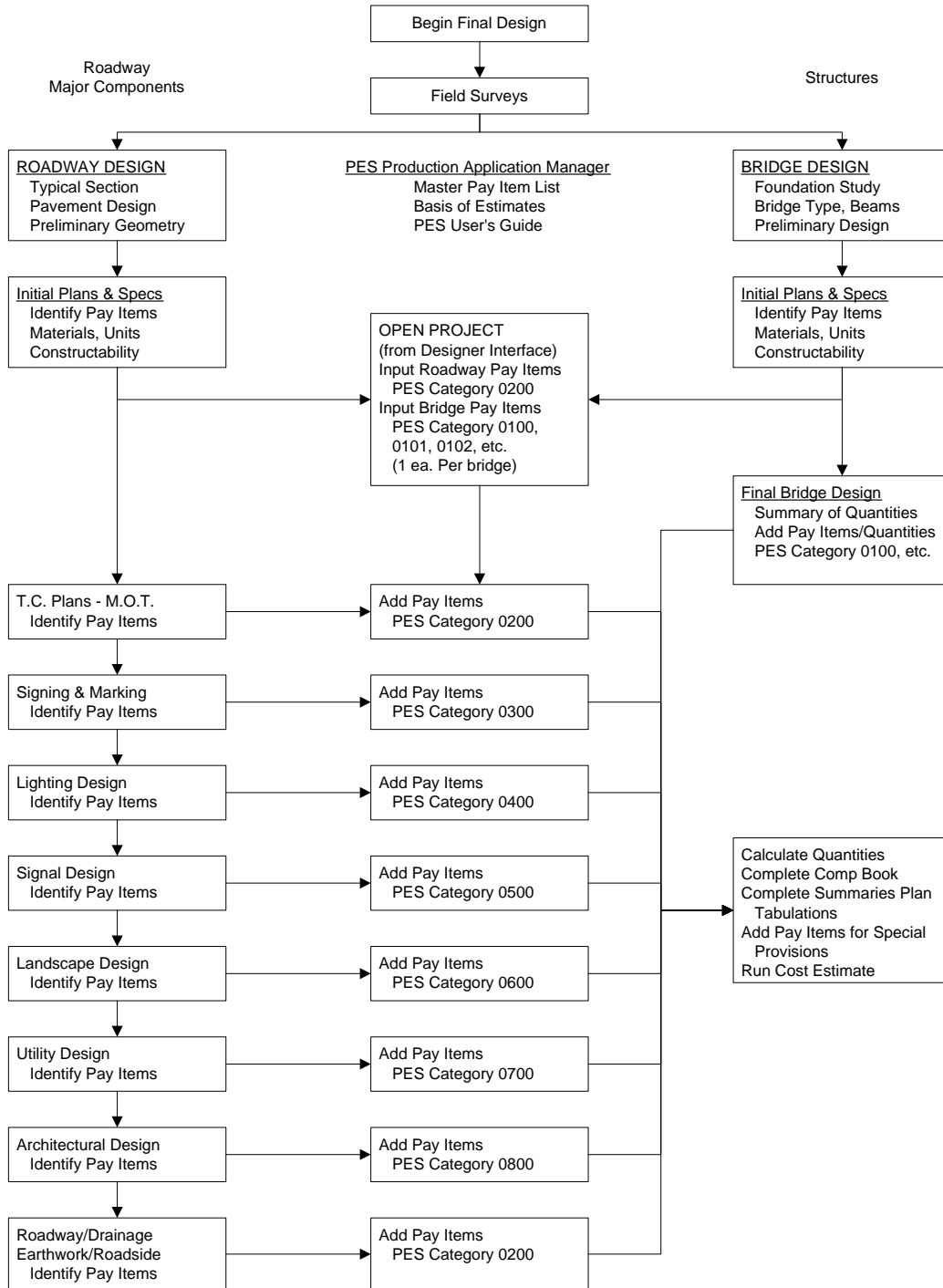


## Chapter 17

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### Exhibit 17-A Major Activities - Engineering Design Estimate Process



## Chapter 17

### Engineering Design Estimate Process

#### 17.1 General

The engineer's estimate of construction cost and contract time is one of the last activities performed on roadway and structures design projects.

To do a quality cost estimate, the engineer must have available the following:

1. The complete contract plans set, including all component sets such as structures, architectural, etc.;
2. The complete specifications, including the supplemental specifications and technical special provisions;
3. The ***Design Standards*** booklet referenced on the key sheet of the contract plans;
4. The completed computation book for the roadway and structures plans; and
5. The current ***Basis of Estimates Handbook***.

## 17.2 Pay Item List

The Specifications establish the method of measurement, basis of payment and payment items for work specified for road and bridge construction. **The Master Pay Item List** contains a list of all the current “open” pay items. The **Basis of Estimates Handbook** contains design aids, notes, and computation information to aid the engineer in preparing the cost estimate. Both the **Master Pay Item List** and the **Basis of Estimates Handbook** are available on the Estimates Office web pages at: <http://www.dot.state.fl.us/estimates/>

Pay items for the various categories of construction work should be identified as those components are completed. For example, pay items for base and pavement work may be identified as the pavement design is completed. Signal pay items may be identified as the signal design is completed. The engineer doing the design and specifications is knowledgeable about what work is to be done and which pay items are needed. The quantity take-off is generally done at a later date when the plans are final and the tabulations and calculations are done. The persons doing the quantity take-off should also be alert to ensure all pay items have been identified.

The Master Pay Item List shall be utilized to identify payment items on all types of projects, including resurfacing, widening, safety, bridge, etc. If any work on a project is not covered by existing specifications, then a technical special provision and possibly a new pay item description, unit of measure, and basis of payment may be required. Establishing new pay items is highly regulated and before it is undertaken, the District Estimates Office where the project is located should be consulted. See **Section 17.6** of this volume for more details.

Participating and nonparticipating portions of work should be determined when identifying pay items so quantity summaries can be set up properly in the TRNS\*PORT and the computation book.

## **17.3 Designer Interface for TRNS\*PORT**

The Designer Interface website is used to build categories and to add pay items and quantities to categories. Procedures and training on this and other TRNS\*PORT programs are available from the Engineering Support Services section of the State Estimates Office in Tallahassee. Contact your District Estimates Office for more information.

## 17.4 Estimated Quantities

### 17.4.1 Computation Book and Summary of Quantities

Quantities for pay items are tabulated and computed by two methods. They are tabulated and totaled on Summary of Quantity sheets in the plans, or they are tabulated and calculated on standard computation forms. The computation book contains calculations and summary of quantities organized in pay item sequence for the project. Backup calculations that substantiate the summary should be filed directly behind the forms. Items calculated using the standard basis of estimate from the ***Basis of Estimates Handbook*** or from the ***Design Standards*** should be clearly shown in the comp book, especially if several intermediate computations are necessary to arrive at the total quantity. All nonstandard methods should be clearly and completely documented by showing all calculations and the basis of estimating the quantities and a pay item note should be shown in the plans indicating the basis of estimate used.

The documentation for quantities must be accurate and clear. Detailed information on the documentation required with the computation book can be found in the ***Computation Methods for Design, Construction and Final Estimates Handbook***.

#### 17.4.1.1 Plan Quantity

The designer is responsible for the final pay quantity for all plan quantity items. Generally, plan quantity items are calculated using lengths based on station-to-station dimensions and widths based on neat lines shown in the plans. With the neat lines shown in the plans, this allows the designer to utilize the computer to generate accurate quantities.

#### 17.4.1.2 Final Measurement Concept

The designer is responsible to estimate a quantity for all final measure items. Because there are many variables associated with these items, the final pay quantity will be determined by measurements performed in the field when the item is being used or constructed.

The original computation book, including the Structures computation book and all backup calculations for roadway and bridge quantities, shall be transmitted to the District Construction Office when the plans are sent for letting.

## 17.4.2 Breakdown of Quantities

For projects that have partial federal funds, adequate distinction should be clearly made between participating (included in federal aid) and nonparticipating (not included in federal aid) items. All nonparticipating items with quantities should be identified in TRNS\*PORT and the Computation Book. The method of presenting this information must be of sufficient detail for project personnel to readily distinguish between participating and nonparticipating work, including its physical location on the project. Project personnel must be able to properly account for the necessary separation of quantities. These separated quantities should be properly identified as to participating and nonparticipating work when entered into TRNS\*PORT. In a few cases certain lump sum items such as mobilization, maintenance of traffic, etc., may be at least partially federal aid nonparticipating depending upon the nature of other nonparticipating items which must be separated. Where it is determined that certain lump sum items should be partially nonparticipating, the percentage assignment of nonparticipating should be negotiated with the FHWA. Upon mutual agreement, this percentage should be reflected when entering data into TRNS\*PORT. These items should be determined during early stages of project development. Coordinate TRNS\*PORT data entry of nonparticipating items with the District Estimates Office.

Where joint project agreements are involved between the Department and a City or County, appropriate participation information regarding this particular phase of the work should be so noted.

When a contract contains more than one Financial Project ID, with or without participating/nonparticipating quantities, the Summary of Pay Items and Summary of Quantities must show the separate quantities for each project. The computation book should clearly distinguish the location of each part of the work. The designer should also verify that the method of payment for an item of work agrees among all projects when projects are combined into a single contract.

### **17.4.3 Utility Contract Plans (Joint Project Agreements)**

When separate plans for utility construction are to be included in the contract, special attention should be given to establishment of pay items and loading the projects into TRNS\*PORT. Reimbursable work is indicated in the Financial Project ID by phase number 56 and nonreimbursable work is indicated by phase number 52.

For contracts with more than one project, the pay items for Mobilization and Maintenance of Traffic will be shown on each project's Summary of Pay Items. An exception to this is when the contract contains a Joint Project Agreement (JPA). The pay items for Mobilization and Maintenance of Traffic will not be shown on the Summary of Pay Items for the JPA. The cost of these items will be included in the lead project.

### **17.4.4 Plan Notes**

Plan notes are intended to be used to clarify design detail, construction practices or method for payment. In general, plan notes should be kept to a minimum. Only those notes that are job specific should be used. Many of the "old" standard notes have been eliminated recently and incorporated into the specifications. Notes that restate the standard specifications or standard indexes shall not be used. This will help to place proper emphasis on those notes that are job specific and avoid discrepancy of documents.



## 17.5 Specifications (Method of Measurement)

The Department's current practice is to provide for final payment under the plan quantity concept for a large number of commonly used items. The specifications for each item identify which items are to be paid for as plan quantity. This concept requires that the estimated quantities be calculated and documented as accurately as possible. (See **Article 9-3.2** of the **Specifications**).

## 17.6 Pay Items

For information about requesting new pay items, or concerning the trial pay item process, see the **Basis of Estimates Handbook**.

## 17.7 Contract Time

After completion of the design project including the completion of the cost estimate, the plans package is submitted to the district construction office scheduling engineer for establishing the contract duration. Contract duration is the time required for the complete construction of the contract. A copy of the contract time is submitted to the Central Office in Tallahassee with the plans transmittal package. Certain large complex projects should have the desired contract duration established earlier in the design process.

## 17.8 Alternative Contracting Practices

It is the intent of the Department to use various techniques on a wide range of project types in order to determine which techniques work the best on each project type. The goal of this program is to reduce the cost and time overruns and thereby reduce the impacts of construction to motorists, businesses and homeowners within the transportation corridor. Most of the Alternative Contracting Practices involve financial incentives to expedite the work. For more detailed instructions refer to the Department's ***Alternative Contracting User's Guide***.