 Train Control System DCM [OCS] 21.17.4 Communications System DCM [OCS] 21.17.6 Trackwork DD-OC-2033 TYPICAL OCS SUPPORT WITH AUXILIARY POWER FOR TWO TANGENT TRACKS IN OPEN ROUTE-220 MPH SEGMENT DD-OC-2034 TYPICAL OCS SUPPORT STRUCTURE WITH

ID	Interface	Document Reference(s)
	<ul style="list-style-type: none"> • Switch heater power supply • Switch heater power distribution • ... 	DISCONNECT SWITCH-220 MPH SEGMENT DD-OC-2038 TYPICAL BORED TUNNEL OCS STRUCTURE WITH DISCONNECT SWITCH ARRANGEMENT-220 MPH SEGMENT DCM [STR] 12.14.4 Conduit Risers DCM [STR] 12.14.5 Embedded Conduits DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports DCM [TUN] 13.15.3 Embedded Conduit and Cable Trough DCM [UTL] 9.4.1 Electrical DCM [UTL] 9.4.1.1 Duct Banks DCM [UTL] 9.4.1.2 Manholes and Handholes DCM [UTL] 9.5.4.5 Placement DCM [UTL] 9.5.4.6 Carrier Pipes DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
	3.2.1.5 Dead & Live Loads	
IF 3018	3.2.1.5.1 Interface between SYS OCS Dead Load, Additional Load & Capacity Protection Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS dead load, additional load and capacity protection requirements have been addressed by the INF team.	DCM [OCS] 21.15.2 OCS Pole and Foundation Requirements DCM [OCS] 21.15.3 OCS Poles DCM [OCS] 21.15.4 OCS Foundations DCM [STR] 12.5.1.1 Dead Load (DC, DW) DCM [STR] 12.5.3.1 Loads and Load Combinations for Design of the Surrounding Area of the Embedded Sleeves of Overhead Contact System Pole Foundation DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports
	3.2.1.6 Protective Screens	

ID	Interface	Document Reference(s)
IF 5641	3.2.1.6.1 <i>Interface between SYS OCS Protective Screening & Barrier Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS OCS protective screening & barrier requirements have been addressed by the INF team.	DCM [OCS] 21.14 OCS Clearances and Protection against Electric Shock DCM [OCS] 21.14.3 Protective Screening and Barriers for Standing Surfaces in Public Areas DCM [OCS] 21.14.4 Protective Screening and Barriers for Standing Surfaces in Restricted Areas DCM [CIV] 7.8.4.2 Roadway Overpasses Crossing HST Trackway DCM [OCS] 21.14.2 Protection by Clearances from Standing Surfaces DD-OC-2044 TYPICAL PROTECTION BARRIERS ARRANGEMENT, AT OVERHEAD BRIDGE, 220 MPH SEGMENT DD-CV-902 FENCING ON GRADE SEPARATED STRUCTURES
	3.3 <i>Automatic Train Control</i>	
	3.3.1 <i>Interfaces with Operations & Maintenance</i>	
	3.3.1.1 <i>Maintenance</i>	
IF 831	3.3.1.1.1 <i>Interface between O&M MoI ATC Interlocking & TCC House Site Access Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI ATC Interlocking & TCC house site access requirements have been addressed by the INF team.	DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.3.2 Train Control, Communications and Traction Power Facilities DCM [CIV] 7.7.1.1 Access Roads DD-CV-901 FENCE AND GATES LOCATIONS DD-CV-900 FENCE AND GATE DETAILS DD-SY-010 TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES

ID	Interface	Document Reference(s)
	3.3.2 Interfaces with Guideway (excl. Trackwork)	
	3.3.2.1 Interlockings / TCC Houses (Sites)	
IF 5611	3.3.2.1.1 Interface between SYS ATC Interlocking & TCC House Site Location Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC interlocking & TCC house site location (where to install, not size) requirements have been addressed by the INF team.	DCM [ATC] 24.3.12 Hardware Requirements DCM [ATC] 24.8.8 Equipment Enclosures DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT
IF 794	3.3.2.1.2 Interface between SYS ATC Interlocking & TCC House Site Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC interlocking & TCC house site spatial requirements (site, not location) have been addressed by the INF team.	DCM [ATC] 24.8.8 Equipment Enclosures DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.3.2 Train Control, Communications and Traction Power Facilities DCM [CIV] 7.7.1.1 Access Roads DD-CV-900 FENCE AND GATE DETAILS DCM [DRN] 8.6.7 Critical HST Structures/Facilities DCM [IPR] 6.3 Protection of HST Operating Infrastructure from Vehicle Intrusion DCM [CLR] 3.3.2 Horizontal Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [ATC] 24.3.12 Hardware Requirements DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT
IF 1049	3.3.2.1.3 Interface between SYS ATC Interlocking & TCC	

ID	Interface	Document Reference(s)
	House Site Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC interlocking & TCC house site foundation requirements have been addressed by the INF team.	DCM [ATC] 24.3 General Design Requirements DCM [ATC] 24.3.12 Hardware Requirements DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT DCM [STR] 12.7.2 Foundations for Equipment Enclosures DCM [DRN] 8.6.7 Critical HST Structures/Facilities DCM [DRN] 8.3 Policies
	3.3.2.2 Wayside/Field Equipment	
IF 3304	3.3.2.2.1 Interface between SYS ATC Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC wayside/field equipment (not trackside) spatial requirements have been addressed by the INF team.	DCM [ATC] 24.3.12 Hardware Requirements DCM [ATC] 24.8 Wayside Equipment DCM [ATC] 24.8.1 Signals DCM [ATC] 24.8.2 Wayside Signs DCM [ATC] 24.8.3 Track Circuits DCM [ATC] 24.8.7 Switch Machines DCM [ATC] 24.8.8 Equipment Enclosures DD-TC-009 SIGNAL SYSTEMS, TYPICAL DWARF SIGNAL LAYOUT DD-TC-011 SWITCH LAYOUT-MAIN LINE-HIGH SPEED-TYPICAL DCM [STR] 12.14.6 Trackside Equipment DCM [TUN] 13.3.5 Clearances DCM [TUN] 13.3.10 Equipment Requirements and Tunnel Niches DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.6.4 Space Around Turnouts DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels

ID	Interface	Document Reference(s)
		DD-ST-100 TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK DD-ST-120 TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY DD-TN-111 TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT DD-TN-113 TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS
IF 5627	3.3.2.2.2 <i>Interface between SYS ATC Wayside/Field Equipment Foundation Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC wayside/field equipment foundation requirements have been addressed by the INF team.	DCM [ATC] 24.3 General Design Requirements DCM [ATC] 24.3.12 Hardware Requirements DCM [ATC] 24.8.1 Signals DCM [ATC] 24.8.2 Wayside Signs DCM [ATC] 24.8.3 Track Circuits DCM [ATC] 24.8.7 Switch Machines DCM [ATC] 24.8.8 Equipment Enclosures DD-TC-009 SIGNAL SYSTEMS, TYPICAL DWARF SIGNAL LAYOUT DD-TC-011 SWITCH LAYOUT-MAIN LINE-HIGH SPEED-TYPICAL DCM [STR] 12.14.6 Trackside Equipment DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports
	3.3.2.3 Conduits & Cables	
IF 876	3.3.2.3.1 <i>Interface between SYS ATC Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC conduit, duct bank, cable trough & manhole requirements have been addressed by the INF team, including but not limited to:	DCM [ATC] 24.3.12 Hardware Requirements DCM [ATC] 24.8.10 Cables, Cable Trough, and Conduit DCM [ATC] 24.8.13 Signal Power DCM [COM] 28.5.6 Systems Conduits at Track

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
	<ul style="list-style-type: none"> • Track circuits & cases • Signals • Transponder & LEU • Cross bonding • Signal power supply • Signal power distribution • ... 	<p>DD-SY-010 TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES</p> <p>DD-CO-G013 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, SYSTEMS LOW VOLTAGE MANHOLE AND UNDERGROUND, DUCTBANK PATHWAYS AERIAL</p> <p>DD-TC-004 STATION INTERLOCKING LAYOUT, TYPICAL TROUGHS AND CONDUITS, AND UNDERTRACK CROSSINGS</p> <p>DD-TC-005 UNIVERSAL INTERLOCKING LAYOUT, TYPICAL DUCTBANK AND CONDUIT</p> <p>DCM [CIV] 7.7.7 Walkways and Cable Trough</p> <p>DCM [STR] 12.14.1 Cable Trough</p> <p>DCM [STR] 12.14.4 Conduit Risers</p> <p>DCM [STR] 12.14.5 Embedded Conduits</p> <p>DCM [TUN] 13.15.3 Embedded Conduit and Cable Trough</p> <p>DCM [TUN] 13.15.5 Design Requirements for Cable Troughs</p> <p>DCM [UTL] 9.4.1 Electrical</p> <p>DCM [UTL] 9.4.1.1 Duct Banks</p> <p>DCM [UTL] 9.4.1.2 Manholes and Handholes</p> <p>DCM [UTL] 9.5.4.5 Placement</p> <p>DCM [UTL] 9.5.4.6 Carrier Pipes</p> <p>DCM [CLR] 3.4 Vehicle Clearance Envelopes</p> <p>DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section</p> <p>DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels</p> <p>DD-CV- 100 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>DD-ST-901 TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>DD-CO-G014 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, SYSTEMS LOW VOLTAGE MANHOLE AND UNDERGROUND, DUCTBANK PATHWAYS TRENCH</p>

ID	Interface	Document Reference(s)
		DD-CO-G015 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, CABLE TROUGH, CIC, END DEVICE PATHWAYS AT-GRADE DD-ST-100 TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK DD-ST-900 TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE DD-ST-903 TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE DD-ST-120 TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY DD-ST-902 CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL DD-ST-904 CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-FRADE / CUT & COVER TUNNEL DD-CO-G016 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, CABLE TROUGH, CIC, END DEVICE PATHWAYS AERIAL DD-TN-113 TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS
	3.3.2.4 Dead & Live Loads	
IF 3017	3.3.2.4.1 Interface between SYS ATC System Dead Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS ATC system dead load requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Wayside facilities 	DCM [ATC] 24.8 Wayside Equipment DCM [STR] 12.5.1.1 Dead Load (DC, DW) DCM [STR] 12.5.3.1 Loads and Load Combinations for Design of the Surrounding Area of the Embedded Sleeves of Overhead Contact System Pole Foundation
	3.3.2.5 Utilities	
IF 2611	3.3.2.5.1 Interface between SYS ATC System Utility Spatial Requirements and GWY Infrastructure	

ID	Interface	Document Reference(s)
	<u>Purpose/Scope:</u> Ensures that the SYS ATC system utility spatial requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Electrical utility (e.g. PG&E) • Gas/fuel • Water • Sewer • Communications 	DCM [ATC] 24.3.12 Hardware Requirements DCM [ATC] 24.8.13 Signal Power DCM [ATC] 24.8.15 Wayside Interfaces DCM [UTL] 9.4.1 Electrical DCM [UTL] 9.4.1.3 Service Connections
	3.4 Communications	
	3.4.1 Interfaces with Operations & Maintenance	
	3.4.1.1 Maintenance	
IF 5871	3.4.1.1.1 Interface between O&M MoI COM Equipment Shelter & Radio Tower Site Access Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the O&M MoI COM equipment shelter & radio tower site access requirements have been addressed by the INF team.	DD-CO-F090 STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.3.2 Train Control, Communications and Traction Power Facilities DCM [CIV] 7.7.1.1 Access Roads DD-CV-901 FENCE AND GATES LOCATIONS DD-CV-900 FENCE AND GATE DETAILS DD-SY-010 TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES
	3.4.2 Interfaces with Guideway (excl. Trackwork)	
	3.4.2.1 Equipment Shelter (Sites)	
IF 5653	3.4.2.1.1 Interface between SYS COM Equipment Shelter & Radio Tower Site Location Requirements and GWY	

ID	Interface	Document Reference(s)
	<i>Infrastructure</i>	
	<p><u>Purpose/Scope:</u> Ensures that the SYS COM equipment shelter & radio tower site location (where to install, not size) requirements have been addressed by the INF team.</p>	<p>DCM [COM] 28.4.5.1 Operations Radio System DCM [COM] 28.4.5.3 Broadband Radio System DCM [COM] 28.5.4 Standalone Radio Sites DD-TP-D101 CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH TWO HIGH-VOLTAGE TRANSFORMERS DD-TP-D102 CONCEPTUAL LAYOUT TRACTION POWER SUBSTATION WITH THREE HIGH-VOLTAGE TRANSFORMERS DD-TP-D201 CONCEPTUAL LAYOUT SWITCHING STATION DD-TP-D301 CONCEPTUAL LAYOUT PARALLELING STATION DD-CO-C001 COMMUNICATIONS SYSTEMS SITES AND LOCATIONS OVERVIEW DD-CO-F090 STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F091 CO-LOCATED RADIO SITE COMMUNICATIONS SPACES, SITE LAYOUT DD-CO-H001 STANDALONE RADIO SITE, PLACEMENT RULES DD-TC-025 TYPICAL INTERLOCKING AT STATIONS DD-TC-026 TYPICAL UNIVERSAL INTERLOCKING LAYOUT</p>
IF 904	<p>3.4.2.1.2 Interface between SYS COM Equipment Shelter & Radio Tower Site Spatial Requirements and GWY Infrastructure</p>	
	<p><u>Purpose/Scope:</u> Ensures that the SYS COM equipment shelter & radio tower site spatial requirements have been addressed by the INF team.</p>	<p>DCM [COM] 28.4.1.4 General Communications Systems Physical, Enclosure and Power DCM [COM] 28.5.3 Communications Shelters DCM [COM] 28.5.4 Standalone Radio Sites DD-CO-F070 SIGNALING EQUIPMENT HOUSE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F080 TRACTION POWER FACILITY, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F110 TUNNEL CROSS PASSAGE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT</p>

ID	Interface	Document Reference(s)
		DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.8.3.2 Train Control, Communications and Traction Power Facilities DCM [CIV] 7.7.1.1 Access Roads DD-CV-900 FENCE AND GATE DETAILS DCM [DRN] 8.6.7 Critical HST Structures/Facilities DCM [IPR] 6.3 Protection of HST Operating Infrastructure from Vehicle Intrusion DCM [CLR] 3.3.2 Horizontal Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DD-CO-F090 STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F091 CO-LOCATED RADIO SITE COMMUNICATIONS SPACES, SITE LAYOUT
IF 1048	3.4.2.1.3 Interface between SYS COM Equipment Shelter & Radio Tower Site Foundation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM equipment shelter & radio tower site foundation requirements have been addressed by the INF team.	DCM [COM] 28.5.5 Radio Towers DD-CO-F070 SIGNALING EQUIPMENT HOUSE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F080 TRACTION POWER FACILITY, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F090 STANDALONE RADIO SITE, COMMUNICATIONS SPACES, PHYSICAL SITE LAYOUT DD-CO-F091 CO-LOCATED RADIO SITE COMMUNICATIONS SPACES, SITE LAYOUT DCM [STR] 12.7.2 Foundations for Equipment Enclosures DCM [DRN] 8.6.7 Critical HST Structures/Facilities DCM [DRN] 8.3 Policies
	3.4.2.2 Wayside/Field Equipment	
IF 600	3.4.2.2.1 Interface between SYS COM Wayside/Field	

ID	Interface	Document Reference(s)
	<p data-bbox="457 240 972 305" style="text-align: center;"><i>Equipment Spatial Requirements and GWY Infrastructure</i></p> <p data-bbox="323 326 1020 423"><u>Purpose/Scope:</u> Ensures that the SYS COM wayside/field equipment spatial requirements have been addressed by the INF team.</p>	<p data-bbox="1108 326 1892 386">DCM [COM] 28.4.1.4 General Communications Systems Physical, Enclosure and Power</p> <p data-bbox="1108 396 1934 423">DCM [COM] 28.4.1.5 General Communications Systems End-Devices</p> <p data-bbox="1108 433 1934 493">DCM [COM] 28.4.5.2 Operations Radio System at Trench and Tunnel Locations</p> <p data-bbox="1108 503 1934 563">DCM [COM] 28.4.5.4 Broadband Radio System at Trench and Tunnel Locations</p> <p data-bbox="1108 573 1927 600">DCM [COM] 28.4.5.5 Public Safety Trench and Tunnel Radio System</p> <p data-bbox="1108 610 1919 670">DCM [COM] 28.4.5.6 Radio Interoperability with External Agencies and First Responders</p> <p data-bbox="1108 680 1646 708">DCM [COM] 28.4.11.1 Telephone Subsystem</p> <p data-bbox="1108 717 1776 745">DCM [COM] 28.5.2 Communications Interface Cabinets</p> <p data-bbox="1108 755 1455 782">DD-CO-F100 WAYSIDE CIC</p> <p data-bbox="1108 792 1604 820">DCM [STR] 12.14.6 Trackside Equipment</p> <p data-bbox="1108 829 1478 857">DCM [TUN] 13.3.5 Clearances</p> <p data-bbox="1108 867 1892 894">DCM [TUN] 13.3.10 Equipment Requirements and Tunnel Niches</p> <p data-bbox="1108 904 1650 932">DCM [CLR] 3.4 Vehicle Clearance Envelopes</p> <p data-bbox="1108 941 1850 1002">DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section</p> <p data-bbox="1108 1011 1850 1071">DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels</p> <p data-bbox="1108 1081 1934 1174">DD-ST-100 TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p data-bbox="1108 1183 1885 1243">DD-ST-120 TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY</p> <p data-bbox="1108 1253 1934 1281">DD-TN-111 TYPICAL TUNNEL NICHE DETAIL - ATC EQUIPMENT</p> <p data-bbox="1108 1291 1934 1351">DD-TN-113 TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS</p>
IF 5725	<p data-bbox="323 1364 1020 1429">3.4.2.2.2 <i>Interface between SYS COM Wayside/Field Equipment Foundation Requirements and GWY</i></p>	

ID	Interface	Document Reference(s)
	<i>Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS COM wayside/field equipment foundation requirements have been addressed by the INF team.	DCM [COM] 28.4.1.4 General Communications Systems Physical, Enclosure and Power DCM [COM] 28.4.1.5 General Communications Systems End-Devices DCM [COM] 28.5.2 Communications Interface Cabinets DD-CO-F100 WAYSIDE CIC DCM [STR] 12.14.6 Trackside Equipment DCM [STR] 12.8.9 OCS Pole and Traction Power Facility Gantry Supports
	3.4.2.3 Conduits & Cables	
IF 877	3.4.2.3.1 Interface between SYS COM Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM conduit, duct bank, cable trough & manhole requirements have been addressed by the INF team.	DCM [COM] 28.4.6 Cable Infrastructure DCM [COM] 28.4.6.4 Cable Infrastructure Physical, Enclosure and Power DCM [COM] 28.4.6.5 Cable Infrastructure End-Devices DCM [COM] 28.5.6 Systems Conduits at Track DD-SY-010 TYPICAL CIVIL ACCOMMODATIONS FOR SYSTEMS, AT SYSTEM SITES, STATIONS, TUNNEL PORTAL FACILITIES AND O&M FACILITIES DD-CO-F002 PHYSICAL SITE LAYOUT, TYPICAL CONNECTIVITY, BETWEEN COMMUNICATIONS SPACES DD-CO-F003 PHYSICAL SITE LAYOUT, TYPICAL CONNECTIVITY AT WAYSIDE SITES DD-CO-G013 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, SYSTEMS LOW VOLTAGE MANHOLE AND UNDERGROUND, DUCTBANK PATHWAYS AERIAL DD-TC-004 STATION INTERLOCKING LAYOUT, TYPICAL TROUGHS AND CONDUITS, AND UNDERTRACK CROSSINGS DD-TC-005 UNIVERSAL INTERLOCKING LAYOUT, TYPICAL DUCTBANK AND CONDUIT

ID	Interface	Document Reference(s)
		<p>DCM [CIV] 7.7.7 Walkways and Cable Trough</p> <p>DCM [STR] 12.14.1 Cable Trough</p> <p>DCM [STR] 12.14.4 Conduit Risers</p> <p>DCM [STR] 12.14.5 Embedded Conduits</p> <p>DCM [TUN] 13.15.3 Embedded Conduit and Cable Trough</p> <p>DCM [TUN] 13.15.5 Design Requirements for Cable Troughs</p> <p>DCM [UTL] 9.4.1 Electrical</p> <p>DCM [UTL] 9.4.1.1 Duct Banks</p> <p>DCM [UTL] 9.4.1.2 Manholes and Handholes</p> <p>DCM [UTL] 9.5.4.5 Placement</p> <p>DCM [UTL] 9.5.4.6 Carrier Pipes</p> <p>DCM [CLR] 3.4 Vehicle Clearance Envelopes</p> <p>DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section</p> <p>DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels</p> <p>DD-CV- 100 TYPICAL CROSS SECTION, TWO TRACK NON-BALLASTED, EMBANKMENT</p> <p>DD-ST-901 TYPICAL CABLE TROUGH DETAILS, EMBANKMENT/CUT</p> <p>DD-CO-G014 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, SYSTEMS LOW VOLTAGE MANHOLE AND UNDERGROUND, DUCTBANK PATHWAYS TRENCH</p> <p>DD-CO-G015 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, CABLE TROUGH, CIC, END DEVICE PATHWAYS AT-GRADE</p> <p>DD-ST-100 TYPICAL CROSS SECTION, AERIAL STRUCTURE, TWO TRACK NON-BALLASTED, TYPICAL CONFIGURATION ON TOP OF DECK</p> <p>DD-ST-900 TYPICAL CABLE TROUGH DETAILS , AERIAL STRUCTURE</p> <p>DD-ST-903 TYPICAL CABLE TROUGH DETAIL, AERIAL STRUCTURE, AT OCS POLE</p>

ID	Interface	Document Reference(s)
		DD-ST-120 TYPICAL CROSS SECTION, TWO TRACK TRENCH, OUTSIDE WALKWAY DD-ST-902 CABLE TROUGH DETAILS, TRENCH / CUT AND COVER TUNNEL DD-ST-904 CABLE TROUGH LAYOUT TRANSITION AREAS. AERIAL STRUCTURE / AT-FRADE / CUT & COVER TUNNEL DD-CO-G016 COMMUNICATION TYPICAL DEVICE AND INSTALLATION, CABLE TROUGH, CIC, END DEVICE PATHWAYS AERIAL DD-TN-113 TYPICAL TUNNEL NICHE DETAIL - ATC SIGNALING AND COMMUNICATION SYSTEMS
	3.4.2.4 Air Gaps	
IF 657	3.4.2.4.1 Interface between SYS COM Air Gap Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM air gap requirements have been addressed by the INF team.	DCM [COM] 28.4.1.5 General Communications Systems End-Devices DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
	3.4.2.5 Dead & Live Loads	
IF 3016	3.4.2.5.1 Interface between SYS COM System Dead Load Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS COM system dead load requirements have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • Wayside facilities 	DCM [COM] 28.4.1.4 General Communications Systems Physical, Enclosure and Power DCM [COM] 28.4.1.5 General Communications Systems End-Devices DCM [COM] 28.5.2 Communications Interface Cabinets DCM [COM] 28.5.6.2 Aerial Cable Conduits DCM [STR] 12.5.1.1 Dead Load (DC, DW) DCM [STR] 12.5.3.1 Loads and Load Combinations for Design of the Surrounding Area of the Embedded Sleeves of Overhead Contact System Pole Foundation

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
	3.5 Grounding & Bonding	
	3.5.1 Interfaces with Guideway (excl. Trackwork)	
	3.5.1.1 Systemwide	
IF 4252	3.5.1.1.1 Interface between SYS Conduit, Duct Bank, Cable Trough & Manhole Requirements G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS conduit, duct bank, cable trough & manhole grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.3 General Grounding and Bonding Requirements DCM [G&B] 22.8.1 General Requirements DCM [G&B] 22.10 Grounding Requirements for Raceway, Cable Tray, Underground Ductbanks, and Structures DCM [G&B] 22.11.1 General DCM [G&B] 22.11.4 Facility Power System and Lighting System DCM [G&B] 22.11.5 Cable Trough and Outside Plant DCM [STR] 12.14.2 Grounding and Bonding
	3.5.1.2 At-Grade	
IF 1141	3.5.1.2.1 Interface between SYS At-Grade G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS at-grade grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.5.12 Fence and Gate Grounding DCM [CIV] 7.8.1.1 Fences DCM [CIV] 7.8.1.5 Gates DD-CV-900 FENCE AND GATE DETAILS
	3.5.1.3 Aerial Structures	
IF 4071	3.5.1.3.1 Interface between SYS Aerial Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS aerial structure grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.5.3 Grounding and Bonding of Structures - General DCM [G&B] 22.5.4.1 Concrete Structures DCM [G&B] 22.5.4.2 Steel Structures DCM [G&B] 22.5.11 Screen/Noise/Wind/Safety Barriers DCM [STR] 12.14.2 Grounding and Bonding

ID	Interface	Document Reference(s)
		DD-OC-2047 TYPICAL GROUNDING AND BONDING ARRANGEMENT, AERIAL STRUCTURE, 220 MPH SEGMENT
IF 4112	3.5.1.3.2 <i>Interface between SYS New Overpass Structure G&B Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS new overpass structure grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.5.8 New Overpasses DCM [G&B] 22.5.11 Screen/Noise/Wind/Safety Barriers DCM [G&B] 22.6.3 Overhead Contact System DCM [STR] 12.14.2 Grounding and Bonding DD-OC-2046 TYPICAL GROUNDING AND BONDING ARRANGEMENT, GRADE SEPARATED STRUCTURE, 220 MPH SEGMENT
	3.5.1.4 Trench Structures	
IF 4122	3.5.1.4.1 <i>Interface between SYS Trench Structure G&B Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS trench structure grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.5.11 Screen/Noise/Wind/Safety Barriers DCM [STR] 12.14.2 Grounding and Bonding DD-OC-2049 GROUNDING AND BONDING ARRANGEMENT, OPEN TRENCH, 220 MPH SEGMENT
IF 5796	3.5.1.4.2 <i>Interface between SYS Cut & Cover Tunnel Structure G&B Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS cut & cover tunnel structure grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.5.10 Tunnels DCM [STR] 12.14.2 Grounding and Bonding DD-OC-2048 TYPICAL GROUNDING AND BONDING ARRANGEMENT, CUT AND COVER TUNNEL, 220 MPH SEGMENT
	3.5.1.5 Utilities	
IF 3999	3.5.1.5.1 <i>Interface between SYS Utility G&B Requirements and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the SYS utility grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.3.1 General Facility Grounding DCM [G&B] 22.5.13 Third-Party Grounding Interface DCM [G&B] 22.9 Grounding and Bonding Requirements for Facility Power Systems and Lighting Systems

ID	Interface	Document Reference(s)
		DCM [G&B] 22.12 Grounding and Bonding Requirements for Utilities DCM [UTL] 9.5.4.7 Casings DCM [UTL] 9.5.5.7 Overhead Utilities
	3.5.1.6 External	
IF 4107	3.5.1.6.1 Interface between SYS Existing Overpass Structure G&B Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the SYS existing overpass structure grounding & bonding requirements have been addressed by the INF team.	DCM [G&B] 22.5.7 Existing Overpasses DCM [G&B] 22.5.11 Screen/Noise/Wind/Safety Barriers DCM [G&B] 22.6.3 Overhead Contact System DCM [STR] 12.14.2 Grounding and Bonding DD-OC-2046 TYPICAL GROUNDING AND BONDING ARRANGEMENT, GRADE SEPARATED STRUCTURE, 220 MPH SEGMENT
	4 Rolling Stock	
	4.1 HST Trainset	
	4.1.1 Interfaces with Guideway (excl. Trackwork)	
	4.1.1.1 Track Alignment	
IF 392	4.1.1.1.1 Interface between RST HST Trainset Minimum Horizontal Radii Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset minimum horizontal radii requirements have been addressed by the INF team.	10 RST Specs 2.10 Major Dimensions/Attributes DCM [ALG] 4.4.3 Minimum Radii DCM [ALG] 4.14 Access Tracks to Yards and Maintenance Facilities DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.4.3 Effects Due to Curve Radius DCM [CLR] 3.5.1 Effect of Small Radii DCM [CLR] 3.7.2 Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section

ID	Interface	Document Reference(s)
		DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
IF 6587	4.1.1.1.2 Interface between RST HST Trainset Minimum Vertical Radii Requirements and GWY Infrastructure	
IF 489	4.1.1.1.3 Interface between RST HST Trainset Actual Superelevation Requirements (incl. Tilting) and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset actual superelevation requirements have been addressed by the INF team.	10 RST Specs 2.3 Design of Trains (5-01.2) 10 RST Specs 22.1 Static Gauge and Dynamic Envelopes 10 RST Specs 22.3 Dynamic Envelope (SR5-03.1) DCM [ALG] 4.4.5.2 Actual Superelevation DCM [CLR] 3.3.1 Vertical Clearances DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.4.4 Effects of Superelevation DCM [CLR] 3.5.2 Effect of Superelevation on Track Centers DCM [CLR] 3.7.2 Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
IF 395	4.1.1.1.4 Interface between RST HST Trainset Unbalanced Superelevation Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset unbalanced superelevation requirements have been addressed by the INF team.	10 RST Specs 7.10.1 General DCM [ALG] 4.4.5.3 Unbalanced Superelevation
IF 70	4.1.1.1.5 Interface between RST HST Trainset Maximum Grade Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u>	10 RST Specs 10.6 Maximum Gradients (SR 5-03.6)

<i>ID</i>	<i>Interface</i>	<i>Document Reference(s)</i>
	Ensures that the RST HST trainset maximum grade requirements have been addressed by the INF team.	DCM [ALG] 4.5.1 Maximum Grades
	4.1.1.2 Vehicle Static Gauge & Dynamic Envelope	
IF 490	4.1.1.2.1 Interface between RST HST Trainset Static Gauge Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset static gauge requirements have been addressed by the INF team.	10 RST Specs 2.3 Design of Trains (5-01.2) 10 RST Specs 2.10 Major Dimensions/Attributes 10 RST Specs 22.1 Static Gauge and Dynamic Envelopes 10 RST Specs 22.2 Static Gauge (SR5-03.1) DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.1 Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM [CLR] 3.7.2 Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation
IF 481	4.1.1.2.2 Interface between RST HST Trainset Dynamic Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset dynamic envelope requirements have been addressed by the INF team.	10 RST Specs 2.3 Design of Trains (5-01.2) 10 RST Specs 22.1 Static Gauge and Dynamic Envelopes 10 RST Specs 22.3 Dynamic Envelope (SR5-03.1) DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.7.1 Appendix 3.A High-Speed Equipment Only, Static Envelope and Dynamic Envelope, Tangent Track DCM [CLR] 3.7.2 Appendix 3.B High-Speed Equipment Only, Static Envelope and Dynamic Envelope Swept Path of Vehicle Rotated for Superelevation
	4.1.1.3 Aerodynamic Effects	
IF 604	4.1.1.3.1 Interface between RST HST Trainset Aerodynamic Effects and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset aerodynamic effects have	10 RST Specs 5.16 Carbody Aerodynamic Provisions 10 RST Specs 5.16.1 Aerodynamic Loads on Track Workers at the Line

ID	Interface	Document Reference(s)
	been addressed by the INF team.	Side (5-06.3) 10 RST Specs 5.16.3 Pressure Loads in Open Air (5-06.5) 10 RST Specs 5.18 Tables DCM [CIV] 7.8.1.2 Walls DCM [STR] 12.5.2.7 Slipstream Effects (SS) DCM [STR] 12.7.1.7 Slipstream Effects from Passing Trains DCM [STR] 12.8.6.17 Walkways, Parapets, and Sound Walls DCM [STR] 12.8.8 Emergency Access DCM [TUN] 13.1 Scope DCM [TUN] 13.2 Regulations, Codes, Standards, and Guidelines DCM [TUN] 13.3.11 Rolling Stock DCM [TUN] 13.3.12 Aerodynamic Considerations DCM [TUN] 13.4 Tunnel Portals DCM [TUN] 13.4.1 Sonic Booms at Tunnel Portals DCM [TUN] 13.8.6 Aerodynamic forces DCM [TUN] 13.16.2 Noise Mitigation Hood DCM [CLR] 3.4 Vehicle Clearance Envelopes DCM [CLR] 3.5 Track Center Spacing DCM [CLR] 3.7.3 Appendix 3.C High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, Open Section DCM [CLR] 3.7.4 Appendix 3.D High-Speed Equipment Only, Structure Gauge and Fixed Equipment Envelope, In Tunnels
	4.1.1.4 Loads & Forces	
IF 1073	4.1.1.4.1 Interface between RST HST Trainset Axle Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset axle loads have been addressed by the INF team.	10 RST Specs 2.5 Static Axle Load (5-03.2) DCM [STR] 12.5.2.1 Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM [STR] 12.6.6.1 High Speed Train Loading (LLV) DCM [TUN] 13.9.5 Fatigue Analysis DCM [UTL] 9.5.4.5 Placement
IF 3457	4.1.1.4.2 Interface between RST HST Trainset Dynamic Train-Structure Interaction Analysis and GWY	

ID	Interface	Document Reference(s)
	<i>Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset dynamic train-structure interaction has been addressed by the INF team.	TM 6.1 3.1.1 ANALYSIS DCM [STR] 12.6 Track-Structure Interaction DCM [STR] 12.6.6 Dynamic Structural Analysis DCM [STR] 12.6.6.1 High Speed Train Loading (LLV) DCM [STR] 12.6.7.1 Dynamic Vehicle-Train-Structure Interaction Analysis Requirements DCM [TUN] 13.9.3 Dynamic Analysis
IF 3180	<i>4.1.1.4.3 Interface between RST HST Trainset Traction & Braking Forces and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset traction and braking forces have been addressed by the INF team.	10 RST Specs 10.4 Mean Acceleration (SR 5-08.1) 10 RST Specs 10.34 Tables 10 RST Specs 11.6 Minimum Braking Performance (5-04.1) 10 RST Specs 11.7 Service Braking Performance (5-04.4) 10 RST Specs 11.29 Tables DCM [STR] 12.5.2.4 Traction and Braking Forces (LF) DCM [TUN] 13.9.3 Dynamic Analysis
IF 3185	<i>4.1.1.4.4 Interface between RST HST Trainset Nosing & Hunting Effects and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset nosing and hunting effects have been addressed by the INF team.	10 RST Specs 7.10.10 Design for Vehicle Stability DCM [STR] 12.5.2.5 Nosing and Hunting Effects (NE)
IF 3227	<i>4.1.1.4.5 Interface between RST HST Trainset Derailment/Collision Loads and GWY Infrastructure</i>	
	<u>Purpose/Scope:</u> Ensures that the RST HST trainset derailment/collision loads have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • HST structures • Trench structures • Other than station & platform structures • Beyond end of track structures 	10 RST Specs 2.5 Static Axle Load (5-03.2) DCM [STR] 12.5.2.13 Derailment Loads (DR) DCM [STR] 12.5.2.14 Collision Loads (CL) DCM [TUN] 13.9 Structural Analysis

ID	Interface	Document Reference(s)
	5 Guideway (excl. Trackwork)	
	5.1 Drainage	
	5.1.1 Interfaces with Operations & Maintenance	
	5.1.1.1 Maintenance	
IF 1260	5.1.1.1.1 <i>Interface between O&M MoI Pump Station Site Access Requirements and GWY Infrastructure</i>	
	<p><u>Purpose/Scope:</u> Ensures that the O&M MoI pump station site access requirements have been addressed by the INF team.</p>	<p>10 MoI CnR Rev 2012-02-11 2 CHST Infrastructure System And Maintainability 10 MoI CnR Rev 2012-02-11 2.5 Structures 10 MoI CnR Rev 2012-02-11 9.4 Right of Way Access DCM [CIV] 7.7.5.1 Parking Facilities for Wayside Facilities DCM [CIV] 7.8.1.5 Gates DCM [CIV] 7.7.1.1 Access Roads DD-CV-901 FENCE AND GATES LOCATIONS DD-CV-900 FENCE AND GATE DETAILS DCM [STR] 12.10.7 Trench Drainage DCM [TUN] 13.15.6 Fencing DCM [TUN] 13.16.4.2 Fixed Facility Power DCM [TUN] 13.16.5 Access Road DCM [TUN] 13.16.21 Parking for Tunnel Maintenance and Traction Power Facility DCM [DRN] 8.6.4 Tunnels DCM [DRN] 8.6.6 Trenches DD-TN-400 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, PLAN DD-TN-401 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE TWIN TUNNEL CONFIGURATION, ELEVATION DD-TN-406 TYPICAL TUNNEL PORTAL FACILITIES-BELOW GRADE, PORTAL ARRANGEMENT SHOWING MAXIMUM FACILITIES, FOR SINGLE TRACK TWIN BORED TUNNEL, PLAN DD-TN-407 TYPICAL TUNNEL PORTAL FACILITIES-BELOW</p>

ID	Interface	Document Reference(s)
		GRADE, PORTAL ARRANGEMENT SHOWING MAXIMUM FACILITIES, FOR SINGLE TRACK TWIN BORED TUNNEL, FRONT ELEVATION DD-TN-403 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, PLAN DD-TN-404 TYPICAL TUNNEL PORTAL FACILITIES, AT GRADE SINGLE TUNNEL CONFIGURATION, FRONT ELEVATION
	6 External	
	6.1 Amtrak	
	6.1.1 Interfaces with Guideway (excl. Trackwork)	
	6.1.1.1 Vehicle Static Gauge & Dynamic Envelope	
IF 3764	6.1.1.1.1 Interface between EXT Amtrak Trainset Dynamic Envelope Requirements and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset dynamic envelope requirements have been addressed by the INF team.	DCM [CLR] 3.1 Scope DCM [CLR] 3.4 Vehicle Clearance Envelopes
	6.1.1.2 Loads & Forces	
IF 3706	6.1.1.2.1 Interface between EXT Amtrak Trainset Axle Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset axle loads have been addressed by the INF team.	DCM [STR] 12.5.2.1 Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM [STR] 12.5.2.1.5 Amtrak Live Loads DCM [UTL] 9.5.4.5 Placement
IF 3683	6.1.1.2.2 Interface between EXT Amtrak Trainset Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset dynamic train-structure interaction has been addressed by the INF team.	DCM [STR] 12.6 Track-Structure Interaction DCM [STR] 12.6.8 Modeling Requirements
IF 3537	6.1.1.2.3 Interface between EXT Amtrak Trainset Derailment/Collision Loads and GWY Infrastructure	

ID	Interface	Document Reference(s)
	<u>Purpose/Scope:</u> Ensures that the EXT Amtrak trainset derailment/collision loads have been addressed by the INF team, including but not limited to: <ul style="list-style-type: none"> • HST structures • Trench structures 	DCM [STR] 12.5.2.13 Derailment Loads (DR) DCM [STR] 12.5.2.13.2 Track Side Containment DCM [STR] 12.5.2.14 Collision Loads (CL)
	6.2 Construction Equipment	
	6.2.1 Interfaces with Guideway (excl. Trackwork)	
	6.2.1.1 Loads & Forces	
IF 3701	6.2.1.1.1 Interface between EXT Construction Equipment Axle Loads and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT construction equipment axle loads have been addressed by the INF team.	DCM [STR] 12.4.1 Structural Design Parameters DCM [STR] 12.5.2.1 Live Loads (LLP, LLV, LLRR, LLH, LLS) DCM [STR] 12.5.2.1.4 Maintenance and Construction Train Live Loads: Cooper E-50 Loading (LLRR) DCM [STR] 12.5.3.3 Construction Loads and Temporary Structures DCM [STR] 12.8.5.3 Crack Control DCM [UTL] 9.5.4.5 Placement
IF 3673	6.2.1.1.2 Interface between EXT Construction Equipment Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	
	<u>Purpose/Scope:</u> Ensures that the EXT construction equipment dynamic train-structure interaction has been addressed by the INF team.	DCM [STR] 12.6 Track-Structure Interaction DCM [STR] 12.6.8 Modeling Requirements

APPENDIX D – Initial RVTM and Submittal Type Allocation

RFP No. HSR 14-32 – INITIAL RELEASE - 05/27/2015





California High-Speed Rail Program

CP4 DCM CH07

RFP No. HSR 14-32 – INITIAL RELEASE - 05/27/2015

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DCM.07.3	7.1 Regulations, Codes, Standards, and Guidelines	CIV UTL STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.4	7.2 Grading, Side Slopes, and Retaining Walls for Roadways and Sites	CIV STR	Design Baseline Report HST AT-Grade (Guideway) Reports and/or calculations
DCM.07.5	7.2.1 Side Slopes	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.6	7.3 Construction Site Best Management Practices	GEN	Design Baseline Report Reports and/or calculations
DCM.07.7	7.4 Slope/Surface Protection Systems Best Management Practices	CIV STR	Design Baseline Report HST AT-Grade (Guideway) Reports and/or calculations
DCM.07.8	Figure 7-1: Slope Rounding, Stepping, Terracing, and Contouring	CIV STR	Design Baseline Report HST AT-Grade (Guideway) Reports and/or calculations
DCM.07.9	7.5 Site Work – Non-Authority Facilities	---	---
DCM.07.10	7.5.1 Roadways	CIV STR	Design Baseline Report RDW Underpass RDW Overhead
DCM.07.11	7.5.2 Traffic Control Devices	CIV	Design Baseline Report RDW Underpass RDW Overhead
DCM.07.12	7.5.3 Sidewalk, Driveways, Curb Cuts	CIV	Design Baseline Report RDW Underpass RDW Overhead
DCM.07.14	7.6 Site Work – Authority Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.15	7.6.1 Authority Roadways	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge
DCM.07.16	7.6.1.1 Access Roads	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway)

Req. ID	Doc. Section and Doc. Language	ENG	SUB
DCM.07.17	Figure 7-2: Access Road Dead End Turn-Around (Emergency Vehicle Staging)	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.18	7.6.1.2 Service Roads	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.20	7.6.2 Site and Roadway Geometrics	---	---
DCM.07.21	7.6.2.1 Grades	---	---
DCM.07.22	7.6.2.1.1 Parking Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.23	7.6.2.1.2 Roadways within Authority and Parking Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.24	7.6.2.1.3 Maximum Grade Differential for Roadways within Authority and Parking Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.25	7.6.2.2 Design Speeds	---	---
DCM.07.26	7.6.2.2.1 Access Roadways	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.27	7.6.2.2.2 Roadways within Authority Facilities and Parking Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.28	7.6.2.3 Clearances	CLR UTL	---
DCM.07.29	7.6.2.3.1 All Authority Roadways	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Tunnel/Cut and Cover HST Open Trench
DCM.07.30	7.6.2.3.2 Parking Facilities	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.31	7.6.2.4 Vertical Curves on Authority Roadways	CIV STR	Design Baseline Report HST AT-Grade (Guideway)

Req. ID	Doc. Section and Doc. Language	ENG	SUB
DCM.07.32	7.6.2.5 Sight Distance at Intersections	CIV	Design Baseline Report
DCM.07.33	7.6.2.6 Curbs and Gutters	CIV	Design Baseline Report
DCM.07.34	7.6.2.7 Pavement	---	---
DCM.07.35	7.6.2.7.1 Roadbed Design	CIV	Specification
DCM.07.36	7.6.2.7.2 Structural Design of the Roadbed	CIV	Specification
DCM.07.37	7.6.2.7.3 Other Paved Areas - Roadbed Design	CIV	Specification
DCM.07.38	7.6.3 Traffic Control Devices	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.40	7.6.4 Parking	---	n/a
DCM.07.43	7.6.4.1 Parking Facilities for Wayside Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.47	7.6.5 Sidewalks and Driveways	---	---
DCM.07.49	7.6.5.1 Driveways	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.50	7.6.6 Walkways and Cable Trough	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.55	7.6.7 Crosswalks	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.56	7.6.8 Emergency Stairs	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.57	7.6.9 Maintenance Access	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench

Req. ID	Doc. Section and Doc. Language	ENG	SUB
DCM.07.58	7.6.9.1 ---	---	---
DCM.07.59	7.6.9.1.1 Aerial Structures	STR	Design Baseline Report HST Aerial Structure and/or Bridge
DCM.07.60	7.6.9.1.2 Underground Structures	STR	Design Baseline Report HST Open Trench
DCM.07.61	7.6.9.1.3 Retained Fill or Cut Structures	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.62	7.6.9.1.4 At-Grade	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.64	7.7 Access Control Devices	---	---
DCM.07.65	7.7.1 Access Control	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass RDW Overhead
DCM.07.66	7.7.1.1 Fences	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass RDW Overhead
DCM.07.67	7.7.1.1.1 Access Restriction Fencing	CLR CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass RDW Overhead Specification
DCM.07.68	7.7.1.1.2 Access Deterring Fencing	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass RDW Overhead

Req. ID	Doc. Section and Doc. Language	ENG	SUB
			Specification
DCM.07.69	7.7.1.1.3 Grounding of Fencing	CIV STR G&B	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass RDW Overhead Specification
DCM.07.70	7.7.1.1.4 Vegetation Control along Fences	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass RDW Overhead Reports and/or calculations
DCM.07.71	7.7.1.2 Walls	IPR CIV STR	Design Baseline Report HST AT-Grade (Guideway) RDW Underpass RDW Overhead
DCM.07.72	7.7.1.3 Traffic Barriers	IPR CIV STR	Design Baseline Report HST AT-Grade (Guideway) RDW Overhead
DCM.07.73	7.7.1.3.1 Traffic Barriers Types	CLR IPR CIV STR	Design Baseline Report HST AT-Grade (Guideway) RDW Overhead Specification
DCM.07.74	7.7.1.4 Fencing and Traffic Barriers in combination	CIV STR	Design Baseline Report HST AT-Grade (Guideway) RDW Overhead Specification
DCM.07.75	7.7.1.5 Gates	CIV STR G&B	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
DCM.07.76	7.7.1.5.1 Types of Gates	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge

Req. ID	Doc. Section and Doc. Language	ENG	SUB
			Specification
DCM.07.77	Table 7-3: Access Control - Gates	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
DCM.07.79	7.7.2 Access Control by Type of HST Trackway	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.80	7.7.2.1 At-Grade Trackway	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench Specification
DCM.07.81	7.7.2.2 At-Grade Trackway within Roadway Corridor	IPR CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.82	7.7.2.3 At-Grade Trackway Adjacent to Conventional Railroad	IPR CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.83	7.7.2.4 At-Grade Trackway through High-Risk Trespassing Areas	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
DCM.07.84	7.7.2.5 Trackway in Cut or Fill (Embankment) Section	IPR CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.85	7.7.2.6 Trackway on Aerial Structure	STR	Design Baseline Report HST Aerial Structure and/or Bridge
DCM.07.86	7.7.2.7 Trackway on Retained Fill	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.87	7.7.2.8 Trackway on Retained Cut	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.88	7.7.2.9 Trackway Underground	STR	Design Baseline Report

Req. ID	Doc. Section and Doc. Language	ENG	SUB
	(Bored, Mined, and Cut-and-Cover Tunnels)	TUN	HST Tunnel/Cut and Cover HST Open Trench
DCM.07.89	Table 7-4: Access Control Fencing – Trackway	IPR CIV STR TUN	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Tunnel/Cut and Cover HST Open Trench
DCM.07.90	7.7.3 Access Control by Type of Facility	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.91	7.7.3.1 Yards and Maintenance Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.92	7.7.3.2 Train Control, Communications and Traction Power Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.113	7.7.3.3 Passenger Station	---	n/a
DCM.07.93	7.7.3.3.1 Inter-Track Fencing or Protection Screens (Walls)	---	n/a
DCM.07.94	Table 7-5: Access Control Fencing – Authority Facilities	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.95	7.7.4 Access Control at Other Locations	---	---
DCM.07.97	7.7.4.1 Roadway Overhead Crossing HST Trackway	IPR CIV STR G&B	Design Baseline Report RDW Overhead
DCM.07.98	7.7.4.2 Streets Ending at HST Trackway	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.99	7.7.4.3 Authority Roadways	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.100	7.7.4.4 Emergency Exits and Equipment Rooms in Tunnels	TUN	Design Baseline Report HST Tunnel/Cut and Cover
DCM.07.101	7.7.4.5 Drainage Structures	CIV DRN STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench

Req. ID	Doc. Section and Doc. Language	ENG	SUB
			Reports and/or calculations
DCM.07.102	Table 7-6: Access Control Fencing – Other Locations	CIV STR	Design Baseline Report HST AT-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Overhead Reports and/or calculations
DCM.07.103	7.8 Wildlife Crossing	CIV STR	Design Baseline Report HST AT-Grade (Guideway)
DCM.07.104	7.9 Maintenance and Protection of Traffic during Construction	CIV	Design Baseline Report Reports and/or calculations
DCM.07.105	7.9.1 Railroad Operations	CIV	Design Baseline Report Reports and/or calculations

APPENDIX E – Initial CIL and Submittal Type Allocation

RFP No. HSR 14-32 – INITIAL RELEASE - 05/27/2015





California High-Speed Rail Program

CP4 Certifiable Items List

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	CEHL	1.1 R-O-W Generally	---
	CEHL	1.1.1 Derailment	---
	CEHL	1.1.1.1 Roadbed Failure Subsidence shifting ground etc.	---
CEHL 138	CEHL	1.1.1.1.1 Mitigation #1 [1] INF: Perform geotechnical analysis and incorporate results into sub-grade design.	Design Baseline Report Report and/or Calculation Specification
CEHL 139	CEHL	1.1.1.1.2 Mitigation #2 [2] INF: Install appropriate drainage.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.1.2 Washout caused by flooding or scouring Flooding scouring	---
CEHL 141	CEHL	1.1.1.2.1 Mitigation #1 [1] INF: Perform hydraulics analysis and incorporate results into sub-grade design slope protection and setting of profile.	Design Baseline Report HST At-Grade (Guideway) Report and/or Calculation Specification
CEHL 142	CEHL	1.1.1.2.2 Mitigation #2 [2] INF: Install scour protection (revetment or other structure) to protect sub-grade from water course.	Design Baseline Report HST At-Grade (Guideway) Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 143	CEHL	1.1.1.2.3 Mitigation #3 [3] INF: Install culvert or bridge structure where crossing water course.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.1.3 Slide Stormwater runoff hillside movement	---
CEHL 145	CEHL	1.1.1.3.1 Mitigation #1 [1] INF: Perform geotechnical analysis to evaluate slope stability that could effect the HSR trackway.	Design Baseline Report Report and/or Calculation Specification
CEHL 146	CEHL	1.1.1.3.2 Mitigation #2 [2] INF: Perform slope stability analysis, develop mitigation measures, and incorporate results into geotechnical design of the slope.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.1.1.4 Seismic Activity Earthquake	---
CEHL 149	CEHL	1.1.1.4.1 Mitigation #1 [1] INF: Perform seismic analysis to prevent loss of life and major structural failures due to ground movement at the location.	Design Baseline Report Report and/or Calculation Specification
CEHL 150	CEHL	1.1.1.4.2 Mitigation #2 [2] INF: Mitigate the effects of seismically-induced forces and deformations due to ground motions resulting from an earthquake.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.1.1.5 High Winds High winds	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 157	CEHL	<p>1.1.1.5.1 Mitigation #4</p> <p>[4] INF: Install wind barriers at high-risk locations where need is supported by wind analysis.</p>	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench RDW Underpass (HST Overpass) Report and/or Calculation Specification
	CEHL	1.1.2 Collision	---
	CEHL	1.1.2.1 Collision between HSR trains	---
CEHL 161	CEHL	<p>1.1.2.1.1 Mitigation #1</p> <p>[1] INF: Track center spacing exceeds the combined dynamic envelopes of the trains.</p>	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	CEHL	1.1.2.2 Non-HSR train enters HSR trackway from adjacent exclusive corridor.	---
CEHL 163	CEHL	<p>1.1.2.2.1 Mitigation #1</p> <p>[1] INF: Install intrusion prevention measures appropriate to site-specific conditions.</p>	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
	CEHL	1.1.2.3 Collision with a highway vehicle at an at-grade crossing	---
CEHL 166	CEHL	<p>1.1.2.3.1 Mitigation #1</p> <p>[1] INF: Grade separations for all public highway crossings at grade in CAHST exclusive corridors.</p>	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	CEHL	1.1.2.4 Highway vehicle enters the HSR trackway from an overpass	---
CEHL 167	CEHL	1.1.2.4.1 Mitigation #1 [1] INF: Install intrusion prevention measures appropriate to site-specific conditions.	Design Baseline Report RDW Overhead (HST Underpass)
	CEHL	1.1.2.5 Highway vehicle enters the HSR trackway from an adjacent roadway	---
CEHL 170	CEHL	1.1.2.5.1 Mitigation #1 [1] INF: Install intrusion prevention measures appropriate to site-specific conditions.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.2.6 Object thrown from overpass	---
CEHL 176	CEHL	1.1.2.6.1 Mitigation #1 [1] INF: Install intrusion prevention fencing at overpasses.	Design Baseline Report RDW Overhead (HST Underpass)
	CEHL	1.1.2.7 Trespasser	---
CEHL 183	CEHL	1.1.2.7.1 Mitigation #1 [1] INF: Install access-restricting fencing.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) RDW Overhead (HST Underpass)
CEHL 184	CEHL	1.1.2.7.2 Mitigation #2 [2] INF/SYS: Install hardened intrusion-prevention barriers and/or an	HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		intrusion detection system at high-risk locations identified by TVA or SSHA.	HST Cut & Cover Tunnel RDW Underpass (HST Overpass) RDW Overhead (HST Underpass)
	CEHL	1.1.2.8 Livestock/Wildlife	---
CEHL 188	CEHL	1.1.2.8.1 Mitigation #1 [1] INF: Install access-restricting fencing.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) RDW Overhead (HST Underpass)
CEHL 187	CEHL	1.1.2.8.2 Mitigation #2 [2] INF: Provide livestock/wildlife undercrossings appropriate to site-specific conditions.	Design Baseline Report HST At-Grade (Guideway) HST Open Trench
	CEHL	1.1.2.9 Flooding standing water	---
CEHL 192	CEHL	1.1.2.9.1 Mitigation #1 [1] INF: Perform hydraulics analysis and incorporate results in setting of profile and drainage conveyance system.	Design Baseline Report HST At-Grade (Guideway) Report and/or Calculation Specification
CEHL 193	CEHL	1.1.2.9.2 Mitigation #2 [2] INF: Provide flood protection where profile cannot be above flood plain for 100-yr storm event.	Design Baseline Report HST At-Grade (Guideway) RDW Underpass (HST Overpass)
	CEHL	1.1.3 Fire and Smoke	---
	CEHL	1.1.3.1 Fire and/or smoke on at-grade alignment	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 203	CEHL	1.1.3.1.1 Mitigation #2 [2] INF: Use of non-flammable materials on ROW.	Design Baseline Report HST At-Grade (Guideway) Specification
	CEHL	1.1.3.2 Wayside fire and/or smoke adjacent to an at-grade alignment	---
CEHL 208	CEHL	1.1.3.2.1 Mitigation #2 [2] INF: Use of non-flammable materials on ROW.	Design Baseline Report HST At-Grade (Guideway) Specification
	CEHL	1.1.4 Close Proximity	---
	CEHL	1.1.4.1 Passing train effects persons or vehicles adjacent to but outside the HSR R-O-W	---
CEHL 215	CEHL	1.1.4.1.1 Mitigation #1 [1] INF: Provide screens/barriers where needed to mitigate effects of passing HSR trains for smaller R-O-W widths.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.4.2 Passing HSR trains affect each other	---
CEHL 216	CEHL	1.1.4.2.1 Mitigation #1 [1] INF: Establish appropriate track center standards	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	CEHL	1.1.4.3 Leak or rupture in hazmat pipeline crossing under or adjacent HSR trackway.	---
CEHL 217	CEHL	1.1.4.3.1 Mitigation #1 [1] INF:	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		Locate and protect high-risk utilities.	
	CEHL	1.1.4.4 Leak or rupture in non-hazmat pipeline crossing under or adjacent HSR trackway.	---
CEHL 218	CEHL	1.1.4.4.1 Mitigation #1 [1] INF: Locate and protect low-risk utilities.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.4.5 Overhead high voltage lines collapse onto ROW or are struck during construction / maintenance activities	---
CEHL 222	CEHL	1.1.4.5.1 Mitigation #1 [1] INF: Locate overhead high-voltage lines in conformance w/CPUC G.O. 95.	Design Baseline Report HST At-Grade (Guideway)
CEHL 223	CEHL	1.1.4.5.2 Mitigation #2 [2] INF: Establish minimum wire-to-wire clearances.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.4.6 Other overhead utility lines (telephone cable etc) collapse onto ROW or are struck during construction / maintenance activities	---
CEHL 226	CEHL	1.1.4.6.1 Mitigation #1 [1] INF: Relocate all other utilities to underground installation.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.4.7 Underground utilities struck during construction / maintenance activities	---
CEHL 229	CEHL	1.1.4.7.1 Mitigation #1 [1] INF: Locate and modify existing or new utilities to provide adequate	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		protection per AREMA and local utility standards.	
	CEHL	1.1.4.8 Structures adjacent the ROW collapse onto the ROW during seismic event	---
CEHL 230	CEHL	1.1.4.8.1 Mitigation #1 [1] INF: Perform seismic assessment for secondary structures that have potential to collapse onto the ROW.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.1.4.9 Adjacent wind turbine suffers rotor failure or structural collapse with resulting intrusion of debris into the ROW.	---
CEHL 401	CEHL	1.1.4.9.1 Mitigation #2 [2] INF: Horizontal separation between the HST right-of-way and the base of the wind turbine of at least 1-1/2 times the total wind turbine height.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.4.10 Adjacent oil/gas well has surface-level blowout. Result is fire earth displacement and intrusion into the ROW by debris from the explosion.	---
CEHL 406	CEHL	1.1.4.10.1 Mitigation #2 [2] INF: Establish minimum setbacks or buffer zones of two hundred (200) feet (measured from the centerline of the nearest CHSTS track) relocating all currently active oil or gas wells within the buffer zone to a point beyond the buffer zone with no new oil or gas wells drilled within the buffer zone.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.5 Other	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	CEHL	1.1.5.1 Evacuation from at-grade alignment	---
CEHL 240	CEHL	1.1.5.1.1 Mitigation #1 [1] INF: Walkways minimum 3 ft wide.	Design Baseline Report HST At-Grade (Guideway)
CEHL 241	CEHL	1.1.5.1.2 Mitigation #2 [2] INF: Emergency access and egress at nominal 2.5 mile intervals with a maximum interval of 3.0 miles.	Design Baseline Report HST At-Grade (Guideway)
CEHL 242	CEHL	1.1.5.1.3 Mitigation #3 [3] INF: Emergency vehicle assembly areas at access/egress points.	Design Baseline Report HST At-Grade (Guideway)
	CEHL	1.1.5.2 Dense ground fog impairs visibility	---
CEHL 245	CEHL	1.1.5.2.1 Mitigation #1 [1] INF: Eliminate highway-rail and pedestrian grade crossings in CAHST exclusive corridors.	Design Baseline Report HST At-Grade (Guideway)
CEHL 246	CEHL	1.1.5.2.2 Mitigation #2 [2] INF: Access-control fencing to seal the corridor from outside access	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) RDW Overhead (HST Underpass)
CEHL 247	CEHL	1.1.5.2.3 Mitigation #3 [3] INF: Intrusion protection berms walls and other barriers to prevent the intrusion of persons animals rail or highway vehicles as	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		identified through site-specific hazard analysis or threat/vulnerability assessment	
	CEHL	1.2 R-O-W Structures	---
	CEHL	1.2.1 Elevated Structures	---
	CEHL	1.2.1.1 Collapse - Fatigue	---
CEHL 251	CEHL	1.2.1.1.1 Mitigation #1 [1] INF: Operational cycles calculated based on a 100-year structural life	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.1.2 Collapse - Exceed capacity of structure	---
CEHL 252	CEHL	1.2.1.2.1 Mitigation #1 [1] INF: Governing load combination considered into the design.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.1.3 Collapse - Seismic activity	---
CEHL 409	CEHL	1.2.1.3.1 Mitigation #1 [1] INF: Perform seismic analysis to prevent loss of life and major structural failures due to ground movement at the location.	Design Baseline Report Report and/or Calculation Specification
CEHL 378	CEHL	1.2.1.3.2 Mitigation #2 [2] INF: Structure designed so that it does not collapse during a maximum considered earthquake.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.1.4 Collapse - Struck by non-HSR train	---
CEHL 255	CEHL	1.2.1.4.1 Mitigation #1 [1] INF: Passive bridge support protection measures for adjacent	Design Baseline Report HST Aerial Structure and/or Bridge

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		railroads.	
	CEHL	1.2.1.5 Collapse - Struck by highway/oversize vehicle	---
CEHL 257	CEHL	1.2.1.5.1 Mitigation #1 [1] INF: Establish minimum OH clearance for roadways.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass)
CEHL 258	CEHL	1.2.1.5.2 Mitigation #2 [2] INF: Passive bridge support protection measures for adjacent roadways.	Design Baseline Report HST Aerial Structure and/or Bridge
	CEHL	1.2.1.6 Collapse - Washout/Erosion	---
CEHL 259	CEHL	1.2.1.6.1 Mitigation #1 [1] INF: Perform hydraulic analysis to determine drainage requirements.	Design Baseline Report Report and/or Calculation Specification
CEHL 260	CEHL	1.2.1.6.2 Mitigation #2 [2] INF: Install scour protection.	Design Baseline Report HST Aerial Structure and/or Bridge Specification
	CEHL	1.2.1.7 Fire on elevated structure	---
CEHL 262	CEHL	1.2.1.7.1 Mitigation #1 [1] INF: Use of non-flammable materials.	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) Specification
	CEHL	1.2.1.8 Fire/smoke from adjacent R-O-W structures or wildfires adjacent the R-O-W	---
CEHL 269	CEHL	1.2.1.8.1 Mitigation #1 [1] INF: Use of non-flammable materials in adjacent R-O-W structures	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		within the HST trainway.	Specification
	CEHL	1.2.1.9 Train falls from elevated structure.	---
CEHL 273	CEHL	1.2.1.9.1 Mitigations #1 [1] INF: Install derailment containment wall in design of structure that keeps train on the bridge.	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass)
	CEHL	1.2.1.10 Person falls from elevated structure.	---
CEHL 276	CEHL	1.2.1.10.1 Mitigation #1 [1] INF: Install fall prevention barriers (handrailing or wall) where exposed edge allows potential fall of greater than 30".	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass)
	CEHL	1.2.1.11 Evacuation required.	---
CEHL 278	CEHL	1.2.1.11.1 Mitigation #1 [1] INF: Stairway access every 2.5 miles with a maximum interval of 3.0 miles.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge
CEHL 279	CEHL	1.2.1.11.2 Mitigation #2 [2] INF: Aerial ladder truck access every 2500 feet.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass)
CEHL 283	CEHL	1.2.1.11.3 Mitigation #6 [6] INF: One outside walkway on each side of multiple-track structures.	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass)
CEHL 284	CEHL	1.2.1.11.4 Mitigation #7 [7] INF: Walkways minimum 3 ft. wide.	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 285	CEHL	1.2.1.11.5 Mitigation #8 [8] INF: Access/egress stairway designed per requirements of CA Building Code Chapter 10 (Means of Egress).	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	CEHL	1.2.1.12 Collapse - Unsupported foundation or ground movement	---
CEHL 286	CEHL	1.2.1.12.1 Mitigation #1 [1] INF: Perform geotechnical analysis to determine ground conditions.	Design Baseline Report Report and/or Calculation Specification
CEHL 287	CEHL	1.2.1.12.2 Mitigation #2 [2] INF: Consider ground conditions in the design and construction of bridge foundations.	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) Report and/or Calculation Specification
	CEHL	1.2.2 Tunnel Structures	---
	CEHL	1.2.2.1 Seismic activity	---
CEHL 410	CEHL	1.2.2.1.1 Mitigation #1 [1] INF: Perform seismic analysis to prevent loss of life and major structural failures due to ground movement at the location.	Design Baseline Report Report and/or Calculation Specification
CEHL 379	CEHL	1.2.2.1.2 Mitigation #2 [2] INF: Structure designed so that it does not collapse during a maximum considered earthquake.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.2.2 Fire or smoke inside tunnel	---
CEHL 289	CEHL	1.2.2.2.1 Mitigation #1	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		[1] INF: Incorporate NFPA 130 guidelines for ventilation where supported by Fire Hazard Analysis.	Report and/or Calculation Specification
CEHL 290	CEHL	1.2.2.2.2 <i>Mitigation #2</i> [2] INF: Dry standpipes.	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation Specification
CEHL 291	CEHL	1.2.2.2.3 <i>Mitigation #3</i> [3] INF: Use of non-flammable materials in tunnel structure.	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation Specification
	CEHL	1.2.2.3 Train impact with tunnel wall	---
CEHL 298	CEHL	1.2.2.3.1 <i>Mitigation #2</i> [2] INF: Walkway bench 9" above top of rail to contain vehicle in trackway.	Design Baseline Report HST Cut & Cover Tunnel
CEHL 299	CEHL	1.2.2.3.2 <i>Mitigation #3</i> [3] INF: Tunnel wall located outside dynamic envelope of train.	Design Baseline Report HST Cut & Cover Tunnel
	CEHL	1.2.2.4 Train impact with tunnel portal face	---
CEHL 301	CEHL	1.2.2.4.1 <i>Mitigation #2</i> [2] INF: Tunnel wall located outside dynamic envelope of train.	Design Baseline Report HST Cut & Cover Tunnel
CEHL 411	CEHL	1.2.2.4.2 <i>Mitigation #3</i> [3] INF: Tunnel portal tapered.	Design Baseline Report HST Cut & Cover Tunnel
	CEHL	1.2.2.5 Evacuation from tunnel structure	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 302	CEHL	1.2.2.5.1 Mitigation #1 [1] INF: Egress to surface or cross-passages to non-incident tunnel at 2500 foot and 800 foot intervals respectively.	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation Specification
CEHL 303	CEHL	1.2.2.5.2 Mitigation #2 [2] INF: Walkways minimum 3 ft. Wide.	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation
CEHL 304	CEHL	1.2.2.5.3 Mitigation #3 [3] INF: Walkways on each outside wall of two-track tunnels.	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation
CEHL 307	CEHL	1.2.2.5.4 Mitigation #6 [6] INF: Emergency lighting for evacuation routes	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation Specification
	CEHL	1.2.2.6 Seepage of hazardous gas from ground hazmat spill during maintenance activities inside tunnel	---
CEHL 309	CEHL	1.2.2.6.1 Mitigation #1 [1] INF: Environmental analysis to determine potential for hazardous gas presence.	Design Baseline Report Report and/or Calculation Specification
CEHL 310	CEHL	1.2.2.6.2 Mitigation #2 [2] INF: Protect against seepage of hazardous gas from the ground.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.2.7 Air pressure pulses as train passes through confined space at high speed.	---
CEHL 312	CEHL	1.2.2.7.1 Mitigation #1 [1] INF:	Design Baseline Report HST Cut & Cover Tunnel

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		Increased tunnel size per UIC Standards	Report and/or Calculation
	CEHL	1.2.2.8 Pressure buildup as HSR trains pass each other at speed in confined spaces.	---
CEHL 313	CEHL	1.2.2.8.1 Mitigation #1 [1] INF: Twin bores or single bores separated by center wall. Single bore twin track tunnels w/out center wall shall be large enough to mitigate the effects of trains passing at 220 MPH.	Design Baseline Report HST Cut & Cover Tunnel Report and/or Calculation
	CEHL	1.2.2.9 Collapse due to inward pressure exceeding the capacity of the tunnel structure	---
CEHL 314	CEHL	1.2.2.9.1 Mitigation #1 [1] INF: Perform geotechnical analysis to determine inward earth pressure.	Design Baseline Report Report and/or Calculation Specification
CEHL 315	CEHL	1.2.2.9.2 Mitigation #2 [2] INF: Construct tunnel structure to retain inward earth pressure, including live and static loads.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.3 Below-Grade / Trench Structure	---
	CEHL	1.2.3.1 Seismic activity	---
CEHL 413	CEHL	1.2.3.1.1 Mitigation #1 [1] INF: Perform seismic analysis to prevent loss of life and major structural failures due to ground movement at the location.	Design Baseline Report Report and/or Calculation Specification
CEHL 384	CEHL	1.2.3.1.2 Mitigation #2 [2] INF:	Design Baseline Report Report and/or Calculation

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		Structure designed so that it does not collapse during a maximum considered earthquake.	Specification
	CEHL	1.2.3.2 Fire in below-grade structure.	---
CEHL 317	CEHL	1.2.3.2.1 Mitigation #1 [1] INF: Use of non-flammable materials.	Design Baseline Report HST Open Trench Specification
CEHL 319	CEHL	1.2.3.2.2 Mitigation #3 [3] INF: Emergency access/egress at 2500 foot intervals. Stairway design per CA Building Code Chapter 10 (Means of Egress).	Design Baseline Report HST At-Grade (Guideway) HST Open Trench Specification
CEHL 320	CEHL	1.2.3.2.3 Mitigation #4 [4] INF: Fixed water supply at emergency access points.	Design Baseline Report HST At-Grade (Guideway) HST Open Trench
	CEHL	1.2.3.3 Impact wall of structure.	---
CEHL 325	CEHL	1.2.3.3.1 Mitigation #2 [2] INF: Walkway bench 9" above top of rail to contain vehicle in trackway.	Design Baseline Report HST Open Trench
CEHL 326	CEHL	1.2.3.3.2 Mitigation #3 [3] INF: Structure wall located outside dynamic envelope of train.	Design Baseline Report HST Open Trench
	CEHL	1.2.3.4 Evacuation required.	---
CEHL 327	CEHL	1.2.3.4.1 Mitigation #1 [1] INF: Emergency access/egress points at nominal 2500 foot intervals.	Design Baseline Report HST At-Grade (Guideway) HST Open Trench
CEHL 332	CEHL	1.2.3.4.2 Mitigation #6	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		[6] INF: Walkway minimum 3 ft. wide.	HST Open Trench
CEHL 333	CEHL	1.2.3.4.3 <i>Mitigation #7</i> [7] INF: Stairway designed per the requirements of CA Building Code Chapter 10 (Means of Egress).	Design Baseline Report HST Open Trench Specification
	CEHL	1.2.3.5 Flooding caused by rain/stormwater runoff	---
CEHL 334	CEHL	1.2.3.5.1 <i>Mitigation #1</i> [1] INF: Hydraulic analysis required in the Final Design.	Design Baseline Report Report and/or Calculation Specification
CEHL 336	CEHL	1.2.3.5.2 <i>Mitigation #2</i> [2] INF: Height of trench wall set above the 100-yr flood plain.	Design Baseline Report HST At-Grade (Guideway) HST Open Trench
	CEHL	1.2.3.6 Flooding caused by breach in overhead canal	---
CEHL 339	CEHL	1.2.3.6.1 <i>Mitigation #1</i> [1] INF: Water-carrying structures that cross the HST alignment shall be in sealed enclosed culvert or the trench section shall be changed to cut-and-cover tunnel configuration.	Design Baseline Report HST At-Grade (Guideway) HST Open Trench HST Cut & Cover Tunnel
	CEHL	1.2.3.7 Person falls into below-grade structure	---
CEHL 340	CEHL	1.2.3.7.1 <i>Mitigation #1</i> [1] INF: Install fall prevention barriers (handrailing or wall) where exposed edge allows potential fall of greater than 30".	Design Baseline Report HST Open Trench
	CEHL	1.2.3.8 Collapse - Inward pressure exceeds the capacity of the trench structure	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 342	CEHL	1.2.3.8.1 Mitigation #1 [1] INF: Perform geotechnical analysis to determine lateral earth pressure.	Design Baseline Report Report and/or Calculation Specification
CEHL 343	CEHL	1.2.3.8.2 Mitigation #2 [2] INF: Construct trench structure to retain lateral earth pressure.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.4 Other Structures	---
	CEHL	1.2.4.1 Raised Embankments - Sliding / Collapse	---
CEHL 344	CEHL	1.2.4.1.1 Mitigation #1 [1] INF: Perform geotechnical analysis to determine global stability and foundation settlement.	Design Baseline Report Report and/or Calculation Specification
CEHL 345	CEHL	1.2.4.1.2 Mitigation #2 [2] INF: Construct embankments to ensure slope stability.	Design Baseline Report HST At-Grade (Guideway) Report and/or Calculation Specification
	CEHL	1.2.4.2 Exposed precipices at culverts retaining walls and other raised structures	---
CEHL 346	CEHL	1.2.4.2.1 Mitigation #1 [1] INF: Install fall prevention barriers (handrailing or wall) where exposed edge allows potential fall of greater than 30".	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass)
	CEHL	1.2.4.3 Person enters confined space / culvert	---
CEHL 348	CEHL	1.2.4.3.1 Mitigation #1 [1] INF:	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		Install barriers at entrances to culverts and other confined spaces to prevent entry by unauthorized persons at high-risk locations as determined by TVA or SSHA.	Specification
	CEHL	1.2.4.4 Overhead structures collapse onto R-O-W due to seismic activity.	---
CEHL 414	CEHL	1.2.4.4.1 Mitigation #1 [1] INF: Perform seismic analysis to determine potential limits of ground movement at the location.	Design Baseline Report Report and/or Calculation Specification
CEHL 385	CEHL	1.2.4.4.2 Mitigation #2 [2] INF: New structure designed so that it does not collapse during a maximum considered earthquake.	Design Baseline Report Report and/or Calculation Specification
CEHL 351	CEHL	1.2.4.4.3 Mitigation #3 [3] INF: Existing structures assessed for maximum considered earthquake rebuild if they do not meet performance objectives.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.4.5 Overhead structures collapse onto R-O-W due to fatigue.	---
CEHL 352	CEHL	1.2.4.5.1 Mitigation #1 [1] INF: New structures designed to non-collapse performance under the maximum considered earthquake (MCE).	Design Baseline Report Report and/or Calculation Specification
CEHL 353	CEHL	1.2.4.5.2 Mitigation #2 [2] INF: For existing structures contractors shall repair and retrofit existing structures to meet non-collapse performance under the	Design Baseline Report Report and/or Calculation Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		maximum considered earthquake (MCE).	
	CEHL	1.2.4.6 Retaining wall - collapse due to seismic activity	---
CEHL 415	CEHL	1.2.4.6.1 Mitigation #1 [1] INF: Perform seismic analysis to prevent loss of life and major structural failures due to ground movement at the location.	Design Baseline Report Report and/or Calculation Specification
CEHL 386	CEHL	1.2.4.6.2 Mitigation #2 [2] INF: Structure designed so that it does not collapse during a maximum considered earthquake.	Design Baseline Report Report and/or Calculation Specification
	CEHL	1.2.4.7 Evacuation from retained fill or raised embankment trainway	---
CEHL 355	CEHL	1.2.4.7.1 Mitigation #1 [1] INF: Walkways minimum 3 ft wide.	Design Baseline Report HST At-Grade (Guideway)
CEHL 356	CEHL	1.2.4.7.2 Mitigation #2 [2] INF: Emergency access and egress at nominal 2.5 mile intervals with a maximum of 3 mile intervals.	Design Baseline Report HST At-Grade (Guideway)
CEHL 357	CEHL	1.2.4.7.3 Mitigation #3 [3] INF: Emergency vehicle assembly areas at access/egress points.	Design Baseline Report HST At-Grade (Guideway)
CEHL 359	CEHL	1.2.4.7.4 Mitigation #5 [5] INF: Access/egress stairway designed per requirements of CA Building Code Chapter 10 (Means of Egress).	Design Baseline Report HST At-Grade (Guideway) Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
CEHL 360	CEHL	1.2.4.7.5 Mitigation #6 [6] INF: One outside walkway on each side of multiple-track structures.	Design Baseline Report HST At-Grade (Guideway)
Security (TVA)			
	TVA	1 ROW	---
	TVA	1.1 Asset	---
	TVA	1.1.1 ROW At-grade Right of Way	---
	TVA	1.1.1.1 IED Detonates on the "At Grade Right-of-Way" in populated areas.	---
TVA 1230	TVA	1.1.1.1.1 Mitigation F [INF] Physical access control with fencing/barriers and high security lock system to restrict access to ROW	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification
	TVA	1.1.1.2 VBIED Collision with rail vehicle at grade ROW	---
TVA 2618	TVA	1.1.1.2.1 Mitigation G [INF] Right of Way access controls	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification
TVA 2619	TVA	1.1.1.2.2 Mitigation H	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		[INF] K-rail, berm or other barrier where tracks are adjacent to public road	HST At-Grade (Guideway)
	TVA	1.1.1.3 Sabotage Occurs on the ROW	---
TVA 1238	TVA	1.1.1.3.1 Mitigation G [INF] Physical access control with high security lock system and fencing/barriers to restrict access to ROW	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification
	TVA	1.1.1.4 Arson/IIED Incendiary explosive device or intentional fire on the at grade ROW	---
TVA 1246	TVA	1.1.1.4.1 Mitigation G [INF] Physical access control with fencing/barriers to restrict access to ROW	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification
	TVA	1.1.1.5 Crime Trespass	---
TVA 2635	TVA	1.1.1.5.1 Mitigation J [INF] Physical access control with fencing/barriers to restrict access to ROW	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	TVA	1.1.1.6 Crime Theft, Vandalism and Property Damage	---
TVA 1261	TVA	1.1.1.6.1 Mitigation F [INF] Physical access control with fencing/barriers to restrict access to ROW	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification
TVA 1262	TVA	1.1.1.6.2 Mitigation G [INF] Physical access control with fencing/barriers to restrict access to ROW	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) RDW Overhead (HST Underpass) Specification
TVA 2638	TVA	1.1.1.6.3 Mitigation J [INF] Utilize graffiti resistant surfaces	Design Baseline Report Report and/or Calculation Specification
	TVA	1.1.2 Bridge/Elevated Structure	---
	TVA	1.1.2.1 VBIED Detonates after being placed under or adjacent to an elevated structure.	---
TVA 1266	TVA	1.1.2.1.1 Mitigation C [INF] Elevated structure constructed to offer blast resistance and blast shielding	Design Baseline Report Report and/or Calculation Specification
	TVA	1.1.2.2 IED Detonates on the load-bearing element supporting the elevated	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		structure.	
TVA 1276	TVA	1.1.2.2.1 Mitigation C [INF] Elevated structure constructed to offer blast resistance and blast shielding	Design Baseline Report Report and/or Calculation Specification
	TVA	1.1.2.3 Sabotage To compromise elevated integrity	---
TVA 1286	TVA	1.1.2.3.1 Mitigation C [INF] Elevated structure constructed to offer blast resistance and blast shielding	Design Baseline Report Report and/or Calculation Specification
	TVA	1.1.2.4 Crime Vandalism and Property Damage to Elevated Structure	---
TVA 2653	TVA	1.1.2.4.1 Mitigation I [INF] Utilize graffiti resistant surfaces	Design Baseline Report Report and/or Calculation Specification
	TVA	2 Systems	---
	TVA	2.1 Asset	---
	TVA	2.1.1 Traction Power Station	---
	TVA	2.1.1.1 IED Detonates on or adjacent to the traction power (station).	---
TVA 1406	TVA	2.1.1.1.1 Mitigation D [INF] Physical security barriers (fencing) erected to restrict access and provide standoff	Design Baseline Report HST At-Grade (Guideway) Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	TVA	2.1.1.2 Sabotage To disrupt/ damage operation ability of traction power (station)	---
TVA 1416	TVA	2.1.1.2.1 Mitigation D [INF] Physical security barriers (fencing) erected to restrict access and provide standoff	Design Baseline Report HST At-Grade (Guideway) Specification
	TVA	2.1.1.3 Cyber Attack Remote or on-site access, control and disruption of traction power (station).	---
TVA 1445	TVA	2.1.1.3.1 Mitigation M [INF] Physical security barriers (fencing) erected to restrict access and provide standoff.	Design Baseline Report HST At-Grade (Guideway) Specification
	TVA	2.1.1.4 Crime Trespass onto traction power station	---
TVA 1453	TVA	2.1.1.4.1 Mitigation D [INF] Physical security barriers (fencing) erected to restrict access and provide standoff.	Design Baseline Report HST At-Grade (Guideway) Specification
	TVA	2.1.1.5 Crime Vandalism and Property Damage to Traction Power (station).	---
TVA 1463	TVA	2.1.1.5.1 Mitigation D [INF] Physical security barriers (fencing) erected to restrict access and provide standoff.	Design Baseline Report HST At-Grade (Guideway) Specification
	TVA	2.1.1.6 Ramming	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		Vehicle used to ram into traction power station	
TVA 1473	TVA	2.1.1.6.1 Mitigation D [INF] Physical security barriers (fencing) erected to restrict access and provide standoff	Design Baseline Report HST At-Grade (Guideway) Specification
	TVA	2.1.2 Signals	---
	TVA	2.1.2.1 IED Detonates on or adjacent to rail signals.	---
TVA 1483	TVA	2.1.2.1.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.2.2 Sabotage To disrupt/ damage signals operation	---
TVA 1492	TVA	2.1.2.2.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.2.3 Arson/IIED Incendiary explosive device or intentional Fire set to rail signal components	---
TVA 1501	TVA	2.1.2.3.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.2.4 Cyber Attack	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
		Remote or on-site access, control and disruption of rail signals.	
TVA 1518	TVA	2.1.2.4.1 Mitigation L [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.2.5 Crime Vandalism and/or damage to rail signals.	---
TVA 2435	TVA	2.1.2.5.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.3 Switches	---
	TVA	2.1.3.1 IED Detonates on or adjacent to rail switches.	---
TVA 1536	TVA	2.1.3.1.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from switches.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.3.2 Sabotage To disrupt/ damage signals operation	---
TVA 1545	TVA	2.1.3.2.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from switches.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.3.3 Cyber Attack Remote or on-site access, control and disruption of rail switch.	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
TVA 1563	TVA	2.1.3.3.1 Mitigation L [INF] Physical security barriers (fencing) erected along the "At Grade Right of Way" to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) Specification
	TVA	2.1.3.4 Crime Theft, vandalism and/or damage to rail switches	---
TVA 1571	TVA	2.1.3.4.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from switches.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.4 Interlocking (IL)	---
	TVA	2.1.4.1 IED Detonates on or adjacent to rail interlocking system.	---
TVA 1581	TVA	2.1.4.1.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from switches.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.4.2 Sabotage To disrupt/ damage Interlocking system operations	---
TVA 1589	TVA	2.1.4.2.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from switches.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.4.3 Cyber Attack Remote or on-site access, control and disruption of rail Signals.	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
TVA 1606	TVA	2.1.4.3.1 Mitigation L [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from signals.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	2.1.4.4 Crime Vandalism and damage to rail interlocking system.	---
TVA 1614	TVA	2.1.4.4.1 Mitigation C [INF] Physical security barriers (fencing) erected along the ROW to restrict access and provide standoff from switches.	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge Specification
	TVA	3 Infrastructure	---
	TVA	3.1 Asset	---
	TVA	3.1.1 Track	---
	TVA	3.1.1.1 IED Detonates on or adjacent to rail track.	---
TVA 1665	TVA	3.1.1.1.1 Mitigation C [INF] Physical security barriers (fencing) erected along the "At Grade Right of Way" to prevent/restrict access from rail track	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass)
	TVA	3.1.1.2 Sabotage To disrupt/ damage rail track.	---
TVA 1674	TVA	3.1.1.2.1 Mitigation C [INF] Physical security barriers (fencing) erected along the "At Grade Right of Way" to prevent/restrict access from rail track	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	TVA	3.1.1.3 Crime Trespass onto Rail track system	---
TVA 1683	TVA	3.1.1.3.1 Mitigation C [INF] Physical security barriers (fencing) erected along the "At Grade Right of Way" to prevent/restrict access from rail track	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass)
	TVA	3.1.1.4 Crime Vandalism and damage to rail track system	---
TVA 1692	TVA	3.1.1.4.1 Mitigation C [INF] Physical security barriers (fencing) erected along the "At Grade Right of Way" to prevent/restrict access from rail track	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass)
Interfaces			
	IF-REG	1 General	---
	IF-REG	1.1 Reliability, Availability, Maintainability & Safety	---
	IF-REG	1.1.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	1.1.1.1 Reliability & Availability	---
IF 1233	IF-REG	Interface between GEN Reliability & Availability Targets and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	IF-REG	2 Operations & Maintenance	---
	IF-REG	2.1 Operations	---
	IF-REG	2.1.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	2.1.1.1 Service/Operating Plan	---
IF 6330	IF-REG	Interface between O&M Universal Crossover Spacing Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
IF 6331	IF-REG	Interface between O&M Station Crossover Spacing Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	2.1.1.2 Design & Operating Speeds	---
IF 355	IF-REG	Interface between O&M Maximum Design Speed (HST Tracks) and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
IF 4355	IF-REG	Interface between O&M Maximum Design Speed (Special Trackwork) and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	2.1.1.3 Operation Simulation / Computer-Based Modeling	---
IF 187	IF-REG	Interface between O&M Computer-Based Modeling and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	2.1.1.4 Visibility of Wayside/Trackside Equipment	---
IF 597	IF-REG	Interface between O&M Visibility of Wayside/Trackside Equipment Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	2.2 Maintenance	---
	IF-REG	2.2.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	2.2.1.1 MoI Roadway Access	---
IF 911	IF-REG	Interface between O&M MoI Infrastructure Access Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	2.2.1.2 MoI Walkway & Stairs	---
IF 843	IF-REG	Interface between O&M MoI Walkway Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 912	IF-REG	Interface between O&M MoI Access Stairway Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench
	IF-REG	2.2.1.3 MoI Live Loads	---
IF 3481	IF-REG	Interface between O&M MoI Walkway Floor Live Load Requirements and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3839	IF-	Interface between O&M MoI Access Stairway Live Load	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG	Requirements and GWY Infrastructure	Report and/or Calculation Specification
	IF-REG	2.2.1.4 MoI Equipment	---
IF 512	IF-REG	Interface between O&M MoI Equipment Dynamic Envelope Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 3691	IF-REG	Interface between O&M MoI Equipment Axle Loads Requirements and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3678	IF-REG	Interface between O&M MoI Equipment Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	2.2.1.5 MoI Maintainability & Ease of Maintenance	---
IF 2586	IF-REG	Interface between O&M MoI CIV Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
IF 5892	IF-REG	Interface between O&M MoI STR Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	Design Baseline Report HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
IF 1203	IF-REG	Interface between O&M MoI DRN Maintainability & Ease of Maintenance Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			HST Cut & Cover Tunnel RDW Underpass (HST Overpass) RDW Overhead (HST Underpass)
IF 4382	IF-REG	3 Systems	---
	IF-REG	3.1 Traction Power	---
	IF-REG	3.1.1 Interfaces with Operations & Maintenance	---
	IF-REG	3.1.1.1 Maintenance	---
IF 878	IF-REG	Interface between O&M MoI TP Facility Site Access Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	3.1.2 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	3.1.2.1 Track Alignment	---
IF 80	IF-REG	Interface between SYS TP Maximum Grade @ Phase Break Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	3.1.2.2 Traction Power Facilities & Wayside Power Cubicles (Sites)	---
IF 5597	IF-REG	Interface between SYS TP Facility & WPC Site Location Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Cut & Cover Tunnel
IF 4271	IF-REG	Interface between SYS TP Facility & WPC Site Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Cut & Cover Tunnel
	IF-	3.1.2.3 Wayside/Field Equipment	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG		
IF 1143	IF-REG	Interface between SYS TP Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
IF 5671	IF-REG	Interface between SYS TP Wayside/Field Equipment Foundation Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
	IF-REG	3.1.2.4 Conduits & Cables	---
IF 885	IF-REG	Interface between SYS TP Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) Specification
	IF-REG	3.1.2.5 Dead & Live Loads	---
IF 3019	IF-REG	Interface between SYS TP System Dead Load Requirements and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	3.1.2.6 Utilities	---
IF 2606	IF-	Interface between SYS TP Utility Spatial Requirements and GWY	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG	Infrastructure	HST At-Grade (Guideway) Report and/or Calculation
	IF-REG	3.2 Overhead Contact System	---
	IF-REG	3.2.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	3.2.1.1 Pantograph Clearances	---
IF 656	IF-REG	Interface between SYS OCS Pantograph Clearance Envelope Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) RDW Overhead (HST Underpass)
	IF-REG	3.2.1.2 Wayside/Field Equipment	---
IF 3299	IF-REG	Interface between SYS OCS Structure & Wire Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 5752	IF-REG	Interface between SYS OCS Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			RDW Underpass (HST Overpass)
IF 5766	IF-REG	Interface <i>between</i> SYS OCS Phase Break Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Cut & Cover Tunnel
	IF-REG	3.2.1.3 Foundations & Support Structures	---
IF 898	IF-REG	Interface between SYS OCS Foundation & Supporting Structure Location Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 5780	IF-REG	Interface between SYS OCS Foundation & Supporting Structure Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	3.2.1.4 Conduits & Cables	---
IF 886	IF-REG	Interface between SYS OCS Conduit, Duct Bank & Manhole Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) Specification
	IF-	3.2.1.5 Dead & Live Loads	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG		
IF 3018	IF-REG	Interface between SYS OCS Dead Load, Additional Load & Capacity Protection Requirements and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	3.2.1.6 Protective Screens	---
IF 5641	IF-REG	Interface between SYS OCS Protective Screening & Barrier Requirements and GWY Infrastructure	Design Baseline Report RDW Overhead (HST Underpass)
	IF-REG	3.3 Automatic Train Control	---
	IF-REG	3.3.1 Interfaces with Operations & Maintenance	---
	IF-REG	3.3.1.1 Maintenance	---
IF 831	IF-REG	Interface between O&M MoI ATC Interlocking & TCC House Site Access Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Cut & Cover Tunnel
	IF-REG	3.3.2 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	3.3.2.1 Interlockings / TCC Houses (Sites)	---
IF 5611	IF-REG	Interface between SYS ATC Interlocking & TCC House Site Location Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
IF 794	IF-	Interface between SYS ATC Interlocking & TCC House Site	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG	Spatial Requirements and GWY Infrastructure	HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
	IF-REG	3.3.2.2 Wayside/Field Equipment	---
IF 3304	IF-REG	Interface between SYS ATC Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 5627	IF-REG	Interface between SYS ATC Wayside/Field Equipment Foundation Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	3.3.2.3 Conduits & Cables	---
IF 876	IF-REG	Interface between SYS ATC Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass) Specification
	IF-	3.3.2.4 Dead & Live Loads	---

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG		
IF 3017	IF-REG	Interface between SYS ATC System Dead Load Requirements and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	3.3.2.5 Utilities	---
IF 2611	IF-REG	Interface between SYS ATC System Utility Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
	IF-REG	3.4 Communications	---
	IF-REG	3.4.1 Interfaces with Operations & Maintenance	---
	IF-REG	3.4.1.1 Maintenance	---
IF 5871	IF-REG	Interface between O&M MoI COM Equipment Shelter & Radio Tower Site Access Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
	IF-REG	3.4.2 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	3.4.2.1 Equipment Shelter (Sites)	---
IF 5653	IF-REG	Interface between SYS COM Equipment Shelter & Radio Tower Site Location Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
IF 904	IF-REG	Interface between SYS COM Equipment Shelter & Radio Tower Site Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel
	IF-REG	3.4.2.2 Wayside/Field Equipment	---
IF 600	IF-REG	Interface between SYS COM Wayside/Field Equipment Spatial Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 5725	IF-REG	Interface between SYS COM Wayside/Field Equipment Foundation Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	3.4.2.3 Conduits & Cables	---
IF 877	IF-REG	Interface between SYS COM Conduit, Duct Bank, Cable Trough & Manhole Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			HST Cut & Cover Tunnel RDW Underpass (HST Overpass) Specification
	IF-REG	3.4.2.4 Air Gaps	---
IF 657	IF-REG	Interface between SYS COM Air Gap Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	3.4.2.5 Dead & Live Loads	---
IF 3016	IF-REG	Interface between SYS COM System Dead Load Requirements and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	3.5 Grounding & Bonding	---
	IF-REG	3.5.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	3.5.1.1 Systemwide	---
IF 4252	IF-REG	Interface between SYS Conduit, Duct Bank, Cable Trough & Manhole Requirements G&B Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			Specification
	IF-REG	3.5.1.2 At-Grade	---
IF 1141	IF-REG	Interface between SYS At-Grade G&B Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) Specification
	IF-REG	3.5.1.3 Aerial Structures	---
IF 4071	IF-REG	Interface between SYS Aerial Structure G&B Requirements and GWY Infrastructure	Design Baseline Report HST Aerial Structure and/or Bridge RDW Underpass (HST Overpass) Specification
IF 4112	IF-REG	Interface between SYS New Overpass Structure G&B Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) RDW Overhead (HST Underpass) Report and/or Calculation
	IF-REG	3.5.1.4 Trench Structures	---
IF 4122	IF-REG	Interface between SYS Trench Structure G&B Requirements and GWY Infrastructure	Design Baseline Report HST Open Trench Specification
IF 5796	IF-REG	Interface between SYS Cut & Cover Tunnel Structure G&B Requirements and GWY Infrastructure	Design Baseline Report HST Cut & Cover Tunnel Specification
	IF-REG	3.5.1.5 Utilities	---
IF 3999	IF-REG	Interface between SYS Utility G&B Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
			Report and/or Calculation Specification
	IF-REG	3.5.1.6 External	---
IF 4107	IF-REG	Interface between SYS Existing Overpass Structure G&B Requirements and GWY Infrastructure	Design Baseline Report RDW Overhead (HST Underpass) Specification
	IF-REG	4 Rolling Stock	---
	IF-REG	4.1 HST Trainset	---
	IF-REG	4.1.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	4.1.1.1 Track Alignment	---
IF 392	IF-REG	Interface between RST HST Trainset Minimum Horizontal Radii Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
IF 6587	IF-REG	Interface between RST HST Trainset Minimum Vertical Radii Requirements and GWY Infrastructure	
IF 489	IF-REG	Interface between RST HST Trainset Actual Superelevation Requirements (incl. Tilting) and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 395	IF-REG	Interface between RST HST Trainset Unbalanced Superelevation Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
IF 70	IF-	Interface between RST HST Trainset Maximum Grade	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG	Requirements and GWY Infrastructure	HST At-Grade (Guideway)
	IF-REG	4.1.1.2 Vehicle Static Gauge & Dynamic Envelope	---
IF 490	IF-REG	Interface between RST HST Trainset Static Gauge Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
IF 481	IF-REG	Interface between RST HST Trainset Dynamic Envelope Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	4.1.1.3 Aerodynamic Effects	---
IF 604	IF-REG	Interface between RST HST Trainset Aerodynamic Effects and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	4.1.1.4 Loads & Forces	---
IF 1073	IF-REG	Interface between RST HST Trainset Axle Loads and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3457	IF-REG	Interface between RST HST Trainset Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
IF 3180	IF-REG	Interface between RST HST Trainset Traction & Braking Forces and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3185	IF-REG	Interface between RST HST Trainset Nosing & Hunting Effects and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3227	IF-REG	Interface between RST HST Trainset Derailment/Collision Loads and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	5 Guideway (excl. Trackwork)	---
	IF-REG	5.1 Drainage	---
	IF-REG	5.1.1 Interfaces with Operations & Maintenance	---
	IF-REG	5.1.1.1 Maintenance	---
IF 1260	IF-REG	Interface between O&M MoI Pump Station Site Access Requirements and GWY Infrastructure	Design Baseline Report HST At-Grade (Guideway)
	IF-REG	9 External	---
	IF-REG	9.1 Amtrak	---
	IF-REG	9.1.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	9.1.1.1 Vehicle Static Gauge & Dynamic Envelope	---
IF 3764	IF-	Interface between EXT Amtrak Trainset Dynamic Envelope	Design Baseline Report

Req. ID	Doc. ID	Doc. Section and Doc. Language	SUB
	REG	Requirements and GWY Infrastructure	HST At-Grade (Guideway) HST Aerial Structure and/or Bridge HST Open Trench HST Cut & Cover Tunnel RDW Underpass (HST Overpass)
	IF-REG	9.1.1.2 Loads & Forces	---
IF 3706	IF-REG	Interface between EXT Amtrak Trainset Axle Loads and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3683	IF-REG	Interface between EXT Amtrak Trainset Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	Design Baseline Report HST Aerial Structure and/or Bridge
IF 3537	IF-REG	Interface between EXT Amtrak Trainset Derailment/Collision Loads and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
	IF-REG	9.2 Construction Equipment	---
	IF-REG	9.2.1 Interfaces with Guideway (excl. Trackwork)	---
	IF-REG	9.2.1.1 Loads & Forces	---
IF 3701	IF-REG	Interface between EXT Construction Equipment Axle Loads and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification
IF 3673	IF-REG	Interface between EXT Construction Equipment Dynamic Train-Structure Interaction Analysis and GWY Infrastructure	Design Baseline Report Report and/or Calculation Specification