COOPER ENGINEERING COMPANY, INC.

STRUCTURES DESIGN
QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)
PLAN AND PROCEDURES

Purpose of the Review

Cooper Engineering personnel shall use the attached spreadsheet as a quality control tool in order to improve our design and drawings, our company's primary product. In the words of WisDOT, we must be able to demonstrate that structure designs and structure plans are being designed adequately and accurately, to appropriate requirements, standards, and policies, and that structure plans are complete, constructible, and are in accordance with approved details.

When to Implement

Our review effort should be accomplished prior to submittal of plans when the review of those plans has the potential to make a significant impact on the project. Preliminary plans, agency review, final plans and bid sets would all be milestones for which our internal review should be performed. This review is necessary to keep projects within budget, keep them on schedule, uncover components of a project not considered, limit our liability and on and on. See the structure QA/QC checklist at g:\cec\plan review\Structure QA QC.xls.

What to Do/Who Does It

The checklist needs to be completed for each of the structure projects leaving our office. The designer, draftsman, inspector, surveyor or engineer can use it at any stage of the project. Some of the items are meant to see that design and plans are reviewed by someone. Other items are meant as a reminder of an item that needs to be considered in every project design (not necessarily by more than one person). The checklist and verification sheet will be, at a minimum, used in the final plan submittal stage of the project as part of the EPlan submittal process.

The document, located at the file address noted above, is a checklist to be added to, revised, and/or consolidated over time to make it more useable and useful. Suggestions can be sent to me and the checklist will be periodically updated to the benefit of all that use it.

Thanks,

Steve Poethke, P.E.
Structural Manager

COOPER ENGINEERING COMPANY, INC.

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WisDOT Project # _____

Project Name _____

Structure # _____

QA/QC Procedure Verification:

I hereby certify that the structure design and plans have been prepared in accordance with the attached QA/QC procedures and the Wisconsin Department of Transportation Bridge Design Manual.

_____	_____	_____
Steve Poethke, P.E.	Structural Manager	(date)

(stamp)

Cooper Engineering Structures QA/QC Checklist

g:\cec\plan review\Structures QA QC.xls

Project Name:			
DOT Project Number:			
Prepared By: (see initials)			
Date:			
Checklist Item	**Verified**	**By**	**Comments**
	Initials	**Date**	
1. Bridge Design Process			
Determine hydrologic data for bridge (stream crossings)			
Send hydrologic data to BOS for approval			
Coordinate geotechnical exploration requirements			
Hydraulic & Structure Sizing reports & submittal to BOS			
Preliminary plans submittal and DNR initial concurrence			
Prepare and submit environmental report			
Prepare and submit Design Study Report (DSR)			
Finalize structure design following DSR approval:			
Structure plans and roadway plans			
Estimate			
Special Provisions			
QA/QC Submittal			
Final plan submittal and submittal to DNR for final concurrence			
PS&E Submittal following BOS and consultant review			
2. Hydrologic/Hydraulic Report			
Verify two methods for computing hydrologic data were used			
Review WSPRO Input and Output			
3. Preliminary Design			
Determination of loads reviewed:			
Load Factors			
Distribution Factors			
Perform review including hand checks of results from:			
Design forces program (moving load programs)			
Bridge deck calculations			
Beams and girders			
Bearings			
Piers and Abutments			
Foundations			
Other (Retaining wall, box culvert, sign, etc.)			
Chapter 6 of the Bridge Manual:			
Structure Survey Report preparation per section 6.2.1			
Preliminary layout per Section 6.2.2 requirements			
Preliminary plan requirements per Section 6.5.2			

Cooper Engineering Structures QA/QC Checklist

g:\cec\plan review\Structures QA QC.xls

Checklist Item	Verified	By	Comments
3. Preliminary Design (cont.)			
Plan and Profile Sheet Requirements:			
Quantify earthwork each side of structure (streams)			
Provide existing and proposed structure information			
Elevations and stations match those on structural sheets			
Erosion protection noted			
R/W information noted and identified. Utilities indicated.			
Adjacent land ownership identified			
Slope intercepts shown			
Existing and proposed structures shown with sta. information			
Provide benchmark data and origin of data			
Show river (if applicable) and direction of flow			
Indicate high and measured water elevations			
Indicate beginning and end of project limits			
General Plan Sheet:			
Provide traffic data, match Title Sheet			
Provide foundation design data to match quantity tables and geotechnical drawings.			
Does the hydraulic information match hydraulic report?			
Does design data match design calculations?			
Check Section 6.3 of the Manual for general notes language			
Confirm the drawing list matches actual design drawings			
Check Project #, Structure #, codes references			
4. Final Plan Design			
Refer to Manual Ch 6.3 for detailed final plan requirements			
Verify additional requirements per 6.5.3 have been addressed			
Verify quantity computations and rounding per Chapter 6.4			
Verify that Chapter 9 - Materials requirements are addressed:			
Tables show bar lengths that reflect subtractions for bends and hooks (Figure 9.9-1,2)			
Length limitations on bar sizes have been considered			
Locations for epoxy coated bars is appropriate			
Important checks on final construction details:			
Have elevations been verified?			
Length, width and angles been verified? (Details are drawn to scale is an important secondary check)			
Have deck grades been reviewed?			
Check bid item names against naming convention			
Final Design Drawing Details (standard detail conformance):			
Standard detail rebar, spacing			
Detail size or height limitations			
Pile spacing requirements met			
Have designer notes been considered in design?			
Are appropriate general notes included?			