Constructability Review

Process Guide

Version 2.0

Contract Management Office
Contract Management & Operations Branch

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1.0 Introduction

The Constructability Review Process is intended to help improve the constructability and consequently the quality of a design. The resulting benefit is a cost-effective design that is biddable, buildable, and maintainable.

The requirements for Constructability Review are identified by the Ministry in an Expression of Interest (EOI) and Request for Proposal (RFP). A design assignment may include one or more Constructability Reviews during the development of design. The Constructability Review Process described below focuses on the following:

- Formalised requirements;
- Formalised approach;
- Dedicated construction expertise and resources;
- Reporting the outcome; and
- Clear accountability for implementing the findings / recommendations.

2.0 Constructability Review: Definitions

Constructability Review is a formalised process that utilizes a team with extensive construction knowledge to ensure that a design is buildable while also cost-effective, biddable, and maintainable, with reduced overruns and delays. A Constructability Review is to be conducted separate from and independent of the design team. The scope of Constructability Review is to be flexible to suit the individual project requirements.

Biddability Review is a review of contract documents to identify errors, omissions and conflicts in plans, specifications, quantities, work items/activities, operational constraints and appropriate basis of payment. Biddability Review is part of Constructability Review process.

At this time, Constructability Review process will be carried out for Detail Design only. In the future, the process may also be considered for Preliminary Design.

Internal Review: Definition

An Internal Review is managed by the successful service provider firm as identified in their EOI and RFP submissions to the Ministry and is undertaken by their team not involved with the design. The Review is conducted in a workshop format at the specified milestone completion(s) and will result in specific observations or recommendations for implementation in design. At this time, Internal Review may be considered at 50 and 80 Percent Stages of Design.
**External Review: Definition**

An External Review is conducted by one or more individual(s) listed in the Ministry’s Roster of External Reviewers for Constructability Review. The requirement for an External Review is identified by the ministry. A firm selects the individual(s) from the Ministry’s Roster, based the qualifications and expertise indicated. The firm identifies the individual(s) selected for External Review in their EOI and RFP submissions to the Ministry. An External Review is conducted at the schedule agreed and recommendations forwarded to the firm for implementation in design. At this time, External review is considered at 80 Percent Stage only.

**3.0 Constructability Review Thresholds**

The following types of Major Road Reconstruction/Widening projects with the level of detail listed below should be considered for Constructability Review:

- Highway Engineering: stage grade raises/cuts, utility locations, major reconstruction (interchange new or rehabilitation, adding/widening lanes);
- Bridges and Tunnels: temporary supports, temporary roadway protection, traffic staging over bridges, complex bridge foundations, launching of girders, both new and rehab;
- Environmental: environmental sensitivity and construction windows; and
- Traffic Staging: traffic staging on 400 series highways, QEW, and urban highways and bridges, high volume intersections/interchanges.

Only Internal Review is required at this time for assignments with a capital construction estimate of $10M - $20M.

Both Internal and External Reviews are typically required for assignments with a capital construction estimate greater than $20M. However complex and high risk assignments of lesser value may be assessed for Constructability Review, on case-by-case basis.

Minor road construction and resurfacing assignments generally will not require Constructability Review. No Constructability Review is required at this time for assignments with construction cost estimate less than $10M.

**4.0 Frequency of Constructability Review**

For large/complex assignments, the Constructability Review may be carried out at both 50 Percent and 80 Percent Stages. For other assignments, a Constructability Review may be conducted at 80 Percent Stage only.
50 Percent Completion Stage

- The Constructability Review (Internal) at 50 Percent Stage is conducted prior to an upcoming Milestone Review / other similar meeting with the ministry and the resulting Constructability Review recommendations are subsequently incorporated in design.

- Revised design (with Constructability Review recommendations incorporated) is sent to the Ministry prior to 60 Percent Milestone Review/Presentation meeting.

- Typical Review considerations include: the traffic staging, construction staging, construction method(s), environmental considerations, work area, access/egress details, construction schedule/working days, operational constraints, etc.

- The following type of information is provided for Constructability Review at 50 Percent Stage:
  - Scope of work details;
  - Up to date Drawings;
  - Operational constraints;
  - Foundation, pavement design, structural and other reports or draft reports;
  - Environmental reports;
  - Utility mapping;
  - Traffic recommendations including lane, ramp and access constraints that are proposed for the contract;
  - Draft critical path construction schedule including the production rates that were used; and
  - Construction Cost Estimates (current for the stage).

- At the Milestone Review meeting, the Service Provider reports on the Constructability Review carried out and the recommendations implemented.

80 Percent Completion Stage:

- Constructability Reviews (Internal and External) at 80 Percent Stage are conducted prior to the scheduled Design Complete / Presentation or other similar meeting. The resulting Constructability Review recommendations are subsequently incorporated in design.

- The Revised design package (with Constructability Review recommendations incorporated) is sent to the Ministry prior to Design Complete / Design Presentation or other such meeting.

- Typical Review considerations include: checking the details of design and staging layout, quantities, specifications, construction method(s), construction schedule,
working day estimates, construction cost, work area, access/egress details, operational constraints, environmental considerations, worker safety and traffic safety, etc. as:

- Reviewing contract documents to ensure that contract requirements are achievable in keeping with common construction methods / standards.
- Addressing construction phasing and scheduling for completing construction activities, and incorporating incentive / disincentive features in the contract.

- Also includes Biddability Review, as:
  - Reviewing the plans / drawings, documents, quantities, estimates, specifications and payment items for completeness.

- The following type of information is provided for Constructability Review at 80 Percent Stage:
  - Scope of work details.
  - Final Drawings, Quantity Sheets and Documents.
  - Operational constraints.
  - Final foundation, pavement design, structural and other reports. (Note reports should include both factual data and recommendations)
  - Environmental reports.
  - Utility mapping.
  - Traffic recommendations. (Note lane, ramp and access constraints that will be included in the contract should be part of the contract documents.)
  - Critical path construction schedule including the production rates that were used.
  - Current Construction Cost Estimates (current for 80 Percent Stage).

- At the above Meeting, the Service Provider reports on the Constructability Review carried out and the recommendations implemented.

### 5.0 Staffing/Expertise Requirements

Depending on the scope of an assignment, typically, construction related expertise and knowledge in one or more of the following areas are required from the team members for Internal and External Review:

- Traffic / Staging
- Construction Supervision / Administration (biddability, construction claims, construction delays)
- Scheduling
- Estimating
- Bridge / Culvert Construction
- Temporary / Permanent Drainage
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- Foundations
- Highway and Worker Safety
- Pavement / Geotechnical
- ATMS / Electrical
- Utilities
- Environmental
- Maintenance (including maintainability, Maintenance access, etc.).

Depending upon the assignment, a minimum of five years of experience in Construction Supervision / Administration / Management or otherwise proven successful experience is required. The individual must have worked on at least three projects of similar size and scope in the above areas.

6.0 Procurement of Constructability Review Services

- The Ministry project manager solicits a Detail Design assignment through EOI process and invites submissions from the qualified firms and identifies the following requirements:
  - Number of Constructability Review(s) required in an assignment;
  - Type of review(s) required for an assignment (i.e. External, Internal, or both); and
  - Critical areas of expertise required for Constructability Review.

- Three to five firms are short-listed based on the evaluations of the submissions received from the qualified service provider firms.
  - A firm’s submission that does not meet the ministry’s Constructability Review requirements identified in EOI is disqualified and not considered.

- The Ministry project manager invites proposal submissions from short-listed firms through a Request for Proposal (RFP) and identifies further details on Constructability Review required:
  - Number of Constructability Review(s) required in an assignment;
  - Type of review(s) required for an assignment (i.e. External, Internal, or both);
  - Critical areas of expertise required for Constructability Review;
  - Follow up required for Constructability Review including implementation of the recommendations, signoff trail and reporting; and
  - Any Reference Document(s).

- The short-listed firms submit proposals to the ministry. A proposal covers the required Constructability Review(s), the team members and their expertise, workshop format, timelines and related details.
For the purposes of an Internal Review, generally one expert is required per critical area of work identified in an RFP. However if available, a firm may provide an individual with expertise in more than one area.

- A firm may also propose the team members in other related areas, as deemed necessary;
- A firm is to identify the Team Lead / Facilitator for the purposes of Internal Review. The Lead facilitates the Internal Review(s) carried out in workshop(s);
- The firm’s project manager for the assignment or any member of Design Team cannot be identified as a member of Constructability Review Team. The firm’s project manager will be available to provide any information required by Constructability Review Team related to the project and answer any questions;
- Ministry project manager or other Ministry staff are not to be part of Constructability Review team. The Ministry project manager may attend to observe the proceedings; and
- The firm provides the project schedule including the schedule for Constructability Review(s) such that all related follow up work occurs prior to the next scheduled Milestone Review Meeting or Design Complete / Design Presentation Meeting with the Ministry Staff.

Ministry evaluates the proposals submitted and awards the assignment through open and competitive bidding process.

- A proposal that does not meet the ministry’s Constructability Review requirements will be disqualified and not considered.

The successful firm proceeds with the design assignment including Constructability Review(s) as per agreed schedule.

- The firm retains the identified individuals to perform Internal and External Reviews as per the requirements details and schedules agreed.

### 7.0 Delivery of Constructability Review

#### Internal Review: Workshop

- Constructability Review Workshop(s) as identified in the RFP and successful proposal are held at the date(s) agreed. Typically, a Workshop may be one to two days in duration, including a field visit as necessary. For complex project projects, a Workshop may take an additional day.

- Prior to the Workshop, the design package/information as completed is forwarded to the lead of the Constructability Review team who circulates it to the team members for their individual reviews (for 80% Review, also include the information on 50% Review and any follow-up by conducted).
• Each Constructability Review team member provides comments to the Team Lead by a due date prior to the workshop.

• Constructability Review Lead consolidates the comments received and circulates those back to the Constructability Review team prior to the workshop.

• The Team Lead consolidates the comments on the design package / information, received from the individual team members, prior to the Workshop.

• All members of Constructability Review team are to attend a scheduled Constructability Review Workshop for its full duration. Detail Design deliverables and any recommendations are collectively assessed and agreed.

• During the workshop, the Service Provider Firm’s project manager provides an overview of the project including the work completed, site and other constraints, any external/regulatory requirements, follow-up work, completion schedule, any critical considerations, milestone or final deliverables, etc. Also, acts as a resource for Constructability Review as required (i.e. explain project background, design requirements, discuss issues, constraints and scoping, etc.).

  **Workshop Format**
  
  *The Workshop is to use the following type of formalized agenda:*

  - Workshop Opening;
  - Overview by Service Provider Firm’s project manager;
  - Field review of the site conditions, as necessary; and
  - Discuss issues and consolidate collective observations and recommendations. Allow time to discuss all critical/pertinent issues in a project.

• The Ministry project manager may attend the site visit and Constructability Review Workshop to observe only.

• Lead for the Constructability Review team consolidates and forwards the collective observations / recommendations within one (1) week of completing the workshop, to the firm’s project manager for the design assignment, with a copy to the Ministry project manager.

**External Review**

• External Review is required at 80 Percent Stage only. Review takes place at the date(s) agreed and close to Internal Review at 80 Percent Stage.

• Design package/information as completed is forwarded to the External Reviewer (s) identified by the firm from the Ministry Roster.
If required, the External Reviewer(s) may request a meeting with the Service Provider firm’s project manager for an overview of the project and the work completed to date and other details as listed above.

External Reviewer(s) may conduct a field review of the site conditions, as required.

The Ministry Project Manager may attend the site visit or the meeting with the Service Provider firm’s project manager

*External Review Format*
- Overview Meeting with the Service Provider firm’s project manager, if required;
- Field review of the site conditions if required, by the External Reviewer; and
- External Reviewer(s) review design package/information and provide recommendations.

External Reviewer(s) provide(s) observations and recommendations within one week of completing a Review, to the firm’s project manager, with a copy to the Ministry project manager.

### 8.0 Constructability Review: Follow-up

The firm’s project manager assesses the recommendations received from Internal / External Reviews for application in design and responds back to the Ministry project manager, as to the actions taken on the Constructability Review findings, as:

- Recommendations accepted for application in design; and
- Recommendations that cannot be applied in design and any rationale/reasoning for not applying.

Ministry project manager may follow up and ask questions or clarification on the actions taken by the firm and may circulate the above correspondence/documentation to the Ministry project team members for review.

At a subsequent Milestone Review Meeting with the ministry staff, the firm provides an overview of the Constructability Review(s) conducted and the recommendations implemented.

Prior to Design Complete Presentation Meeting, the Service Provider firm shall ensure that all work in the contract package is correctly included for payment. A contract package must be checked/verified and corrected for any errors and inconsistencies in plans, specifications, estimates and the requirements and details for all payment items. The Service Provider firm must submit with a contract package, a certification and sign-offs that the contract package and all details have been independently checked/verified and corrected for all payment items.
The Service Provider project manager submits a Constructability Review Report for the project prior to Design Complete Presentation Meeting. The Report is to include all Reviews carried out and the recommendations acted upon/implemented. The report must be submitted within four (4) weeks of completing the last Review.

9.0 Constructability Review Report

The Service Provider firm’s project manager submits a Constructability Review Report for the project to the Ministry. This is to include all Reviews carried out and the recommendations acted upon / implemented. The report must be submitted within four (4) weeks of completing the last Review and one (1) week prior to Design Complete Presentation Meeting with the ministry staff.
Appendix A

Typical Constructability Review Report Format

W.P.:
HIGHWAY NO.:
LOCATION: DATE/LOCATION OF REVIEW:
TIME:

Instructions

*Internal Review*

During the Constructability Review Workshop, all comments will be recorded numerically, noting the person who identified the issue/comment, a description of the issue and its associated problems as well as any recommendations collectively made in the Workshop to mitigate the issue. The Document will also identify who on the Service Provider’s project team needs to take action to respond to this issue.

At the end of the Constructability Review Workshop, the Document is sent to the Service Provider’s project manager to take action. The Document is also copied to the ministry Project Manager who will distribute them to the project team.

Each item will require a designer response stating whether the Constructability Review recommendation is agreed to or if not then why. Once all action items have been responded to, the Document will be sent back to the ministry Project Manager for distribution to the entire project team.

1) Attendees

2) Descriptions of project

3) List of documents available for review

4) Review Number (or % complete)

5) Documents Review: List all documents with issue dates reviewed (reports, approvals, correspondence, contract drawings / documents, environmental reports, utility plans, others)
Comment # 1
Name:
Drawing #’s or Document Page #’s
Comment/Issue:
Recommendation:
Action by:
Service Provider project manager’s Response:

Comment #2
...

6) Review - drawings/documents

Comment # 1
Name:
Drawing #’s or Document Page #’s
Comment/Issue:
Committee Recommendation:
Action by:
Service Provider Project Manager’s Response:

Comment #2
...

**External Review**

During the External Review, all comments will be recorded numerically including a description of the issue and its associated problems as well as any recommendations made to mitigate the issue.

At the end of an External Review, the observations/recommendations are sent to the Service Provider project manager to take action. A copy of the observations / recommendations is sent to the Ministry project manager who may distribute those to the project team.

Each item will require a designer response stating whether the Constructability Review recommendation is agreed to or if not then why. Once all action items have been responded to, the document will be sent back to the Ministry project manager for distribution to the entire project team.

1) External Reviewer Name(s)

2) Descriptions of project

3) List of documents available for review
4) Review Number: 80 % Complete

5) Documents Review: List all documents with issue dates reviewed (reports, approvals, correspondence, contract drawings / documents, environmental reports, utility plans, others)

Comment # 1
Name:
Drawing #'s or Document Page #'s
Comment/Issue:
Recommendation:
Action by:
Service Provider Project Manager’s Response:

Comment #2
...

6) Review - drawings/documents

Comment # 1
Name:
Drawing #'s or Document Page #'s
Comment/Issue:
Committee Recommendation:
Action by:
Service Provider Project Manager’s Response:

Comment #2
...