




Phase 2 – Broad River Road at I-20
Interchange



***Construction Quality Management
Plan***

| REVISION HISTORY | | | |
|---------------------|-------------------------------|---------------|-------------------------|
| Revision | Revision Date (YYYY-MM-DD) | Pages Revised | Description of Revision |
| 0 | 2022-xx-xx | | |
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The signatures below indicate that this Quality document has been reviewed and accepted and demonstrates that the signatories are aware of all the requirements contained herein and are committed to ensuring their provision.

| | Name | Signature | YYYY-MM-DD |
|--------------|---------------|-----------|------------|
| Prepared by: | Lee Robertson | | 2022-xx-xx |
| Reviewed by: | Frank Hribar | | 2022-xx-xx |
| Approved by: | | | |



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1.0 Introduction

The Construction Quality Management Plan (CQMP) is developed by Archer-United Joint Venture (AUJV) to guide the construction quality and its continuous improvement on the Carolina Crossroads Phase 2 Project.


The CQMP encompasses construction *Quality Control (QC)* and independent *Quality Acceptance (QA)* related processes and individuals, necessary to provide confidence and objective evidence that the Work is in compliance with the Contract Documents. The Quality Control Manager (QCM) is responsible for the execution of the QC portion of the CQMP. The Independent Quality Manager (IQM) is responsible for the execution of the QA portion of the CQMP. QC and QA operations will be conducted separately and independently while maintaining open lines of communication to ensure proper workflow for acceptance. The QCM and IQM are jointly responsible for producing and updating the CQMP. Any revisions made to the approved CQMP will require SCDOT approval and be performed in accordance with procedure QA423.

The CQMP contains methods and procedures for a comprehensive program to assure construction quality with both QC and independent QA components, and documents conformance to Contract requirements. The distinction on the quality processes are characterized below.

- **Quality Control (QC)** is considered to be the operational techniques and activities that are performed or conducted by AUJV's QC staff, production forces and their sub-contractors of in-process or completed work product to determine that the end product is satisfactory and meets the specified requirements. The construction QC processes highlight quality planning, material quality preparation, and workmanship, while the QC Procedures detail the process controls executed by work crews and assigned QC staff in advance of quality hold points. QC operations and practices are conducted separately and independently from QA activities. AUJV QC operations will be managed from the AUJV Office located at 1021 Briargate Circle, Columbia, SC. Infrastructure Consulting & Engineering (ICE) will manage and provide QC support activities as a part of the AUJV team. ICE QC personnel will operate from ICE's CEI office located at 121 Midlands Court, West Columbia, SC. Both locations are within 2 miles of the project.
- **Quality Acceptance (QA)** is considered to be a planned and systematic process performed jointly by the Independent Quality Firm (IQF) and SCDOT. Raba Kistner (RK) will serve as the IQF and is organizationally separate of AUJV's QC and construction production forces. Mead & Hunt, Wilson-Ferguson and S&ME will be subcontractors to RK and will be providing QA inspection and testing support for the project. The IQF will provide documented objective evidence, through a program of independent auditing, inspection and testing to ensure that work meets contract requirements. QA personnel will operate from their office and lab located at 1404 St. Andrews Road, Columbia, SC.

In addition to verification of the QA efforts performed by IQF, SCDOT will perform direct acceptance inspection and/or testing on precast, prestressed, and structural steel elements.

- **Owner Verification (OV)** is considered to be the verification of QA activities performed by SCDOT or its consultant(s) to validate and/or verify the compliance of the IQF with the CQMP. SCDOT will observe and evaluate quality processes in action to assess compliance with the CQMP to include performance of verification testing and inspection to validate and/or verify IQF efforts and conclusions.

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- **Independent Assurance (IA)** is considered to be a systematic process for evaluating certified testing equipment, personnel and laboratory on the project. The IQF will work with SCDOT or its consultants to ensure that all staff performing acceptance materials testing on the project are evaluated through the SCDOT IA program.

2.0 Scope

This CQMP applies to construction QC activities performed by AUJV and QA activities by the IQF as characterized above throughout the construction activities, manufacturing, and installation of all physical elements of the Carolina Crossroads Phase 2 Project.

3.0 Definitions

Accept or Acceptance - Formal conditional determination by the IQF that a particular matter or item appears to meet the requirements of the Contract documents.

As-Built Documents - Documents provided at the completion of the Project with changes identified to reflect any deviation to the documents.

Audit - A documented systematic, independent and objective process to obtain evidence for the purpose of objective evaluation to determine compliance or required improvements of the audited element.

Carolina Crossroads Phase 2 (CCR-2) – The Project

Construction Documents - All Project and Utility Adjustment Shop Drawings and Working Drawings, fabrication plans, material and hardware descriptions and specifications.

Contract – A legally binding agreement between two entities that defines terms, conditions, and responsibilities of each entity. The Contract includes all exhibits, SCDOT’s Request for Proposals and all attachments, Request for Qualifications and all attachments, and Contractor’s Qualifications and all attachments. Contracts are also referred to as Agreements.


Contract Change Request (CCR) – A written request to change contract requirements or to deviate from SCDOT accepted practices.

Contractor - The entity identified in the Agreement to perform work under the applicable project, together with its successors and assigns.

Corrective Action - An action taken to address the root cause of a process nonconformance, and hence, eliminate the future recurrence of a problem of that nature.

Corrective Action Report (CAR) - An established vehicle to document and report the identification of repeatedly occurring conditions adversely affecting quality. This includes corrective actions to be taken to correct the issue, identification of cause of the issue, system improvements to prevent recurrence, and monitoring of issue after corrections have been made. CARs must be submitted to SCDOT, IQF and appropriate levels of AUJV for review and approval prior to implementing corrective actions.

Correlation Testing - Testing performed to check or establish variability of testing procedures and equipment between laboratories and/or field testing.

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Deficiency - Any work product (i.e., engineering/test/inspection report, etc.) or process not in conformance with contractual or referenced requirements that can be corrected by reworking to bring it into conformance with the requirements prior to client acceptance.

Deficiency Notice (DN) - A form used to identify and document a deficiency and record the corrective action taken to bring it into conformance.

Department - The South Carolina Department of Transportation (SCDOT).

Design Documents - All drawings (including plans, profiles, cross-sections, notes, elevations, sections, details and diagrams), specifications, reports, studies, calculations, electronic files, records and submittals necessary for, or related to, the design of the Project or the Utility Adjustments in accordance with the Contract Documents, the Governmental Approvals and applicable Law.

Design Manager - The individual responsible for coordinating the individual design disciplines and is responsible for ensuring that the overall Project design is completed, and the design criteria and requirements met.

Design Builder – The Archer United Joint Venture team (AUJV).

Design Change Notification (DCN) - A form produced by the designer to initiate changes to the RFC design documents.

Document Owner - The person responsible for the creation of the document or in responsible charge for creation of the document.

Engineer of Record (EOR) - The individual responsible for the development of contractual documents, and who, as a registered, Professional Engineer endorses (signs and seals) the Record Drawings.

Engineering Judgment (EJ) - Decision made and documented by SCDOT, the IQM or other SCDOT approved Professional Engineer, based upon SCDOT delegation, to accept the results of an acceptance decision when, while not meeting minimum requirements, results indicate reasonable conformance with the specification, or RFC Documents.

Field Change Notification (FCN) - A form to request changes to the RFC design documents.

Hold Point (HP) - Points where critical quality characteristics are to be measured, tested, and documented, and/or at points where it is nearly impossible to determine the adequacy of either materials or workmanship once work proceeds past this point.


Independent Assurance (IA) - All activities that are included in an unbiased and independent evaluation program for all the sampling and testing procedures used in the Acceptance Program.

Independent Quality Firm (IQF) - The independent firm identified as responsible for performing independent quality acceptance material testing, inspection, audits of the CQMP.

Independent Quality Manager (IQM) – An employee of the IQF who is responsible for management of construction Quality Acceptance functions.

Inspection - The act of monitoring or observing specific acts or activities to verify conformance to the specified requirements.

Inspector - The SCDOT certified QC and/or IQF representatives assigned to monitor, document and report the work in progress.

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Material Certification - A certification provided by a manufacturer, producer, or supplier of a product that the product, as furnished, complies with the pertinent specification or Contract requirements.

Nonconformance - The failure to fulfill a contractual requirement related to a work product that has been delivered to SCDOT.

Nonconformance Report (NCR) - A form used to identify and record a nonconforming product and proposes a disposition of repair or use-as-is for consideration of the EOR and SCDOT.

Originator - An individual and/or entity that detects and reports evidence of a nonconformance and initiates and/or requests to initiate the nonconformance process.

Owner Verification Firm (OVF) – Firm representing SCDOT to verify IQF inspections, material certifications, test results, inspection documentation and inspection procedures as well as conduct periodic audits of project records.

Procedure - A controlled document that describes, often in significant detail, how a particular task is performed. Procedures are typically not cross-functional and pertain to task activities within a particular department.

Punch List - The list of work items with respect to the Project which remain to be completed and/or corrected after achievement of Substantial Completion, generally limited to minor incidental items of Work which have no adverse effect on the safety or operability of the Project.

Quality Acceptance (QA) - A planned and systematic process that is performed by the IQF independently of the construction production forces, for the purpose of determining conformance of the work by providing independent inspection, sampling, and testing, to verify the contractor's QC sampling and testing. The QA process is organizationally independent of any QC operations and contractor production forces.

Quality Control Manager (QCM) - The QCM is responsible for the QC portion of the CQMP with the authority of stopping the work, and accountable for implementing, monitoring, and adjusting the CQMP processes to make certain that acceptable quality is achieved and maintained.

Released For Construction (RFC) Documents – All drawings, specifications, revisions thereto, and any other items necessary to conduct the work, signed and sealed by the Engineer of Record.


Request for Information (RFI) - The request to clarify the contract, plans and specifications.

Shop Drawing - An in depth interpretation of the design requiring confirmation by the Engineer of Record, produced by the contractor, supplier, manufacturer, subcontractor, or fabricator.

Subcontractor - Any entity with whom Contractor has entered into any Subcontract to perform any part of the Work or provide any materials, equipment or supplies for the Project on behalf of Contractor and any other entity with whom any Subcontractor has further subcontracted any part of the Work, at all tiers.

Supplier - Any Entity not performing work at or on the site which supplies machinery, equipment, materials, hardware, systems, or any other appurtenance to the Project or to any Subcontractor in connection with the performance of the work. Persons, who merely transport, pick up, deliver, or carry materials, personnel, parts or equipment or any other items or persons to or from the site shall not be deemed to be performing work at the site.

Verification - The act of reviewing, inspecting, observing, testing, checking, auditing or otherwise determining and documenting whether items, processes, services, or documents conform to specified requirements.

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Working Drawings - Supplemental documents to show erection plans, falsework plans, shoring or any other supplementary information required by the AUJV to control the work that require verification by the AUJV design team.

4.0 Construction Quality Management Plan

4.1 General Requirements

The CQMP outlines the QC and QA procedures and personnel in place to manage and accept the final product. The CQMP describes the use of QA testing and inspection performed by the IQF as the basis for acceptance decisions when the results are validated by SCDOT's OV process. QC and QA activities will be performed independently throughout the duration of the project to ensure compliance with the specifications and to maintain the integrity of the QA process.

4.2 Control of Documents

The CQMP will be controlled in accordance with Procedure QA423 CQMP Revisions. All printed copies of this CQMP and associated documents, unless contained within a defined Controlled Document Binder, and managed through a Distribution Log are considered uncontrolled and the user must verify its currency against the electronic repository prior to use.

5.0 Quality Control

5.1 Management Commitment


AUJV is committed to the implementation of the Construction Quality Management Plan as described and documented by this CQMP.

5.2 Planning

Planning is a critical element for the successful execution of the QC procedures. There will be open communication and transparency between the AUJV Management Team and their SCDOT counterparts regarding the planning and execution of the CQMP.

5.3 Roles and Responsibilities

Quality Control Manager (QCM): The QCM is responsible for assuring that personnel are performing work in accordance with the applicable specifications and requirements. The QCM will verify that construction supervision and QC inspection personnel performs all required inspections and documents the results as required. The QCM ensures that all sampling and testing done by QC staff is performed in accordance with SCDOT specifications to include SCDOT Certified Inspectors. The QCM reports directly to the AUJV Project Manager.

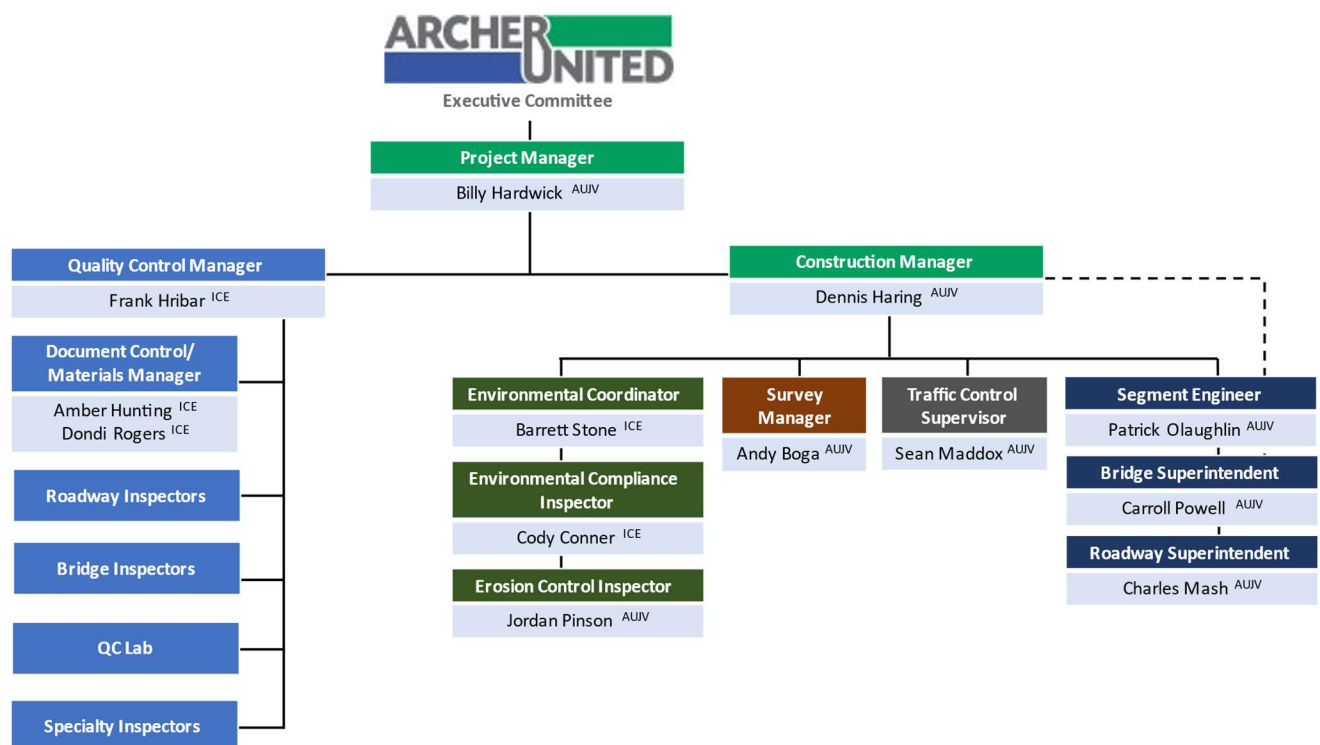
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The AUJV Management Team has designated the QCM as having the additional responsibility and authority to:


- Report to the AUJV Management Team on the performance of the CQMP and any need for improvements;
- Update the CQMP as required;
- Assure the promotion of awareness of SCDOT and stakeholder requirements throughout AUJV staff;
- and serve as a liaison with SCDOT and project sponsors on matters related to the CQMP.

5.3.1 Quality Control Staffing

The following QC personnel are planned for the project. See Figure 5.3.1(a) below for QC Organizational Chart.



QC Organizational Chart
Figure 5.3.1(a)

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Quality Control will be performed utilizing the following roles and positions:

Roadway and Bridge Inspectors: The QCM will maintain a staff of SCDOT certified inspectors to perform QC field sampling, testing and process monitoring to ensure that the QC portion of the project is in compliance with the plans and specifications and being constructed to the highest standards. This staff will work independently of the QA project staff. ICE QC inspectors will perform all QC sampling and testing required. See Figure 5.3.1(d) below for list of required SCDOT certifications. Inspectors shall report to the QCM.


Construction Manager: The Construction Manager (CM) reports to the CCR Project Manager and is responsible to assure the Work performed by AUJV construction personnel and our suppliers/vendors conforms to the requirements of the contract documents. The CM will provide oversight of the Work of the staff, subcontractors, and suppliers, and expedite and coordinate the correction of identified construction deficiencies and nonconforming construction items.

Segment Engineer(s): The Segment Engineers will be responsible for coordination with survey/engineering/construction staff, processing RFC design packages from design engineers, providing feedback to the Construction Manager for cost, quantities and monthly reports, overseeing field document control, conducting document QC reviews, and serving as the primary liaison between safety staff and preplanning activities. The Segment Engineers report to the Construction Manager.

Survey Manager: The Survey Manager is the single point of contact for all Construction Survey issues within the CCR-2 project. The Survey Manager is responsible for the planning, methods, and implementation of all construction survey work. The Survey Manager will coordinate with design engineers, SCDOT and any potential control survey subcontractors to assure data meets construction survey needs and Survey Verification is performed in accordance with QC850. The Survey Manager will also be instrumental in assuring that the QC aspects of the survey are followed with the CQMP and all applicable standards, rules and regulations. The Survey Manager will be a South Carolina Professional Land Surveyor (PLS) and will report to the Construction Manager.

Roadway Superintendent: The Roadway Superintendent is responsible for executing all field operations related to earthwork, drainage, basic roadway fine grading, and asphalt paving. The Roadway Superintendent will have thorough knowledge of base, HMA pavement, drainage and concrete flatwork. Quality Control functions on a task by task, daily basis will be initiated and coordinated by the Roadway Superintendent and his superintendents. The Roadway Superintendent will report to the Segment Engineer.

Bridge Superintendent: The Bridge Superintendent is responsible for the execution of all the Bridge Work, and the scheduling of all concrete batch plant operations for all work on the structures, and miscellaneous concrete. They will have a thorough knowledge of cranes and their capabilities as well as thorough knowledge of all types

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of formwork for standard operations. Quality Control functions on a task by task, daily basis will be initiated and coordinated by the Bridge Superintendent and his superintendents/foremen. The Bridge Superintendent will report to the Segment Engineer.

Traffic Control Supervisor (TCS): The TCS is responsible for the execution of all the Maintenance of Traffic (MOT) items including the installation and removal of traffic control devices. The TCS will be certified in Work Zone Traffic Control and have a thorough knowledge of SCDOT standard practices and procedures as well as the Manual on Uniform Traffic Control Devices (MUTCD). The TCS will report to the Construction Manager.

Environmental Coordinator (EC): The EC is responsible for ensuring that all environmental commitments are being met throughout the life of the project. The EC will coordinate the installation and maintenance of all Erosion Control items as well as monitoring the commitments contained in the Environmental Compliance Plan, Permits and plans. The Environmental Coordinator reports to the Construction Manager.

Environmental Compliance Inspector: The Environmental Compliance Inspector is responsible for conducting periodic onsite inspections to ensure that the project is being constructed in accordance with the plans, specifications, and environmental commitments. The Environmental Compliance Inspector will be the primary contact for construction related issues and compliance and reports to the EC.

Erosion Control Inspector: The Erosion Control Inspector is responsible for conducting weekly inspections of the project to ensure that all required BMP's are installed and maintained per the plans and specifications and reports to the EC.

Document Control/Materials Manager: The Document Control/Materials Manager is responsible for ensuring that all necessary and required documentation is obtained, approved and on file at all times. The duties also include ensuring that all materials samples, tests, and certifications are up to date and on file. The Document Control/Materials Manager reports to the QCM.

Production Staff: The achievement of quality, and technical requirements of the Work, is the responsibility of the entire CCR-2 organization, including our subcontractors and suppliers. The responsibility for achieving the Quality requirements of the Work rests with the personnel performing the Work. Each and every member of the Contractor's staff, subcontractors, suppliers, and vendors are a part of the production staff and have a role in Quality Control.

Quality Control Staffing

The AUJV Construction QC staff will consist of sufficient and qualified personnel to adequately monitor and inspect the Work in accordance with the CQMP. All work crew leaders, foremen and supervisors including those of our subcontractors are an extension of the QC. AUJV construction personnel assigned the responsibility for Quality Control of the Item of Work (e.g., Foremen, Superintendents, Crew leaders



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and other AUJV Construction staff members performing QC activities) will be on site at all times their Work is being performed. Staffing will be adjusted based on the work being performed and the required level of QC activity as defined in Supplement I. As the Work progresses and if the schedules are modified, the QC staff will be adjusted to augment the current project schedule. See Figure 5.3.1(b) below.

| QC | 2022 | | | 2023 | | | | 2024 | | | | 2025 | | | |
|--|------|----|----|------|----|----|----|------|----|----|----|------|----|----|----|
| Employee Count | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| QC Manager | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Document Control/ Materials Manager | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Senior Inspector | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Junior Inspector | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| Construction Manager | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Segment Engineer | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Bridge Superintendent | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Roadway Superintendent | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Environmental Staff | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |
| Traffic Control Supervisor | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Totals | 2 | 7 | 8 | 10 | 12 | 13 | 13 | 13 | 13 | 13 | 13 | 9 | 9 | 9 | 9 |

QC Staffing
Figure 5.3.1(b)

Experience, Knowledge and Skill Levels of QC Staff:

- QC Manager will have 20+ years of related work experience and be SCDOT certified in all necessary areas of inspection
- Chief Inspectors will have 5+ years of related work experience, supervisory experience and be SCDOT certified in all necessary areas of inspection (see Figure 5.3.1(c) and 5.3.1 (d)).
- Senior Inspectors will have 5+ years of related work type experience and be SCDOT certified in all necessary areas of inspection (see Figure 5.3.1(c) and 5.3.1(d)).
- Junior Inspectors will have 2+ years of related work experience and be SCDOT certified in all necessary areas of inspection (see Table 5.3.1(c) and 5.3.1(d)).
- Construction Manager will have 5+ years of related work experience and supervising QC activities.
- Segment Engineers, Bridge and Roadway Superintendents will have 2+ years of related work experience and supervising QC activities.
- Environmental personnel will be SCDHEC Certified Erosion Prevention and Sediment Control Inspectors.

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| POSITION | | EXPERIENCE CLASSIFICATIONS |
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| Chief Inspector* | | The Chief Inspector is a more experienced inspector, has all certifications, has experience with both structural and/or roadway work and can manage other inspectors. Can perform inspections, knows all DOT policies and can make day to day decisions on behalf of IQF and prepare all paperwork. |
| Sr Inspector | | The Senior Classification has all certifications, good at inspections but does not manage the job and requires minimal supervision. |
| Mid-Level Inspector | | Mid Level has most of the certifications and requires some supervision |
| Jr. Inspector | | Has some certifications but needs guidance and supervision |
| Electrical Inspector | | Has all certifications required by the Contract and can inspect lighting, traffic signals and ITS with minimal supervision |
| Chief Inspector* | Experience | Has all certs and significant progressive experience on a broad range of complex highway and bridge construction projects. |
| | Duties | Can administer complex construction contracts from start to finish with minimal oversight. Manages and provides instruction to other inspectors. Coordinates inspection on assigned projects and performs field inspections as needed. Maybe assigned multiple projects concurrently and is proficient with project closeout tasks. |
| Sr Inspector | Experience | Has all certifications and progressive experience in all phases of highway and bridge construction. Has some experience with construction contract administration. |
| | Duties | Requires minimal supervision and performs inspection of any complexity. Reads and interprets plans and specifications and directs other inspectors accordingly. Experience may be broad or focused on bridge or road inspection. Provides guidance to less experienced inspectors. Assists with project closeout tasks. |
| Mid-Level Inspector | Experience | Has worked on multiple state highway/bridge construction contracts. Is certified and proficient in several phases of highway and bridge construction. |
| | Duties | Performs construction inspection in conformance with certification training without supervision. Able to perform complex WZTC and CEPSCI inspections and works with contractor to ensure compliance. Reads and interprets plans and specifications and advises contractors accordingly. |
| Jr Inspector | Experience | Has worked on multiple state highway/bridge construction contracts. Is certified and proficient in one or more phases of highway or bridge construction. Experienced in basic WZTC or CEPSCI inspections. |
| | Duties | Performs construction inspection in conformance with certification training with minimal supervision. Able to perform basic WZTC or CEPSCI inspections. Performs dialy diaries and inspection reports required by certification training. |
| Electrical Inspector | Experience | Has worked on multiple state highway/bridge construction contracts. Experienced in all phases of lighting, traffic signals, and ITS |
| | Duties | Preforms construction inspection in conformance with certification training. Reads and interprets plans and specifications and advises advises contractors accordingly. |

*NOTE: The Chief Inspector position may not be required for CCR Phase 1 Project. Some of the chief inspector's activities may be performed by the IQM, Materials Engineer, Field Engineer or Sr Inspector.

Figure 5.3.1 (c)

QC Inspector Qualifications: All QC sampling and testing will be performed by SCDOT certified inspectors as per Figure 5.3.1(d) below. All inspector certifications are available through the Document Control/Materials Manager in ICE's West Columbia CEI Office located at 121 Midlands Court and are available to IQF and OVF staff at any time.



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| Quality Control and Quality Assurance Certification Requirements (Including but not limited to the below items of work) | |
|--|---|
| Item of Work | SCDOT Inspector Certification |
| Embankment (Borrow) | Earthwork and Base Course Technician Nuclear Gauge Hazmat Certification |
| Hot Mix Asphalt (HMA) Roadway | Asphalt Roadway Technician |
| Hot Mix Asphalt (HMA) Production | HMA Level 1 (Quality Control Technician) HMA Level 2 (Job Mix Technician) HMA Level 3 (Quality Control Manager) |
| Concrete Placement | Level 1 and 2 Concrete Field Technician ACI Concrete Field Testing Technician - Level 1 |
| Bridge (Foundations-Piles, Shafts, Footings) | Foundations Technician Level 1 and 2 Concrete Field Technician ACI Concrete Field Testing Technician - Level 1 |
| Bridge (Columns, Caps, Decks, Parapet Walls) | Level 1 and 2 Concrete Field Technician ACI Concrete Field Testing Technician - Level 1 |
| Storm Drain (Pipe) | Earthwork and Base Course Technician Nuclear Gauge Hazmat Certification |
| Median Walls/Parapet Walls | Level 1 and 2 Concrete Field Technician ACI Concrete Field Testing Technician - Level 1 |
| MSE Walls | Earthwork and Base Course Technician Nuclear Gauge Hazmat Certification |
| Erosion Control | Certified Erosion Prevention & Sediment Control Inspector (CEPSCI) |
| Traffic Control | Work Zone Traffic Control Certification |
| Structural Steel Coatings | NACE Coating Inspector Level I or SSPC Bridge Coating Inspector Level 1 |
| Specialty Inspection (ITS, Lighting, Signals, etc.) | IMSA Traffic Signals Level II IMSA Fiber Optic Technician Level II |

Required Inspector Certifications for QC and QA Inspectors
Figure 5.3.1(d)

QC Laboratory Technicians: QC Technicians will be certified to perform each test method they are to perform in accordance with the laboratory's Quality Management Systems (QMS) Manual. They will demonstrate competency in the test methods by either participating in AASHTO Re:Sources proficiency program or completion of the internal technician training and evaluation program as outlined by AASHTO R-18. All testing shall be performed in ICE's AASHTO Accredited laboratory. Copies of the technicians' certifications are on file in ICE's West Columbia Lab located at 121 Midlands Court and are available to IQF and OVF staff at any time.

QC Testing Equipment: QC testing equipment, tools, gauges, etc. are calibrated based on ASTM and the manufacturers recommendations (QC759). Calibration stickers will be visible on the equipment with the calibration date and due date for the next calibration. Calibration records are maintained on file in ICE's West Columbia CEI Office located at 121 Midlands Court and are available to IQF and OVF staff at any time.

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5.3.2 Quality Control Services

A) Scope

This section describes the procedures to assure that all activities affecting the quality of the Work are accomplished under controlled conditions, using appropriate equipment for the task being performed and the requirements for inspections and tests that will be performed by the QC personnel during the construction and installation activities.

B) General

All Work performed by AUJV, our subcontractors, and suppliers will be performed through the use of suitable production, installation, and serviced equipment in a suitable working environment. Personnel performing Work on the project will be qualified and certified, where required, to perform the given Item of Work.


The QCM, or his designee, will perform selected inspections of the Work, as required, to verify the effectiveness of the CQMP. All inspections, sampling and testing will be performed in accordance with SCDOT sampling and testing procedures by SCDOT Certified Inspectors.

C) QC Inspection and Test Planning

The QCM will identify the inspection and activities to be performed by the Inspectors, the Segment Engineers, and the Superintendents during the performance of the Work. These inspection activities will be discussed at the Preconstruction and Preactivity Meetings by the QCM to ensure that QC personnel are present for all permanent work activities. The Inspection Planning will include the following:

- Identification of the individuals or groups responsible for performing the inspection;
- Item to be inspected;
- Location of the inspection (on/off site);
- Identification of characteristics and activities to be inspected;
- A description of the method of inspection;
- Quality Control criteria;
- Identification of required procedures, drawings, and specifications; and,
- The frequencies of the required inspections (Supplement I of CQMP)

In accordance with Section 3.3.2 of the QAP (shown in Supplement A of the CQMP), the QCM will ensure that IQF, OVF and SCDOT are provided sufficient notification of sampling and testing opportunities for QA and OV with the submittal of 3-week look ahead schedules and using QC752 and QC760. The QCM will also coordinate with Contractor personnel to ensure that adequate material is available for QA and OV sampling and testing. The QCM and Construction Manager will review all materials certifications for specification compliance prior to incorporation in the work in accordance with QC743. QCM and Construction Manager will also verify that all

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work is being performed in accordance with the latest RFC plans and specifications.

In accordance with Supplement D of the CQMP and QC756, where mandatory inspection or test hold points are required, the Superintendents, subcontractors or suppliers will not proceed without the specific consent of the QC Staff, IQF and OV, as required. The specific hold points will be indicated in inspection plan and communicated during Preconstruction meetings.

D) In-Process QC Sampling and Testing

In-process sampling and testing of the Work will be performed by SCDOT Certified Inspectors using appropriate inspection and testing methods. The certifications of the in-process testing personnel will be available to SCDOT upon request. These inspections and tests of the Work will be accomplished under the direction of the QCM. Results of all inspections and tests will be reviewed by the QCM for conformance to the acceptance criteria and will be retained in Box and submitted weekly to SCDOT. All sampling and testing performed will be in compliance with the applicable AASHTO, ASTM or SCDOT (SC-T or SC-M) procedures. The planned frequency of sampling and testing as well as the test procedures or methods to be used are included in Supplement I of the CQMP.

E) QC Inspection

Quality Control Inspection of the construction/installation activities will include any combination of the following:

- Observation of the physical performance of the Work;
- Review, or spot checks, of procedures or instructions governing the Work, including inspection and test results;
- Evaluation or verification of the presence and effectiveness of controls; and,
- Discussion with personnel performing or supervising the Work.


Inspection results will be documented in the QC Daily Report by the QC Inspector/Contractor and reported to the QCM.

The QCM will review records of inspections and tests daily. Deficient or Nonconforming Work or materials will be reviewed and addressed with QA and OV prior to continuation of work.

QC inspections and tests will be performed and documented on existing SCDOT Construction forms included in Supplement F of the CQMP.

5.3.3 Control of the Work

Ensuring that the project is being built using the most current approved RFC plans is critical to maintaining quality control during construction. Request for Information (RFI), Design Change Notification (DCN), Field Change Notification (FCN) and Contract Change Requests (CCR) as outlined in Exhibit 5, Section 104B of the RFP may result in changes to the RFC plans. AUJV will follow the RFC distribution process outlined in Section 3.6 and Section 5.5 of the Design Quality Control Plan

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(shown in Supplement B of the CQMP) to ensure that the current plans are distributed to AUJV field personnel, QC, IQF, OVF, and SCDOT for construction and inspection. QCM will have the responsibility to ensure that all QC personnel are working with the most current RFC plans, Shop Drawings, and specifications. A review of the plan/shop drawing status of a particular work item will be conducted prior to the Pre-Activity meeting for that item to ensure that all parties are working from the most current version.

5.3.4 QC Daily Report

The Supervisor responsible for the construction of the feature of the work or the QC Inspector/Technician will prepare a QC Daily Report in accordance with QC751, QC Daily Report.

5.3.5 Hot Mix Asphalt (HMA)

HMA production and construction will be performed utilizing SCDOT's existing SC-M-400 process and procedures for QC and QA activities. The roles and responsibilities of QC and QA are depicted in the flowchart in QA762 Attachment A. QC will be performed in accordance with QC762.

5.3.6 Environmental Compliance

AUJV and QC personnel will inspect and monitor the installation and maintenance of all erosion control measures to ensure compliance with all Federal and State Environmental Permits conditions. AUJV and QC personnel will also assist the Environmental Coordinator in the monitoring and completion of the Environmental Commitments in the project permits and RFP in accordance with Procedure QC769 and the approved Environmental Compliance Plan shown in Supplement C of the CQMP.

5.3.7 Maintenance of Traffic


Safety is the highest priority of any project. AUJV will install and QC will closely monitor all Traffic Control devices and lane closure operations to ensure compliance with plans, specifications and SCDOT Standard Drawings in accordance with QC768. QC and AUJV will conduct daily inspections of traffic control installations (permanent and temporary) to ensure compliance with SCDOT Standard Drawings, Plans and specifications.

5.3.8 Control of Quality Control Records

QC will use Box to collect and house quality control records. Box is a cloud-based platform that will allow all parties to access and review QC documents. Access, permissions, and notification alerts will be granted to SCDOT, FHWA, OVF and IQF personnel as needed to provide real time reviews of QC activities as necessary to allow for an efficient submittal and review process. Records to be stored Include, but are not limited to the following:

5.3.8.1 Materials test reports;

5.3.8.2 Material sampling reports;

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5.3.8.3 Materials Certifications:

5.3.8.4 Daily inspection reports;

QC Records will be systematically catalogued and stored in Box using unique identifiers to include, but not limited to:

- Location/Feature (Bridge 36, Bent 4)
- Report type (Erosion Control, Compaction, etc.)
- Major item identification (ex. Bridge 34)
- Sub-item identification (ex. Bent 3)
- Additional Identification (ex. Column 3)

To facilitate document identification consistency, QC will utilize the structure identified in STRATA for Location-Feature in QC Daily Work Reports as well as sampling and testing reports. Document control details will be further defined upon the receipt of RFC plans to ensure proper labeling for document retrieval and searchability.

QC will utilize existing SCDOT inspection and testing forms whenever possible. QC reports will be generated in Excel format and converted to .pdf format when approved by the QCM. The approved reports will be uploaded into Box for storage, access, and distribution. The QC inspection and testing reports will be submitted to SCDOT weekly in accordance with the QAP specifications. The QC Document Control Manager will submit these documents and operate out of the ICE CEI Office located at 121 Midlands Court, West Columbia, SC.

QC will coordinate with IQF to ensure that all sampling, testing, and inspection documentation contains uniform identification markers to enable logical and efficient validation by IQF and OVF as needed.

6.0 Quality Acceptance

6.1 Management Commitment

AUJV is committed to the implementation of the Construction Quality Acceptance Plan as described and documented by this CQMP.


6.2 Planning

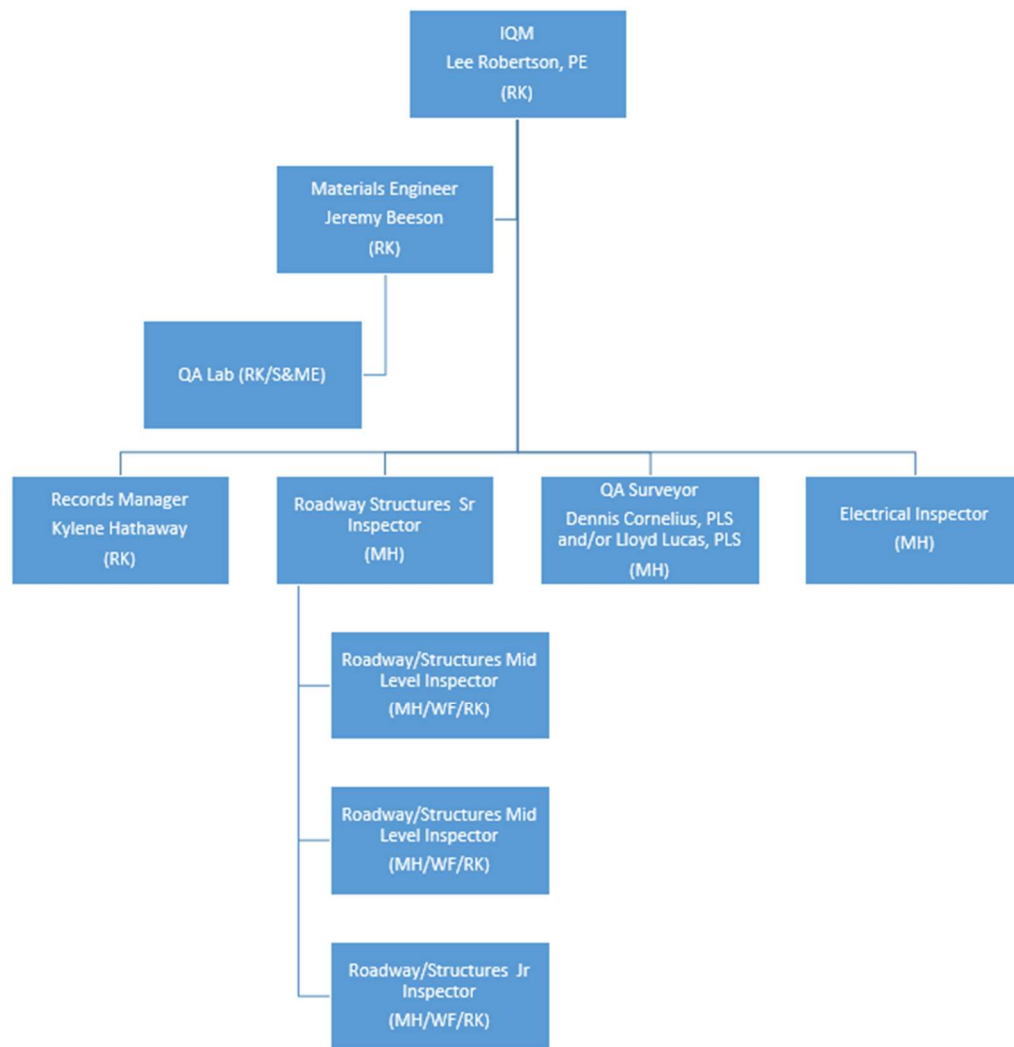
Planning is a critical element for the successful execution of the Quality Acceptance procedures. There will be open communication and transparency between the AUJV Management Team and their SCDOT counterparts regarding the planning and execution of the CQMP.

6.3 Roles and Responsibilities

6.3.1 Quality Acceptance Staffing

The following IQF personnel are planned for the project to perform Quality Acceptance (QA). See Figure 6.3.1(a) below for QA Organizational Chart.

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IQF Organizational Chart
Figure 6.3.1(a)

Quality Acceptance will be performed utilizing the following roles and positions:

Independent Quality Manager (IQM): The IQM is a South Carolina licensed Professional Engineer and will report directly to the AUJV Executive Committee and SCDOT. The IQM will not report to any person or party responsible for design or construction production.

The IQM is considered the “Resident Construction Engineer” when interpreting SCDOT Standard Specifications, Contract, standards, policies, and technical provisions during construction and will have the authority to stop work. However, the IQM is not considered the Designer or Engineer of Record. The IQM will oversee the Quality Acceptance activities and be responsible for coordinating their efforts with their counterparts in SCDOT, OV and AUJV. The IQM will be responsible for the day-



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to-day scheduling of the IQF staff to perform the required QA inspection and testing. The IQM will meet regularly with SCDOT, QC and Production staff to review outstanding deficiencies. The IQM will be responsible to review and approve QA inspection reports. Once SCDOT grants approval, the IQM will also have the authority to exercise Engineering Judgement (See Supplement H of the CQMP for letter requesting the use of Engineering Judgment). Along with the IQF Materials Engineer, the IQM will compile all required test and certification information needed for Final Materials Certification per Procedure QA770.

On a monthly basis, the IQM will provide the following to SCDOT:

- The “Independent Quality Firm Certification” (shown in Appendix D of Supplement A of the CQMP)
- The Engineering Judgement (EJ) Log
- The Non-Conformance Report (NCR) Log
- The Deficiency Notice (DN) Log
- The monthly summary of any steel that didn’t meet the Buy America requirements of 23 CFR 635.410 per Procedure QA744.
- IQF test reports
- IQF survey verification information showing the required frequency per Procedure QA850 is being met
- AS-1 sheets
- SCDOT Forms 800.02, 800.03 and 800.05
- Reconcile accepted (tested and inspected) quantities with installed quantities by AUJV each month and report them to SCDOT monthly. (Note: this report will also be sent by the Materials Engineer weekly per QA855)

The AUJV Management Team has designated the Independent Quality Manager as having the additional responsibility and authority to:

- Report to the AUJV Management/Executive Team as well as SCDOT on the performance of the CQMP and any need for improvements;
- Update the CQMP as required;
- Assure the promotion of awareness of SCDOT and stakeholder requirements throughout AUJV staff;
- and serve as a liaison with SCDOT and project sponsors on matters related to the CQMP.

Materials Engineer: The Materials Engineer is an Engineer in Training with at least five years experience that reports to the IQM. The Materials Engineer is responsible for the IQF materials acceptance program including laboratory and field testing. In this role, the Materials Engineer coordinates with his/her OV and SCDOT counterparts on the resolution of materials related issues. The Materials Engineer shall also coordinate with OMR on the review and approval of mix designs as shown in QA735 (OMR to approve all mix designs). The Materials Engineer will also oversee the review and approval of all IQF inspection and test records.



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IQF Inspectors: The IQM will maintain a staff of SCDOT certified inspectors to perform field sampling, testing and process monitoring to ensure that the QA portion of the project is in compliance with the plans and specifications and being constructed to the highest standards. This staff will work independently of the QC project staff. See Figure 5.3.1(c) above for list of required SCDOT certifications for Inspectors. See table 6.3.1(c) for a list of experience and duties for each classification. In addition to normal highway and bridge work, IQF inspectors will perform inspections for traffic control and erosion control as required. IQF Inspectors that perform erosion control inspections will be CEPSCI certified. IQF Inspectors that perform traffic control inspections shall be Work Zone Traffic Control Certified. IQF Inspectors will report to and support the role of the IQM and Materials Engineer.


Records Manager: The IQF Records Manager shall be responsible for the upkeep of all QA documentation, material certifications, personnel certifications, and other documents as required to perform the IQF role as described in the QAP and CQMP. This includes receiving the document, filing it in the appropriate place in ELVIS, and distributing the document to SCDOT, OV, AUJV or other IQF team members as required. This position is also responsible to transfer all required QA documentation via ProjectWise Deliverables Management and/or STRATA via a secure FTP site.

QA Surveyor: The QA Surveyor shall be a one-man survey crew and perform the roles and responsibilities called out in procedure QA850 QA Survey. This person shall be a Professional Land Surveyor in the State of South Carolina and have at least 8 years' experience.

IQF Lab Supervisor: Shall have at least 8 years' experience in lab testing with at least one year of supervisory experience. Shall demonstrate competency in the test methods by either participating in AASHTO Re:Sources proficiency program or completion of the internal technician training and evaluation program as outlined by AASHTO R-18. Extensive knowledge of material testing methods, processes, and procedures. Considerable knowledge of the implementation methods and procedures for material evaluation and acceptance.

IQF will build-out a project dedicated lab at 1404 St. Andrews Road in Columbia, SC. Until this lab is built out and received its required AASHTO accreditations and SCDOT approvals, materials will be sampled and tested in accordance with Supplement E of the CQMP with S&ME performing all lab tests not being submitted to SCDOT OMR. IQF will utilize S&ME for the project duration for specialty testing (examples of "specialty testing" would be testing reinforcing steel, direct shear tests, etc). The IQF lab will be approved by SCDOT at least 30 days prior to commencing construction activities for which the IQF lab will be used as the basis for acceptance.

IQF Auditor: Shall be a Certified Manager of Quality / Organizational Excellence (CMQ/OE) and employed by the IQF Firm. Shall audit the QA and QC portions of the CQMP. Shall send SCDOT all applicable audit documentation (see QA865) within five business days after audit is completed.

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IQF Electrical Inspector: Shall have two years of general inspection experience and have IMSA Traffic Signal Technician Level II and IMSA Fiber Optic Technician Level II certifications as shown on Figure 5.3.1(c).

Independent Quality Firm (IQF) Staffing Plan

The IQF staff will consist of sufficient and qualified personnel to adequately monitor and inspect the Work in accordance with the CQMP. As the Work progresses and if the schedules are modified, the IQF staff will be adjusted to augment the current project schedule.


Figure 6.3.1(b) below, indicates the projected IQF staffing levels using numerical values to represent the full time employees will be present on the site (e.g., a 1.0 indicates full time, a value less than 1.0 represents part time). This staff will be assessed and adjusted as needed during the course of the Work to correspond to the schedule of construction activities. Inspection presence for each discipline of the construction will vary depending on the workforce of the construction crew, relative sensitivity of the construction item, and capacity of inspection personnel. Where a significant amount of inspection or testing would hinder the IQF staff from adequately assuring the quality of the operation, other IQF staff will be present until the frequency is reduced. Approval of this CQMP does not eliminate the responsibility of IQF to monitor construction activities and provide adequate coverage of all activities to ensure that all QA requirements are being met during the life of the project.

| IQF Employee Count | 2022 | | | 2023 | | | | 2024 | | | | 2025 | | | |
|-----------------------|------|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------|----|----|----|
| | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| IQF Manager | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Materials Engineer | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Sr Inspector | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mid-Level Inspector | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 0 | 0 | 0 |
| Jr Inspector | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| Lab Supervisor | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| Records Manager | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| Electrical Inspector | 0 | 0 | 0 | .1 | 0 | .1 | 0 | .1 | 0 | .1 | 0 | .1 | 0 | 0 | 0 |
| IQF Surveyor | 0 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .5 | .3 | .3 | .3 | 0 | 0 | 0 |
| Totals | 3 | 8.5 | 8.5 | 8.6 | 8.5 | 8.6 | 8.5 | 8.6 | 8.5 | 7.4 | 7.3 | 7.4 | 4 | 1 | 0 |

IQF Staffing Plan
Figure 6.3.1(b)

IQF personnel shown in the above staffing plan will comprise the Quality Acceptance Inspection Team. As the Work progresses and if the construction schedule is modified, the QA staff will be adjusted to augment the current project schedule. The information above in Figure 5.3.1(c) lists the minimum qualifications and duties for inspection staff levels:

Inspector assignments will be made only to those QA Inspectors holding SCDOT

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Certifications in the disciplines with which they are inspecting.

QA Testing Equipment: QA testing equipment, tools, gauges, etc. are calibrated based on ASTM Standards and the manufacturer's recommendations in accordance with Procedure QA760.

6.3.2 Quality Acceptance (QA) During Construction Operations

A) IQF Inspection and Testing Scope of Work

Acceptance observations, inspections, and tests will be performed by the IQF, under the direction of the IQM. Acceptance testing performed by the IQF will be validated and/or verified by the Owner's Verification (OV) program, in accordance with the Project's Quality Assurance Program (QAP) shown in Supplement A of the CQMP.

QA inspections and tests will be performed and documented on the forms shown in Procedures QA752 and QA824. The IQF inspection and test results will be electronically provided as outlined in Section 6.3.7 below. Procedures for QA Inspections, Sampling and Testing are contained in QA752.

B) Hold Points


In accordance with QA756, IQF will participate in Hold Point inspections at predetermined stages of the work. The list of Hold Points specific to the project is shown in Supplement D of the CQMP. Additional Hold Point inspections will be added as needed. During Hold Point inspections, IQF will utilize checklists to assess compliance prior to proceeding with the next stage of work. Prior to their use, the checklists will be provided to SCDOT for review at least 2 weeks prior to the Pre-Activity Meeting for a given construction operation and finalized in the Pre-Activity Meeting. Once approved, the checklists will be incorporated into the CQMP.

C) Sampling and Testing

QA824 and QA855 will be utilized to ensure that the minimum guide schedule for QA sampling and testing frequencies shown in Appendix B of the QAP (shown in Supplement A of the CQMP) are obtained. ELVIS will be used to store the results prior to distributing to OVF and SCDOT in accordance with Appendixes C and E of the QAP (shown in Supplement A of the CQMP).

D) Asphalt Inspection

IQF will provide certified Asphalt Roadway Technicians to ensure compliance of SCDOT Hot Mix Asphalt QA Program as outlined in SC-M-400. IQF will provide adequate certified inspectors to monitor and verify that the Contractor QC and QA processes are acceptable. This includes acquiring QA sample and test results from the Contractor and SCDOT District Asphalt Manager (DAM) for inclusion in the project records and submittal to SCDOT. IQF will prepare and submit AS-1 summary sheets to SCDOT as well. Additional information is discussed in Procedure QA762.

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E) Material Certifications

The Materials Engineer will review all materials certifications for specification compliance and verify the material is approved by SCDOT OMR prior to incorporation in the work in accordance with Procedure QA754. The material certifications will be sent to OVF and/or OMR (as directed per the SCDOT Material Certification Requirements document, updated 1/2/2020) via ProjectWise Deliverables Management.

6.3.3 Control of the Work

Ensuring that the project is being built using the most current approved RFC plans is critical to maintaining quality control during construction. Request for Information (RFI), Design Change Notification (DCN), Field Change Notification (FCN) and Contract Change Requests (CCR) as outlined in Exhibit 5, Section 104B of the RFP may result in changes to the RFC plans. AUJV will follow the RFC distribution process outlined in Section 3.6 and Section 5.5 of the Design Quality Control Plan (shown in Supplement B of the CQMP) to ensure that the current plans are distributed to contractor field personnel, AUJV, QC, IQF, OVF, and SCDOT for construction and inspection. The IQM will have the responsibility to ensure that all QA personnel are working with the most current RFC plans, Working Drawings, Shop Drawings, and specifications.

6.3.4 Environmental Compliance


IQF will perform weekly erosion control inspections (SCDOT Form 800.02) to ensure that the approved SWPPP and Erosion Control Plans are being properly installed and maintained per QA769. IQF will assist the Environmental Coordinator in the monitoring of the Environmental Commitments in the project permits and RFP in accordance with QA769 and the approved Environmental Compliance Plan shown in Supplement C of the CQMP. IQF will also maintain all forms, records and project plans as required by SCDHEC as noted in QA769.

6.3.5 Maintenance of Traffic

QA will conduct weekly and monthly inspections of traffic control installations on SCDOT Form 600.02 (permanent and temporary) to ensure compliance with SCDOT Standard Drawings, Plans and specifications. IQF will review and approve the Traffic Control Plan submitted by AUJV. For new traffic control set ups, IQF will conduct a hold point inspection and monitor the installation of the devices periodically to verify compliance with the approved Traffic Control Plan per Procedure QA768.

6.3.6 Survey Verification

QA survey verification will be performed by the QA Surveyor in accordance with Procedure QA850.

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6.3.7 SCDOT Direct Acceptance

SCDOT personnel will perform direct inspection and acceptance of precast, prestressed, and structural steel elements that are manufactured off site. Final inspection of materials accepted off site will be made by the IQF at the point of incorporation into the Work based on visual inspection to confirm damage did not occur during transport. On-site work will be observed, inspected, and tested by IQF as work progresses.

6.3.8 Control of QA Records


The IQF will use the ELVIS system to collect and house construction quality records including (but not limited to) the following:

- 6.3.8.1 Materials test reports;
- 6.3.8.2 Daily inspection reports;
- 6.3.8.3 Materials Submittals;
- 6.3.8.4 Materials Certifications;
- 6.3.8.5 Monthly quality reports;
- 6.3.8.6 Non-conformance logs;
- 6.3.8.7 Deficiency Notice logs;
- 6.3.8.8 Pre-Construction Coordination Meeting Minutes
- 6.3.8.9 Weekly correspondence from Materials Engineer noting quantities and verifying the required testing frequencies are being met
- 6.3.8.10 Weekly Quality Meeting Minutes;
- 6.3.8.11 Weekly Materials Meeting Minutes;
- 6.3.8.12 Quality Audits;
- 6.3.8.13 IA Activity and Status of Technicians
- 6.3.8.14 Engineering Judgement Log;
- 6.3.8.15 Inspection Checklists;
- 6.3.8.16 IQF personnel certifications;
- 6.3.8.17 Quality Technical Memoranda.

Access to ELVIS will be granted to SCDOT to allow for continuous and real time monitoring of the construction quality program including those documents noted above.

To facilitate document identification consistency, IQF will utilize the structure identified in STRATA for Location-Feature in the QA Daily Inspection Reports.

Inspection reports with their associated material certifications will be batched and submitted via ProjectWise Deliverable Management to SCDOT in a format acceptable to SCDOT within 48 hours after the work shift is completed. Material test results will be transmitted via a secure FTP site to SCDOT (STRATA) within 24 hours of the test being completed in the format shown in Appendix E, Supplement A of the CQMP, XML Definition Document (form has been revised from what is shown in the Final QAP). Material test results will be submitted independently with no prior review or input from the Contractor.

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7.0 Resource Management

7.1 Provision of Resources

The AUJV Management Team is committed to assuring that resources are available to fulfill the processes defined within this CQMP, and to identify and implement Corrective Action Reports (CARs) to this CQMP.

7.2 Human Resources

7.2.1 General

Personnel performing or managing Quality Control and Quality Acceptance activities will be familiar with the requirements of the Contract, CQMP, RFC Plans, SCDOT Standard Specifications and SCDOT Standard Drawings. Personnel performing activities affecting the quality of work will have appropriate qualifications as defined throughout this CQMP.

7.2.2 Competence, Training and Awareness

All personnel who have responsibilities in the execution of CQMP procedures will be identified and assessed for proper training and certification needs. They will receive training regarding these procedures for achievement of the expected results in accordance with Procedure QA622. All SCDOT certifications for QC and QA personnel will be provided to the OVF prior to working on the project. IA will have the opportunity to perform process and competency inspections of all QC and QA personnel during the life of the project to verify that sampling and testing is being performed in accordance with established SCDOT Standards.

7.3 Infrastructure


AUJV understands the importance of maintaining the integrity of the Quality Assurance Program and will ensure that all QC and QA operations are performed and managed independently. QC personnel and QA personnel will work from separate locations for the duration of the project. QC will operate from 121 Midlands Court, West Columbia, SC while QA will operate from 1404 St. Andrews Road, Columbia, SC.

8.0 Project Planning and Execution

8.1 Project Planning

The planning for the various work disciplines is achieved through a thorough understanding of the Contract Documents, detailed work plans, effective communication and deployment of Pre-Construction and Pre-Activity Meetings utilizing Procedures QC752 and QA753.

Pre-Construction Meetings will be held prior to beginning major items or features of work and will be conducted by AUJV and QC personnel. These include but are not limited to: Asphalt Paving, Bridge Construction, Traffic Shifts or Re-alignments, MSE Walls and Utility Relocations.

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Pre-Activity Meetings will be held prior to beginning an individual work task with a major feature of work. These include but are not limited to: Individual paving operations, pile or shaft operations, bridge columns, bent caps, bridge deck pours, MSE Wall installation, drainage installation and Work Zone Traffic Control Operations. The list of items for Pre-Construction and Pre-Activity Meetings will change as the final construction plans are further developed.

8.2 Design

Please see Design Quality Management Plan for this project in Supplement B of the CQMP.

8.3 Procurement

AUJV will procure products that are to be incorporated into the final work that meet the requirements of the Contract. Materials that are proposed for inclusion will follow the Procedures outlined in QC743 Control of Materials and QC754 Construction Submittals to ensure that requirements are met.

8.4 Plan Distribution and Changes


8.4.1 Released For Construction Plans

Released for Construction (RFC) Plans and Revisions will be distributed utilizing the format established in Section 5.5 of the approved Design Quality Management Plan (DQMP) shown in Supplement B of the CQMP. RFC Plans will be submitted to SCDOT via the Project Wise Deliverable Management System (PWDM). AUJV/QC/IQF personnel will be added to the distribution list for notification of new or revised RFC Plans. AUJV and QCM will verify that all parties are utilizing the proper RFC plans during the Preconstruction or Preactivity Meetings. AUJV and QCM will distribute RFC plans to field personnel to ensure that the most recent version is being used for construction. IQM will provide the most current version to QA personnel for construction and inspection. Shop Plans and Drawings will be distributed using the same process as RFC Plans.

8.4.2 Requests for Information (RFI), Shop Drawings/Plans, Field Design Changes

Quality will be monitored during all phases of construction. Conflicts or issues with plans, specifications or contract language that adversely affect quality or constructability may result in the issuance of an RFI. The RFI will be submitted from AUJV Document Control Manager to the EOR to investigate and prepare a response to the RFI. After review and approval, EOR will return the RFI to AUJV Document Control Manager. AUJV Document Control Manager will coordinate the distribution of RFIs and the responses to AUJV Project Management and Supervisors, QCM, IQM, OVF and SCDOT. All approved actions resulting from an RFI will be incorporated in the RFC or As-built Plans accordingly in accordance with Section 6.0 of the DQMP and Procedure QA830 and distributed accordingly.

The same routing process will occur for Shop Drawings/Plans and Field Design Changes. It is the AUJV Document Control Managers responsibility to ensure that all field personnel have received the most current version of working documents for

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construction. See Figure 8.4.2 below for more information.

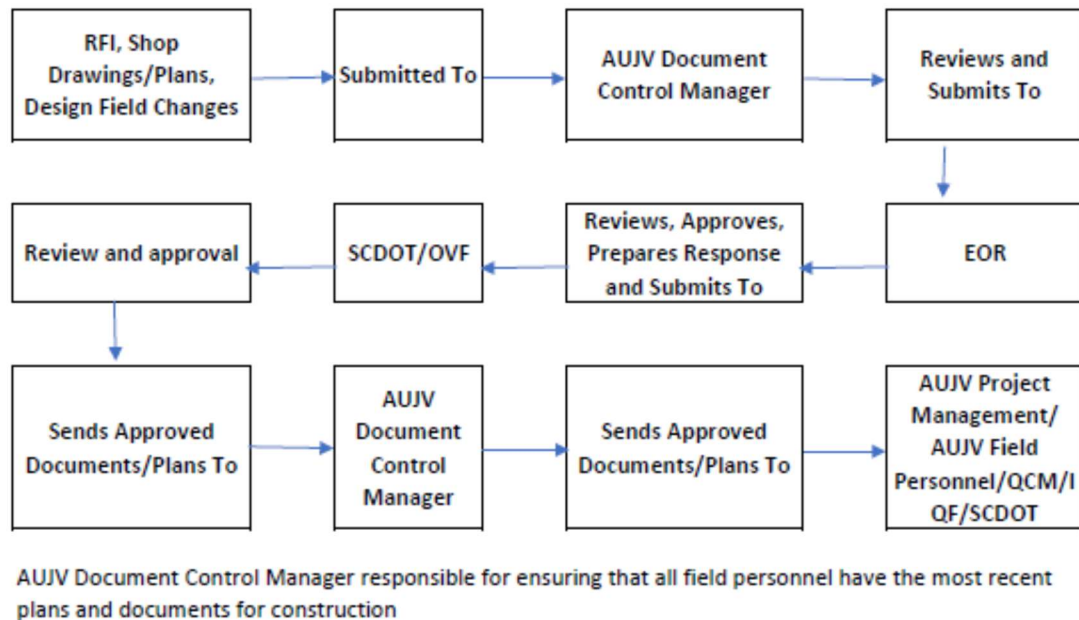


Figure 8.4.2 QC Document Control Workflow

9.0 Performance Evaluation and Improvement

9.1 General


Monitoring is the act of observing or inspecting an activity, typically to verify it is being performed correctly. Measurement is the act of determining the compliance of an item with the established standard, and then recording the statistical data, and reporting it. Only by monitoring activities and measuring results can AUJV verify that the end product satisfies SCDOT.

9.2 IQF Audit

IQF will conduct internal audits quarterly per Procedure QA865 to determine whether the CQMP is effectively implemented and maintained. The results of the audit (findings) will be sent to SCDOT / OVF within 5 business days after audit is completed.

9.3 Control of Nonconforming Products

When IQF recognizes a work product which has been considered nonconforming with requirements; this work product will be identified, reported and processed by creating a Non-Conformance Report (NCR) or a Deficiency Notice (DN). An NCR will be submitted to the EOR or AUJV as appropriate to investigate and prepare a response through a disposition process as defined within the CQMP. All NCR dispositions must be approved by SCDOT prior to resolution. A DN will be

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submitted to AUJV's QC and/or Construction Manager to investigate and address through resolution process as defined within the CQMP. Refer to QA830 Control of Construction Non-Conformance and QA831 Construction Deficiency Notice.

9.4 Continual Improvement

AUJV is committed to the continual improvement of the CQMP. The AUJV Management Team uses quality objectives, results of audits, the Corrective Action Report (CAR) program, the Partnering program, and the Management Review process to identify opportunities and make improvements to the CQMP.

9.5 Corrective/Preventive Action

AUJV has established a documented Procedure for Corrective Action Report. This Procedure (QC860) describes the process used to achieve corrective and preventive action. If analysis indicates a series of nonconforming issues, a failure to correct or improve practices, or a systematic breakdown of quality systems, the CAR process will be initiated. A CAR provides written notice that a specific failure to the quality system is not being properly implemented requiring corrective action to bring the program and product into conformance.

9.6 Work Stoppage

If satisfactory results are not obtained from the Corrective Action Reports (CAR) within the established time frame, the Work may be stopped until the deficient process or program is corrected. A stop-work order may also be issued without any prior notification to prevent nonconforming work due to improper materials, equipment, or procedures. Safety issues may receive an immediate Stop Work Order in order to ensure worker and public safety.

10.0 Index of Procedures and Forms

QC Procedures

| | | |
|-------|---|-------|
| QC743 | Control of Materials | Rev 0 |
| QC751 | QC Daily Work Report | Rev 0 |
| QC752 | Pre-Construction and Pre-Activity Meeting | Rev 0 |
| QC753 | QC Inspection Planning | Rev 0 |
| QC754 | Construction Material Submittals | Rev 0 |
| QC756 | Hold Point Inspections | Rev 0 |
| QC759 | Control of Equipment for Quality Testing | Rev 0 |
| QC760 | QA Notification of Inspection and Testing | Rev 0 |
| QC762 | SCDOT HMA Sampling and Testing | Rev 0 |
| QC768 | Maintenance of Traffic | Rev 0 |
| QC769 | Environmental Compliance | Rev 0 |
| QC850 | QC Survey Verification | Rev 0 |
| QC860 | Corrective Action Report | Rev 0 |



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QC Forms

| | | |
|---------|---|-------|
| QC743-1 | Materials Certification Log | Rev 0 |
| QC751-1 | QC Daily Work Report | Rev 0 |
| QC752-1 | Pre-Construction and Pre-Activity Meeting | Rev 0 |
| QC754-1 | Construction Material Submittals | Rev 0 |
| QC756-1 | Hold Point Inspection Checklist | Rev 0 |
| QC860-1 | Corrective Action Report | Rev0 |
| QC860-2 | Corrective Action Report Tracking Log | Rev 0 |

QA Procedures

| | | |
|-------|---|-------|
| QA423 | CQMP Revisions | Rev 0 |
| QA622 | IQF Personnel Competency and Certification | Rev 0 |
| QA735 | Mix Design Review | Rev 0 |
| QA744 | IQF Buy America Verification | Rev 0 |
| QA752 | IQF Inspection and Reporting | Rev 0 |
| QA752 | Attachment A | Rev 0 |
| QA753 | Pre-Construction and Pre-Activity Meetings | Rev 0 |
| QA754 | Construction Document Submittals | Rev 0 |
| QA756 | Hold Point Inspections | Rev 0 |
| QA760 | Control of Equipment used for Quality Testing | Rev 0 |
| QA762 | SCDOT HMA Sampling and Testing | Rev 0 |
| QA762 | Attachment A | Rev 0 |
| QA768 | Maintenance of Traffic | Rev 0 |
| QA769 | Environmental Compliance | Rev 0 |
| QA770 | Final Materials Certification | Rev 0 |
| QA810 | Engineering Judgement | Rev 0 |
| QA824 | Sampling, Testing, Review and Approval | Rev 0 |
| QA824 | Attachment A | Rev 0 |
| QA825 | Random Sampling | Rev 0 |
| QA830 | Control of Construction Non Conformance | Rev 0 |
| QA831 | Construction Deficiency Notice | Rev 0 |
| QA850 | QA Survey Verification | Rev 0 |
| QA855 | IQF Guide Schedule Compliance | Rev 0 |
| QA855 | Attachment A | Rev 0 |
| QA865 | IQF Audit Procedures | Rev 0 |

QA Forms

| | | |
|---------|---|-------|
| QA423-1 | DCR Log | Rev 0 |
| QA423-2 | DCR Form | Rev 0 |
| QA744-1 | IQF Buy America Verification Spreadsheet | Rev 0 |
| QA752-1 | Daily Inspection Report | Rev 0 |
| QA762-1 | AS-1 Sheet, HMA mixes | Rev 0 |
| QA762-2 | AS-1 Sheet, Full Depth Patching | Rev 0 |
| QA770-1 | Ex of Materials Memo used on previous project | Rev 0 |



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| QA770-2 | Ex of Materials Sampling Checklist used on previous project | Rev 0 |
| QA770-3 | Ex of Materials Certification Log used on previous project | Rev 0 |
| QA770-4 | Ex of EJ Log used for closeout purposes on previous project | Rev 0 |
| QA770-5 | Ex of NCR Log used on previous project for closeout purposes | Rev 0 |
| QA810-1 | Ex of EJ Log used on previous project | Rev 0 |
| QA824-01 | Concrete paving thickness by measurement | Rev 0 |
| QA824-02 | Concrete sampling and testing | Rev 0 |
| QA824-03 | Concrete thickness correlation between stab and core | Rev 0 |
| QA824-04 | Concrete truck log | Rev 0 |
| QA824-05 | Liquid and plastic limit | Rev 0 |
| QA824-06 | Moisture density relationships of soils and aggregates | Rev 0 |
| QA824-07 | pH | Rev 0 |
| QA824-08 | Resistivity | Rev 0 |
| QA824-09 | Sample ID Form | Rev 0 |
| QA824-10 | SCT29 1-point proctor | Rev 0 |
| QA824-11 | SCT31 density and moisture content of soils and soil-aggregate | Rev 0 |
| QA824-12 | SCT34 sieve elutriation | Rev 0 |
| QA824-13 | SCT36 Determining percent ignition loss of organic soils | Rev 0 |
| QA824-14 | Sieve analysis for borrow, embankment and free draining backfill | Rev 0 |
| QA824-15 | Sieve analysis for HMA, base and concrete aggregate | Rev 0 |
| QA824-16 | Specific gravity and absorption of coarse aggregates | Rev 0 |
| QA824-17 | T267 determination of organic soils by loss on ignition | Rev 0 |
| QA824-18 | Unit weight and voids in aggregate | Rev 0 |
| QA830-1 | Nonconformance Report | Rev 0 |
| QA831-1 | Construction Deficiency Notice | Rev 0 |
| QA850-1 | QA Survey Verification | Rev 0 |
| QA855-1 | Minimum Sampling Guide Schedule Report (see note on QA855) | Rev 0 |
| QA865-1 | Audit Summary | Rev 0 |
| QA865-2 | Audit Plan | Rev 0 |
| QA865-3 | Pre/Post Audit-Conference Attendance | Rev 0 |
| QA865-4 | Final Audit Report | Rev 0 |
| QA865-5 | Audit Schedule | Rev 0 |