

# **Quality Assurance/Quality Control Plan**



## **Delaware Department of Transportation**

**Division of Transportation Solutions**

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## **Mission Statement**

The Mission of the State of Delaware's Department of Transportation is to provide a safe, efficient, and environmentally sensitive transportation network that offers a variety of convenient, and cost-effective choices for the movement of people and goods.

## **General Policy**

It is the intent of the Division of Transportation Solutions (DOTS) to meet the requirements of the Department's Mission Statement on every project that is developed throughout the Division. To do so, this Quality Assurance/Quality Control (QA/QC) Plan has been developed.

Completion of a successful project requires good planning, coordination and thorough reviews of all documents. This QA/QC Plan focuses on the plan development portion of a project and has been developed to ensure that every project developed and executed through DOTS meets the level of quality required by the public. The policies and procedures in this QA/QC Plan apply to all projects within DOTS, hopefully resulting in a continuously improving consistency and quality throughout the Division.

Consultants typically have their own QA/QC plan and in many cases have customized them for the states in which they work. Each consultant should develop a QA/QC plan specific for DelDOT use. The QA/QC should incorporate any and all DelDOT checklists. The Consultant QA/QC plan shall be reviewed with and mutually agreed upon with DelDOT's Project Manager prior to the start of each project.

This plan requires that technical reviews be completed on every project. Additionally, supporting documentation, including reports and calculations must be reviewed by experts in specific areas of technical expertise. The [Plan Development Process](#), which can be found on [DelDOT's website](#), under [Doing Business](#), Design Resource Center ([DRC](#)), spells out the steps from start to finish. This process is to be followed in conjunction with this QA/QC Plan to produce a quality project.

The Design Resource Center ([DRC](#)) shall be visited periodically for up-to-date information regarding references, model plans, CADD Standards, design guidance, manuals, and checklists.

DelDOT's Project Manager should store electronic copies of the plan sets, special provisions, reports, calculations, completed checklists and the Review Comment Response Spreadsheet on the Department's shared server in the appropriate project directory. Many of the distributions can be accomplished electronically by sending notification of the distribution including a link to the project directory.

## **QA/QC Responsibilities**

### *Project Designer*

The Project Designer is DelDOT's engineer, technician or design consultant assigned to the project. The Project Designer's main role is to perform the project design, prepare reports, complete design calculations, and develop the Plans, Specifications and Estimate (PS&E).

The Project Designer shall address all comments that are generated from the technical review of the submittals. This includes providing responses in writing to the reviewers.

The Project Designer is responsible for alerting DelDOT's Project Manager of issues that may affect the project schedule, as they develop.

### *DelDOT's Project Manager (DelDOT's PM)*

DelDOT's PM is the Project Designer's supervisor on in-house projects. On consultant designed projects, DelDOT's PM administers the Consultant agreements for that project. DelDOT's PM's role is to ensure that the scope of the project meets the needs of the project location, the contract bid documents meet the needs of the scope, and the Project Designer's work is accurate and on schedule.

DelDOT's PM has the ultimate responsibility for the project and should review all plan sets, calculations and reports prior to Department-wide submissions. This review is critical to ensure the project is on target and to reduce careless errors. DelDOT's PM should ensure that all information is submitted at the appropriate submission stages. It is his/her responsibility to ensure that all elements of the project have received a thorough review prior to the PS&E submission.

### *Consultant Project Manager (Consultant's PM)*

The Consultant's PM is responsible for overseeing the project design, development of reports, all design calculations, the specifications and estimate.

The Consultant's PM must execute their QA/QC plan, insure internal peer reviews are completed on all documents, maintain the project schedule, and check all calculations prior to submission to DelDOT's PM.

The Consultant's PM shall review all invoices directly prior to submission to DelDOT for payment to assure accuracy and consistency with the progress report.

When issues arise during the life of the project, the Consultant's PM shall provide options and recommendations to the DelDOT's PM. DelDOT resources, such as support sections maybe consulted as necessary. DelDOT's PM will be responsible for providing the final decision.

The Consultant's PM shall include a line item in all proposals for quality review. If they choose to include this activity under the overhead item, they should still include proposed man-hours for the review in the proposal as a no cost item.

### Support Sections

The support sections include Environmental Studies, Materials and Research, Quality, Real Estate, Team Support, Traffic, and Utilities. These support sections have important roles in the plan development process and coordination with these sections is critical to keep the project on schedule and to ensure that the expected level of quality is met. The support sections should coordinate with DeIDOT's PM when questions arise as the project develops.

### **QA/QC Plan Execution**

The execution of the QA/QC plan relies heavily on the thorough review of all project-related documents. These documents are submitted to DeIDOT's PM for review prior to department-wide distribution at the appropriate plan submission milestone and include plans, estimates, special provisions, reports, calculations and completed checklists. These documents are identified at the beginning of the [Plan Submission Checklist](#), Appendix A. The Plan Submission Checklist shall be completed and reviewed prior to each plan submission.

Completed DeIDOT checklists used during review of the plans to verify content and accuracy shall be included with each plan submission to DeIDOT's PM. These checklists shall be signed and dated by the Engineer performing the review.

Each project shall have a Design Document Binder or folder that contains the following at a minimum: completed Design Criteria Form, Design Control Checklist, Design Exception Requests, a chart containing any significant design decisions not included in the first three items, drainage calculations, quantity calculations, project reports, the Plan Submission Checklist, the Right-of-Way Checklist, the Stormwater Checklists, etc. The Design Criteria Form, Design Control Checklist and Design Exception Request can be found in Chapter 3 of DeIDOT's [Road Design Manual](#).

All final documents from Consultant design projects, including all of the documentation in the Design Document Binder should be submitted to DeIDOT in hard copy and electronic form at the PS&E stage. If they have been previously submitted as final, they do not need to be submitted again. The Consultant shall also retain these documents for 1 year after completion of final audit for state funded projects and for 3 years and after completion of final audit for federally funded projects, as per DeIDOT's Agency Records Retention Schedule. The Consultant should coordinate with DeIDOT's PM before disposing their files.

Records of internal reviews including marked up plans and checklists shall be retained by the Project Designer at least until the project construction is completed and is accepted by DeIDOT. DeIDOT reserves the option to request these documents at any time.

By the semi-final plan submission the following must be submitted to DeIDOT's PM: a current detailed cost estimate with quantity calculations, all required reports (such as drainage calculations, stormwater report, hydraulic and hydrology reports, geotechnical/foundation reports, etc.) and all preliminary special provisions. Once DeIDOT's PM has completed a review, he or she will make them available or distribute as

needed. DeIDOT's PM should submit all of the calculations to the Quality Section for review or make them available on the shared server along with the semi-final plans.

### Plan Sets

Plan sets, calculations, reports, and checklists should be submitted to DeIDOT's PM at least one month prior to each milestone submission date for review. DeIDOT's PM should forward comments to the Project Designer who shall address these comments before the Department-wide distribution. The sections receiving plan sets should review and forward comments to DeIDOT's PM on or before the specified deadline.

The Project Designer should tabulate all comments received on the [Review Comment Response Spreadsheet](#) in Appendix D. This spreadsheet shows the comments received and the action taken. The spreadsheet with the comments and actions taken should be distributed with subsequent plan submissions.

### Special Provisions

Special Provisions should be submitted to DeIDOT's PM at least one month prior to the semi-final construction plans submission date. Upon review, DeIDOT's PM should forward comments to the Project Designer. The updated Special Provisions should then be distributed with the semi-final construction plans as spelled out in the Plan Distribution List. This distribution can be accomplished electronically by placing them in the shared directory and sending notification of the distribution with the semi-final plans.

### Reports

Reports are an important part of the project development process. They should be well written and organized so they can be easily understood many years after the project has been completed. It is possible that these reports could be used in future litigations. Therefore, they should detail all of the assumptions made during the development of the report and the reason why they were made. Draft reports should be submitted to the DeIDOT's PM at least one month prior to the plan submission date as identified in the Plan Submission Checklist. After DeIDOT's PM's comments have been addressed, copies of the report should then be made available in the project's shared directory or distributed as listed below. Notice should be sent out when these reports are placed in the shared directory. The appropriate support sections should then review and provide comments back to DeIDOT's PM. The Designer should tabulate and address the comments using the Review Comment Response Spreadsheet. Copies of the final reports should be distributed electronically or as required below along with the spreadsheet of tabulated comments and responses.

If not available electronically, the distribution of reports should be as follows:

- Stormwater Report - 1 copy for Project Designer, 1 copy for DeIDOT's PM, 2 copies for Stormwater Engineer
- Geotechnical and/or Foundation Report(s) - 1 copy for Project Designer, 1 copy for DeIDOT's PM, 2 copies for Geotechnical Engineer, 1 copy for Quality Section
- Hydrologic and Hydraulic Report - 1 copy for Project Designer, 1 copy for DeIDOT's PM, 2 copies for Stormwater Engineer, 1 copy for Quality Section, 1 copy for Environmental Studies Section (New Castle projects only)
- Type, Size, and Location Report - 1 copy for Project Designer, 1 copy for DeIDOT's PM, 1 copy for Quality Section, 1 copy for Bridge Design Engineer

Calculations:

Calculations should be prepared in a logical manner to ensure that anyone reviewing them can easily understand their contents including the design criteria, any assumptions made and any constraints on the design. Preference shall be for the use of electronic means to develop the calculations but legible hand-written versions are acceptable. All calculations for a project should be tabulated and kept in one notebook.

All calculations shall be checked prior to submission to DelDOT. They should clearly indicate who completed the calculations and who checked them, including the dates the calculations were completed and when they were checked. A Professional Engineer's seal and signature shall be included as required. The final calculation notebook shall be completed and included with the final plan submission.

## Review Process Summary

- Each consultant should develop a QA/QC plan specific for DelDOT use, which incorporates any and all DelDOT checklists. The QA/QC plan shall be reviewed with and mutually agreed upon with DelDOT's Project Manager (DelDOT's PM) prior to the start of each project.
- Consultants shall include a line item in all proposals for quality review. If the consultant chooses to include this activity under the overhead item, they should still include proposed man-hours for the review in the proposal as a no cost item.
- Electronic copies of the plan sets, special provisions, reports, calculations, checklists and the Review Comment Response Spreadsheet should be stored on the Department's shared server in the appropriate project directory. Many of the distributions can be accomplished electronically by sending notification of the distribution including a link to the project directory.
- Completed DelDOT checklists used during review of the plans to verify content and accuracy shall be included with each plan submission to DelDOT's PM. These checklists shall be signed and dated by the Engineer performing the review.
- All calculations shall be checked prior to submission to DelDOT, indicating who completed the calculations and who checked them, including the dates the calculations were completed and when they were checked. A Professional Engineer's seal and signature shall be included as required.
- Each project shall have a Design Document Binder or folder that contains the following at a minimum: completed Design Criteria Form, Design Control Checklist, a chart containing any significant design decisions not included in the first two items, drainage calculations, quantity calculations, project reports, Plan Development Checklist, the Right-of-Way Checklist, Stormwater Checklists, etc.
- A completed [Review Comment Response Spreadsheet](#) shall be included with the semi-final and final plan distributions to indicate how the previous comments were addressed.
- By the semi-final plan submission the following must be submitted to DelDOT's PM; a current detailed cost estimate with quantities, all required reports (such as drainage calculations, stormwater report, hydraulic and hydrology reports, geotechnical/foundation reports, etc.) and all preliminary special provisions. DelDOT's PM will make them available or distribute as needed.
- When issues arise during the life of the project, the Consultant's PM shall provide options and recommendations to DelDOT's PM. DelDOT resources, such as support sections maybe consulted as necessary. DelDOT's PM will be responsible for providing the final decision.
- All final documents from the project, including everything in the Design Document Binder should be submitted to DelDOT in hard copy and electronic form at the PS&E stage. If they have been previously submitted as final, they do not need to be submitted again. The Consultant shall also retain these documents for 1 year after completion of final audit for state funded projects and for 3 years and after completion of final audit for federally funded projects, as per DelDOT's Agency Records Retention Schedule. The Consultant should coordinate with DelDOT's PM before disposing their files.
- Records of internal reviews including marked up plans and checklists shall be retained at least until the project is completed and is accepted by DelDOT. DelDOT reserves the option to request to review these documents at any time.

- The Consultant's PM shall review all invoices directly prior to submission to DeIDOT for payment to assure accuracy and consistency with progress report.
- The Design Resource Center ([DRC](#)) shall be visited periodically for up-to-date information regarding references, model plans, CADD Standards, design guidance, manuals, and checklists.

## **Appendix A – Plan Submission Checklist**

Visit the following link:

[http://www.deldot.gov/information/business/drc/pd\\_files/plan\\_development/plan\\_submission\\_checklist.pdf](http://www.deldot.gov/information/business/drc/pd_files/plan_development/plan_submission_checklist.pdf)

## **Appendix B – Right-of-Way Checklist**

Visit the following link:

[http://www.deldot.gov/information/business/drc/pd\\_files/plan\\_development/right\\_of\\_way\\_plan\\_checklist\\_\(R04-26-2007\).pdf](http://www.deldot.gov/information/business/drc/pd_files/plan_development/right_of_way_plan_checklist_(R04-26-2007).pdf)

**Appendix C** – Sediment and Stormwater Management Project Design & Review  
Checklist

Visit the following link:

[http://www.deldot.gov/information/pubs\\_forms/manuals/es2m/pdf/1-  
proj\\_design\\_review\\_cklst.pdf](http://www.deldot.gov/information/pubs_forms/manuals/es2m/pdf/1-proj_design_review_cklst.pdf)

**Appendix D** – Review Comment Response Spreadsheet

Visit the following link:

[http://www.deldot.gov/information/business/drc/forms/comment\\_form.xls](http://www.deldot.gov/information/business/drc/forms/comment_form.xls)

**Appendix E - Report Cover Sheet**