California High-Speed Rail Authority

RFP No.: HSR 14-32

Request for Proposal for Design-Build Services for Construction Package 4

Book IV, Part D.2 – Master Quality Plan

Master Quality Plan

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California High Speed Rail Program

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Master Quality Plan

Revision 2.0, FEBRUARY 2015

Accepted By: _____   2-6-15
Mark Robinson, PE   Date
Quality Manager, California High Speed Rail Authority

Approved By: _____   2-9-15
Jon Tapping, PE   Date
Director of Risk Management and Project Controls,
California High Speed Rail Authority

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Quality Policy

The Authority serves the public by delivering the California High-Speed Rail Program with a quality and safety that meets or exceeds acceptable industry and government standards, on schedule, and at the lowest possible cost. The Authority follows internationally accepted standards for quality on every phase of the Program, starting at project planning, preliminary and final engineering, system construction, equipment procurement and testing, and culminating in revenue service.

The California High Speed Rail Authority and its partners are implementing a Quality Program with the following requirements:
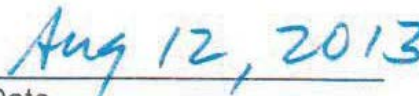
- ANSI/ISO/ASQ Q9001:2008 Quality Management Systems
- U.S. Department of Transportation, Federal Transit Administration, *Quality Management System Guidelines*, December 2012, and
- CHSR Project and Construction Management Guidelines.

To assure the Quality Management Systems (QMS) remain effective and current throughout the Program, the Authority is committing to a program wide implementation, monitoring, review and improvement process as the CHSR Program grows and moves forward.

The commitment to quality, as stated in this Quality Policy Statement, is the basis for the Program's QMS. All managers, supervisors, and employees participating in the CHSR are urged to participate and establish quality objectives in their areas of responsibilities. These will help shape effective quality procedures and plans that then can then be communicated and implemented within the CHSR program.

_____
Chief Executive Officer
Jeff Morales
California High Speed Rail Authority

Aug 12, 2013
Date

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Acronyms

Acronym	Acronym Definition
ANSI	American National Standards Institute
ASQ	American Society for Quality
Authority	California High Speed Rail Authority
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
ISO	International Organization for Standardization
MQP	Master Quality Plan
Program	California High Speed Rail Program
QMS	Quality Management System
VV&SC	Verification, Validation, and Self-Certification

Definitions

As-Built - Documented data or drawings that describe the final product.

Contractor - A generic term used within this document to refer to any entity contracted with the Authority to provide a specified scope of work.

Master Quality Plan (MQP) - The document to be used in the development and implementation of the Program QMS. The MQP contains the Authority's Quality Policy, Quality Objectives, and outlines the framework and processes for Authority organizational units and contractors to develop their own quality management plans.

Non-conformance/Noncompliance (NCR) - Non-fulfillment of a requirement.

Organizational Units - Groups within the Authority that have a common purpose. Organizational units are the higher level groupings within the Authority organizational chart.

Quality Assurance (QA) - Actions at a management level that directly improve the chances that QC actions will result in a product or service that meets requirements. QA includes ensuring the project requirements are developed to meet the needs of all relevant internal and external agencies, planning the processes needed to assure quality of the project, ensuring that equipment and staffing is capable of performing tasks related to project quality, and documenting the quality efforts.

Quality Control (QC) - Actions at a working level to assure that a product or service meets requirements and that the work meets the product or service goals. QC is the act of taking measurements, testing, and inspecting a process or product to assure that it meets specification. Products may be design drawings/calculations or specifications, manufactured equipment, or constructed items. QC also refers to the process of witnessing or attesting to, and documenting such actions.

Quality Elements - Management practices that ensure quality of design, manufacturing, construction services, and operations and maintenance. Quality elements are identified in the ANSI/ISO/ASQ Q9001:2008.

Quality Management Plan - A document prepared by the Authority organizational units and contractors that describes the quality objectives, roles and responsibilities, and processes and procedures, per the Program QMS and this MQP.

Quality Management System (QMS) - A formalized system that documents the structure, responsibilities, and procedures required to achieve effective quality management.

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1. Introduction

1.1 Purpose

The purpose of this document is to define the Authority's Quality Management System (QMS) and quality expectations for the California High Speed Rail Program (Program). This Master Quality Plan (MQP) satisfies the requirement set forth in the U.S. Department of Transportation, Federal Rail Administration (FRA), Grant/Cooperative Agreement FS-HSR-0009-10-01-00, as amended.

1.2 Background

The California High-Speed Rail Authority (Authority) is responsible for planning, designing, building and operation of the first high-speed rail system in the nation. California high-speed rail will connect the mega-regions of the state, contribute to economic development and a cleaner environment, create jobs and preserve agricultural and protected lands. By 2029, the system will run from San Francisco to the Los Angeles basin in under three hours at speeds capable of over 200 miles per hour. The system will eventually extend to Sacramento and San Diego, totaling 800 miles with up to 24 stations. In addition, the Authority is working with regional partners to implement a statewide rail modernization plan that will invest billions of dollars in local and regional rail lines to meet the state's 21st century transportation needs.

1.3 Program Quality Management System

The Program QMS establishes and provides documentation of the organizational structure, responsibilities, procedures, processes, and resources needed to meet the quality policy and objectives of the Program.

As the Program progresses through various project phases – planning, design, construction, testing, operations, and maintenance – the QMS and this MQP will evolve to accommodate changing organizational and programmatic needs. As such, the QMS and the MQP are living systems and documents subject to ongoing review, evolution, and continuous improvement.

This MQP and the Program QMS are based on the Criteria for Performance Excellence published by the National Institute for Standards and Technology (NIST)[1]. Within these criteria are comprehensive, non-prescriptive and adaptable guidance to achieve the highest level of performance excellence. Under the umbrella of the NIST criteria many different quality management systems can be used.

The Authority has also adopted the ANSI/ISO/ASQ Q9001:2008 per the *Federal Transit Administration (FTA) Quality Management System Guidelines,* December of 2012. The Program QMS consists of the Quality Policy, this MQP, the associated Authority organizational units and

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[1] http://www.nist.gov/baldrige/publications/criteria.cfm

project quality management plans, procedures, work instructions, and quality records as illustrated in Figure 1.3.1 – The QMS Pyramid.

The QMS Pyramid begins with the Program Quality Policy, which is documented in the MQP. All Authority organizational units and contractors are required to have a quality management plan consistent with this MQP.
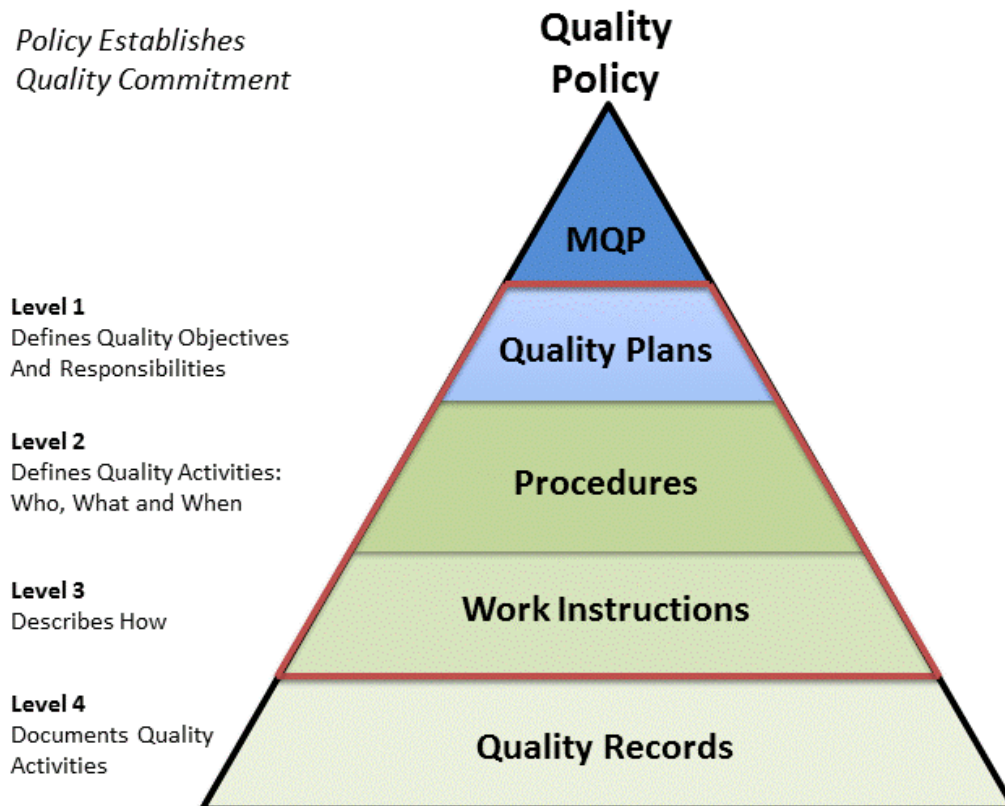

Figure 1.1: The QMS Pyramid

Level 1 of the QMS Pyramid defines the quality objectives, responsibilities, and the methodology for identification, resolution, and continuous improvement on quality issues. Quality objectives must be measurable, separate from operational activities, and consistent with the Program Quality Policy.

Level 2 of the QMS Pyramid defines the quality related activities, specifically, the **who**, **what**, and **when** needed to meet deliverables.

Level 3 of the QMS Pyramid defines the step-by-step instructions to implement the procedures and quality related activities established in Level 2.

Level 4 of the QMS Pyramid includes the documentation and reporting of identification, resolution, and continuous improvement of quality issues.

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1.4 Quality Objectives

The Authority establishes the following Quality Objectives:

- Develop and implement quality management plans to promote performance excellence;

- Deliver quality work on time and within budget;

- Identify requirements and assure assignment;

- Assure development and implementation of procedures to meet requirements;

- Identify metrics to facilitate data driven decisions; and

- Identify and implement continuous improvement opportunities.

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2. Essential Elements of a Quality Management Plan

2.1 Quality Management Plan Requirements

All Authority organizational units and contractors are required to develop a quality management plan, consistent with the Program QMS and this MQP. Contractors to the Authority must submit their quality management plans <u>within 60 days of receiving a Notice to Proceed</u> or as stipulated in the contract. Authority organizational units must submit their quality management plans per the direction of the Authority's Quality Manager. The quality management plan must address the following seven Performance Excellence Criteria as well as the 15 quality elements of ANSI/ISO/ASQ Q9001:2008 per FTA's Quality Management System Guidelines.

Performance Excellence Criteria

1. **Leadership:** Quality requires that leadership be engaged.
   o Articulate the quality policy and objectives
   o Establish the commitment by leadership to implement the quality program.
   o Describe the roles and responsibilities of the quality manager.
   o Describe how leadership will create, communicate, and manage the quality program.
2. **Strategic Planning**: Quality must be planned.
   o Describe the process and schedule for quality related activities such as process/design quality control and continuous improvements.
   o Describe the process to identify, assess, and mitigate risk items that may affect the overall quality of the work.
   o Identify the work systems and core competencies to develop and implement the quality program.
3. **Customer Focus:** Quality must involve customers early and often.
   o Describe how the organization will communicate with the Authority and identify and address its concerns.
   o Describe how customer satisfaction and engagement will be determined.
4. **Measurement, Analysis and Knowledge Management**: Quality is achieved by detecting and resolving issues and incorporating continuous improvements from the lessons learned.
   o Describe how quality data is collected, analyzed, and reported.
   o Describe the approach, deployment, and integration of the processes to:
     ▪ identify requirements;
     ▪ identify, analyze, and resolve quality issues;
     ▪ evaluate overall performance; and
     ▪ ensure continuous improvement and lessons learned.
5. **Workforce Focus**: Quality requires competent and qualified staff.
   o Describe the process to ensure that personnel have and maintain adequate skills (i.e. certifications, licenses, and training) to complete the scope of work.
   o Describe the process to ensure that adequate resources are available and deployed.
   o Describe the process to promote a constructive work environment.
6. **Operations Focus**: Quality is sustainable by having effective processes and tools.

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    o Describe the work processes and procedures necessary to meet project objectives and requirements.

    o Describe the work processes to schedule and scope assessments and document continuous improvement.

7. Results: Quality is ultimately determined by the project outcomes or results.

    o Describe the performance metrics used to evaluate the organization's effectiveness and success in achieving the quality objectives and requirements.

    o Describe the frequency of reviews of these performance metrics and the process to address and correct any underperformance.

Quality Elements

The 15 quality elements are as follows:

1. **Management Responsibility;**

2. **Documented QMS;**

3. **Design Control;**

4. **Document Control;**

5. **Purchasing;**

6. **Product Identification and Traceability;**

7. **Process Control;**

8. **Inspection and Testing;**

9. **Inspection, Measuring, and Test Equipment;**

10. **Inspection and Test Status;**

11. **Non-conformance;**

12. **Corrective Action;**

13. **Quality Records;**

14. **Quality Assessments; and**

15. **Training.**

The details of the 15 elements are further defined in the following table:

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Table 1: Quality Elements by Project Phase

Quality Management Plan Element	Project Phase			
	Project Planning	**Preliminary Engineering/ Final Design**	**Construction/Procurement**	**Testing/ Start-Up**
1. Management Responsibility	- Describe the quality responsibilities of the project team and how the organization responsible for quality will communicate and integrate with the Authority and all other entities within the Program. - Identify the quality policy and objectives. - Identify the quality manager and other key personnel responsible for the development and implementation of the QMS and the quality management plan. - Describe the responsibilities of the quality manager and the aforementioned key personnel.	- Describe the quality responsibilities of the project team and how the organization responsible for quality will communicate and integrate with the Authority and all other entities within the Program. - Identify the quality policy and objectives. - Identify the quality manager and other key personnel responsible for the development and implementation of the QMS and the quality management plan. - Describe the responsibilities of the quality manager and the aforementioned key personnel.	- Describe the quality responsibilities of the project team and how the organization responsible for quality will communicate and integrate with the Authority and all other entities within the project and the Program. - Identify the quality policy and objectives. - Identify the quality manager and other key personnel responsible for the development and implementation of the QMS and the quality management plan - Describe the responsibilities of the quality manager and the aforementioned key personnel. Identify quality oversight activities and those responsible for carrying them out.	- Describe the quality responsibilities of the project team and how the organization responsible for quality will communicate and integrate with the Authority and all other entities within the project and the Program. - Identify the quality policy and objectives. - Identify the key personnel responsible for acceptance, demonstration, and integration testing. - Describe the responsibilities of the quality manager and the aforementioned key personnel. - Identify the testing program requirements and those responsible for carrying them out.
2. Documented Quality Management System	- Submit a quality management plan within 60 days of receiving Notice to Proceed or as stipulated within the contract. - Incorporate by reference all quality procedures applicable to the project. - Applicable existing procedures must be referenced for all of the Quality Management Plan elements.	- Submit a quality management plan within 60 days of receiving Notice to Proceed or as stipulated within the contract. - Incorporate by reference all quality procedures applicable to the project. Construction and/or equipment manufacturing related procedures are particularly relevant. - Applicable procedures must be referenced for all of the Quality Management Plan elements.	- Submit a quality management plan within 60 days of receiving Notice to Proceed or as stipulated within the contract. - Incorporate by reference all quality procedures applicable to the project. Construction and/or equipment manufacturing related procedures are particularly relevant. - Applicable procedures must be referenced for all of the Quality Management Plan elements.	- Submit a quality management plan within 60 days of receiving Notice to Proceed or as stipulated within the contract. - Incorporate by reference all quality procedures for applicable to the project. - Testing and inspection related procedures are particularly relevant. - Applicable procedures must be referenced for all of the Quality Management Plan elements.
3. Design Control	- Specify requirements for review & sign-off for design. - Specify required design reviews during the PE and Final Design Phase. - Specify any contract quality requirements for PE or Final Design consultants. - Describe the procedures to be followed for design changes, including sign-off and documentation. - Describe the procedure for ensuring that the various planning and design efforts integrate so	- Describe the procedures to be followed for the development, revision, and sign-off of designs and specifications and the documentation of these processes. - Describe the procedures for obtaining waivers of requirements during design and construction. All developed designs and specifications must be signed and stamped by those in responsible charge. - Identify the requirements for "as-built" documents.	- Describe the procedures to be followed for the development, revision, and sign-off of designs and specifications and the documentation of these processes. - Describe the procedures for obtaining waivers from requirements during construction. All developed designs and specifications must be signed and stamped by those in responsible charge. Identify the requirements for "as-built" documents. - Describe the procedure for ensuring that the	- Describe the procedures to be followed for fixing problems that are uncovered during final testing. Configuration management practices must be identified and followed.

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Quality Management Plan Element	Project Phase			
	Project Planning	Preliminary Engineering/ Final Design	Construction/Procurement	Testing/ Start-Up
	that the high-speed rail functions as one system.	- Describe the procedure for ensuring that the various planning and design efforts integrate so that the high-speed rail functions as one system.	various planning and design efforts integrate so that the high-speed rail functions as one system.	
4. Document Control	- Describe procedures for the control of project documents. All document control procedures must be in compliance with the Authority's Document Control Plan.	- Describe procedures for the control of project documents. All document control procedures must be in compliance with the Authority's Document Control Plan.	- Describe procedures for the control of project documents. All document control procedures must be in compliance with the Authority's Document Control Plan.	- Describe procedures for the control of documentation for testing and inspection.
5. Purchasing	- Describe procedures to obtain qualified personnel/contractors/consultants/materials. - Describe the process to ensure that purchasing documents are reviewed and approved by the designated personnel prior to release.	- Describe procedures to obtain qualified personnel/contractors/consultants/materials. - Describe the process to ensure that purchasing documents are reviewed and approved by designated personnel prior to release.	- Describe procedures to obtain qualified personnel/contractors/consultants/materials. - Describe requirements for purchasing control to be placed upon construction contractors or equipment manufacturing contractors for the project. - Describe purchasing and receiving control procedures.	- Describe procedures to obtain qualified personnel/contractors/consultants/materials. - Describe the requirements and the procedure for the testing of materials. - Specify random testing to be conducted of products for which fabricators submit material certificates or certificates of compliance and the personnel responsible for conducting the testing. - Describe the procedures that must be followed when the validity of the materials/products or documentation are questionable and the additional testing requirements that apply in these situations.
6. Product Identification and Traceability	- Describe requirements for product identification and traceability	- Describe requirements for product identification and traceability.	- Describe requirements for product identification and traceability.	- Describe the requirements for product identification and traceability.
7. Process Control	- Describe requirements for process control and procedures for special processes and specify any sequencing of work requirements within these procedures.	- Describe requirements for process control and procedures for special processes and specify any sequencing of work requirements within these procedures.	- Describe requirements for process control and procedures for special processes and specify any sequencing of work requirements within these procedures.	- Describe requirements for process control and procedures for special processes and specify any sequencing of work requirements within these procedures. - Describe maintenance procedures.

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Quality Management Plan Element	Project Phase			
	Project Planning	Preliminary Engineering/ Final Design	Construction/Procurement	Testing/ Start-Up
8. Inspection & Testing	- Describe requirements for inspection and testing. - State the types and frequency of tests required and the standards and specifications to be met. - Describe the procedures for ensuring system integration testing and the ability of various subsystems and facilities to work together.	- Describe requirements for inspection and testing. State the types and frequency of tests required and the standards and specifications to be met. - Describe the procedures for ensuring system integration testing and the ability of various subsystems and facilities to work together.	- Describe requirements for inspection and testing. State the types and frequency of tests required and the standards and specifications to be met. - Specifications must indicate the types and frequency of tests required and the standards to be met. - Describe the procedures for ensuring system integration testing, the ability of various subsystems and facilities to work together. - Describe the procedures for independently reviewing tests that affect system safety to ensure that potential hazards are identified and remedied.	- Describe requirements for acceptance testing, demonstration testing, and integration testing of the system and equipment. - State the types and frequency of tests required and the standards and specifications to be met. - Acceptance tests verify that performance of all delivered equipment is in conformance with specifications. - Demonstration tests demonstrate the reliability of the system equipment. - Describe the procedures for ensuring system integration testing, the ability of various subsystems and facilities to work together. - Describe the procedures for independently reviewing tests that affect system safety to ensure that potential hazards are identified and remedied.
9. Inspection, Measuring &Test Equipment	- Describe requirements for calibration and maintenance of inspection, measuring, and test equipment. Describe where these requirements are appropriate.	- Describe requirements for calibration and maintenance of inspection, measuring, and test equipment. - Describe where these requirements are appropriate.	- Describe requirements for calibration and maintenance of inspection, measuring, and test equipment for each contract.	- Describe requirements for calibration and maintenance of inspection, measuring, and test equipment.
10. Inspection & Test Status	- Describe requirements to identify the inspection and test status of work during production and installation. Describe where these requirements are appropriate.	- Describe requirements to identify the inspection and test status of work during production and installation. Describe where these requirements are appropriate.	- Describe requirements to identify the inspection and test status of work during production and installation.	- Describe requirements to identify the inspection and test status of work during final testing.
11. Non-conformance	- Describe the procedures for identifying, analyzing, and resolving nonconforming work. - Describe how non-conformances will be reported to the Authority and/or its representative. - Describe procedures for managing nonconforming work. - Procedures must include and define responsibilities, state conditions that would cause work to stop, and provide documentation.	- Describe the procedures for identifying, analyzing, and resolving nonconforming work. - Describe how non-conformances will be reported up to the Authority. - Describe the procedures for managing nonconforming work. Procedures must include and define responsibilities, state conditions that would cause work to stop, and provide documentation.	- Describe the procedures for identifying, analyzing, and resolving nonconforming work. - Describe how non-conformances will be reported up to the Authority and/or its representative. - Procedures must include and define responsibilities, state conditions that would cause work to stop, and provide documentation.	- Describe the procedures for identifying, analyzing, and resolving nonconforming work. - Describe how non-conformances will be reported up to the Authority and/or its representative. - Procedures must include and define responsibilities, state conditions that would cause work to stop, and provide documentation.

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Quality Management Plan Element	Project Phase			
	Project Planning	Preliminary Engineering/ Final Design	Construction/Procurement	Testing/ Start-Up
12. Corrective Action	- Describe procedures for managing and reporting corrective actions.	- Describe procedures for corrective actions.	- Describe procedures for corrective actions	- Describe procedures for managing and reporting corrective actions.
13. Quality Records	- Describe the procedures for establishing and maintaining quality records.	- Describe the procedures for establishing and maintaining quality records.	- Describe the procedures for establishing and maintaining quality records.	- Describe the procedures for establishing and maintaining quality records.
14. Quality Audits	- Describe the audit/assessment program and how it will be implemented and enforced. - Describe the procedures for accommodating audits/assessments conducted by the Authority. - Describe the procedures for a final audit to ensure that project quality records are complete and in satisfactory condition.	- Describe the audit/assessment program and how it will be implemented and enforced. - Describe the procedures for accommodating audits/assessments conducted by the Authority. - Describe the procedures for a final audit to ensure that project quality records are complete and in satisfactory condition.	- Describe and implement an audit program for construction and equipment manufacturing activities. - Describe the procedure for accommodating audits/assessments conducted by the Authority. - Describe the procedures for a final audit to ensure that project quality records are complete and in satisfactory condition.	- Describe and implement an audit program for construction and equipment manufacturing activities. - Describe the procedure for accommodating audits/assessments conducted by the Authority. - Describe the procedures for a final audit to ensure that project quality records are complete and in satisfactory condition.
15. Training	- Identify specific training required for personnel. - Describe how training, certification, and license requirements will be tracked and maintained.	- Identify specific training required for personnel. - Describe how training, certification, and license requirements will be tracked and maintained.	- Identify specific training required personnel. - Describe how training, certification, and license requirements will be tracked and maintained.	- Identify specific training required personnel. - Describe how training, certification, and license requirements will be tracked and maintained.

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3. Implementing the QMS

3.1 The Authority Quality Manager

The Authority Quality Manager is responsible for implementing the QMS, investigates quality-related activities in all areas of the Program, and reports to the Director of Risk Management and Project Controls. In addition, the Authority Quality Manager also identifies, evaluates, and ensures resolution of quality-related issues. The responsibilities of the Authority Quality Manager include, but are not limited to the following:

- Advising Authority management on organization development to promote performance excellence;

- Communicating and collaborating with Authority and contractors to resolve quality related issues;

- Developing and communicating the Authority's quality programs and procedures;

- Reviewing Authority contracts for appropriate quality requirements;

- Managing the development, review, and acceptance of quality management plans;

- Managing the quality assessment program;

- Managing the Authority's continuous improvement process; and

- Reporting quality and continuous improvement metrics, trends, and issues to management.

The Authority Quality Manager will conduct quality assessments at all levels of the Program as deemed necessary. The quality assessments will be used to provide feedback on the implementation of the QMS, individual quality management plans, a specific component or element of the Program or a project, and/or the overall compliance with contractual requirements.

3.2 Quality Assessments

Quality assessments will be scheduled at frequencies appropriate to the status and importance of the activity or at the discretion of the Authority Quality Manager. An assessment plan describing the scope of the assessment and a questionnaire will be provided to all participating entities in advance of the quality assessment. Quality assessments will consist of interviews, observations, and review of documents within the scope of the assessment, as well as opening and closing meetings.

Initial quality assessment findings will be provided to the assessee at the closing meeting. The assessee will have the opportunity to clarify the findings at this time. Quality assessment findings may be classified as either non-conformances (NCRs) that require action to be taken, or observations. Observations are indications of possible deviations from quality assessment criteria that do not warrant a non-conformance. A quality assessment report will be written

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summarizing the assessment and its results. The lead assessor will sign and submit the final quality assessment report to the entity's Quality Manager/Contact for approval. A follow-up quality assessment shall be conducted to evaluate the implementation of the resolutions, if any, of the initial quality assessment findings.

Quality assessment records include but are not limited to:

- Letter or memo from the Authority Quality Manager initiating the assessment;

- Final quality assessment reports;

- Quality assessment schedules;

- Quality assessment questionnaires;

- Quality assessment plans;

- Sign-in Sheets;

- Non-conformance Reports;

- Observation reports; and

- Relevant correspondence.

The Authority Quality Assessment records are managed interactively through SharePoint to maximize communication.

3.3 Quality Management Plan Acceptance

Quality management plans developed by organizational units and contractors must incorporate the principles and elements discussed in this MQP and also serve as a living document, which will be a reference for the Authority and its contractors for quality policies, procedures, roles, and responsibilities.

Quality management plans prepared by contractors must be submitted to the Authority Contract/Project Manager. The Authority Contract/Project Manager is responsible for submitting the quality management plan to the Authority Quality Manager for review and acceptance. The Authority Contract/Project Manager is responsible for ensuring that the accepted quality management plan is implemented by the entity.

Quality Plans prepared by Authority organizational units must be submitted to the Authority Quality Manager.

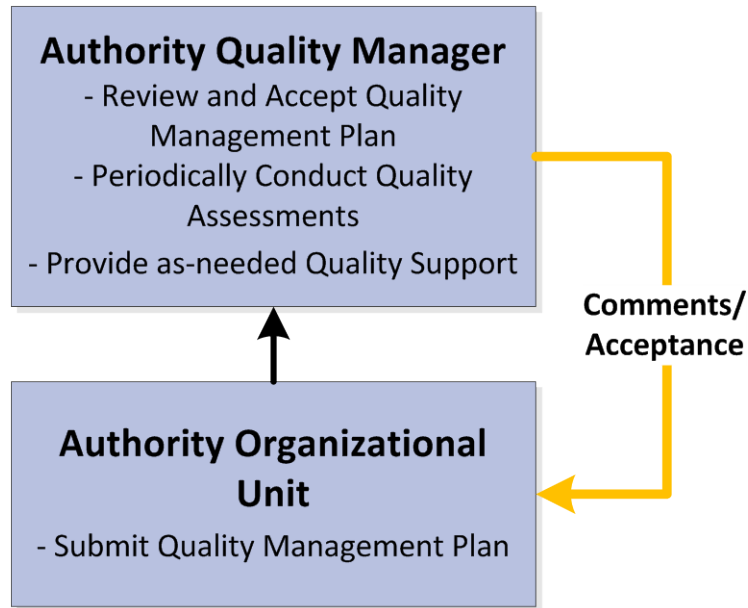The acceptance procedures of quality management plans are shown in Figures 3.1 and 3.2.

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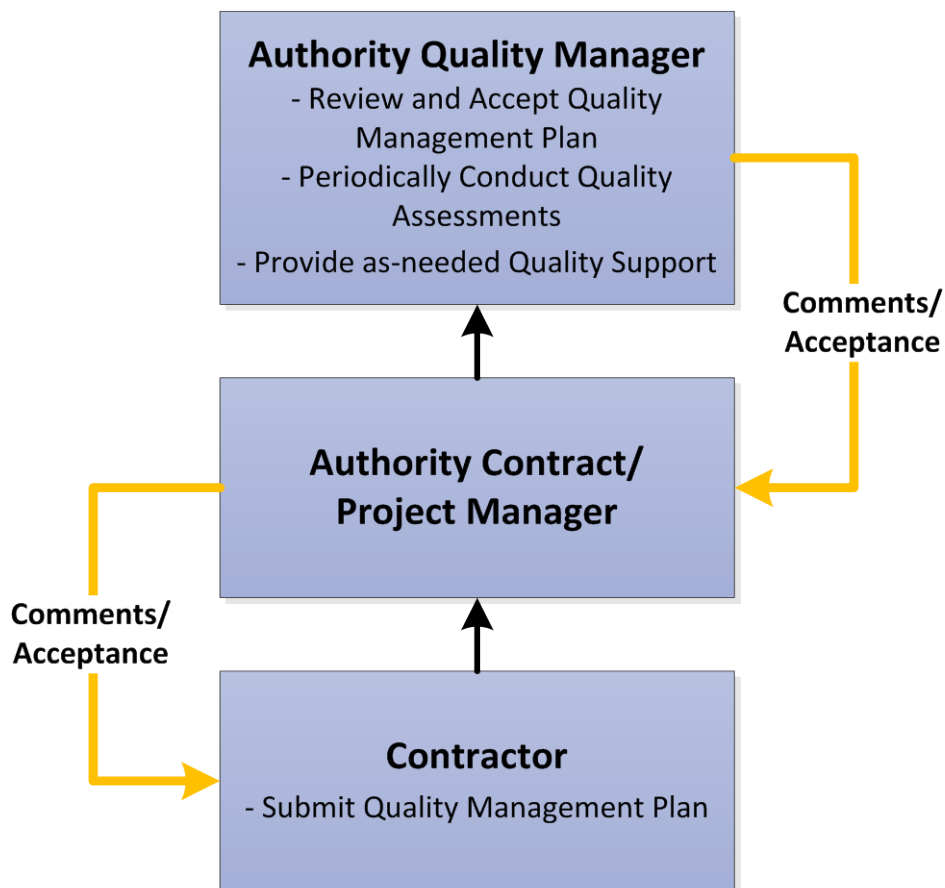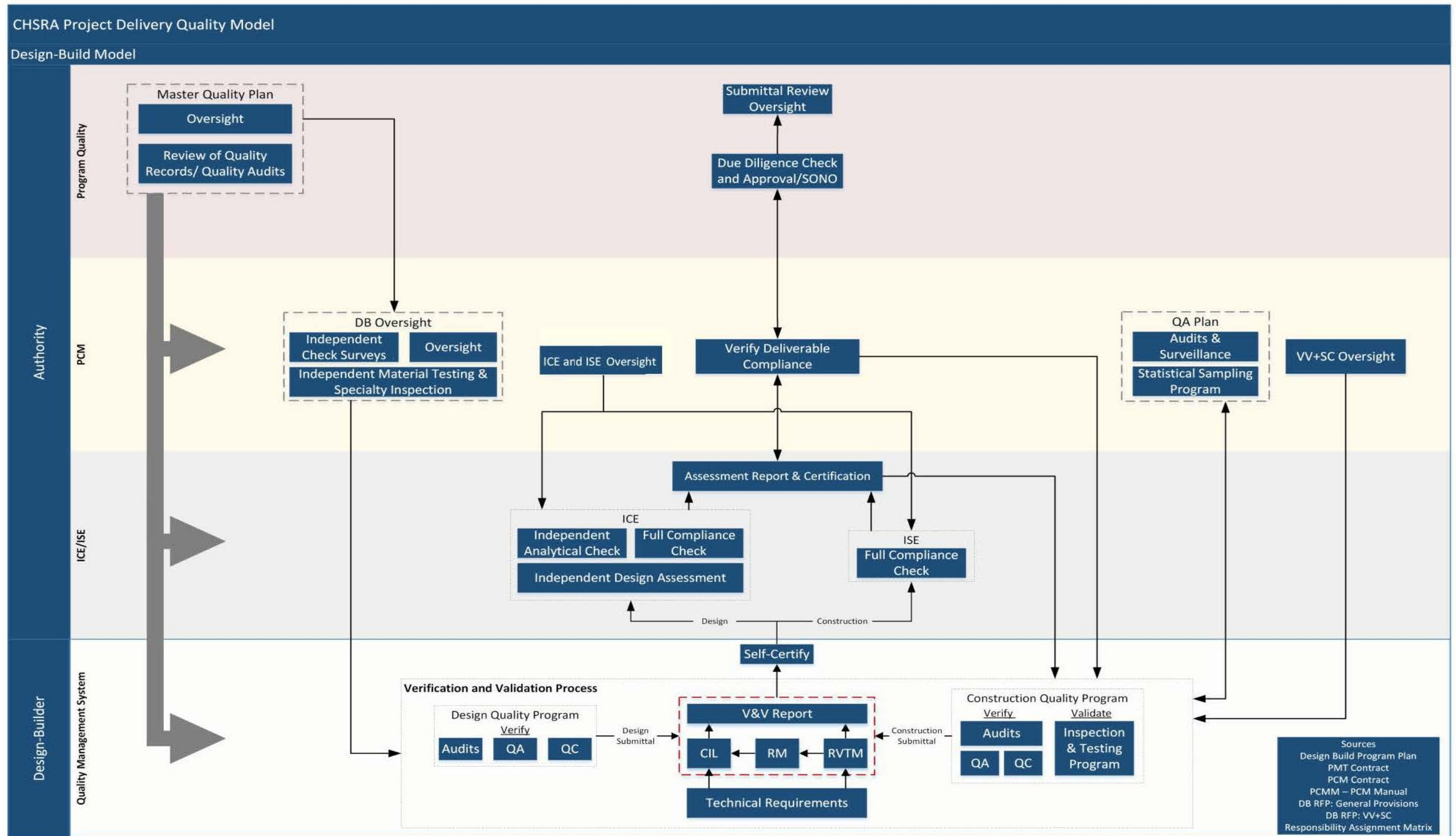*Figure 3.1: Acceptance of Authority Organizational Unit Quality Management Plan*

Figure 3.2: Acceptance of Contractor Quality Management Plan

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Appendix A – Sample Design-Build Project Delivery Quality Model

Figure A.1: Sample Design-Build Project Delivery Model

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