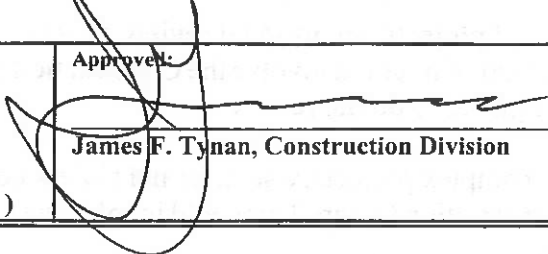


n-30-1-87728- Design Quality Assurance Bureau EIS Administrator Bldg. 5, Rm. 408 MC 0750,		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 99-013
Title: CONSTRUCTABILITY REVIEW			
Distribution: ☐ Manufacturers (18) ☒ Main Office (30) ☐ Local Govt. (31) ☒ Regions/Agencies (32)		Approved:  James F. Tynan, Construction Division 4-26-99 Date	
☐ Surveyors (33) ☒ Consultants (34) ☐ Contractors (39) ☐ ()			

This Engineering Instruction (EI) supersedes EI 91-30. It is anticipated that this guidance will be contained in a future update to the administrative section of the Construction Supervision Manual

PURPOSE. This EI updates the Department's policy for conducting constructability reviews.

EFFECTIVE DATE. This EI is effective immediately.

BACKGROUND. The Department recognizes the need for contract documents that will ensure rational bids and minimize problems during construction. The Constructability Review establishes a formal as well as a routine plan review. A significant aspect of developing high-quality contract documents is to incorporate review processes in all phases of a project to assess its constructability. Constructability reviews have the potential to minimize the number and magnitude of changes, disputes, cost overruns, and delays during construction.

A successful constructability review process must follow an established methodology similar to value engineering. The process must be flexible enough to be applied to all types of projects handled by the Department. Furthermore, the process must address the critical issues impacting today's transportation construction projects such as, ease of construction, environmental factors, construction phasing and scheduling, and project safety. To obtain maximum benefit from a constructability review, it must be initiated early enough to give the Regional Construction Group and others sufficient time to review the project, and then sufficient time to allow the designers to incorporate the recommended revisions. It is recommended the constructability review be conducted not later than the Advance Detailed Plans (ADP). The ADP phase provides the reviewers nearly complete detailed plans for Constructability Review. For large projects the Region may want to consider doing reviews during earlier phases of the design.

The Constructability Review Process (CRP) must be flexible in order to adapt it to specific project characteristics and requirements. Similarly, the CRP can be modified to be consistent with the Regions' approach to project development, policies, and resource availability. A key factor in determining the scope or type of the CRP is project complexity. Typically, total project cost and total work-hour effort reflects a level of complexity. Projects located in an urban setting and those involving reconstruction or grade separation are often more complex. Projects that involve many interfaces with other government agencies, utilities, the public, local officials etc. may indicate a higher level of complexity.

Complex projects require more formalized constructability practices. Based on project complexity, the CRP can be classified into three levels of formality:

- Informal,
- Semiformal, and
- Formal

For the simplest of projects, an informal review consists of the review by one or two staff from the Regional Construction Group. This could involve the Construction Supervisor or a staff person assigned by the Regional Construction Engineer to do the review.

For moderately complex projects, a semiformal review consists of the review by a team assigned from within the Regional Construction Group. This could involve the Construction Supervisor, Engineer-In-Charge, Safety Coordinator, etc.

For the most complex projects, a formal review will be performed by an Independent Review Team assigned by the Regional Construction Engineer. The Independent Review team is described in more detail under the section herein entitled INDEPENDENT CONSTRUCTABILITY REVIEW.

SUMMARY OF CHANGES. The primary changes to the current procedure are 1.) establishing selection criteria based on project complexity 2.) identification of the (ADP) as the specific review time during design to ensure sufficient time to make changes if necessary 3.) the development of a constructability review checklist to be used as a guideline by the reviewers, and 4.) transferring the responsibility of determining the need for an Independent Review Team from the Regional Director to the Regional Construction Engineer.

TRANSMITTED MATERIALS.

Checklist for Constructability Review

ACTIONS BY REGIONAL CONSTRUCTION GROUP. The Regional Construction Group will coordinate the CRP so that it is consistent with the review process outlined in the Design Procedure Manual.

Regional Construction Groups will review plans and will consider the "Constructability" of all projects commensurate with project cost, complexity (as outlined above) and risk. The Regional Construction Groups will use the "CHECKLIST FOR CONSTRUCTABILITY REVIEW" as the minimum standard for what to review, when conducting a Constructability review.

When utilizing the checklist the reviewer(s) should address two fundamental questions, can the project be bid rationally and can it be built without significant contract change? The Constructability review should include consideration of economics, availability of materials, site restrictions, local conditions that may affect the construction process, environmental considerations, maintenance and protection of traffic and construction safety. Each of these components is defined on the attached checklist along with some pertinent criteria that should be addressed during design development. The questions listed under each component are not intended to be mutually exclusive nor are they meant to be all inclusive.

RESPONSIBILITY FOR REVIEWS. The Regional Construction Engineer will be responsible for assuring that Regional Construction Groups have qualified construction engineers assigned to a plan review function and that the primary objective of that plan review process is the "constructability" of the proposed plans. In most cases, this function can be performed within the Regional Construction Group as a routine responsibility. Often, the Construction Supervisor (Job Manager) is assigned this responsibility. In certain other cases, a Regional Construction Engineer may determine that an Independent Constructability Review is required, utilizing some combination of resources from within or Consultants. The Construction Division will be notified

of the initiation of each Independent Review, and the Regional Director will be kept informed of the progress of the review. Should the need arise for outside assistance, consultant assistance may be obtained through the Construction Division. Consultant services could be acquired through a Design Services Agreement, new designation, or in rare instances, through the project design agreement.

INDEPENDENT CONSTRUCTABILITY REVIEW. An independent constructability review is a formal review of all project data and documents by a specially selected independent team.

The independent constructability review team will be comprised of individuals with experience in the various aspects of design and construction required for the project at hand. The size of the team will depend on the complexity, regional significance or state significance, and the number of experts from other program areas needed to conduct an effective and timely review. The team will be chaired by a staff person from the Regional Construction Group selected by the Regional Construction Engineer.

TIMING OF REVIEWS. Constructability reviews for all projects should be performed at such a time when the design details are sufficiently completed to facilitate a meaningful review. The review should be conducted no later than the ADP phase. For large projects the Region may want to conduct the review during earlier phases of project design. The Constructability review should be coordinated with the Value Engineering review conducted during design, to ensure that the alternative construction methods adopted as a result of the Value Engineering review are considered when performing the Constructability review. Additionally, the designer must be given sufficient time to incorporate the recommended changes, if they are appropriate.

SCOPE AND DOCUMENTATION OF REVIEW. The individuals selected to perform the constructability review, i.e., construction group staff or the independent review team, will receive a thorough briefing of the project by the project designer and examine the project site (if appropriate). They should receive all available pertinent reference materials, including the design approval document, advanced detail plans, any special specifications or special notes, the construction schedule, Baseline Data provided on CONR 9I, ECOPAC, utility & railroad agreements if available. A reevaluation of decisions made during design phases I-IV should not to be undertaken as part of the constructability review, unless major issues are found. The reviewer(s) will address as a minimum, each of the items listed in the "CHECKLIST FOR CONSTRUCTABILITY REVIEW" of this EI that applies to the project. Additional criteria concerning the bidding or building of the project will be identified by the reviewers on a project by project basis.

Constructability issues that are identified by the reviewer and/or review team will be documented in a memorandum to the Regional Design Engineer and the Project Manager, who will share the information with the RPPM to assess program implications. After review and consideration the Regional Design Engineer, will document the reasons for their course of action concerning each recommendation in a memorandum to the Regional Construction Group, Project Manager and the RPPM. For reviews conducted by an Independent Review team, a copy of the above transmittals will be sent to the Construction Division. .

Constructability reviews performed by independent review teams must be documented in a report prepared addressing , at a minimum the topics outlined in the checklist. The completed report will be submitted to the Regional Director, Regional Design Engineer, Project Manager and the RPPM for their consideration regarding changes to the contract documents. An informational copy must also be provided to the Main Office Construction Division and the Design Division. After review and consideration of the recommendations contained in the report, the Regional Design Engineer must document the reasons for their course of action concerning each recommendation and provide a copy to the independent review team, RPPM, Regional Director, Construction Division, and the Design Division.

ACTIONS BY THE MAIN OFFICE. The "CHECKLIST FOR CONSTRUCTABILITY REVIEW." will be continuously updated based on project site visits conducted by the Construction Division's Engineering Liaisons during construction , Regional feedback, and disputed work reviews.

COST IMPACT. Constructability reviews as currently conducted should reduce the number of change orders, delays and disputes during construction, resulting in a net savings for the State. The changes introduced in this EI will have a negligible additional cost to the capital construction program.

CONTACT PERSON. Questions regarding this Engineering Instruction concerning interpretation should be directed to Lou DiLillo. Questions concerning the project related issues should be directed to John Grady. They may be reached at (518) 457-6475.

CHECKLIST FOR CONSTRUCTABILITY REVIEW

PIN # _____ Reviewer(s) _____
D# _____
Designer _____
Projected Letting Date _____
Date Review Started _____
Date Review Completed _____

The following is a checklist of project items (if applicable to the project) that need to be reviewed during a Constructability Review :

	Description	YES	NO	NA	MORE INFO NEEDED
I.	BIDDABILITY				
	<i>The clarity of the final plan and proposal to the bidders so that they may submit a fair and accurate bid.</i>				
1	Are bidders unnecessarily restricted in their bids, or has the appropriate degree of flexibility been included in the bidding documents?				
2	Information sufficient to avoid major field changes?				
3	Coordination and agreements with appropriate agencies/parties?				
4	Permits been identified and sufficient time allowed to secure?				
5	MP&T plans adequate and complete?				
6	MP&T plans too restrictive?				
7	Items appropriate?				
8	Items omitted?				
9	Cross referencing between various contract documents consistent?				

**CHECKLIST
FOR
CONSTRUCTABILITY REVIEW**

	Description	YES	NO	NA	MORE INFO NEEDED
II.	BUILDABILITY				
	<i>The accuracy and completeness of the contract plans so that the design as shown on the final plans can be built.</i>				
A.	Site Investigation				
1	Sufficient field investigation been done to ascertain that contract work can be performed as shown on plans?				
2	Current site survey (horizontal & vertical controls)?				
3	Subsurface exploration?				
4	Utility investigation?				
5	Current traffic counts?				
6	Structural inspection?				
7	Emergency/interim structural repairs been considered?				
B.	Right of Way				
1	Sufficient R.O.W. available for all operations				
2	Equipment, material and hazardous waste storage?				
3	Staging?				
4	Field Office?				
5	Access requirements?				
6	Access to work areas?				
C.	Construction Staging				
1	Phased to provide minimum number of stages and reasonable work areas and access?				
2	Are there areas with restricted access?				
3	Are widths of work zones and travel lanes adequate?				

**CHECKLIST
FOR
CONSTRUCTABILITY REVIEW**

	Description	YES	NO	NA	MORE INFO NEEDED
4	Does staging cause special conditions (i.e., structural adequacy/stability)?				
5	Proposed adjacent contracts, restrictions, constraints identified and accounted for?				
6	Can the details as shown on the plans be constructed using standard industry practices, operations and equipment?				
D.	M&PT/Traffic Control				
1	M&PT requirements realistic for site conditions?				
2	Are lane closures reasonable for traffic volumes?				
3	Adequate provisions for access for pedestrians and abutting properties?				
4	Signing and traffic control adequate?				
5	Can construction operations be carried out safely under M&PT and staging?				
6	Design adequate for averting delays /congestion?				
7	Is a detour necessary for averting delays /congestion?				
E.	Schedule				
1	Length of time and production rates for work reasonable?				
2	Is sequence of construction reasonable?				
3	Seasonal limits on construction operations?				
4	Utility relocation schedule reasonable?				
5	Regulatory permit restrictions?				
6	Processing of shop drawings and related approvals?				
7	Materials ordering, fabrication and delivery requirements				
8	Restricted hours impact on production?				

**CHECKLIST
FOR
CONSTRUCTABILITY REVIEW**

	Description	YES	NO	NA	MORE INFO NEEDED
9	All necessary construction operations identified?				
10	Relationship with adjacent contracts?				
11	Impact of additional work (emergency structural repairs, additional quantities of concrete/ steel repair)?				
12	Time related specs - completion / milestone realistic?				
13	Night and weekend work proposed, and impacts considered?				
F.	Special Materials / Conditions				
1	Pertinent provisions and restrictions clearly indicated?				
2	Any special (unique / proprietary) materials, methods of technologies required for contract?				
3	Special coordination required, RR, Permits, Regulatory				
4	Presence of asbestos, hazardous waste or toxic materials?				
5	Safety requirements, fall protection, electric lines, and other utilities, RR requirements				
6	Winter concreting and the schedule for delivery of concrete?				

Additional Comments: _____

[illegible][illegible]