4.3.4 Quality Management Plan

4.3.4.A Quality Program Concept

The Quality Management Plan (QMP) sets forth general quality control (QC) and quality assurance (QA) procedures and policies for all work to be conducted or supervised by the Team. The QMP is predicated on the premise that the quality for all activities is achieved by those who have the responsibility for performing the work and that the work is confirmed by management and verified by those assigned to quality functions. It provides general guidelines for providing quality on all deliverables, including investigations, engineering analysis, design, and construction. What follows is a conceptual QMP that outlines the contents of what will be a much larger document.

i. Purpose of the Quality Management Plan - The purpose of the QMP is to ensure the work will satisfy the requirements established for the product. The QMP provides quality management procedures and policy for the Team to assure quality products and services during planning, design, construction and maintenance phases of individual TTC-35 Facilities. These basic quality procedures may be expanded for specific tasks. The QMP provides requirements for general controls, supervision, inspections and tests to achieve acceptable quality for TTC-35 development. Implementation of this QMP will achieve the objectives set forth in TxDOT's CDA.

ii. Scope of the Quality Management Plan - The QMP will serve as the overall quality document for all work to be accomplished by the Team on TTC-35 Facilities, with necessary customization to meet specific requirements. Thus, the document serves as guidance and reference for the development of Facility-specific Quality Plans. The QMP includes all activities that determine the quality policy, standards and responsibilities, and implements them through quality planning, control, assurance, and improvement. The QMP is applicable to all investigation, analysis, design, ROW acquisition, permitting, construction, and operations and maintenance (O&M), including:

- Preliminary Facility planning
- NEPA Support
- Traffic and Revenue Studies
- Preliminary and final engineering
- Financial plans
- ROW services
- Environmental mitigation
- Construction
- Maintenance operations

It covers all activities accomplished both on- and off-site by the Team and subcontractors. In addition, it covers all materials and equipment used on TTC-35 Facilities.

Where appropriate for large subcontracted scopes, subcontractors will be required to submit a Quality Plan with in-house staff responsibilities and qualifications for review by the Team. These plans will be incorporated as addenda to the Facility-specific Quality Plan.

iii. Goals - The Goals of the QMP include:

- Ensuring that Quality Management Activities are planned. For example, at the kick-off meeting for a particular task, the specific quality plan is presented, reviewed, modified, and accepted by all stakeholders. All involved must recognize the impact to schedule and budget of implementing the quality plan, and more importantly the impact of not implementing the quality plan.
- The measurable quality standards and their priority are well defined. For example, identifying the design criteria to meet is of higher priority than line styles of a design file.
- Progress in achieving quality is managed and documented. The process of quality reviews must be managed to ensure they are completed at the appropriate time, and that the reviews are documented.

iv. Initial Coordination - Prior to finalizing the QMP, TxDOT and the Team will work together to form a mutual understanding of the Plan's details, including the forms for recording the QC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of the Team's management and control with TxDOT's quality expectations. There may be occasions for subsequent conferences

to reconfirm mutual understandings and/or to address deficiencies in the QC system or procedures that may require corrective action by the Team.

v. Acceptance of Quality Management Plan - TxDOT will approve the QMP prepared for each Facility as part of the Facility Agreement. Prior to acceptance of the Facility-specific QMP, the Team will meet with TxDOT and review the plan for the following:

- Forms to be used to document QC activities,
- Control activities,
- Testing,
- System administration, and
- Coordination with client QA activities.

Review of the Plan will be an ongoing process throughout the duration of the CDA and may be modified with mutual agreement from time to time.

vi. Modification of Quality Management Plan - The Team will submit written notification via a serial letter to TxDOT regarding addenda or modifications to the Project QMP for approval or disapproval. The notification will be submitted at least seven days prior to implementation of any proposed change, and implementation will not occur without TxDOT approval.

vii. Approach - Quality procedures are applied to each anticipated function: investigation, analysis, design, construction and O&M. To clarify the steps and requirements of the work, flow paths are utilized to identify prerequisites, tasks and standards for completions of quality work.

The Facility QA/QC process details goals, functions, and procedures for providing a work product of high quality. Properly applied, the quality system should complement the work sequence in achieving the final end product. How the Team's QA/QC system "feathers-in" with other efforts is demonstrated by the following typical sequence of activities during CDA execution.

1. The Project Manager notifies the Quality Manager (QM) that a kick-off or preliminary meeting is planned for a new Facility and that Task Specific Quality Managers (TSQMs) will need to be assigned. A list of tasks and potential candidates for each TSQM is presented.
2. The QM ascertains any potential conflicts of interest of the potential candidates such that impartiality of the QC process could be compromised.
3. Through sufficient review, the appropriate TSQMs are chosen.
4. Prior to the Preliminary meeting, each TSQM is responsible for reviewing the Facility and, through discussions with the Project Manager, identify applicable standards or specifications, and determine anticipated QC requirements and procedures.
5. The QM and TSQMs attend preliminary or "kick-off" meeting with Project Manager and the rest of the Facility Team during which goals, tasks and strategies are identified.
6. For each identified task, the QMP process is applied to answer questions regarding quality. This will likely occur in smaller, individual meetings involving separate disciplines. The Project Manager (or designee) attends each of these meetings.
7. The questions "How do you know?" or "How can you be certain?" are asked to ascertain points and degree of required QC. Through this process, the list of items and actions requiring QC is refined. Through the QMP process, the appropriate level of QC is determined for the various stages of a work sequence.
8. During initial phase meetings, levels of required workmanship is communicated to each member of the Facility Team. Descriptions of how the QC staff will conduct QC functions are explained such that expectations and responsibilities of each Facility Team member (including QC staff) are clearly communicated. Possible repercussions of nonconformance are identified, including work stoppage if necessary.

The QC system, if properly implemented, should not encumber work by adding layers of managerial requirements, but rather provide a means to ensure work of high quality by fulfilling a fundamental role of protection in the overall execution of a project.

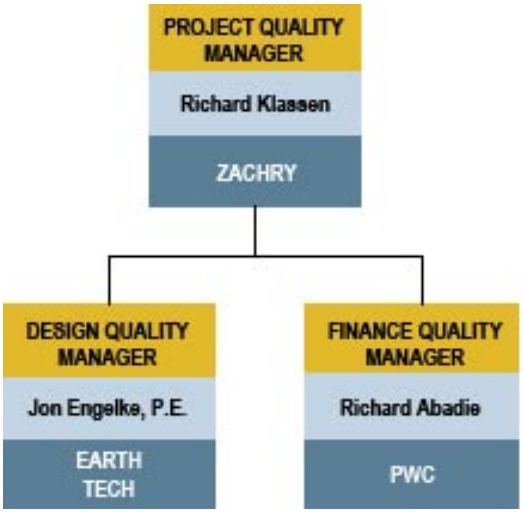
4.3.4.B Quality Program Organizations

The Team QMP stresses clearly defined objectives, well-documented procedures, and management support for its effectiveness. These objectives and procedures are communicated to the Team's managers and appointed quality managers through various in-house meetings in which the elements of the QMP are discussed in detail.

The Facility-specific quality requirements will be communicated to the staff during a meeting prior to project inception, and reinforced during all meetings. All work shall be covered by a quality plan and the staff will be required to read and understand it before work begins.

Personnel with appropriate training and authority will develop, refine and implement our quality systems. Senior management emphasizes its commitment to quality, the responsibilities and authorities inherent in all positions throughout the Team, and the importance of quality to the success of the CDA.

i. Quality Management Organization and Reporting Relationships - Cintra and Zachry, as the equity partners, will be ultimately responsible for TTC-35 quality. As such, the TTC-35 quality program manager, Richard Klassen, is employed by Zachry. Each major participant has also identified a quality manager who will be responsible for their firm's and their subconsultant's quality. Resumes for these individuals are included in the Appendix. The following quality organization chart shows already identified quality managers and their reporting relationships.



ii. Quality Management Responsibilities - Responsibilities of the quality managers are established to ensure that all quality functions meet the intended objectives of the Facility and support TxDOT's goals and policies regarding quality of services. Specific responsibilities can be categorized according to the following functional areas:

- Establishment of QA/QC goals and objectives;
- Establishment and approval of QA/QC implementation methodologies, procedures and acceptance criteria;
- Performance of QA duties to ensure the QC Program is being properly implemented;
- Implementation of a QA/QC record keeping system;
- Approval of QC procedures, methodologies, acceptance criteria;
- Review/approval of proposed changes to the Quality Management Plan;
- Authority to stop work if deemed necessary when conditions exist that are detrimental to quality;
- Certification that the Quality Management Plan is established and implemented according to applicable contract requirements;
- Certification that deliverables meet all contract requirements;
- Review and approval of quality program implementation by sub-tiered firms;
- Delegation of responsibilities to qualified personnel.

4.3.4.C Quality Management Interrelationships

The quality planning, control, and assurance described in previous sections permeate and apply to on all aspects of the TTC-35 CDA. The following table gives a limited number of examples of how quality management relates to the major CDA tasks.

CDA Task	Quality Planning	Quality Control	Quality Assurance
Project Management	• Establish requirements for invoices, meeting notes and progress reports • Create checklists for the above items	• Monitor deliverables to determine if project management items are meeting the established quality standards	• Senior management review of Project Manager performance as related to quality
Planning	• Verify criteria for selecting Facilities • Identify data sources to be used • Verify preliminary design criteria • Create checklists for schematic submittals	• Monitor specific submittals to determine if they are meeting the standards • Ensure checklists are utilized	• Evaluation of quality control issues to ensure planning tasks are fulfilling identified needs
Design	• Verify detailed design criteria • Establish components of design submittals · • Establish design file structure • Create checklists for each submittal type	• Complete all checklists for each submittal • Ensure checklists are returned to the producer	• Executive review and analysis of design quality, based on checklists and TxDOT comments
Construction	• Verify all construction specifications • Verify inspection procedures • Establish pre-inspection checklists	• Ensure field personnel are utilizing the established checklists • Identify ways to mitigate risk	• Review and reporting of construction success and failures • Develop lessons learned
Operation & Maintenance	• Establish maintenance criteria • Establish acceptable user quality of service criteria • Develop emergency procedures • Create roadway maintenance checklists • Create toll collection system checklists	• Review checklists for patterns of poor service • Establish ways to eliminate causes of poor service • Review emergency responses	• Evaluation of operation and maintenance results analysis • Report on emergency actions • Develop improvement reports

CDA Task	Quality Planning	Quality Control	Quality Assurance
Finance	• Establish required documentation for any potential bonding • Create checklists for required financial reporting	• Ensure checklists are completed prior to submittal of documents	• Senior management review of performance to provide required financing
Environmental Compliance	• Establish documentation required for environmental mitigation tracking • Create checklists for environmental compliance documentation	• Ensure documents are permanently filed with environmental documentation	• Oversight of environmental commitments, successes and failures • Develop lessons learned
Public Involvement	• Establish requirements for documents to be produced by the Team in support of TxDOT's public involvement process • Create checklists for each type submittal (e.g. schematics for public meetings)	• Complete all checklists for each submittal	• Review quality / acceptance of submittals by the public • Verify / revise quality standards utilized
Safety	• Verify roadway design criteria • Develop emergency procedures • Establish frequency of Facility safety checks during operation • Create checklists of safety issues for field personnel	• Fill out all design checklists · Review emergency responses • During operation, complete and appropriately file each safety check	• Report on emergency actions • Evaluation and presentation of safety record of Facilities

4.3.4.D Quality Studies and Analysis

The Team's Quality Manager will periodically review the quality control results, checklists, comments and their disposition, and summarize the results for use by the Team and TxDOT. The Quality Manager will help develop lessons learned for use by TxDOT and the Team to modify procedures during the CDA.

A Quality Assurance Report will be produced on a quarterly, or as required, basis. This report will discuss the following:

- Progress report
- Schedule analysis
- Tasks at risk
- Risk resolution strategy
- Previous risks resolved

As time will usually be of paramount importance during the CDA, formal Monte Carlo simulations will be completed on detailed schedules as part of the review process.

4.3.4.E Submittal Review

Each activity to be completed for the CDA has a quality component. It is anticipated that most activities of the CDA will be completed on a "fast-track" or expedited schedule. The disadvantage of accelerating an activity schedule is the risk of "short-cuts" that can negatively impact quality. Therefore, it is imperative that the detailed quality control process is in place for each task. This quality control process need not add excessive time to the activity duration when the activity is properly planned and scheduled. All involved must "buy-in" to the process, and allow sufficient time for the work production and quality process to be successful.

i. Responsibilities - The Quality Control Manager (QCM) is responsible for ensuring the proper control of documents and submittals to TxDOT and other government agencies in the execution of the CDA. The QCM has sign-off authority and is responsible for filling out the QC Reports.

ii. Basic Requirements - There are three main requirements of the QMP: preparatory, execution and recording. The Team and TxDOT will jointly establish and maintain procedures for identifying, preparing, reviewing, approving, revising, collecting, indexing, filing, storing, maintaining, retrieving, distributing, and disposing of pertinent quality documentation and records. Such procedures will be applicable to all forms of documents and records, including print and electronic media.

Documents requiring control will be identified in each Facility-specific QC Plan. Documents, including revisions, will be reviewed by the QCM for conformance with technical requirements and quality process requirements. Approved documents are released by authorized personnel. Documents used to perform design work (e.g., design manuals and software) will be identified and kept current for use by personnel performing the work. Measures will be taken to ensure that users understand the documents to be used. Obsolete or superseded documents will be identified and not used. The QCM will ensure users remove these documents from the official document repositories.

Sufficient records will be specified, prepared, reviewed, authenticated, and maintained by the QCM to reflect the achievement of the required quality for completed work and/or to fulfill any statutory requirements. The maintenance of records will include provisions for retention, protection, preservation, traceability and retrievability.

iii. Submittals - QC procedures for certifying submittals to TxDOT for any phase of work will be instituted as part of the QC Plan development process. This process includes the Preparatory Phase, Initial Phase, and Follow-up Phase. The QC activities will cover all submittals from the Team as well as submittals for subcontractors, suppliers and off-site fabricators. The QCM will submit a QC Report form to the designated TxDOT representative. The submittals may include reports, drawings, shop drawings and material, equipment and testing plans. Procedures will specify QC checks necessary to assure conformance with CDA requirements. The QC checks will be performed by the QCM or appointed member of QC staff. Scheduling and review of submittals will be coordinated between project management and QC personnel.

Document Register. A Document Register will be prepared for each technical discipline. Information sufficient to clearly portray contents, author, purpose and date will be included.

Initial Submittals. Submittal and approval of each document will undergo the QC procedure listed below. The procedure will be coordinated through a secure Facility Internet site. The individual responsible for implementing QC functions will have suitable experience and knowledge of the process for proper review of the document. The general procedure for submittals will be as follows:

1. Each initial submittal will be noted as a "Draft" document and is to have a Quality Control Transmittal Form attached. This form identifies the document undergoing QC, the technical reviewer performing the QC function, and each item requiring attention. This form is also used to transmit shop drawings, equipment data, material samples or manufacturer's certificates of compliance.
2. When making edits to the document under review, the technical reviewer will make edits in red ink, or if

reviewing the document electronically, track changes mode shall be used.

3. Once all edits have been made and the initial QC procedure is complete, the individual responsible for implementation of QC shall sign off on the document being reviewed as the checker of record with the date. The technical reviewer shall also complete appropriate sections of QC Form.
4. Once the document has been reviewed, signed, and dated, the technical reviewer shall return the review document and QC Form to the author or project manager.
5. Upon receipt of the reviewed document, the author or project manager shall acknowledge those items of nonconformance with which he/she agrees need corrective measures. For disputed items of nonconformance that cannot immediately be resolved, the author is responsible for resolving the differences. The technical reviewer must concur with the resolution of the disputed item by signing the appropriate item of the QC Form or requiring a subsequent QC review.
6. The author shall keep any hardcopy of documents upon which QC comments were made for ultimate insertion to the project file.

iv. Request for Information/Clarification - If the Team requires additional information or clarification from TxDOT, a Request for Information/Clarification form will be submitted to TxDOT. A Request for Information/Clarification log will be used to track information requests.

v. Change Orders - A Change Order will be submitted to TxDOT via serial letter when a change to the contract is required or desired.

vi. Serial Letters - Serial letters are to be used for correspondence between the Team and TxDOT when appropriate. The project manager will log all serial letters and track their responses.

vii. Procurement of Materials and Services - The procurement of purchased items and services that directly affect the quality of project activities will be planned and controlled to ensure that the quality of the items and services is known, documented, and meets the technical requirements and acceptance criteria.

Procurement documents (e.g., purchase orders, services agreements) will contain information clearly describing the item or service needed and the associated technical and quality requirements, and how the supplier's conformance to the requirements will be verified. Each supplier will have a demonstrated capability to furnish items and services that meet all requirements specified in the procurement documents. Manufacturer's QC processes will be reviewed by the QCM to ensure optimum quality products are delivered for use on TTC-35.

4.3.4.F Evaluations and Documentation

As described previously, the checklists, comments and their disposition will form the basis for quality documentation. The final checklists for each phased submittal will be delivered "up-the-chain" of the Team's organization chart with each submittal. Each firm will retain all comment and disposition forms for each submittal during the completion of the task. At the conclusion of each major work product, electronic versions of all checklists, comments and dispositions will be submitted to the Team's Quality Manager.

The Team's Quality Manager will review all checklists, comments and dispositions to evaluate where improvements may be made to the work products. This review and analysis will be included in the quarterly Quality Assurance Report.

For the life of the CDA, the Team will retain these electronic quality documents, and all quality assurance reports. The most likely cause to need these documents will be an environmental-related lawsuit. Therefore, it is most important to retain all environmental compliance documentation throughout the CDA.

4.3.4.G Reporting Relationships

Each firm within the Team will be responsible for its own QC process. Each firm will submit a signed checklist, along with their deliverable, to the next higher firm on the Team organization chart. The person who completes the checklist will be a peer, or higher, to those who produce

the product, and will not have been involved with the preparation of the product. The firm's quality manager, who will have reviewed the previously completed comments and dispositions for the work product, will also sign the checklist. The Team's Quality Manager will complete periodic reviews of the performance of the QMP and produce quality assurance and improvement reports.