SUPPORTIVE DOCUMENTS

CHAPTER 500

501 SUPPORTIVE DOCUMENTS

This section describes the written backup material that will supplement the Final Plans. The project specifications and estimates will become part of the Contract Documents, while the design computations and quantity estimates will be used to verify the information contained in the Final Plans. The number of copies of supportive documents to be submitted should be coordinated through the Project Engineer. Chapter 300 (Design Development) describes which documents or parts of documents shall accompany the plans for the various submissions.

502 COMPUTATIONS

502.01 HORIZONTAL AND VERTICAL ALIGNMENT

Horizontal geometry computations shall be submitted in a bound copy with the final design submission. These shall include all computations required to establish the horizontal geometry. They shall include computer printouts or handwritten computations as well as sketches to define each location.

All horizontal geometry computations shall include the following information:

1. Project Number
2. Town (where project is to be constructed)
3. Subject of computations
4. Names of persons that prepared and checked the computations
5. Date of preparation and date checked
6. Sketches as required to define locations

Vertical geometry computations (referred to as a grade list) shall be submitted with the Final Design submission. The grade list shall contain the following information:

1. Project Number
2. Town (where project is to be constructed)
3. Name of road that grade list applies to
4. Names of persons that prepared and checked the grade list
5. Date that the grade list was prepared and checked

6. Station and elevation of P.V.I.'s, P.V.C.'s, P.V.T.'s, intersection of roadways, beginning of construction, end of construction, and any other point required to adequately describe critical controls along the baseline
7. Grade of all tangent sections
8. Station and elevation of all sections shown on the cross section sheets
9. Banking of road

502.02 DRAINAGE COMPUTATIONS

The Consulting Engineer shall submit the final drainage computations. Their computations shall be based on the criteria established in the Department's current "Drainage Manual" and shall include all mapping and data utilized to perform the drainage design.

503 QUANTITIES

The Consulting Engineer shall prepare and submit quantity computations for each project.

The Consulting Engineer shall carefully evaluate the Contractor's need to borrow or stockpile material during each phase of construction; ensuring that the roadway excavation and embankment placement are properly coordinated with the provisions of the Maintenance and Protection of Traffic concept. In cases where balanced quantities are not possible within a phase, this temporary quantity imbalance will be provided for in the contract documents by the Consulting Engineer.

503.01 BREAKDOWN OF QUANTITIES

Quantity computations shall be supportive of and in agreement with the Detailed Estimate Sheet as well as the Proposal and Federal Estimates of the Contract Documents. These computations shall be complete in detail, showing the breakdown of quantities, method of estimating and the specific locations where the computations apply. The quantity computations shall be prepared in such a manner that the nature, quantity and location of all construction work will be readily disclosed.

503.02 SUMMARY OF QUANTITIES

A quantity summary sheet shall be prepared for each category of items.

The information on the quantity summary sheets shall be in agreement with the Detailed Estimate Sheet of the Final Contract Drawings.

The quantity computations shall indicate the names of the preparer and the checker, and the corresponding dates.

504 SPECIFICATIONS

Items shown in the Contract Documents shall conform to the Standard Specifications, Supplemental Specifications or Special Provisions.

504.01 STANDARD SPECIFICATIONS FOR ROADS, BRIDGES AND INCIDENTAL CONSTRUCTION

Construction items noted in the Contract Documents shall conform to the specifications outlined in the Department's Manual entitled "Standard Specifications for Roads, Bridges and Incidental Construction." This document is commonly referred to as simply the "standard specifications." They are the basic construction specifications that describe and define the requirements of those items most commonly used in highway construction.

These specifications undergo constant change as new methods, materials and technology become available. The vehicle for accomplishing permanent change to a standard specification is the supplemental specifications.

504.02 SUPPLEMENTAL SPECIFICATIONS

The Supplemental Specifications add to, delete or otherwise revise the Standard Specifications.

The Supplemental Specifications are issued periodically in a package containing all the current supplements that have been issued since the last publication of the Standard Specifications. Contact your Project Engineer to ensure that you have the latest supplemental specifications.

504.03 SPECIAL PROVISIONS

In those cases where neither the Standard Specifications, the Supplemental Specifications, and notes on the plans are found to adequately describe a construction activity or pay item, a special provision must be prepared.

The special provisions for a particular project are usually prepared by the designer, as that person is most familiar with the item's requirements. An exception is where the use of a highly specialized item is proposed. In those instances, Department personnel may become involved to assist the Consulting Engineer in the preparation of the special provisions.

Format

It is essential that the format of the Standard Specifications or Supplemental Specifications be followed in preparing the special provisions. Consistency will assure that all essential elements are addressed and will simplify its interpretation.

The book of Standard Specifications is arranged in sections, each section dealing with a specific item or group of items.

Each section is further divided into five subsections called articles. Each article is descriptive of its function. They are Description, Materials, Construction Methods, Method of Measurement and Basis of Payment. Any subpart of an article is a sub-article. For example, in the case of the bituminous concrete specification, the specification is Section 4.06 - Bituminous Concrete or Section M.04-Bituminous Concrete Materials. The article is the unit under the section, such as 4.06.03 - Construction Methods. The subarticle is such as 4.06.03-1 Samples; 4.06-01(b) Cessation of Supply; or M.04.01-3 (a) Job-Mix Formula.

Item numbers and names used on the title of a special provision shall conform to the Department's "Bid Master File" of item names and numbers. The letter "A" shall be affixed following the item number on all special provisions. This alerts the user of a special condition. Should no item number exist for a new item, the consultant shall request, through the Project Engineer, that a number be issued if possible.

1. Description

This fully describes the item or operation. It should be factually descriptive, concise and accurate. There must be room for only one interpretation.

2. Materials

In describing the materials to be employed to build this item, this article should refer to the materials section of the Standard Specifications, if possible. Next in line would be, in preferential order, AASHTO, ASTM, recognized national standard or industry standard. If standards are not available, the physical requirements necessary for the construction of a particular item should be specified and noted in this article. Brand names should only be used as a last resort and, where they are used, at least three manufacturers of a particular item should be specified. Should a proprietary material be required, a waiver should be requested in accordance with applicable Federal Regulations.

3. Construction Methods

A properly written section on Construction Methods may be written as one of the following: 1) a description of the result to be accomplished; 2) a detailed step-by-step description of construction; 3) a combination of 1) and 2) with either predominating. The use of 2) is to be avoided as much as possible. The use of 1) or 3) is advised, 1) being preferred to the extent practicable.

4. Method of Measurement

This article directs the measurement of the item in the unit of measurement by which the item will be paid. The unit used must be consistent with the type of construction used. For example, an item such as curbing, which is essentially linear in extent, will have a linear unit of measurement. No measurement or computation need be made in the case of a lump sum item.

5. Basis of Payment

This article describes the manner in which payment will be made for a particular item. It is based on the unit of measurement of the “Method of Measurement” article. The item name specified in this article shall correspond to the name used on the title of the special provision. Particular care must be taken to state exactly

what will be paid for, what part of the operation or under what circumstances no payment will be paid, and what work will be paid for under other specific items.

Preparation

The preferred method of preparing a special provision is by reference to an existing item in the Standard Specifications and by making appropriate modifications to fit the condition at hand. This helps assure that the essential elements are included. A second method involves developing an entirely new specification, including all of its articles. The object of either method is to convey to the user, in the briefest possible fashion, the directions required to complete construction of the item. In the case of an "end result specification," a description of the final product should be available in the articles.

An amendment to an existing standard specification may be made by modifying only the portions required to adapt it to present need. When referring to an existing specification, the reference may be to a section, a specific article or a sub-article. In some cases, the desired result can be achieved by amending only a specific sentence.

504.04 RAILROAD

The Consulting Engineer shall write special provisions to cover protective requirements of Railroad Companies where construction work takes place, on, over, under or immediately adjacent to a railroad right-of-way. They are subject to review by the affected Railroad Company. Required special provisions dealing with specific Railroad Companies' requirements will be furnished by the Department's Project Engineer to the Consulting Engineer as requested.

504.05 MUNICIPALITIES AND UTILITY COMPANIES

These special provisions cover requirements of Municipalities and/or Utility Companies whose required work is included within the Department's Contract Documents.

Each individual utility owner is responsible to write and submit needed special provisions to the Consulting Engineer. The Consulting Engineer shall review them for conformity to Department requirements and shall include them in the Contract Documents. Furthermore, the Consulting Engineer shall formulate and write additional special provisions as needed to supplement submissions made by the utility companies. They shall pertain to integrating the various individual requirements of the affected municipality

or utility company. Those may include revisions to the limitation of operations due to utility work or contractor assistance such as temporary utility supports required for the utility construction.

504.06 CONTROL OF BID MASTER FILE

In order to contain the number of new items assigned to the Bid Master File, the following procedure is to be followed:

Option 1: As projects are developed and units of work are identified, standard pay items from the "Standard Specifications for Roads, Bridges and Incidental Construction" and its supplements are to be used wherever possible.

Option 2: In the event that this is not practical, the item number and name of standard pay items should be used and a Special Provision written to provide all the essential elements required for the construction of that item (Description, Materials, Construction Methods, Method of Measurement, and Basis of Payment). The item number needs a suffix A.

Option 3: If either of the two preferred options outlined above cannot be utilized, the use of existing non-standard item numbers and names contained in the Bid Master File should be used and a Special Provision written as previously discussed. The item number selected needs a suffix A.

Option 4: When it becomes necessary to add a new item to the file, prior approval from the Department is required. Plans and Specifications should not contain reference to any new items until such approval has been obtained. The new item number needs a suffix A.

If there are any questions concerning these guidelines, please discuss them with your Project Engineer.

505 PROPOSAL ESTIMATE

A completed proposal estimate shall be submitted by the Consulting Engineer.

It is imperative that the item numbers on the proposal estimate correctly correspond to the Bid Master File. Furthermore, the quantities shall correspond to those shown on the detailed estimate sheet.

All proposal estimate data shall be kept confidential, to conform to the Department's policy of not divulging any cost data prior to accepting bids.

506 FEDERAL ESTIMATE

On Federal-Aid projects, in addition to the proposal estimate, the Consulting Engineer shall submit a completed federal estimate.

The Federal Estimate shall be subdivided into sections as follows:

1. Roadway items
2. Bridge items (one section for each bridge over 6 m in length)
3. Federal Aid non-participating items
4. Railroad items
5. Utility items that are reimbursable and are included in the State's contract
6. Utility items necessary to accommodate public utilities on bridges
7. Bridges which provide grade separation over a highway and railroad

For construction contracts with multiple project numbers, federal estimates and corresponding section breakdowns must be provided per federal-aid project.

It is imperative that the proposal estimate and the total of all federal estimates add up to the same dollar figure.

507 DESIGN REPORT

The Consulting Engineer shall prepare and submit a Design Report with the Final Design. The report shall be written in a brief narrative style. The report shall include, but not necessarily be limited to, the following information:

1. Date
2. Federal Aid Project Number

3. State Project Number
4. Town(s)
5. Construction district
6. Final maintenance responsibility of each road
7. Description of project
    a. Beginning and ending stations, and length of project
    b. Other roadway construction
    c. Number of structures
    d. Provisions for future construction (if any)
8. Reimbursable Funds: State amount reimbursable, the items involved, and by whom it will be paid
9. Exceptions to minimum design standards for all affected roadways
10. Public utilities affected by project
    a. Date that each utility was informed of possible affect by the project
    b. Date that final design plans were sent to each utility
    c. Utility items included in the State's contract
    d. Special considerations affecting utilities
11. Salvage: List all items to be salvaged and to where these items are to be transported (if appropriate)
12. Permits: Specify restrictions to the project due to permits that may affect the Contractor's operations
13. Remarks: Make recommendations concerning the project that would aid in the successful completion of the work. List commitments and major decisions as well as the reason why the decision was made during the design development that would be important to district forces during construction, especially decisions or commitments involving environmental issues, municipalities, utility companies and all right-of-way concerns.
14. Unusual design features including unusual foundation conditions.

508 CONTRACT TIME ANALYSIS

The contract time analysis shall be made by the Consulting Engineer and shall be submitted to the Department. Date of anticipated start of construction, duration of time available to work in each construction season, the various construction operations, the time required by the Construction Contractor to perform the major construction operations, the

number of calendar days to be allowed for the project, together with other pertinent information, shall be submitted on forms to be furnished by the Department.

For multi-year construction contracts, consideration should be given to eliminating the winter shutdown by modifying the Standard Specifications.

F:\SR\HARL\CEMANUAL\CE500.DOC