

111 Final Engineering Design Process

111.1 General

The final engineering design process follows the initial engineering design process and review. The primary objective of the final engineering design phase is to prepare contract plans and specifications that can be used to bid and construct the project with a minimum number of field changes, delays, and cost overruns.

Modification for Non-Conventional Projects:

Delete the above paragraph and replace with the following:

The primary objective of the final engineering design phase is to prepare contract plans and specifications sufficient to construct the project.

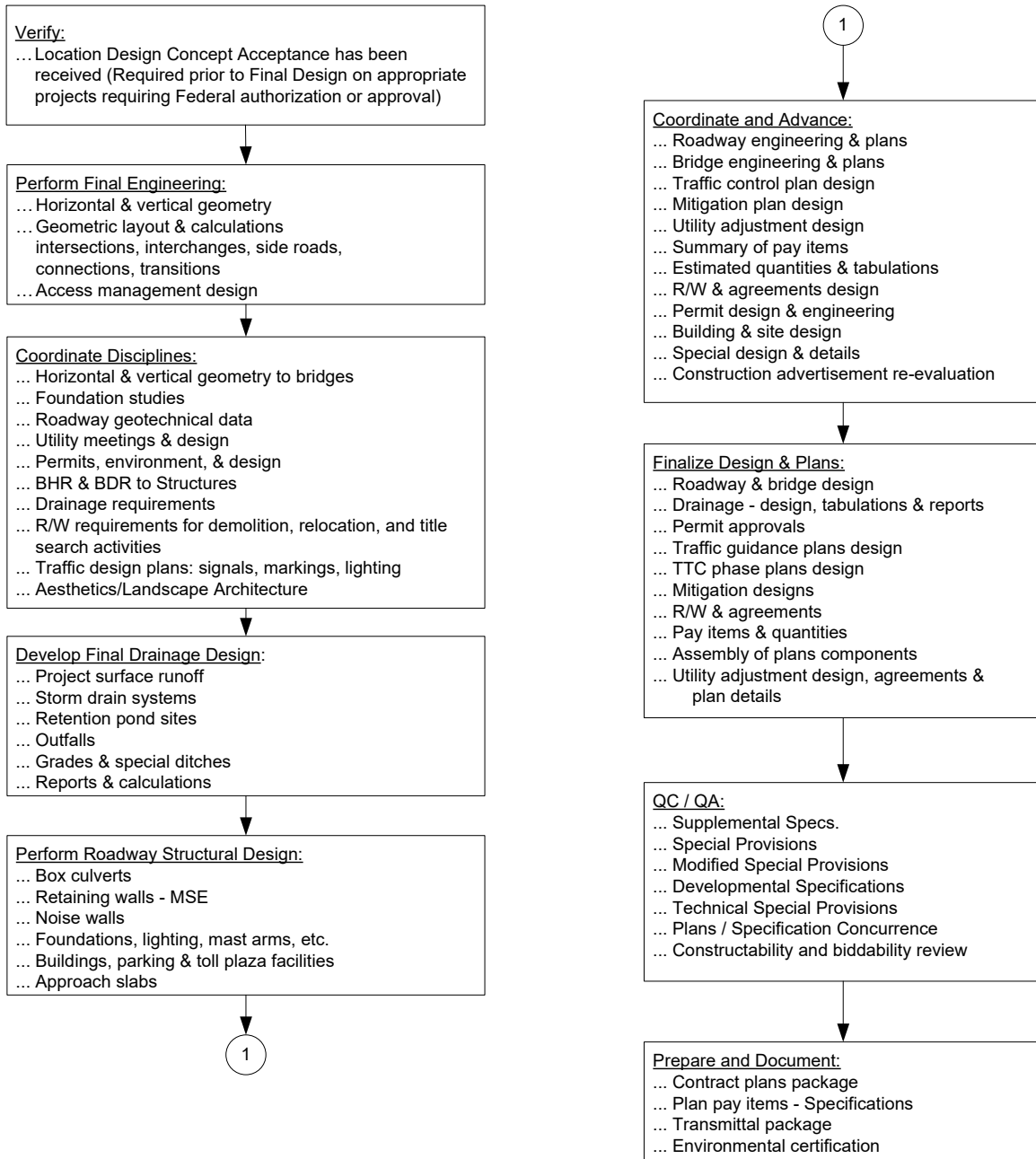
On projects requiring Federal authorization where the Design Phase and the PD&E Phase overlap, the Department must receive Location Design Concept Acceptance (LDCA), prior to acceptance of the Phase II submittal (prior to advancing into Final Design). To advance past Phase II coordinate with the Environmental Management Office who will work with FHWA (see **Part 1, Chapter 4** of the [PD&E Manual](#)). The Design Project Manager must coordinate with the PD&E Project Manager, and the District Environmental Management Office to ensure that that the Department has received LDCA for the project. The Design Project Manager will need to convey this information to the district federal aid staff in the District Work Program Office. (See the [Project Management Handbook, Part 2, Chapter 3](#)). **Figure 111.1.1** shows the major activities included in the final engineering design process.

Modification for Non-Conventional Projects:

Delete the first two sentences of the above paragraph and replace with the following:

On projects requiring Federal authorization where the Design Phase and the PD&E Phase overlap, the Department must receive Location Design Concept Acceptance (LDCA), prior to finalizing the RFP.

Figure 111.1.1 Major Activities – Final Engineering Design Process



111.2 Final Engineering Design

The Engineer of Record (EOR) and Design Project Manager must coordinate all activities to ensure that the quality, accuracy, and appropriate decisions go into the performance of each step. The project quality control should include a plan-do-check routine for each set of activities or operations.

The major design activities include, but are not limited to, the following:

- (1) Pavement design
- (2) Drainage design
- (3) Structural (bridge) design
- (4) Structural (roadway) design
- (5) Roadway design including access management, earthwork, selective clearing and grubbing, geometrics, ADA
- (6) Traffic plans design including signing, marking, signals, lighting
- (7) Utility adjustment design
- (8) Permit preparation design including ponds, mitigation
- (9) Traffic control plans (work zone) design
- (10) R/W requirements design
- (11) Building and site design including landscaping, ADA, transit
- (12) Estimates and Quantities preparation
- (13) Specifications and special provisions
- (14) Landscape design including accommodating existing and proposed vegetation.
- (15) Noise barrier design

Modification for Non-Conventional Projects:
Delete item 12 above.

111.2.1 Work Program Administration (WPA) System

Project stationing information is to be checked and entered into the Work Program Administration (WPA) system during final engineering design. This information is

important for tying construction records, such as material coring, sampling and testing to other databases. The information is entered by stations, which are related to roadway mile post for later information retrieval.

The EOR is responsible for finalizing the project stationing. The District Design Engineer should designate an individual to be responsible for coordinating the input of stationing information into the WPA system.

The begin and end stations, and station equations are entered into the WP50 computer screen under FM on the FDOT CL/SUPERSESSSION Main Menu for each WPA location. After logging onto SUPERSESS, the WP50 designees enter on FM (Financial Management System). On the FM Main Menu, press ENTER: 3 for WPA (Work Program Administration). On WPA Main Menu, press ENTER: 25 for WP50 (Station Definition).

Update access to WP50 screen is granted through the Work Program Development Office in Tallahassee. Listed below are the important edit and browse features:

- (1) Only enter FM Item Segment number on the top line.
- (2) The RDWYLOC sequence number displays on the top line of the screen and on the first line of the header information. It's entered on the top line to retrieve a particular location.
- (3) The transaction type "00" is entered on the top line to browse all station equation information for that RDWYLOC. The transaction type "02" is entered on the top line to update all station equation information for that RDWYLOC. The transaction type "99" is entered on the top line to erase all station equation information for that RDWYLOC.
- (4) Press the F8 key will forward from one RDWYLOC to the next RDWYLOC on the same Item Segment number. Press ENTER key to update or delete data on the screen depending on the transaction type but will not page forward.
- (5) Press F3 key will take the user to the FM main menu while press F15 key will take the user back to the SUPERSESS main menu.

After entering the station information, it is important to verify the milepost limits in WPA are still accurate. This can be accomplished by reviewing the WP50 computer screen.

If the project length has changed, the District Work Program Office should be advised to correct the mileposts.

111.3 Contract Plans Preparation

The products of the engineering design activities are component sets of contract plans. The major component sets may include:

- (1) Roadway
- (2) Signing and Pavement Marking
- (3) Signalization
- (4) Intelligent Transportation Systems (ITS)
- (5) Lighting
- (6) Landscape
- (7) Architectural Plans
- (8) Structures Plans

Each Utility Work by Highway Contractor Agreement may have a separate phase for each Financial Project Identification Number (FPID). The plan set for each agreement is placed in the back of the contract plans set under the associated FPID.

Modification for Non-Conventional Projects:

Delete the two sentences above and see the RFP.

These component sets, the specifications package, and the pay items list with calculated quantities are assembled and packaged as the construction contract letting documents.

Modification for Non-Conventional Projects:

Delete the sentence above and replace with the following:

These component sets, the specifications package, and the pay item list are assembled and packaged as the construction contract documents.

111.3.1 Three-Dimensional Models

If horizontally and vertically controlled cross sections are required for plans production to communicate design intent and construct the project, then that section of the project should be three-dimensionally (3D) modeled.

Modification for Non-Conventional Projects:

Delete **FDM 111.3.1** and see RFP for requirements.

111.4 Standard Specifications and Special Provisions

The EOR must develop engineering designs that can be constructed, controlled, measured and paid for under the current [Standard Specifications](#). In the event the work required is not covered by the Standard Specifications or the supplements and special provisions thereto, the EOR must develop Modified Special Provisions or Technical Special Provisions to be made part of the contract for the project. The EOR can obtain Department procedural guidance to assist with the preparation of the specifications package. Additional guidance on the preparation of Specification packages can be found in the [Specifications Handbook](#).

111.5 Pay Items and Summaries of Quantities

As the engineering plans are prepared, the quantities are calculated, tabulated, and summarized by Pay Item (of work) as stipulated by the Standard Specifications and the [Basis of Estimates Manual](#). The summary of pay items is updated as quantities are determined and summarized.

Modification for Non-Conventional Projects:

Delete **FDM 111.5**.

111.6 PS&E Package Submittal

A submittal consisting of the final Plans, Specifications, and Estimate (PS&E), along with any other contract and transmittal documents, is known as a PS&E package. PS&E submittals are numbered consecutively, and re-submittals are required until the project is accepted by the District Program Management Office. The PS&E package is transmitted to the Central Office for letting or is assembled and held in the district for district advertisement and letting. **FDM 131** provides further guidance on the contents of the transmittal.

Modification for Non-Conventional Projects:

Delete **FDM 111.6**.

111.7 Project Documentation Submittal

This section is currently under development.