

CHAPTER 16 – QUALITY ASSURANCE AND QUALITY CONTROL

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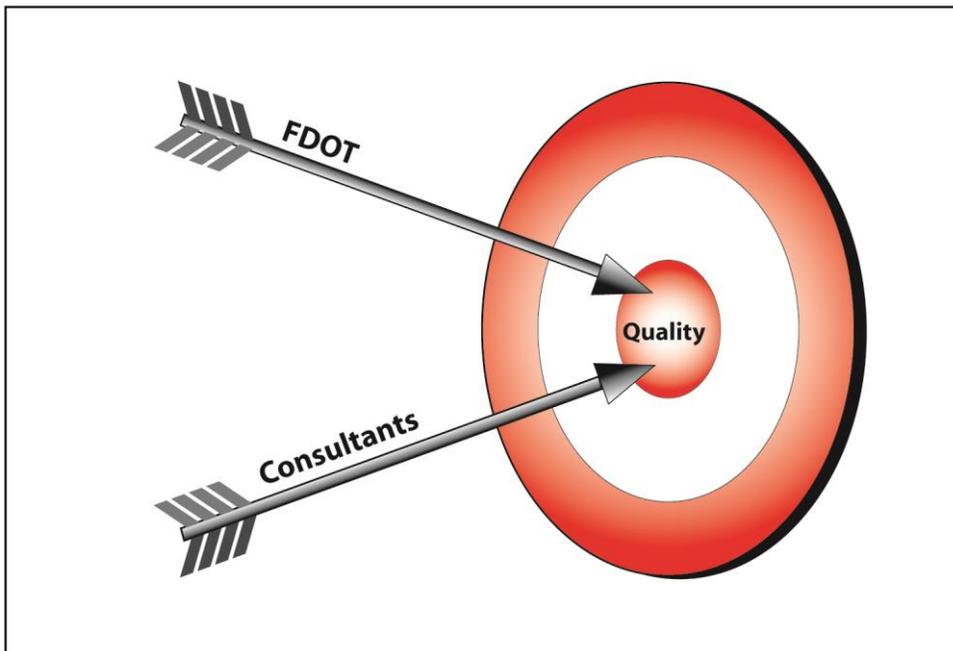
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Introduction

Quality Assurance (QA) and Quality Control (QC) are processes used to ensure project deliverables meet project objectives and are of appropriate quality. Perfection is difficult to achieve and the cost of a perfect product would be prohibitive. However, defined standards must be met on Florida Department of Transportation (FDOT) projects. Quality frequently comes into conflict with the schedule. The Project Manager (PM) is responsible for meeting both quality and schedule objectives. Poor quality work should not be accepted just to meet a schedule.

The FDOT PM and consultant PM use the terms “QA” and “QC” somewhat differently. However, as Figure 1, **Quality Assurance & Quality Control Target** illustrates, both the FDOT and consultants target quality in project delivery.

Figure 1
Quality Assurance & Quality Control Target



FDOT QA and QC

Two distinct processes, QA and QC, are used by the FDOT to ensure that the public receives a quality product. The Central Office is the responsibility for, and performs QA. District Offices and as appropriate their agents (consultants) are responsible for and perform QC. Each district has a QC plan, at least for design. For design projects, specific QA/QC requirements can be found in Chapter 18 of ***Procedure No. 625-000-007, [Plans Preparation Manual \(PPM\), Volume I](#)***. For construction projects, QA/QC is detailed in Section 3.2 of ***Procedure No. 700-000-000, [Construction Project Administration Manual \(CPAM\)](#)***. Another construction-related reference is the ***[Statewide Construction Quality Assurance/Quality Control \(QA/QC\) Plan](#)***.

Two important parts of any FDOT PM's QC responsibility are (1) ensure the consultant's QA/QC plan is being followed adequately and (2) review project deliverables to ensure they are of appropriate quality. The FDOT PM should meet with the consultant PM early in the project to reach a common understanding of QA/QC methodologies to be used and submittal requirements. The FDOT PM should check the consultant's QA/QC actions by visiting the consultant's office and reviewing the QC documentation. There should be a record of all QA/QC activities. Marked-up copies of reviewed reports and plans should be on file. The consultant's project schedule should allow adequate time for QC reviews. If possible, the FDOT PM should schedule an office visit to observe a QC review as it is taking place. The FDOT PM must ensure the individuals identified in the project QA/QC plan are actually performing assigned QA/QC tasks. Another control technique is to require documentation of QC activities accompany submittals. Documentation could include completed checklists, certifications or the reviewers' marked-up copy of the reviewed document itself. In some districts, many of the actions discussed above are formalized in a formal QC audit process.

Traditionally, FDOT reviews of formal submittals have been the focus of QC for consultant projects. However, when the FDOT Project Manager and technical team members take the proactive approach of reviewing work in progress, the result is usually higher quality submittals. Problems can be identified and solutions worked out before submittals. The review team also will have a better understanding of major issues and what to expect in the submittal.

The FDOT PM should have a clear understanding of the objectives of project submittal reviews. The consultant is responsible for conducting QC reviews before every submittal.

Every FDOT district uses the Electronic Review Comment (ERC) system for review of submittals. Information about the ERC system is available at ***[FDOT Electronic Review Comment System \(ERC\)](#)***.

Detailed, in-depth reviews are usually not necessary or desirable and serve to relieve the consultant of some responsibility for the quality of the product. Submittals found to be unacceptable should be returned for re-submittal.

Frequently pressures on the FDOT PM to maintain the project schedule make it difficult to require re-submittals of poor quality work. Poor quality work, however, eventually results in a project delay. Thus, it is usually better to correct the quality problem at the earliest possible date.

Here are some helpful guidelines for reviewing and commenting on consultant submittals:

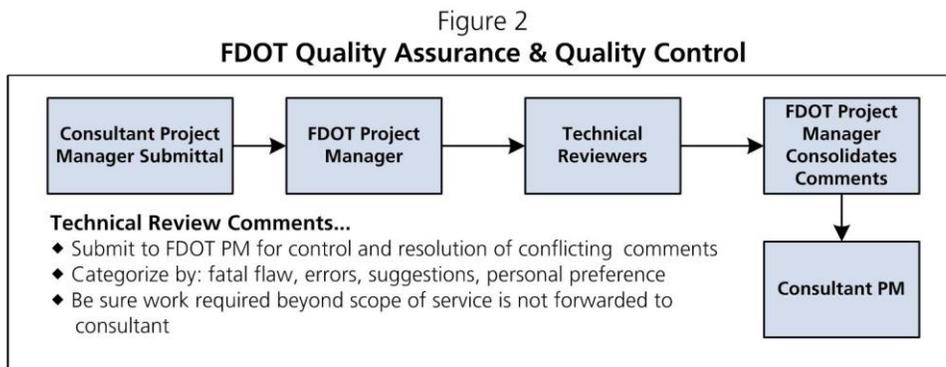
- Make sure what each reviewer needs to see is clear. For instance, in a design submittal, the structures reviewer may want to see only the bridge plans, but the geotechnical group may need the full set. Some reviewers may need to see submittals only at certain stages of a project. Reviewer requirements should be determined prior to the first submittal. A review matrix showing this information may help the FDOT PM manage this process.
- The FDOT PM should distribute copies of the submittal to all appropriate reviewers as quickly as possible. Reviewers' comments should be returned directly to the FDOT PM for control and resolution of conflicting comments.
- Comments should be categorized as fatal flaws, errors, suggestions or personal preferences.
- Generally, a comment requiring work beyond the scope of services should not be forwarded to the consultant before establishing a valid need. Once so determined, the Scope of Work should be revised and a Scope of Services Amendment contract amendment should be processed in accordance with procedures explained in Part I, Chapter 14, of this handbook. In situations where the comment will require a very minor work effort, it may be forwarded with the understanding that the FDOT PM and consultant PM must exercise good judgment in the final resolution.
- Because the consultant is professionally responsible for the work, personal preferences should not be imposed. If personal preference comments are forwarded they should be clearly labeled.

- When submittals are reviewed by a number of FDOT individuals, the FDOT PM should review and consolidate them before transmitting them to the consultant.
- The FDOT PM must return comments within the time frame allowed in the project schedule. Otherwise, the FDOT may delay progress on the project.

Stay Focused on the Important Issues: A study of FDOT reviews of design projects found the average cost of a review comment, taking into account the time of both the FDOT reviewers and the consultant to research and address each comment, to be \$200. Design projects averaged 180 comments per submittal. Clearly the review process is expensive. The same study also investigated a number of Phase 1 and 2 design submittals and determined 50 percent of the comments were editorial in nature, 10 percent related to format, and 40 percent addressed engineering issues. The primary purpose of these submittals should be to resolve engineering issues, yet at least half the cost was expended on comments that were not really important. This same concern applies to all types of projects. FDOT reviewers should focus on the important issues.

Consultant QA and QC

Figure 2, **FDOT Quality Assurance & Quality Control** maps this process.



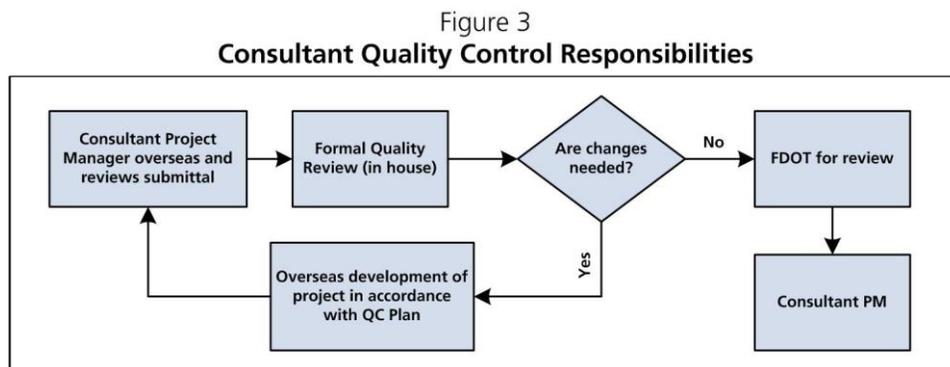
A Consultant firm frequently typically has a firm-wide Quality Assurance and Quality Control (QA/QC) plan that identifies general responsibilities and required actions to assure quality products. However, FDOT requires a consultant to create a project-specific QA/QC plan. A consultant's project QA/QC plan should describe the processes in place to assure QA/QC procedures to be used. Specific individuals to be involved and their responsibilities should be identified. The project QC officer who has responsibility for ensuring that the plan is properly executed should be identified. QC reviewers should not be closely associated with the project and should be at least as experienced as the originators. If qualified reviewers are not available in the consultant firm, then the subcontracting the responsibility should be considered. The plan should

describe how the QC activities will be documented. The submittal review process should be described in detail. The following procedures are typically used:

1. The originator (usually the PM) produces the submittal and should thoroughly check the submittal.
2. The QC reviewer critiques the document, marks up the submittal, and returns it to the originator.
3. The originator reviews the comments and then meets with the reviewer(s) to ensure that the originator's intent and the comments are understood. The originator who accepts professional responsibility for the submittal, either accepts (agrees to make the recommended changes), or rejects each comment.
4. The necessary corrections are made, and the submittal is returned to the reviewer.
5. The reviewer verifies the corrections were properly made, and returns the document to the originator.
6. After final corrections are made, the document is submitted for review to the FDOT.

If done properly, this process is time and labor consuming. It must be properly accounted for in the project schedule, negotiations and budget. Even more important, the process must be followed.

Figure 3, **Consultant Quality Assurance & Quality Control Responsibilities**, maps the QC process.



Project Phases

The following discussion is based on the services being performed by professional services consultants, QA/QC requirements for which are typically included in the associated Scopes of Services. Each project phase has different QA/QC issues. QA/QC requirements for various deliverables are addressed in applicable procedures and manuals.

Planning: Although the FDOT does not have specific requirements for planning projects, QA/QC are important activities. All submittals for planning projects should be subjected to a peer review in the same manner previous described. Common quality issues are data collection, study methodology, assurance that report conclusions and recommendations are supported by study findings and quality of the writing.

Project Development and Environment (PD&E): For PD&E project quality issues are similar to those for planning projects. A QC activity is included in the scope of services and staff hours for all Consultant PD&E projects. While there is no formal FDOT QC process in PD&E, QC is required for all formal submittals and materials for public meetings and hearings. In many Districts, the consultant is required to provide the Department with a QC plan at the beginning of a project.

Design: For design projects, QA/QC is generally a well-defined process. Usually the QA/QC plan is the first deliverable for a consultant design project. The consultant PM should review Chapter 18 of **PPM, Volume I** before preparing the QA/QC plan to ensure all requirements are met. The plan should be unique to the project, not “off the shelf.” Each project has its own technical issues, scope, schedule and team, all of which should be accounted for in the plan. Work of subconsultants should be addressed in the plan. Good design quality control requires several reviewers who represent all technical skills involved. Technical skill areas may include highway design, drainage, traffic and maintenance of traffic, structures and constructability.

Right of Way (R/W): District R/W Offices have Core Process Measures and QC Plans in place in order to ensure compliance with laws, rules, procedures, and regulations related to R/W projects. The Office of R/W monitors these measures and plans (QA) to assure consistency with statewide requirements, determine the effectiveness of the districts quality control plans, and to make adjustments in the processes as necessary to maintain high levels of quality performance in providing right of way necessary for Construction. All functional areas of R/W are involved including Appraisal, Acquisition, Relocation Assistance, Property Management, Funds Management and Work Program. Consultants may be used for some of these functional areas, with the district offices being responsible for hiring consultants who are experienced, technically competent, and have adequate quality control measures in place to provide adequate work products.

Construction: For construction projects, the contractor has specific responsibilities, defined in the Standard Specifications. QC is also a primary responsibility of the Construction Engineering and Inspection (CEI) consultant who monitors and evaluates the contractor’s product and performance. The FDOT Construction Project Manager (CPM) must ensure the CEI adequately performs its responsibilities and the Central Office performs QA reviews, as prescribed in the **Statewide Construction QA/QC Plan**. Specific QC requirements are detailed in Section 3.2 of the **CPAM**. The CEI consultant should have an internal QA/QC plan which addresses the following: (1) CEI

operating procedures, (2) sufficient staff to ensure adequate inspection coverage, (3) checks to ensure that inspectors are performing properly, and (4) internal quality reviews of records and office procedures. The CEI's objective should be to find and correct performance problems before issues come to the attention of the FDOT CPM.

Maintenance: To ensure the quality of maintenance projects and compliance with FDOT procedures, QA/QC processes should be in place. QA/QC processes include adequate inspection of the work and sufficient documentation to ensure compliance with contract specifications. Asset Management contracts should comply with the ***Asset Management Monitoring Plan***, available on the [Maintenance Office](#) website.