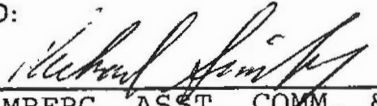


TO:		ENGINEERING INSTRUCTION	
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		SUBJECT: CONSTRUCTABILITY REVIEW	
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R. SIMBERG, ASST. COMM. & CHIEF ENGR., OFC. OF ENGR		Supersedes:	

Increasing difficulties are being encountered during construction of complex projects. In extreme cases, the designs as shown on the final plans cannot physically be built.

This Instruction formalizes a procedure of "constructability review" which has recently been used successfully on a Statewide basis. A constructability review is an independent review of all project data and documents to determine whether or not a project can physically be built as designed within the specified time and whether or not it can reasonably be bid by contractors.

The term constructability consists of two components -- can it be bid rationally and can it be built without significant contract change? Each of these components is defined below along with some pertinent criteria that should be addressed during design development. There are some overlapping issues, i.e. construction time allowed has a bearing on bidding and building. Therefore, the questions listed under each component are not intended to be mutually exclusive nor are they meant to be all inclusive. The important point is to address these issues as early as possible and throughout design development.

Bidding - The clarity of the final plan and proposal to the bidders so that they may submit a fair and accurate bid.

Criteria

- Is the information contained in the bidding documents sufficient to allow the uninterrupted construction of the project?
- Have all the permits necessary been obtained and is the job ready to go to bid?
- Has necessary coordination with other parties been accomplished so that those arrangements which must be implemented after letting are fully planned in detail?
- Is the bidder unnecessarily restricted in his bids or has the appropriate degree of flexibility been included in the bidding documents?
- Is the information contained in the bidding documents sufficient to avoid major field changes?

Manual	Code EI88- 14 Date 3/24/88 Page 2
Subject: CONSTRUCTABILITY REVIEW	

- Are the maintenance and protection of traffic plans adequate and complete?

Building - The accuracy and completeness of the contract plans insuring that the designs as shown on the final plans can be built.

Criteria

- Has sufficient field investigation during design been made to determine that the design can physically be built?
- If traffic is to be maintained on site, is there sufficient room to build the project?
- Is the sequence of construction activities realistic?
- Can the project be built in the timeframe allowed?
- Is there adequate space for the contractor's equipment to access the site and perform the work?
- Can the details as shown be constructed using the standard practices of the industry?
- Are the maintenance and protection of traffic plans adequate and complete?

Constructability Reviews

All capital projects should be designed in accordance with the above principles. In addition, independent constructability reviews shall be made for all projects in excess of \$10 million, as well as those less than \$10 million but identified as requiring unusually complex construction. Exceptions to such independent reviews may be approved by the Chief Engineer.

Independent Constructability Review Teams

A constructability review team will be comprised of individuals with experience in various aspects of design and construction. The teams will be assembled by the Construction Division and, depending on the complexity of the project, will range in size from four to ten individuals. The Construction Division will also determine the feasibility of consultant assistance.

Subject: CONSTRUCTABILITY REVIEW

Once the team is assembled, they will review the contract documents, examine the project site (if appropriate) and prepare a report containing their findings and recommendations. Based on the team's recommendations, a determination will be made regarding any changes that are required to the contract documents. Constructability reviews will be accomplished within a tight time frame and on a schedule which will not delay a project unless a major finding requires redesign.

The team will receive a thorough briefing including a discussion of the issues addressed during design development. They should receive all pertinent reference materials, including the detailed plans, any special specifications and all information concerning the construction schedule.

Timing of Reviews

Obviously, an independent constructability review would be most effective if done early in the design process. However, most of the information needed to conduct this type of review probably would be available only at the advanced detail plan stage. Therefore, for now, the advanced detail plan stage will serve as the trigger to identify when there is a need for a constructability review. A complete constructability review will not usually be finished until the PS&E is virtually complete. However, immediately after the advanced detail plans have been prepared, the review team can concentrate on elements of buildability.

More important than the formal review is attention to design quality from the very inception of the project. Our real goal is virtual elimination of the constructability review as experience shows constructible designs arriving at the detail plan stage.



Subject: Constructability Review