The Afghanistan Engineering Support Program assembled this deliverable. It is an approved, official USAID document. Budget information contained herein is for illustrative purposes. All policy, personal, financial, and procurement sensitive information has been removed. Additional information on the report can be obtained from Firouz Rooyani, Tetra Tech Sr. VP International Operations, (703) 387-2151.

USAID
FROM THE AMERICAN PEOPLE

ENGINEERING SUPPORT PROGRAM

Contract No. EDH-I-00-08-00027-00

Task Order No. 1

WO-LT-0090 Interim QA Monitoring and Evaluation Services

QUALITY ASSURANCE TECHNICAL MANUAL

February 9, 2016

This publication was produced for review by the United States Agency for International Development.
It was prepared by Tetra Tech, Inc.

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TETRA TECH

February 9, 2016

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Re: Contract No. EDH-I-00-08-00027-00/ Task Order No. 1
Afghanistan Engineering Support Program (AESP)

Quality Assurance Technical Manual

[redacted],

It is with great pleasure that Tetra Tech submits the Quality Assurance Technical Manual in support of WO-LT0090: Interim Quality Assurance, Monitoring, and Evaluation Services. This manual will provide specific guidance for our efforts toward quality assurance (QA) of the PTEC Program and the QA framework for other programs as may be assigned by USAID.

The objectives of the QA Program are to identify, define, and assure the application of corrective actions (CA) to issues that may negatively affect the Project and to assure that equipment, systems and structures covered under this work order are constructed and/or fabricated in accordance with approved quality assurance/quality control plans and the requisite specifications, standards and codes.

The QATM serves as the "work plan" that supports the Quality Assurance Plan. It will provide detailed audit procedures, data management, organizational roles, and responsibilities, reporting requirements and a detailed audit plan. This technical document will be updated regularly to reflect changes and or clarifications to the contract.

Please contact me at your convenience should you have any questions or comments regarding this report.

Respectfully,
Tetra Tech, Inc.

[redacted]

Energy Program Director

cc: [redacted] AID OEGI
D OEGI
USAID OEGI

AFGHANISTAN ENGINEERING SUPPORT PROGRAM

Contract No. EDH-I-00-08-00027-00
Task Order No. 1
WO-LT-0090 Interim QA Monitoring and Evaluation

QUALITY ASSURANCE TECHNICAL MANUAL

February 9, 2016

EXECUTIVE SUMMARY

The Tetra Tech (Tt) Afghanistan Engineering Support Program (AESP) has been tasked by USAID to provide Quality Assurance (QA) services to oversee the Power Transmission Expansion and Connectivity (PTEC) program. It is Tetra Tech's responsibility to review Contractor's Quality Assurance/Quality Control (QA/QC) Plans, Policies and Procedures in order to assure USAID that the contractor is operating in accordance within approved quality standards.

Tetra Tech is also cognizant of its responsibility to USAID to monitor project costs and schedules. As part of the team consisting of USAID and its implementing partners (i.e. Da Afghan Breshna Sherkat (DABS), the contractors, and the construction management teams), Tt's role is to provide oversight of the Quality Assurance and Quality Control processes, and to safeguard and protect the interests of USAID. This oversight will include the tasks necessary to substantiate the progress and adherence of the construction management teams and contractors to schedules, budgets, and acceptable quality.

This Quality Assurance Technical Manual proscribes the policies, procedures and audit categories for Tt to assess contractor compliance and adherence to plans and specifications as outlined in the approved Quality Assurance and Quality Control plans provided by the construction manager and the relevant contractors. Quality Assurance is focused on process and procedure and is a preventative action. The objective of the QA process is to identify, define, and apply corrective actions to any issues that may negatively affect the project.

This document was developed to function as work instructions for the specific QA / audit activities Tt will perform under AESP long term Work Order 0090 (WO-LT-0090). The Quality Assurance Technical Manual (QTAM) acts as a supplement to the Quality Assurance Plan and provides a more detailed description for the specific tasks, activities, policies, and procedures necessary for Tt to assure PTEC construction meets international standards and quality.

In order to meet the needs of USAID, the QATM establishes specific audit categories in the following functional areas:

- Pre-construction Categories
- Construction Contract Required Plans
- Design and Drawing Reviews
- Field Observations
- Testing
- Environmental Compliance
- Review of Quality Control Procedures
- Healthy and Safety Oversight
- Schedule Reviews
- Invoice Reviews
- Factory Quality Assurance
- Site Quality Assurance
- Regular Reporting to USAID

Tetra Tech is aware that quality and compliance cannot be "inspected in" to a product. Quality must be built into the product or service and therefore must be controlled by the Contractor. Clear communication between Tt, the contracting entities, and stakeholders is a prerequisite to success. Clear communication and cooperation will allow Tt AESP to provide a high level of assurance to the client that projects are being constructed within the approved schedule, budget and with the requisite quality.

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ACRONYMS

AC	Alternating Current
ACI	American Concrete Institute
ACOR	Alternate Contracting Officer's Representative
AESP	Afghanistan Engineering Support Program
ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
AWS	American Welding Society
BS	British Standards
CA	Corrective Action
CAR	Corrective Action Report
CBR	California Bearing Ratio
CC	Carbon Copy
CCTV	Closed Circuit Television
CM	Construction Manager
CMC	Construction Management Contractor
COP	Chief of Party
COR	Contracting Officer's Representative
DABS	Da Afghan Breshna Sherkat
DC	Direct Current
Dept.	Department
DIN	Deutsches Institut für Normung eV (German Institute for Standardization; similar to US ANSI)
DPQM	Deputy Project Quality Manager
EDMS	Electronic Data Management System
EMMP	Environmental Mitigation and Monitoring Plan
EIS	Environmental Impact Statement
EPQM	Electrical Quality Project Manager
GFA	The company that is the CMC for the project.
GI	Gas Insulated, or Galvanized iron
HS	Health and Safety
HSE	Health, Safety and Environment
HVAC	Heating, Ventilation and Air Conditioning
ICB	International Competitive Bidding
ID	Identification
IEC	International Electrotechnical Commission

IEEE	Institute of Electrical & Electronics Engineers
IT	Information Technology
ITU	International Telecommunications Union
KEC	KEC International, an engineering, procurement & construction (EPC) firm
kV	Kilo Volts
LA	Lead Auditor
LT	Long Term
LV	Low Voltage
MIS	Management Information System
MOE	Measures of Effectiveness
MV	Medium Voltage
NC	Non-conformance
NCR	Non-Conformance Report
NSF	No Significant Findings
NSFR	No Significant Findings Report
OBR	Observation Report
OBS	Observation
OEGI	Office of Economic Growth and Infrastructure
OIG	Office of the Inspector General
PE	Project Engineer
PMP	Project Management Plan
POWER	POWER Engineers, Inc.
PowerRB	Power Reachback
PQM	Project Quality Manager
ProjectWise®	A product by Bentley, of Ireland
PTEC	Power Transmission Expansion and Connectivity
PWA	ProjectWise® Administrator
PWAESPA	ProjectWise® AESP Administrator
PWTA	ProjectWise® Technical Administrator
QA	Quality Assurance
QAP	Quality Assurance Plan
QATM	Quality Assurance Technical Manual
OBS	Observation
QC	Quality Control
QPMOE	Quality Performance Measures of Effectiveness
PE	Project Engineer

POWERRB	POWER ReachBack
Reachback	Staffing in the USA that supports this project
RFP	Request for Proposal
SC	Spot Check
SH	Stakeholder
SM	Security Manager
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SPM	Support Manager
ST	Strength
STM	Senior Technical Manager
STR	Strength Report
TL	Technical Lead
Tt	Tetra Tech, Inc.
TtRB	Tetra Tech Reachback
TtSEC	Tetra Tech Security
TT	Type Test
TtRB	Tetra Tech Reach Back
USACE	United States Army Corp of Engineers
USAID	United States Agency for International Development
VDE	Verband der Elektrotechnik, Elektronik Und Informationstechnik
WO	Work Order

1.0 SCOPE

Tetra Tech's Quality Assurance Technical Manual (QATM) establishes the policy, procedures, organization, and Quality Assurance activities in support of Work Order LT – 0090: Interim QA Monitoring and Evaluation Services and Contract #; DABS /92 /ICB / 004 Lots 1 and 2. This QATM specifies requirements for controlling the quality of work performed by the Contractor, its suppliers, vendors and subcontractors. The Technical Manual described the Tetra Tech AESP 1 Quality Assurance System, organizational structure, and functional auditable categories.

Implementation plans, procedures and standards were derived from the KEC Contract, RFP, KEC Quality Assurance Plan and KEC Quality Control Plan, as well as internationally recognized best business practices. This plan may be modified as necessary to meet project requirements or in response to corrective and improvement actions initiated by the Contractor. The QATM will be reviewed and updated as needed. The organizational structure ensures a direct line of autonomy and communication among quality personnel and quality management in conducting QA and oversight activities.

2.0 DEFINITIONS

Audit: A systematic and independent examination to determine whether quality processes and procedures, activities and their results comply with planned arrangements, whether these arrangements are implemented effectively, and whether they are suitable to achieve project objectives.

Auditee: An organization or individual who undergoes an audit.

Auditor: An Auditor is an individual who is qualified and trained to perform audits, and authorized for a particular audit. This person is typically a member of an Audit Team, which is managed by the Lead Auditor.

Cause: A factor contributing to the occurrence of a nonconformity.

Corrective Action (CA): A formal, documented action to eliminate the cause of a detected nonconformity. A Corrective Action should be timely, appropriate to the magnitude of the problem, and commensurate with the risks encountered.

Discipline Audit: A detailed technical investigation to determine whether technical tasks are being performed according to discipline standards, project plans, regulatory requirements, and best practices.

Electronic Data Management System (EDMS): A web based document management system.

Exit Brief: A meeting held after an audit investigation is completed, to present the findings to the Auditee and responsible management and establish a due date for Auditee responses.

Findings: Results of the evaluation of the collected audit evidence against audit criteria.

Health, Safety and Environmental (HSE): Typically a plan produced by the contractor to monitor the HSE components of a Project.

In Brief: A meeting held before an audit begins, to discuss the Investigation Plan, introduce the Audit Team members, and welcome the individuals whose work will be investigated.

IT: Information Technology

Measures of Effectiveness (MOEs): An MOE is a measure of how well a specific task or groups of tasks are being accomplished.

Non-Conformance (NC): The non-fulfillment of a specified requirement.

No Significant Findings (NSF): An audit finding that the audited condition is acceptable. A NSF does not require a written response.

Observation (OBS): An audit finding framed as a comment, suggestion, or opportunity for improvement. An OBS is a one-way communication to the Auditee that does not require a written response.

Project Lead Auditor (PLA): A Lead Auditor is an individual who is qualified to manage audits by providing procedural, administrative, and general guidance. The PLA is responsible for the QA actions associated with a specific Functional Area i.e. Electrical, Civil, Invoicing, Schedule etc.

Project Quality Auditor (PQA): The individual responsible for conducting a specified audit, typically a subject matter expert in the area of interest.

Project Quality Manager (PQM): The individual responsible for the management and oversight of a Quality Assurance Program associated with a specific Project.

ProjectWise ReachBack Administrator (PWA): This individual will be responsible for administering the permissions and higher-level file structures for the ProjectWise program. The PWA is located in the United States.

ProjectWise AESP Administrator (PWAESPA): This individual will be responsible for locally administering the middle and lower level permissions and file structures for the ProjectWise program. The PWAESPA is located in Afghanistan.

ProjectWise AESP Technical Administrator (PWAESPTA): This individual will be responsible for providing technical assistance to the local users. The PWAESPTA reports to the PWA.

Quality Assurance (QA): A quality review procedure, which ensures organizational process and procedures are being executed accurately and in a timely fashion. QA is focused on prevention.

Spot Check (SC): A no notice review of a policy, procedure, or condition.

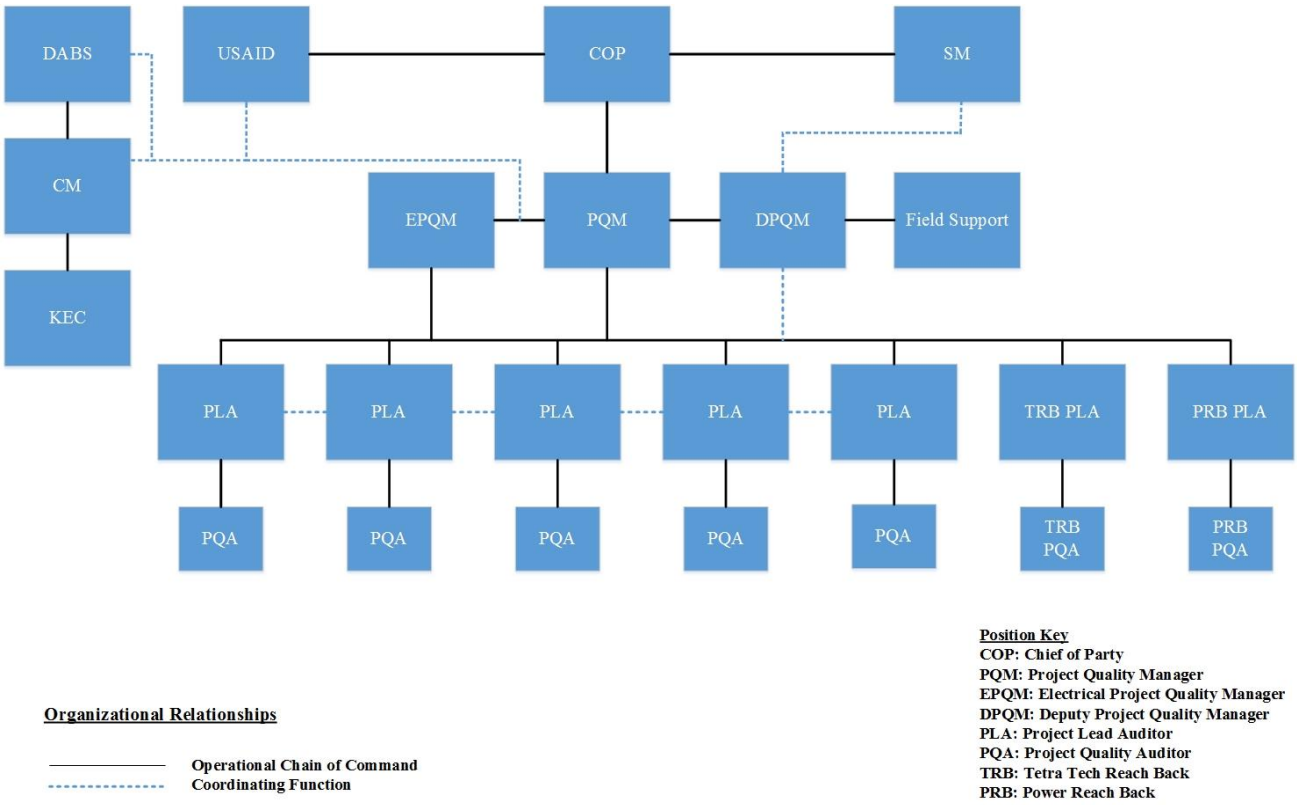
Stakeholder (SH): Either USAID, DABS, Tt Kabul, Tt ReachBack, POWER ReachBack, , KEC and other entities that may be identified in the future.

Strength (STR): An audit finding that validates good work or positive conditions. A STR does not require a response from the Auditee.

3.0 ORGANIZATIONAL ROLES AND RESPONSIBILITIES

The Quality Assurance organization shown in Figure 1 below was developed and has been implemented in support of Contract #: DABS -92-ICB-004 Lots 1 and 2.

Figure 1 – QA Organizational Chart



The following describes the roles and responsibilities of the personnel in the Tetra Tech Quality Assurance Organization**:**

Chief of Party (COP): The COP is responsible to the client (USAID) for all Project deliverables. He develops Program strategy, allocates resources, and approves all Programmatic changes to work scope.

Project Quality Manager (PQM): The PQM is responsible for the management and oversight of a Quality Assurance Program associated with a specific Project. He allocates resources, provides operational direction, and is responsible to the COP for Project deliverables.

Project Engineer (PE): The PE is responsible to provide technical oversight for their respective departments, and to delegate technical responsibilities to the staff engineers

Electrical Quality Project Manager (EPQM): The EQPM is the Project technical lead. He provides technical audit guidance for all Program participants and ensures the validity of auditable specifications. The EPQM also provides electrical safety guidance to the PLA and the PQA. The EPQM reports to the COP in conjunction with the PQM.

Deputy Project Quality Manager (DPQM): The DPQM coordinates with PLAs and PQAs to provide all support requirements. He assumes PQM responsibilities in the absence of the PQM. The DPQM provides the final quality control for all documents reports and correspondence associated with QA activities. The DPQM reports to the PQM.

Project Lead Auditor (PLA): The PLA is an individual who is qualified to manage audits by providing procedural, administrative, and general guidance. The PLA is responsible for the QA actions associated with a specific Functional Area i.e.: Electrical, Civil, Invoicing, Schedule etc. The PLA reports to the EPQM and PQM dependent upon the nature of the report.

Project Quality Auditor (PQA): The PQA is responsible for conducting a specified audit, typically a subject matter expert in the area of interest. The PQA is responsible to the PLA.

Security Manager (SM): The SM is responsible for the safe conduct of the audit. The SM evaluates security conditions, makes deployment recommendations, and provides security briefs to audit participants as required. The SM reports to the COP but coordinates all movements and briefings through the DPQM.

4.0 DOCUMENT MANAGEMENT

4.1 ROLES AND RESPONSIBILITIES

The Contractor has been instructed to send submittals requiring review to the MIS Manager, the responsible Administrative Assistant, and the QA Technical Advisor. These roles are defined below:

MIS Manager: The MIS Manager provides overall quality assurance to process of logging, reviewing and returning submittals from the contractor. On a weekly basis, the MIS Manager is responsible for reconciling the submittal log with received submittals. This ensures the accuracy of the submittal log and of the review procedures.

QA Administrative Assistant: One Administrative Assistant is responsible for maintaining the Project Files, the Submittal log, and the ProjectWise entries. The Administrative Assistant is the first person to review the submittal, and should be the primary manager of the Submittal Log.

QA Technical Advisor: The QA Technical Advisor provides Quality Control for the processes completed by the Administrative staff, including the following: reviewing the cover page sent by the Contractor, checking the submittal log and checking file structure for accuracy.

Additionally, the QA Technical Advisor is responsible for distributing submittals to the appropriate review team, sending a "receipt" to the Contractor for every submittal, and updating the "reviewed by" column in the Submittal log.

Reviewer 1: Reviewer 1 is the person who performs the first review of the document. This is customarily the detailed review. Reviewer 1 must have at least a four-year engineering degree from an accredited school. The reviewer need not necessarily be a licensed (registered) engineer.

Reviewer 2: Reviewer 2 is the person who checks the work of Reviewer 1. This is a quality control (QC) task.

Reviewer 1 must have at least a four-year engineering degree from an accredited school. The reviewer need not necessarily be a licensed (registered) engineer.

Reviewer 2 is the supervisor of Reviewer 1. However, if Reviewer 2 is not available then either of two other persons can review the document:

1. The manager of the supervisor (that is, the person two levels above the reviewer) provided that the manager is of the same discipline (for example, electrical engineering) as Reviewer 1; or,
2. A peer of Reviewer 1 provided that the peer be of the same discipline.

4.2 RECEIVING A SUBMITTAL

When the Contractor sends a submittal to the Administrative team described above, specific procedures are required to accurately and efficiently log the submittal.

1. The QA Administrative Assistant records the submittal in the Submittal Log, and saves the file in the Review/Approval folder. This includes naming the file and submittal with the appropriate Tt tracking number.
2. The QA Administrative Assistant sends a link to the file location to the QA Technical Advisor, copying the MIS Manager.
3. The QA Technical Advisor reviews the Contractor's transmittal form, the Submittal Log, and the file structure for accuracy.

4. The QA Technical Advisor sends a receipt to the Contractor, confirming that the submittal has been logged and is in process, copying the QA Administrative Assistant and the MIS Manager.
5. The QA Technical Advisor distributes the submittal to the appropriate review team (Civil/Electrical/Mechanical/Structural/Other). This will include the corresponding Technical Lead and Project Engineer, copying the QA Administrative Assistant and the MIS Manager.
6. The QA Technical Advisor updates the "reviewed by" column in the Submittal Log, showing that the submittal has been distributed to the appropriate team.
7. The QA Administrative Assistant uploads the submittal to ProjectWise (see Section 5.0 Electronic Document Management System Overview).

4.2.1 Tt Tracking Number

A Tetra Tech tracking number is assigned to each submittal using the following convention:

Work Order Number – Contractor – Substations/Transmission Lines – Sequential Reference Number

See example below:

WO-A-100-KEC-SS-00043

4.2.2 Submittal Log

Each time a document is received or returned for comments, the action should be recorded in our submittal log.

The Submittal Log should be updated daily by the Administrative Assistant and checked for accuracy by the QA Technical Advisor.

4.3 REVIEWING A SUBMITTAL

Once the QA Technical Advisor distributes a document to the appropriate Technical Review Team, the following steps occur:

1. The Technical Lead or the Project Engineer makes a decision to process the document in country or through reachback support.
    a. If in-country support is appropriate: the Technical Lead or Project Engineer notifies the AESP Engineers of their tasks, notifying the QAAA and the QATA of the assignments.
    b. If Reachback support is needed: the Project Engineers notifies the appropriate Tetra Tech or Power Engineers Reachback staff, notifying the QAAA and the QATA of the assignments.
2. Reviewer 1 and 2 complete their reviews and apply the stamp and signatures according Section 4.3.1.
3. Reviewer 1 completes the Submittal Review Form (see the Appendices) and assembles the package.
4. Reviewer 2 or the Technical Lead sends the complete package to the QA Administrative Assistant, copying the MIS Manager and the QA Technical Advisor.

4.3.1 Review Stamp

The Review Stamp is the mark placed on a page of a document and in the review stamp; the reviewer indicates the result of the review. Three custom Review Stamps have been created for the AESP project; they are loaded into the Adobe Professional of the reviewers.

Rules governing the placement and use of the review stamp are provided below:

- The review stamp is placed any convenient place on the PDF version (that is, format) of the document.
- The review stamp is placed on *each* document.
- A document can be a drawing, a table, a chart, a figure, a sketch, a printed spreadsheet, etc.
- If a document consists of several pages then *each* is page is reviewed individually and the review stamp is placed on each individual page.
- The Review Stamp on one page has no bearing on other pages. The review of each page stands alone.
- The size of the Review Stamp is adjusted in Adobe Professional when the Review Stamp is placed on the document so that the whole of the Review Stamp is legible and reasonably sized for viewing on print out or on a screen.
- A review stamp is *not* issued for a set of documents (for example, a set of drawings).

4.3.2 Outcomes of a Review and Form of the Review Stamp

Options governing a review of submittals are prepared from the Contractor's contract. The Stamp should be prepared based on the Contractor's contract.

4.3.3 Submittal Review Form

This Submittal Review Form will be added to the front of every returned submittal for document tracking purposes.

The Submittal Review Form is to be filled in by Reviewer 1 and inserted as the first page in the set of PDF documents (see the Appendices). All of the documents that were sent by the Contractor are to be in the set of documents returned to the Contractor.

4.4 RETURNING A SUBMITTAL

When a submittal has been returned by the technical team to the administrative team, the following steps take place:

1. The QA Technical Advisor reviews the submittal review form, the stamps, and the signatures for accuracy. Once this is completed, the QA Technical Advisor alerts the QA Administrative Assistant (copying the MIS Manager).
2. The Administrative Assistant returns the submittal to the Contractor, copying the MIS Manager and the QA Technical Advisor.
3. The QA Administrative Assistant saves the sent email in the file structure.
4. The QA Administrative Assistant updates the Status column of the Submittal Log and uploads the completed file to ProjectWise.

4.5 WEEKLY RECONCILIATION

On a weekly basis, the QA Technical Advisor and the MIS Manager conduct a reconciliation to ensure file fidelity and accuracy, using the following procedures:

1. The QA Technical Advisor prepares a weekly list of received submittals by Thursday at noon.
2. The MIS Manager reconciles this list with received emails from the Contractor, rectifying any discrepancies with the QA Administrative Assistant. If there are discrepancies, this triggers the receiving and review processes immediately.
3. The MIS Manager distributes the list of weekly submittals to the Contractor.

5.0 ELECTRONIC DOCUMENT MANAGEMENT SYSTEM OVERVIEW

Anticipating a large volume and coordination of documents among various stakeholders, the scope of work for WO-LT-0090 includes set-up of an Electronic Document Management System. Tt will deploy a project-wide EDMS, Bentley ProjectWise, to efficiently control and manage documentation and workflows between Tt, USAID, DABS, and other PTEC project stakeholders. EDMS includes and contains revision controls as well as file structure and naming standards.

5.1.1 Capabilities

Bentley ProjectWise® (PW) has the following capabilities:

- Enable project teams, stakeholders, and contractors to create, review, and approve documentation with secure document control
- Provide secure remote and mobile field access to essential project documents
- Streamline and automate transmittal processes including incoming requests, internal review, and external distribution of controlled documents to multiple parties
- Track progress against project milestones by means of dashboards and reports Organization of Data

A large number of documents and files will need to be shared and several stakeholders will collaboratively review and edit the documents and files. Strong file organization will be key in order to reduce lost data, allow easy access, and provide consistent archiving of information. A basic description of the work flow process and file structure is provided in Figure 2, below. A disciplined workflow and file structure is critical to the successful implementation of ProjectWise.

5.1.2 Work Flow

The following numbered list and flow chart illustrates the general workflow of documents once they enter the EDMS system. Exceptions will arise, however most documents will follow a similar work pattern. In order to assure proper coordination by the project administrator it is important that all documents include an electronic transmittal form. The transmittal form can be found in Appendix A.

The steps a document follows within the ProjectWise workflow is as follows:

1. The Contractor submits documents to the appropriate Tt staff, including the AESP ProjectWise Administrator (PWA) and the QA Administrative Assistant, depending on the allocation of resources.
    a. Documents sent from the CMC will be submitted with the previously distributed Transmittal Sheet.
2. The Transmittal Sheet is reviewed by the designated QA Technical Advisor (TA), who will ensure that the sheet has been correctly filled out and that the proper people were copied on the submission of the document. Once this step has occurred, the TA will inform the ProjectWise Administrator (PWA) and the QA Administrative Assistant, depending on the allocation of resources.
3. The PWA enters the document into ProjectWise, maintaining proper document names, coding, and file structure.
4. Once entered, the PWA notifies, the responsible Project Engineer and Tech Lead, identifying the proper PW file location in the process.
5. When all internal changes and internal document QA/QC have been completed, the Project Engineer notifies the PWA that the document is ready for external submission.
6. The stakeholder internally manages the document in their organization, ensuring that all changes are stored within (that is, ultimately submitted to) AESP's ProjectWise.

5.1.3 File Structure

The WO-LT-0090 ProjectWise has a file structure created by the AESP PW administrator. Designed to reflect the needs of the project, the AESP project administrator works with the Tt ProjectWise Technical Administrator to adapt and maintain the file structure. Only administrative users and project managers have the ability to create and delete folders and subfolders.

The file structure begins with project folders and is then separated into subfolders based on sectors. The sectors are then further divided into document type. Beneath the document-level, folders can be created at the discretion of the AESP PW Administrator. Users petition the PWA to create subfolders.

5.1.4 File Naming and Codes

All documents entered into the EDMS will follow Tetra Tech's file naming standards. In order to allow easy filing and searching within the ProjectWise System, all files will additionally be given a unique code.

PW will control which document codes that can be placed in the system, checking for validity and ensuring no redundancy. Once a file is received, the PWAESPAA or the PWAESPAT is responsible for inputting the proper codes before sending to engineers who will utilize the document.

5.2 LICENSED USERS

The PW for the PTEC program has 50 licensed users. The majority of the users will be AESP staff working daily on documents related to providing QA services to the PTEC program. These users will be using the PW client on project computers and mobile devices when applicable. Other stakeholders (i.e. USAID, DABS, Reachback support, and contractors) will have the ability to read, edit, and upload documents through AESP ProjectWise®'s online portal. The online portal will have limited functionality compared to those with the ProjectWise client. The 50 users will be separated into user groups. User group status designates each user's permissions and abilities within PW. Abilities and permission are detailed in section 5.2.1 and 5.2.2 respectively.

Due to licensing restrictions, all stakeholders will have a limited number of users that can access the documents through the online portal. The respective stakeholders will be responsible to coordinate documents within their own chosen point of contact and must ensure current document versions are checked back into the AESP ProjectWise.

5.2.1 Abilities

In order to ensure control of documents, and minimize corruption of documents and file structure, each user group has a certain number of abilities that they have permission to perform. Table 5.2.1.1 below gives a summary of abilities of each group. Group abilities are decided by the AESP ProjectWise Administrators, and reflect the tasks necessary to be performed by each group. Changes to abilities are done by the Tetra Tech ProjectWise Technical Administrator based in the United States, as directed by AESP administrators.

Table 1 – Description of User Abilities

User Group	Description of User Abilities
Administrators (PWAESPA, PWAESPTA, and IT personnel)	These members have full control of all folders, files, and permissions.
Project Managers (PM)	PM managers have the ability to create subfolders, delete, read, and write folders. They can create, delete, read, and write files.

AESP Engineers	These members have the ability to read folders and read, write, and delete files.
USAID	These members have the ability to read folders, and read and write files to which they are granted access.
Power Reachback (PRB)	These members have the ability to read folders, and read and write files to which they are granted access.
Tt Reachback (TRB)	These members have the ability to read folders and read, write, and delete files to which they are granted access.
CMC	These members have the ability to read folders, and read and write files to which they are granted access.
Contractors	These members have the ability to read folders, and read and write files to which they are granted access.

5.2.2 Permissions

Access permission for users is assigned by the above user groups and restricted at the folder level. AESP maintains a security matrix detailing group permission for each folder. A sample security matrix can be found in Appendix C. This matrix can be displayed online in PW for those who are authorized. Group permissions are decided by the AESP PW Administrators, and are dependent on the tasks required by each group. Changes to permission are accomplished by the Tetra Tech PW AESP Administrator (PWRBA) based in the United States as directed by the AESP Administrators (PWAESPA).

6.0 AUDIT PROCESS

6.1 PROJECT INITIATION

At project initiation, the assigned auditor in conjunction with the Tetra Tech PQM, DPQM and EPQM will perform the following activities:

1. Align with the Project Management team, which includes:
    - Attending the project kick-off and alignment sessions
    - Understanding the scope of work and the Client's requirements
2. Develop an appropriate audit strategy for the project, with input from the Project Manager (Tetra Tech) and the Construction Management Consultant (CMC). The audit strategy is expressed in a document (email, letter, report, etc.) appropriate to the project and the need.
3. Prepare the Initial Project Audit Plan and obtaining required approvals
4. Prepare the Master Schedule
5. Prepare Job Bulletins for the Quality Section if required
6. Ensure required Quality forms and documents are available on the project Data Base. (Project Wise)
7. Determine the appropriate Quality Performance Measures of Effectiveness (QPMOEs) that will be tracked on the project

6.2 Project Execution

Tetra Tech Project Quality Auditors (PQA) are mainly involved in engineering activities from initiation through the completion of the project. These activities are reviewed at the in-country office, Tetra Tech Reachback (TtRB) and at the construction site as required. Non-engineering activities such as schedule analysis and invoice validation are accomplished at the in-country office.

6.2.1 Required Activities during Project Execution

The assigned PQA is required to perform the following activities:

1. Review the project-specific Project Audit Plan and updating its status as required
2. Schedule the project audits and manage the schedule in ProjectWise
3. Conduct Project Quality Audits according to the Audit Plan
4. Monitor the timely close-out of Corrective Actions (CAs)
5. Perform any additional project quality activities (such as SPOT checks) as agreed with Project Management
6. Prepare input to the Bi Monthly and Monthly Progress Reports
7. Interface with the Client's quality representatives and/or auditors as required

6.3 CONDUCTING THE AUDIT

Tt will perform multiple audits throughout the lifecycle of a project, according to the Project Audit Plan, which is developed for the project shortly after project initiation. Generally, two types of audits are performed:

1. Quality System Audits – Conducted by office Quality personnel
2. Discipline Audits – Conducted by Discipline Auditors from their respective discipline (for example, electrical, structural, civil, mechanical, health, safety, environmental, etc.) and facilitated by other Quality Personnel

This section describes the Tt standard audit process, and explains variations in procedures for Quality System Audits and Discipline Audits.

All products of audit processes are documented in the Tetra Tech EDMS as implemented in ProjectWise® (PW). This section provides information about the elements of auditing.

6.3.1 Key Elements of Auditing

There are two key elements of auditing, the main components in the Tt Quality Management System:

1. Audits, which are processes and activities
2. Audit Findings, which are results and deliverables

6.4 TYPES OF AUDITS

An audit is defined as a systematic and independent examination to determine whether quality activities and their results comply with planned arrangements, whether these arrangements are implemented effectively, and whether they are suitable to achieve project objectives.

Tt performs two main types of audits to monitor compliance with quality requirements:

1. Quality System Audits – Typically done by the Project Quality Auditor (PQA) to determine whether project activities are being performed according to project procedures, internal Contractor requirements, and Contract terms. The most common types of Quality System Audits are:
    a. Startup or readiness audit
    b. Support Activities audit
    c. Close-out audit
2. Discipline Audits – Detailed technical investigations conducted on a discipline to determine whether technical tasks are being performed according to discipline standards, the project

Baseline, client and regulatory requirements, and the Contractor standard practices and guidelines.

The PQA / Lead Auditor will identify the specific type of audit when generating an Audit document in Project Wise. As the project matures, the frequency and extent of audits should be assessed to ensure maximum value is obtained for the effort expended.

6.5 TYPES OF AUDIT FINDINGS

The results of an audit are known as findings. Findings cross the entire work spectrum, ranging from unsatisfactory to exceptional. Some findings may identify instances where specified requirements or criteria are not being met. An instance of this is known as a nonconformity (also known as a nonconformance). Findings may also identify areas indicating strengths, which identify and validate good or positive work conditions. The finding areas are as follows:

1. Non-Conformance (NC) – A formal, documented finding of nonconformity that happened in the past or is happening in the present. This finding results in a Non-Conformance Report (NCR).
2. Observation (OBS) – A finding that results in a comment, suggestion, or opportunity for improvement. This finding results in an Observation Report (OBSR).
3. Strength (ST) – A finding of good work, positive conditions, or an innovative work process that adds significant value to project execution. This finding results in a Strength Report (ST).
4. No Significant Findings (NSF): An audit finding that the audit condition is acceptable.

6.6 TYPES OF REPORTS

Reporting outputs of the QA process will include the following:

a.) Non-Conformance Report (NCR) – This report will highlight any significant deficiencies or omissions noted. It will not have a regular distribution interval, as NCRs will be issued when deficiencies are observed. As part of the NCR process, the Contractor will be required to provide a Corrective Action (CA) Plan to rectify the non-conformance. The CA Plan will provide specific steps required to correct the non-conformance, including a schedule of when the non-conformance will be resolved. The NCR will remain open until the deficiency has been corrected, at which time the NCR will be change from “open” to “resolved”. All open NCRs will be tracked on an “Aging” file. All NCRs will be tracked using the EDMS system. The unique identification-numbering scheme is defined in EDMS. .See Appendix D for the NCR format.

b.) Observation Report (OBR) – This report is used to identify areas that while not significant enough to warrant an NCR (see above), can be improved. Unlike an NCR, there is no requirement for a formal response or corrective action plan from the contractor. OBRs shall be tracked using the EDMS system. The unique identification-numbering scheme is defined in EDMS. See Appendix E for the OBR format.

c.) Strength Report (STR) – This report format is used to identify areas that are performing exceptionally well, or have proven to be extremely effective. No formal response is required from the contractor. STRs shall be tracked using the EDMS system. The unique identification-numbering scheme is defined in EDMS. See Appendix F for the STR format.

d.) No Significant Findings Report (NSFR) – This report format is used when no significant findings (either positive or negative) are noted; that the process is functioning as expected. No formal response is required from the contractor. NSFs shall be tracked using the EDMS system. The unique identification-numbering scheme is defined in EDMS. See Appendix G for the NSF format.

Observations and Strengths do not require documented corrective action, which means no response is required when these findings are issued.

6.7 CONDUCT DURING AN AUDIT

During audit meetings and other communications related to auditing, Auditors will:

1. Perceive the work situation realistically
2. Understand complex operations from a broad perspective
3. Understand the roles of groups and departments within the overall organization
4. Obtain and assess objective evidence fairly, using good judgment
5. Remain true to the purpose of the audit without fear or favor
6. Evaluate implications of audit findings and personal interactions during an audit
7. Treat affected personnel in a way that will best achieve the audit purpose
8. Perform the audit process without deviating due to distractions
9. Commit full attention and support to the audit process
10. React effectively in stressful situations
11. Arrive at generally acceptable conclusions based on audit observations
12. Remain true to a conclusion despite pressure to change that is not based on evidence
13. Be alert for fraud, corruption, collusion, bribery, extortion, etc.

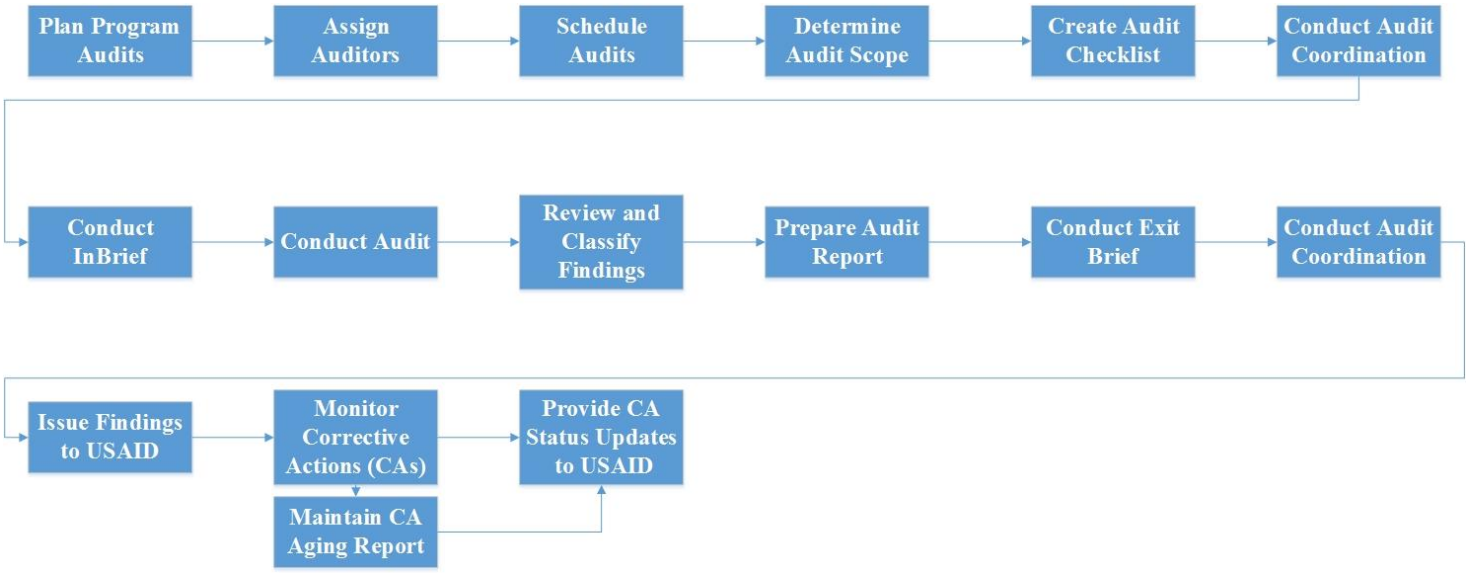
"Do's" and "Don'ts" for Auditors:

1. Be punctual and courteous
2. Be objective and impartial
3. Be logical and non-judgmental
4. Be an active listener
5. Follow the checklist points of audit
6. Imagine yourself as the person and entity being audited
7. Make auditees feel like part of the audit team
8. Confirm any findings with the auditee (when practical) prior to the end of the interview
9. Show interest and be inquisitive
10. Ask questions, but don't make it personal
11. Be methodical in recording details and peoples' names
12. Don't abuse your authority to investigate
13. Don't be distracted from key issues – get to the facts
14. Don't let the auditee pick the samples
15. Do not investigate what may turn out to be fraud, corruption, collusion, bribery, extortion, etc. Rather, report the findings to appropriate persons.

6.8 STANDARD PROCESS FOR TETRA TECH AESP I AUDITS

The following flowchart summarizes the main phases of the standard audit process:

Figure 2 – QA Process Flow Chart



6.9 STANDARD PREPARATIONS FOR AN AUDIT

A systematic discussion for each of these phases is included in the following sections.

6.9.1 Roles and Responsibilities

The following individuals have important roles to play in all types of audits:

1. Project Quality Manager (PQM) - The individual responsible for the management and oversight of a Quality Assurance Program associated with a specific Project.
2. Project Lead Auditor –Manages audits by providing procedural, administrative, and general guidance.
3. Project Quality Auditor (PQA) may also provide procedural, administrative, and general guidance during project audits. He or she is responsible for conducting the specified audit and is typically a subject matter expert in the area of interest

On most projects, the Lead Auditor and PQA are the same person.

1. Audit Team – The audit team is made up of the Lead Auditor and any other Auditors who are assigned to perform a project audit. This may include the CMC or other external representatives. Large audit teams are rare, but may be required on large, complex, or high-risk projects. Normally, the audit team consists of only the PQA. On Discipline Audits, the PQA will be the Discipline Auditor.
2. Auditee – An organization or an individual who undergoes an audit.

6.10 PREPARING FOR THE AUDIT

The following flowchart depicts the steps to be followed when preparing for an audit:

6.11 STANDARD PREPARATIONS FOR AN AUDIT

Figure 3 – Audit Preparation Flow Chart

6.11.1 Plan All Audits for the Project

The PQA prepares an initial draft of the Project Audit Plan. The PQA then reviews the draft audit plan with the responsible Lead Auditor, key Project Leads, the Project Manager (Tetra Tech) to obtain their input and concurrence. The CMC may also be asked to review the audit plan. The PQA then finalizes the Project Audit Plan and obtains the approvals of the Lead Auditor and Project Manager. After approval, the PQA should make the Project Audit Plan available to the project team.

6.11.2 Assign an Auditor

Auditors will be selected based on skill set requirements, audit complexity, and availability. The Auditor is an individual who is qualified and trained to perform audits, and authorized for a particular audit.

6.11.3 Schedule the Audit

The PQA or Lead Auditor individually schedules each audit listed on the Project Audit Plan, and enters it into ProjectWise. An audit is typically scheduled several weeks before it is to be performed. Scheduled calendar dates are subject to change based on the availability of auditees. Audit schedules will be provided to USAID upon completion.

6.11.4 Determine the Scope of the Audit

For Discipline Audits, the PQA, Project Manager, and Discipline Auditor should hold an informal alignment meeting prior to the In Brief, to determine the audit scope. The PQA should print copies of the Discipline Audit Checklist and the supporting working documents. The PQA is to bring them to the meeting to use as a guide for discussion.

Factors to consider when determining the audit scope and level of detail include:

- Extent and complexity of project work
- Number of disciplines that need to be interfaced with on the project
- Checklist Topics and Points of Audit (POAs) that will be addressed
- Findings that were identified in previous audits
- Expectations for the level of detail to be pursued
- Types of documents that will be examined
- Presence of RISK ISSUES and mitigation plans
- Critical financial, logistical, or safety issues
- Shortened schedule for the type of project (if applicable)
- Limited experience of the Discipline Lead, project team, or PM
- Contractors' lack of familiarity with the project type
- Date by which the audit should be finished if completion date is a critical factor (for example, when the review of invoices is involved).

Projects that include some of these risks may require a more extensive, in-depth audit, or even additional audits added to the Project Audit Plan. Projects with a limited scope of work and/or less risk may not require audits of all disciplines.

6.11.5 Setup the Audit Checklist and Prepare Supporting Working Documents

In preparation for the audit, the PQA or Lead Auditor should prepare a set of working documents, which are suitable for the audit scope. This includes the contract, project planning documents, applicable audit procedures, relevant sections of the RFP, relevant sections of the contract for construction if the contract is different from the RFP, links to relevant industry standards, and the standard Audit Checklists. Auditors should take time to become familiar with these documents, which will be used to facilitate and substantiate the audit. If more than one Auditor is involved, all members of the audit team should review the supporting working documents. Afterward, they should meet again to discuss any concerns and plan the mechanics of the audit. Other preparations for the audit include reviewing previous audits and observations, and following up on open items as needed. The PQA or Lead Auditor will email the Audit Schedule Notification to the people who will be involved in the audit.

An Assignment Letter shall be prepared, signed and given to the audit team. The Assignment Letter orders them to conduct the audit on behalf of the project and empowers them to directly represent the AESP in the audit, and indirectly represent USAID. See Appendix L for a sample Assignment Letter.

6.11.5.1 Coordinate the Audit Arrangements

For a Discipline Audit, this typically includes the Discipline Auditor, Auditee, (usually the Project Discipline Lead), and the Project Engineering Manager (for Engineering audits). The Project Manager and the CMC are also notified.

E-mail recipients should respond if they have any conflicts with the specified date for the audit. The PQA or Lead Auditor then coordinates the final arrangements, including the time of day, location, and list of attendees for the Entry and Exit Meetings.

6.12 CONDUCTING THE AUDIT

This flowchart depicts the steps to be followed when conducting an audit investigation:

Figure 4 – Audit Conducting Flow Chart

6.12.1 Hold the Entry Meeting

At least one week before the Entry Meeting is to be held, the PQA or Lead Auditor should notify participants of the meeting time and location and provide an agenda for the meeting. No notice "spot checks" will be conducted without notification. At the Entry Meeting, the Auditor explains the plan for the audit investigation and communicates related facts to the Auditees:

- Identifies the PQA and other Auditors
- Discusses the discipline work that will be audited
- Provides an estimate of time needed with each person or discipline
- Identifies the types of documents that should be available for review
- Discusses the team approach and constructive intent of the investigation

6.12.2 Interview the Auditee

The Auditor interviews people and investigates the products they are developing and the services they are performing. This includes the following tasks:

- Print the Audit Checklist and use it as a guide. Proceed with the Topics and POAs selected on the checklist, sequentially and logically
- Apply the guidelines for conducting the interview
- Review applicable documents such as the discipline Activity Plan, Work Instructions, calculations, drawings, specifications, records, and contract terms
- Mark preliminary findings (unfulfilled requirements and potential adverse conditions) on the checklist
- Try to identify the real effects of your findings. Tie the findings to real consequences for the organization, or dollar values when available
- Collect objective evidence to substantiate the findings
- At the end of the interview, briefly summarize the preliminary findings of the audit, including whether corrective or preventive action will likely be required. Indicate this will be discussed further in the Exit Meeting and that a formal report will be forthcoming

6.12.3 Classify the Audit Findings

Audit findings are the results of evaluating the collected audit evidence against the audit criteria. Findings can indicate either conformity or nonconformity with audit criteria, and/or opportunities for improvement. After the audit, investigation is done (and before the Exit Meeting), the Auditor, together with other audit team members, should mark preliminary classifications of the findings on the checklist including:

- Non-Conformance (NC)
- Observation (OBS)
- Strength (STR)
- No Significant Findings (NSF)

6.12.4 Prepare the Draft Audit Report

After discussing the findings with the Auditor, the PQA or Lead Auditor prepares the Draft Field Audit Report to clarify the audit results. Prior to the Exit Meeting, the Draft Field Audit Report is typically e-mailed to the following people:

- Auditees
- Auditor
- CMC
- Tt Project Manager

6.12.5 Hold an Exit Meeting to Discuss the Findings

The purpose of the Exit Meeting is to present the preliminary findings to the Auditee and responsible management and to ensure a complete understanding of conditions, constraints and/or unknown variables by all parties. Prior to the meeting, the PQA and Auditor should prepare a written description of the findings:

- This may be a printed copy of the Draft Audit Report, the Audit Checklist, or a summary of the findings in a separate document

- If the Exit Meeting will be attended by a large group of people, a PowerPoint slide presentation that summarizes the findings can be effective

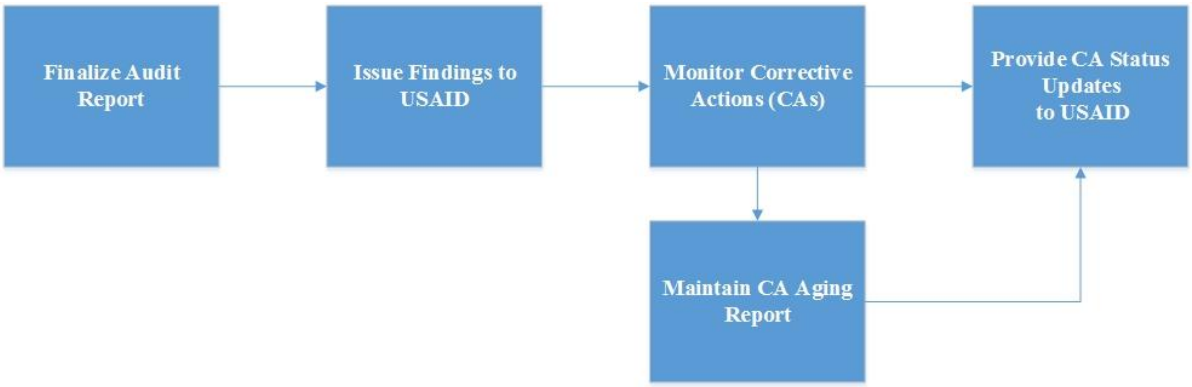
The same individuals who are invited to the Entry Meeting will also be invited to the Exit Meeting. Exit Meeting business conducted by the PQA and the Auditor includes:

- Distribute the written description of preliminary findings (NCR, OBSR, STR, and NSF)
- Verbally identify and discuss the NCRs and OBSR nonconformities
- Invite written comments on the draft Audit Report and preliminary conclusions of the audit
- Request written action plans to resolve the NCRs
- Set the due date for action plans, typically within ten calendar days. Due date can be adjusted based on levels of risk identified

6.13 COMPLETING THE AUDIT

This flowchart depicts the standard steps involved in completing an audit:

Figure 5 – Completing the Audit



6.13.1 Finalize the Classification of Findings

People who attended the Exit Meeting (and other audit participants) should have a minimum of three working days to send their final written comments. The PQA in consultation with the Lead Auditor and Project Manager, consider the final comments, and then finalizes the findings. The PQA or Lead Auditor prepares the final Audit Report by updating the Draft Audit Report to include:

- Summary of the finalized findings with cause codes
- Completed Audit Checklist

6.13.2 Issue the Audit Report and Requests for CAs of NCs

Within ten calendar days after the Exit Meeting, the PQR or Lead Auditor issues (e-mails) the final Audit Report to the standard Tetra Tech Quality Assurance Department for distribution to USAID. Copies of the final Audit Report may be sent to other parties if and as directed by USAID.

For each Non-Conformance that was identified, the PQA or Lead Auditor creates a NCR and then e-mails the NCR to USAID. Copies of the final Audit Report may be sent to other parties if and as directed by USAID.

6.13.3 Monitor Non-Conformance Corrective Action Reports (CARs)

CARs will be prepared by the CMC/Quality Assurance Contractor and will be tracked to resolution. Tetra Tech will provide an "aging" corrective actions report to USAID and other designated parties every two weeks. The CAR Aging Report will also be available in PW on-line with daily updates.

A CAR shall be submitted to USAID within 14 calendar days of the NCR having been submitted by USAID to the responsible entity (Implementing Contractor (e.g. KEC), DABS, , etc.). The 14-calendar day response time can be adjusted in the NCR based upon the severity of the NCR.

7.0 REPORTING

The following types of reports are required by this QATM.

8.0 FUNCTIONAL AREAS OF AUDIT RESPONSIBILITY

8.1 PRE CONSTRUCTION ACTIVITIES

The pre-construction or "kickoff meeting is critical to the success of all projects. The purpose of the meeting is to ensure an understanding of the scope of work and establish alignment of all principle participants. Tetra Tech will provide Management level oversight by the PQM, EPQM, and/or the DPQM. Tetra Tech will ensure the transfer / sharing of all Project specific documentation, aid in the establishment of authority and the establishment of lines of communication and assist in ensuring the dissemination of all critical elements of information. As USAID's quality assurance representative, Tetra Tech will provide a QA Operating Procedures Brief describing auditable areas, general standards, policies and procedures and coordination points among the Contactor, DABS, USAID and Tetra Tech. The following matrix details areas of review, coordination, and information sharing that will be executed and assessed.

Table 2 – QA Pre Construction Activities Table

Audit Activities	Responsible	Standard	Frequency
.Project Scope Identified	AESP Management	PMP SOP	Per Contract
WBS and WBS Directory Created	AESP Management	PMP SOP	Per Contract
Network Diagram	AESP Management	PMP SOP	Per Contract
Critical Path Identified	AESP Management	PMP SOP	Per Contract
Budget Developed	AESP Management	PMP SOP	Per Contract
Quality Process, Standards and Metrics Developed	AESP Management	PMP SOP	Per Contract
Procurement Improvement Plan Developed	AESP Management	PMP SOP	Per Contract
Roles and Responsibilities Developed	AESP Management	PMP SOP	Per Contract
Risk Analysis Performed	AESP Management	PMP SOP	Per Contract
Project Management Plan (PMP) Developed	AESP Management	PMP SOP	Per Contract
Kickoff Meeting Conducted	AESP Management	PMP SOP	Per Contract

Reporting Requirements/Schedule Established	AESP Management	PMP SOP	Per Contract
Testing Requirements Established	AESP Management	PMP SOP	Per Contract
Submittal Schedule and Process Defined	AESP Management	PMP SOP	Per Contract

8.2 CONSTRUCTION CONTRACT REQUIRED PLANS

DABS contract DAB-92-ICB-004 Lot 1 and Lot 2 identifies specific Plans the contractor must develop, maintain and execute. The plans provide a basic framework for project management across key functional areas and establish policies and procedures for safe, efficient and compliant execution of the contract. Tetra Tech will audit required contract plans in order to assure they are in compliance with the contractual initiating document and are aligned with industry standard best practices. The following matrix details areas of review, coordination and information sharing that will be executed and assessed.

Audit Activities	Responsible	Standard	Frequency
Environmental Mitigation and Monitoring Plan	Tt QA DPM	Contract	Per contract
Quality Assurance Plan (QAP)	Tt QA DPM	Contract	Per contract
Quality Control Plan (QCP)	Tt QA DPM	Contract	Per contract
Project Security Implementation Plan	Tt QA DPM	Contract	Per contract
Health and Safety Plan	Tt QA DPM	Contract	Per contract
Land Acquisition and Resettlement Plan (LARP)	Tt QA DPM	Contract	Per contract
Field Quality Plan	Tt QA DPM	Contract	Per contract
Hazardous Materials Management Plan	Tt QA DPM	Contract	Per contract
Waste Management Plan	Tt QA DPM	Contract	Per contract
Blast Plan	Tt QA DPM	Contract	Per contract
Manufacturing Quality Control Plan	Tt QA DPM	Contract	Per contract
Personnel/Staffing Plan	Tt QA DPM	Contract	Per contract

8.3 DESIGN AND DRAWING REVIEWS

By definition, construction documentation encompasses the preparation of drawings and specifications that establish the detailed requirements for the construction of a Project. Drawings represent the illustrative dimension of construction documentation, while specifications represent the written, coupled they establish the foundational basis of all construction Projects. Tetra Tech will conduct Quality Control (QC) and Quality Assurance (QA) reviews of Contractor drawings. Separate and distinct QA/QC multi-disciplined design and drawing reviews will be conducted at specified milestones. Review will consist of design, specifications, contractor work plans, procedures, and conformance to accepted engineering and drafting standards. The following matrix details areas of review, standards, and frequencies.

Table 3a – QA/QC Design and Drawing Reviews Matrix Table - Electrical

Audit Activities	Responsible	Standard	Frequency
Reviews conducted against appropriate Baseline	Tt Elec Auditor	Tt SOP	25% sample of works completed
Tt approved review stamp applied	Tt Elec Auditor	Tt SOP	25% sample of works completed
Subcontractor approved review stamp applied	Tt Elec Auditor	Tt SOP	25% sample of works completed
Approved stamp applied to each doc page	Tt Elec Auditor	Tt SOP	25% sample of works completed
Approved stamp is legible	Tt Elec Auditor	Tt SOP	25% sample of works completed
One "condition" selected on the stamp	Tt Elec Auditor	Tt SOP	25% sample of works completed
Comments applied to the document	Tt Elec Auditor	Tt SOP	25% sample of works completed
1st reviewer meets or exceeds reviewer quals	Tt Elec Auditor	Tt SOP	25% sample of works completed
2nd reviewer meets or exceeds reviewer quals	Tt Elec Auditor	Tt SOP	25% sample of works completed
Appropriate digital signatures applied	Tt Elec Auditor	Tt SOP	25% sample of works completed
No alterations to the Contractors documents	Tt Elec Auditor	Tt SOP	25% sample of works completed
All received docs returned to the Contractor	Tt Elec Auditor	Tt SOP	25% sample of works completed
Submittal returned within 14 days of sub	Tt Elec Auditor	Tt SOP	25% sample of works completed

Table 4b – QA/QC Design and Drawing Reviews Matrix Table - Civil

Audit Activities	Responsible	Standard	Frequency
Reviews conducted against appropriate B/L	Tt Civ Auditor	Tt SOP	25% sample of works completed
Tt approved review stamp applied	Tt Civ Auditor	Tt SOP	25% sample of works completed
Subcontractor approved review stamp applied	Tt Civ Auditor	Tt SOP	25% sample of works completed
Approved stamp applied to each doc page	Tt CivAuditor	Tt SOP	25% sample of works completed
Approved stamp is legible	Tt Civ Auditor	Tt SOP	25% sample of works completed
One "condition" selected on the stamp	Tt Civ Auditor	Tt SOP	25% sample of works completed

Comments applied to the document	Tt Civ Auditor	Tt SOP	25% sample of works completed
1st reviewer meets or exceeds reviewer quals	Tt Civ Auditor	Tt SOP	25% sample of works completed
2nd reviewer meets or exceeds reviewer quals	Tt Civ Auditor	Tt SOP	25% sample of works completed
Appropriate digital signatures applied	Tt Civ Auditor	Tt SOP	25% sample of works completed
No alterations to the Contractors documents	Tt CivAuditor	Tt SOP	25% sample of works completed
All received docs returned to the Contractor	Tt Civ Auditor	Tt SOP	25% sample of works completed
Submittal returned within 14 days of sub	Tt Civ Auditor	Tt SOP	25% sample of works completed

Table 5c – QA/QC Design and Drawing Reviews Matrix Table - Mechanical

Audit Activities	Responsible	Standard	Frequency
Reviews conducted against appropriate B/L	Tt Mech Auditor	Tt SOP	25% sample of works completed
Tt approved review stamp applied	Tt Mech Auditor	Tt SOP	25% sample of works completed
Subcontractor approved review stamp applied	Tt Mech Auditor	Tt SOP	25% sample of works completed
Approved stamp applied to each doc page	Tt Mech Auditor	Tt SOP	25% sample of works completed
Approved stamp is legible	Tt Mech Auditor	Tt SOP	25% sample of works completed
One “condition” selected on the stamp	Tt Mech Auditor	Tt SOP	25% sample of works completed
Comments applied to the document	Tt Mech Auditor	Tt SOP	25% sample of works completed
1st reviewer meets or exceeds reviewer qualifications	Tt Mech Auditor	Tt SOP	25% sample of works completed
2nd reviewer meets or exceeds reviewer qualifications	Tt Mech Auditor	Tt SOP	25% sample of works completed
Appropriate digital signatures applied	Tt Mech Auditor	Tt SOP	25% sample of works completed
No alterations to the Contractors documents	Tt Mech Auditor	Tt SOP	25% sample of works completed
All received docs returned to the Contractor	Tt Mech Auditor	Tt SOP	25% sample of works completed
Submittal returned within 14 days of sub	Tt Mech Auditor	Tt SOP	25% sample of works completed

8.4 FIELD OBSERVATIONS

Field observations are primarily designed to verify a given condition and will be used as a diagnostic tool. Tetra Tech will focus on factors related to specific high-risk areas of concern, primarily schedule and cost. Field observations will be performed by functional area experts. In general, no specific field observation reports will be generated; however, the observations will be used to validate reports and submissions from the Contractor and Contract Management Company. The following matrix details areas of review, standards, and frequencies.

Table 6a – QA Field Observation Table - General

Audit Activities	Responsible	Standard	Frequency
Inspectors wearing proper PPE	Tt Field Auditor	H & S Plan & OSHA	Weekly
Use of appropriate inspection check list	Tt Field Auditor	Contract	Weekly
Use of appropriate equipment	Tt Field Auditor	Contractor QC Plan	Weekly
Equipment calibrations / serviceability confirm	Tt Field Auditor	Contractor QC Plan	Weekly
Safety meeting conducted	Tt Field Auditor	H & S Plan	Weekly

Table 7b – QA Field Observation Table - Civil

Audit Activities	Responsible	Standard	Frequency
Excavation Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Surveying Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Grouting Record			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required

Finish Coating Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Surface Preparation Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Post Pour Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Fire Proofing Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Road / Paving Record			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required

Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Concrete Test Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Concrete Placing Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Backfill record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
General Inspection Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required

Table 8b – QA Field Observation Table – Structural Steel

Audit Activities	Responsible	Standard	Frequency
Foundation Pad Inspection Record			
Appropriate checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Column Plumbness Report Record			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Bolt Torque Test Record			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Structural Steel Final Inspection Report			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Baseplate grouting report			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required

Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Foundation Release for Equipment Report			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Structural Steel Fabrication Report			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Painting Inspection Report		Contractor QC Plan	
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required
Galvanizing Checklist Report			
Appropriate Tt checklist in use	Tt Field Auditor	Contractor QC Plan	As required
Checklist completed	Tt Field Auditor	Contractor QC Plan	As required
Checklist signed	Tt Field Auditor	Contractor QC Plan	As required
Document properly recorded	Tt Field Auditor	Contractor QC Plan	As required

8.5 TESTING

Site, field, laboratory and shop testing are used to determine the acceptance of a material or a semi-finished product or the site condition at some specified stage of works before further work is allowed to proceed. Factory Acceptance Testing is covered in a Section below. Tetra Tech will review the Contractor's field testing program and procedures, conduct random spot checks throughout the life cycle of the Project to confirm testing results / procedures and generate NCRs when Contractor Field Test Reports are in conflict with spot check findings. The following matrix details areas of review, standards, and frequencies.

Table 9 – QA Testing Table

Audit Activities	Responsible	Standard	Frequency
Verify test procedures/frequency are in accordance with contract requirements	QA Auditor	Contract Documents	According to Project Schedule
Review test results	QA Auditor	Contract Documents	TBD
Perform random observations of field testing to ensure correct testing procedures	QA Auditor	Contract Documents	TBD
Tower Types (DA, DB, DC, DD, DDE and ERS			
Verify test procedures/frequency are in accordance with contract requirements	Civil Dept.	ASTM A-239 & A-123 DIN 17100-steel IEC 60652-tower testing DIN 267-bolts DIN 127-nuts DIN 126-washers VDE 0210/12.85 –anti-climbing DIN 48088 part 2-grounding DIN 40006-ID plates	Occasional observation during material delivery & erection
Review test results	Civil Dept.		
Perform random observations of field testing to ensure correct testing procedures	Civil Dept.		
Backup Batteries and Battery Chargers			
Verify test procedures/frequency are in accordance with contract requirements	Electrical Dept.	Table 1.4.19 in Specification documents, Page 128. Notes are at the end of this worksheet.	Field-testing shall be performed to each battery, verifying validity after shipping, and field-testing of the assembly after installation, for commissioning.
Review test results	Electrical Dept.		
Perform random observations of field testing to ensure correct testing procedures	Electrical Dept.		
Backup Diesel Generators			

Verify test procedures/frequency are in accordance with contract requirements	Mechanical and Electrical Dept.	British Standards 5000	Once during start-up & commissioning
Review test results	Mechanical and Electrical Dept.	British Standards 5000	
Perform random observations of field testing to ensure correct testing procedures	Mechanical and Electrical Dept.	British Standards 5000	
Concrete Works		ASTM	
Sampling of Trail Mix (at Batching Plant)	Civil Dept.	BS / ASTM	Per Contract Documents
Sampling of aggregates (at stockpile)	Civil Dept.	BS 812, BS 882 ASTM C-33	Per Contract Documents
Sampling of reinforcement	Civil Dept.	ASTM A-615 ASTM A-617 ASTM A-706 ACI 318	Per Contract Documents
Soil Moisture Test	Civil Dept.	BS 1377 BS 1924	Per Contract Documents
Slump Test (for workability of concrete)	Civil Dept.	BS C25, BS 5328, BS 1881 ACI318	Per Contract Documents
Temperature Test (for green concrete)	Civil Dept.	BS C25 BS 5328 BS 1818 ACI 318	Per Contract Documents
Compression Test	Civil Dept.	ASTM BS C25 BS5328 BS 1881 ACI 318	Per Contract Documents
Sand Patch Test (for surface profile of rigid or flexible pavement)	Civil Dept.	Contractor QC Plan	Per Contract Documents
Rolling Edge Test (for surface profile of ridged or flexible pavement)	Civil Dept.	Contractor QC Plan	Per Contract Documents
Cover Meter Test (for reinforced concrete structure)	Civil Dept.	ASTM ACI 318	Per Contract Documents
Steelwork		(ASTM / DIN)	
Torque Test	Mechanical Dept.	ASTM	Per Contract Documents
Pull Out Test (for cast-in sockets of anchorage system)	Civil Dept.	BS 4449 ASTM A-36 ASTM A-47 AC41A, ASTM B-240	Per Contract Documents
Paint Thickness Test	Civil Dept.	ASTM 123, BS 729 , DIN 50961	Per Contract Documents

Radiographic Test (for welding)	Civil Dept.	AWS D12.1	Per Contract Documents
Ultrasonic Test (for welding)	Civil Dept.	AWS D12.1	Per Contract Documents
Magnetic Particle Inspection (MPI)	Civil Dept.	TBD	Per Contract Documents
Water Leakage			
Soil Permeability Tests	Civil Dept.	BS / ANSI	Per Contract Documents
Dye Test	Civil Dept.	TBD	Per Contract Documents
Ponding Test (for service reservoir/penstock)	Civil Dept.	Contractor QC Plan	Per Contract Documents
Piling Works			
Kentledge Pile Loading Test	QA Auditor	Contractor QC Plan	Per Contract Documents
Drainage Works			
Air Test (for gravity pipeline	QA Auditor	Contractor QC Plan	Per Contract Documents
Water Test (for gravity pipeline)	QA Auditor	Contractor QC Plan	Per Contract Documents
Infiltration Test (for sewage drainage system)	QA Auditor	Contractor QC Plan	Per Contract Documents
Pigging	QA Auditor	Contractor QC Plan	Per Contract Documents
Closed Circuit Television (CCTV)	QA Auditor	ITU-T H.26x	Per Contract Documents
Earthworks			
Proctor test (to determine the max dry density and optimum moisture content)	QA Auditor	Contractor QC Plan	Per Contract Documents
Sand Replacement Ration (to determine compacted soil condition	QA Auditor	Contractor QC Plan	Per Contract Documents
California Bearing Ratio (CBR) Test	QA Auditor	Contractor QC Plan	Per Contract Documents
Compaction by Roller (product specification)	QA Auditor	Contractor QC Plan	Per Contract Documents

8.6 ENVIRONMENTAL COMPLIANCE

The Project must comply with environmental rules and regulations during all phases of construction. Tetra Tech will review the Contractor's Environmental Mitigation and Monitoring Plan (EMMP) to ensure alignment with host country rules and regulations. Design and physical construction will also be monitored and measured against the EMMP during site visits and design reviews. The following matrix details areas of review, standards, and frequencies.

Table 10 - QA Environmental Compliance Table

Audit Activities	Responsible	Standard	Frequency
Perform review of environmental documentation, including EMMP, Environmental Impact Assessment (EIA)	QA Auditor	22 CFR 216 /Reg 216 & NEPA Stds	Per Contract Documents
EMMP review for contract Compliance	QA DPM	Contract/NEPA	Per Contract Documents
Perform field observations to confirm compliance with environmental program	QA Auditor	22 CFR 216 & NEPA	Per Contract Documents
Environmental Checklist reviewed for NEPA compliance	QA DPM	Contract/NEPA EEI	Per Contract Documents

8.7 QUALITY CONTROL PROCEDURE REVIEW

Quality Control (QC) is product oriented and focused on defect identification. Tetra Tech will review the Contractor's QC Plan evaluating the process, procedure, and scope. Site visits will be performed to confirm the implementation of the QC Plan and effectiveness of corrective actions (CAs). CAs will be reviewed for appropriateness and timeliness. CA aging reports will be provided on a monthly basis. The following matrix details areas of review, standards, and frequencies.

Table 11 – QC Procedure Review Table

Audit Activities	Responsible	Standard	Frequency
Review QC Plan for conformance with standard QC process and procedures for implementation	QA Auditor	QC SOP	At Award/ QC Plan Approval
QPC Review for contractual compliance	QA DPM	Contractor QC Plan	Per contract
Review QC Findings	QA Auditor	Contractor QC Plan	Monthly
Assess QC findings	QA Auditor	Contractor QC Plan	Monthly
Assess Corrective Actions	QA Auditor	Contractor QC Plan	Monthly
Provide CA "Aging" Report	QA Auditor	Contractor QC Plan	Monthly

8.8 HEALTH AND SAFETY OVERSIGHT

An effective, aggressive, well executed Health and Safety Plan is critical to the success of all construction projects. Tetra Tech will review the Contractor's Health and Safety Plan focusing on the process,

procedure, and scope. Onsite reviews such as toolbox meetings, health and safety board meetings and operating conditions will be observed. The following matrix details areas of review, standards, and frequencies.

Table 12 – QA Health and Safety Oversight Table

Audit Activities	Responsible	Standard	Frequency
Perform review of site Specific Health and Safety documentation for compliance with approved contract documents	QA DPM	HSE Plan / Contract/OSHA	Per Contract Documents
Perform field observations to confirm compliance with H & S program	Field Audit personnel	HSE Plan/OSHA	Per Contract Documents
Material Storage	Field Audit personnel	HSE Plan	Per Contract Documents
Weather	Field Audit personnel	HSE Plan	Per Contract Documents
Record of Monthly HSE meetings	Field Audit personnel	HSE Plan	Per Contract Documents
Record of HS meetings for visitors to sites	TBD	Contractor QC Plan	Per Contract Documents
Displayed Documentation	Field Audit personnel	HSE Plan	Per Contract Documents
Accident Reporting System	Field Audit personnel	HSE Plan	Per Contract Documents
Vehicle movement	Field Audit personnel	HSE Plan	Per Contract Documents
Tool Box Talks	Field Audit personnel	HSE Plan	Per Contract Documents
Risk Evaluation	Field Audit personnel	HSE Plan	Per Contract Documents
Performance Award Program	Field Audit personnel	HSE Plan	Per Contract Documents
Tool Condition	Field Audit personnel	HSE Plan	Per Contract Documents
Danger Tags used where necessary	Field Audit personnel	HSE Plan	Per Contract Documents
Welding and Cutting	Field Audit personnel	HSE Plan	Per Contract Documents
Waste Management Plan	Field Audit personnel	HSE Plan	Per Contract Documents
Vehicle Condition	Field Audit personnel	HSE Plan	Per Contract Documents
Journey Management System	Field Audit personnel	HSE Plan	Per Contract Documents
Camp Facilities (for a camp job)	Field Audit personnel	HSE Plan	Per Contract Documents

Sufficient and Adequate toilets	Field Audit personnel	HSE Plan	Per Contract Documents
Kitchen and dining facility hygiene	Field Audit personnel	HSE Plan	Per Contract Documents
First Aid Kits	Field Audit personnel	HSE Plan	Per Contract Documents
firefighting system installed and adequate	Field Audit personnel	HSE Plan	Per Contract Documents
free medical consultation for workers in case of sickness or injury	Field Audit personnel	HSE Plan	Per Contract Documents
waste management	Field Audit personnel	HSE Plan	Per Contract Documents
Procedures	Field Audit personnel	HSE Plan	Per Contract Documents
Fire	Field Audit personnel	HSE Plan	TBD
Traffic Accident	Field Audit personnel	HSE Plan	TBD
Other Emergency Situation	Field Audit personnel	HSE Plan	TBD
Worker site protection	Field Audit personnel	HSE Plan	TBD
Smoking Policy	Field Audit personnel	HSE Plan	TBD
Flammable material Storage	Field Audit personnel	HSE Plan	TBD
Personal Protective Equipment	Field Audit personnel	HSE Plan	TBD
Hardhats	Field Audit personnel	HSE Plan	TBD
Eye Protection	Field Audit personnel	HSE Plan	TBD
Hearing Protection	Field Audit personnel	HSE Plan	TBD
Safety associated with working in confined spaces, holes and trenches	QA Auditor	Contractor QC Plan	TBD
Procedures and Safety during Gas, Oil and Diesel Transfers	QA Auditor	Contractor QC Plan	TBD
Procedures and safety for lifting (by personnel, of heavy loads, etc.)	QA Auditor	Contractor QC Plan	TBD
Cable and Rope – Splicing and Terminating	QA Auditor	Contractor QC Plan	TBD
Arc Flash	QA Auditor	Contractor QC Plan	TBD
Lock Out – Tag Out	QA Auditor	Contractor QC Plan	TBD

Footwear	Field Audit personnel	HSE Plan	TBD

8.9 SCHEDULE REVIEW

Schedule or Project execution time is considered a high-risk area of concern. Given the nature of the construction environment, funding sources and political climate, major energy construction projects must be completed on time. The Contractor's overall schedule will be audited for actual work performed against baseline compliance. The critical path will be reviewed separately on a monthly basis and recommendations for mitigation plans will be generated if required. Mitigation plans will be evaluated for viability, appropriateness of the Contractor's ability to execute the plan. The following matrix details areas of review, standards, and frequencies.

Table 13 – QA Schedule Review Table

Audit Activities	Responsible	Standard	Frequency
Schedule date for appropriate period	QA Auditor	Tt SOP	Monthly
Baseline schedule include	QA Auditor	Tt SOP	Monthly
Baseline schedule present in updated schedule	QA Auditor	Tt SOP	Monthly
Schedule resource loaded to show units	QA Auditor	Tt SOP	Monthly
No unapproved changes to the baseline	QA Auditor	Tt SOP	Monthly
Schedule narrative is provided	QA Auditor	Tt SOP	Monthly
Narrative and schedule dates match	QA Auditor	Tt SOP	Monthly
Seven day calendar applied to the schedule	QA Auditor	Tt SOP	Monthly
Status date matches the updated schedule date	QA Auditor	Tt SOP	Monthly
Recovery plan required / included	QA Auditor	Tt SOP	Monthly
Recovery plan narrative included	QA Auditor	Tt SOP	Monthly
Recovery plan assessed for viability	QA Auditor	Tt SOP	Monthly

8.10 INVOICE REVIEW

Like schedule, Project cost is considered a high-risk area of concern. Projects executed in "contingency environments' have historically exceeded schedule and budget. Invoices will be reviewed for compliance with the contract schedule of payment and against the progression of work, based on the Contractor's schedule. Site visits will be conducted to verify completion of milestones and the quality of work. The following matrix details areas of review, standards, and frequencies.

Table 14a – QA Invoice Review Table - General

Audit Activities	Responsible	Standard	Frequency
Activities description present	QA Auditor	Contract General Terms	Bi-Weekly

Release of payment request	QA Auditor	Tt SOP	Bi-Weekly
Invoice # and date present	QA Auditor	Tt SOP	Bi-Weekly
Ref # checked against price schedule	QA Auditor	Tt SOP	Bi-Weekly
Unit type matched against price schedule	QA Auditor	Tt SOP	Bi-Weekly
Unit price matched against price schedule	QA Auditor	Tt SOP	Bi-Weekly
Math calculations checked	QA Auditor	Tt SOP	Bi-Weekly
Terms of payment checked against contract	QA Auditor	Contract	Bi-Weekly
Advance payment deduction reviewed	QA Auditor	Contract	Bi-Weekly
Payment history attached	QA Auditor	Tt SOP	Bi-Weekly

Table 15b – QA Invoice Review Table – Design Drawings and Documentation

Audit Activities	Responsible	Standard	Frequency
DABS PM approval	QA Auditor	Contract	Bi-Weekly

Table 16c – QA Invoice Review Table - Supply/Procurement of Plant Equipment, Spare parts, Tools (50%)

Audit Activities	Responsible	Standard	Frequency
Inspection/receipt certificates reviewed	QA Auditor	Contract	Bi-Weekly
Manufacturer's warranty reviewed	QA Auditor	Contract	Bi-Weekly
Shipping details and packing list reviewed	QA Auditor	Contract	Bi-Weekly
Certificate of origin reviewed	QA Auditor	Contract	Bi-Weekly
Shipping documents reviewed	QA Auditor	Contract	Bi-Weekly

Table 17d – QA Invoice Review Table - Supply/Procurement of Plant Equipment, Spare parts, Tools (40%)

Audit Activities	Responsible	Standard	Frequency
Material delivery conformation review	QA Auditor	Contract	Bi-Weekly
Storage status justification review	QA Auditor	Contract	Bi-Weekly

Table 18e – QA Invoice Review Table - Supply/Procurement of Plant Equipment, Spare parts, Tools (5%)

Audit Activities	Responsible	Standard	Frequency
Certificate of Completion Review	QA Auditor	Contract	Bi-Weekly

Completion of liability period review	QA Auditor	Contract	Bi-Weekly

Table 19f – QA Invoice Review Table - Proto Type Tower Test

Audit Activities	Responsible	Standard	Frequency
Test Report Review	QA Auditor	Contract	Bi-Weekly

Table 20g – QA Invoice Review Table - Construction, Install, Test, Commissioning and Other Charges

Audit Activities	Responsible	Standard	Frequency
Review of Progress Payment Percentages to Date	QA Auditor	Tt SOP	Bi-Weekly
Field Test and Commissioning Reports Review	QA Auditor	Tt SOP	Bi-Weekly

Table 21h – QA Invoice Review Table – Construction, Install, Test, Commissioning and Other Charges (5%)

Audit Activities	Responsible	Standard	Frequency
Certificate of Completion Review	QA Auditor	Contract	Bi-Weekly
Completion of liability period review	QA Auditor	Contract	Bi-Weekly

Table 22i –On the Job Training, Transfer of Knowledge

Audit Activities	Responsible	Standard	Frequency
Job Training Plan Review	QA Auditor	Tt SOP	Bi-Weekly
Attendance Certification Review	QA Auditor	Tt SOP	Bi-Weekly
Project Manager Approval of OJT Review	QA Auditor	Contract	Bi-Weekly

8.11 SITE QUALITY ASSURANCE

Site visits will be conducted and consist of planned and unscheduled visits. Unscheduled visits or spot audits will follow the same scheduling protocols as regularly scheduled visits but will not appear on the Tetra Tech master QA schedule. The primary purpose of QA site visits will be to assess the overall operating conditions. They will normally be conducted in conjunction with a field-testing deployment or an environmental compliance site visit.

Table 23 – QA Site Quality Assurance Table

Audit Activities	Responsible	Standard	Frequency
Review Contractor Oversight Activities	QA DPM	Contract Plans	Monthly

8.12 FACTORY QUALITY ASSURANCE

The Type Test (TT) and the Factory Acceptance Test (FAT) are terms that are widely used by vendors. The TT is for all new major prototypes and is conducted to determine if the prototype structure will meet the specified conceptual design parameters. This test is performed by the vendor. Prior to actual testing both inspection and test plans must be submitted by the vendor. The FAT test is conducted to determine that the equipment operates according to its construction code, purchase order specifications and covers functional requirements. The scope and requirements of TTs and FATs are customarily specified in the RFP and the contract, which see. The details of the FAT test are extracted from construction codes that are provided in the contractor's documentation, are summarized in the inspection, and test plan sheet. Tetra Tech will review and evaluate all testing plans and specifications prior to testing. Actual tests will be observed and evaluated by Tetra Tech subject matter experts (SME). Testing anomalies, failures, and or procedural noncompliance will be reported via an NCR. The following matrix details areas of review, standards, and frequencies.

Table 24 – Factory Quality Assurance Table

Audit Activities	Person Responsible	Standard	Frequency
Appropriate pre-test documents received	Discipline Auditor	Contract	As required
Pre-test inspect plans reviewed and approved	Discipline Auditor	Contract	As required
Appropriate discipline engineer assigned	Discipline Auditor	Contract	As required
Type Test Conducted	Discipline Auditor	Contract	As required
FAT test conducted	Discipline Auditor	Contract	As required
Audit completed identifying discrepancies	Discipline Auditor	Contract	As required
Post-test documents reviewed	Discipline Auditor	Contract	As required
Post-test documents support audit conclusions	Discipline Auditor	Contract	As required

APPENDICES

APPENDIX A
EDMS TRANSMITTAL FORM

Transmittal Sheet

WO-LT-0090 Interim QA Monitoring and Evaluation Services

Afghanistan Engineering Support Program
EDH-I-00-08-00027 Task Order No.1
Tetra Tech, Inc.

Originator		
Project		
Document Title		
Document Type		
Actionable?	☐ Yes ☐ No	If Yes, Action Needed:

☐ QA ☐ CM (This section to be filled out by TT Administrators)

Remarks	**Sector**	**X**
	Administrative	
	Architectural	
	Civil/ Structural	
	Electrical	
	Mechanical	
	Transportation	

Submitter			
Organization		**Date**	

APPENDIX B
EDMS FILE NOMENCLATURE

Project Wise Naming Standards

All documents should be numbered as follows:

XXXX-	A -	ABC-	AUT-	XXXXX
Project ID	Sector	Document Type	Author	Reference No.

Codes

Project ID	
Project	Code
WO-LT-048 AMD3	0483
WO-LT-048 AMD 4	0484
WO-LT-048 AMD 5	0485
WO-LT-063 AMD 4	0636
WO-LT-063 AMD 6	0636
WO-LT-090	0900
WO-LT-091	0910
New Project 1	0010
New Project 2	0020

Sector	
Type	Code
Administrative	X
Architectural	A
Civil/Structures	C
Electrical	E
Mechanical	M
Transportation	T

Document Type	
Type	Code
Correspondence	COR
Cut sheet	CTS
Drawing	DRW
Inspections	INP
Letter	LTR
Photographs	PIC
Report	RPT
Schedule	SCH
Specifications	SPC
Submittals	SUB
Testing	TST

Author	
Name	Code
AESP	TT
DABS	DAB
GFA	GFA
Hilfiger	HIL
KEC	KEC
Power Reachback	PRB
Tt Reachback	TRB
USAID	AID

Reference Number
Will be in numerical order from when received
Starts at 00001

APPENDIX C
EDMS SAMPLE SECURITY MATRIX

AESP ProjectWise Security Matrix

Arghandi - Ghazni

Folder	Admins	PM	AESP Engineers	USAID	DABS	PRB/B&V/T t DIV	TRB	KEC	IRD
Arghandi-Ghazni T/L									
QA									
ProjMgmt									
Contracts									
Original									
Change Orders									
Correspondence									
RFIs									
Emails									
Letters									
Memos									
Documents									
QA Reports									
Biweekly									
Monthly									
Preconstruction Activities									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
Construction Contract Required Plans									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
Design and Drawing									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
Field Observations									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
Testing									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
Environment Compliance									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
QC Procedures									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
H&S Oversight									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									
NCR									
OBSR									
NSFR									
STR									
Schedule									
Audit Reports									
NCR									
OBSR									
NSFR									
STR									
Internal QA									

C	Authority
	Full Control
	Read, Write, Delete, and Create
	Read, Write
	Read
	No Access

ProjectWise User Descriptions

1	**Admins -** These members as outlined in group lists and has full control of all folders, files, and permissions. IT staff are included in this list.
2	**Project Managers (PM) -** PM managers as indicated in the group lists. Have the ability to create subfolders, delete, read, and write folders. For files they can create, delete, read, and write.
3	**AESP Engineers -** These members as listed in the Group Lists have the ability to read folders and read, write, and delete files as indicated in the security matrix
4	**USAID** - These members as listed in the Group Lists have the ability to read folders and read and write files only as indicated in the security matrix
5	**DABS** - These menbers as listed in the Group Lists have the ability to read folders and read files only as indicated in the security matrix
6	**GFA** - These members as listed in the Group Lists have the ability to read folders and read and write files only as indicated in the security matrix
7	**Power Reachback (PRB)** - These members as listed in the Group Lists have the ability to read folders and read and write files only as indicated in the security matrix
8	**Tt Reachback (TRB) -** These members as listed in the Group Lists have the ability to read folders and create,read, write, and delete files as indicated in the security matrix
9	**Hilfiker** - These members as listed in the Group Lists have the ability to read folders and read and write files only as indicated in the security matrix
10	**KEC** - These members as listed in the Group Lists have the ability to read folders and read and write files only as indicated in the security matrix

Folder Key
Level 1 - Project Folder
Level 2 - QA/ QC Distinctions
Level 3 - PM vs. Docs
Level 4 - Folders
Level 5 - Folders
Level 6 - Folders

NCR
OBSR
NSFR
STR
Invoice
Audit Reports
NCR
OBSR
NSFR
STR
Internal QA
NCR
OBSR
NSFR
STR
Factory Quality Assurance
Audit Reports
NCR
OBSR
NSFR
STR
Internal QA
NCR
OBSR
NSFR
STR
Site Quality Assurance
Audit Reports
NCR
OBSR
NSFR
STR
Internal QA
NCR
OBSR
NSFR
STR
CM
ProjMgmt
Contracts
Original
Change Orders
Correspondence
RFIs
Emails
Letters
Memos
Meetings
Documents
Submittals
Submittal Registry
Drawings
Specifications
Calculations
Procedural Plans
Environmental Mitigation and Monitoring Plan (EMMP)
Quality Assurance Plan (QAP)
Quality Control Plan (QCP)
Project Security Implementation Plan
Health and Safety Plan
Land Acquisition and Resettlement Plan (LARP)
Field Quality Plan
Hazardous Materials Management Plan
Waste Management Plan
Blast Plan
Manufacturing Quality Control Plan
Invoices
Construction Schedules
Baseline Schedule
Update Schedules
Recovery Schedules
Tetra Tech Schedules
Reports
Progress
Daily
Weekly
Monthly
Preconstruction Activities
QC Reports
NCR
QC Reports
NCR
OBSR
NSFR
STR
Construction Contract Required Plans
QC Reports
NCR
OBSR
NSFR
STR
Design and Drawing
QC Reports
NCR
OBSR
NSFR
STR
Field Observations
QC Reports
NCR
OBSR
NSFR
STR
Testing
QC Reports
NCR
OBSR
NSFR
STR
Environment Compliance
QC Reports
NCR
OBSR
NSFR
STR
QC Procedures
QC Reports

Go from Read-Write to No access
Go from Read Only to Read-Write

Folder Key
Level 1 - Project Folder
Level 2 - QA/ QC Distinctions
Level 3 - PM vs. Docs
Level 4 - Folders
Level 5 - Folders
Level 6 - Folders

NCR									
OBSR									
NSFR									
STR									
H&S Oversight									
QC Reports									
NCR									
OBSR									
NSFR									
STR									
Schedule									
QC Reports									
NCR									
OBSR									
NSFR									
STR									
Invoice									
QC Reports									
NCR									
OBSR									
NSFR									
STR									
Factory Quality Assurance									
QC Reports									
NCR									
OBSR									
NSFR									
STR									
Site Quality Assurance									
QC Reports									
NCR									
OBSR									
NSFR									
STR									
Commissioning									
O&M Manual									
As Built Documentation									

APPENDIX D
NON CONFORMANCE REPORT (NCR) FORMAT

NON-CONFORMANCE REPORT

NCR No.		**Status:**	Ongoing ☐ Resolved ☐
Project:			
Organization:		**Location:**	
Tt POC:		**Report Date:**	
NCR Subject:			
Description:			
Findings (including references):			
Expected Corrective Actions:			
Response:			

APPENDIX E
OBSERVATION REPORT (OBS) FORMAT

OBSERVATION REPORT

OBR No.			
Project:			
Organization:		**Location:**	
Tt POC:		**Report Date:**	
OBR Subject:			
Description:			
Findings (including references):			

APPENDIX F
STRENGTH REPORT (STR) FORMAT

STRENGTH REPORT

STR No.			
Project:			
Organization:		**Location:**	
Tt POC:		**Report Date:**	
STR Subject:			
Description:			
Findings:			

APPENDIX G
NO SIGNIFICANT FINDINGS REPORT (NSF) FORMAT

NO SIGNIFICANT FINDINGS REPORT

NSFR No.			
Project:			
Organization:		**Location:**	
Tt POC:		**Report Date:**	
NSFR Subject:			
Description:			

APPENDIX H
NCR AGING REPORT FORMAT

TETRA TECH

NCR Aging Report

NCR #	Date of Report	General Description	Date of CA Response	Date of CA Resolution	Aging

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