STRAND ASSOCIATES, INC.®
QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN
FOR STATE OF WISCONSIN BRIDGE, CULVERT, AND RETAINING WALL STRUCTURES

Project Name: _____ Date: _____
Client Name: _____ Project Office: _____
Project Number: _____ Project Manager: _____

1. Project Scope

The Project Manager will review the project design agreement and Concept Definition Report to identify key project tasks. The Project Manager will prepare the internal Project Management Memorandum (PMM) that will identify scope, team members and their roles and assigned hours, and key dates.

Concept Definition Report Date: _____
Construction Opinion of Probable Cost (CDR, If Available): _____

EDIT AS NECESSARY:
Project Scope: Preliminary and final bridge design, special provisions, opinion of probable cost, PS&E documents. See attached Agreement Special Provisions for detailed scope of services.

2. Project Delivery Milestone Schedule (List Contract and other key review/delivery dates.)

Item (Example)	Date
1. Notice to Start Work	
2. Design Criteria	
3. SSR/Preliminary Plans	
4. Environmental Document	
5. DSR	
6. Final Plans (To Management Consultant or Region)	
7. Final Plans (To Central Office-minimum of 2 months prior to PSE)	
8. PS&E Date	
9. Let Date	

3. Existing Bridge Information available: ☐ Yes ☐ No

Project Manager or Bridge Engineer shall place copies of existing bridge plans, current inventory reports, current inspection reports, and current sufficiency rating calculation in appropriate project file folders.

4. Standards and Guidelines

Structures will be designed to meet the requirements of the following documents:

WisDOT LRFD Bridge Manual
WisDOT Facilities Design Manual
WisDOT Standard Specifications for Highway and Structure Construction
AASHTO LRFD Bridge Design Specifications
AASHTO Guide Specifications for Design of Pedestrian Bridges
AASHTO Standard Specifications for Highway Bridges, 17th Edition (Box Culverts and Sign Structures)
AREMA Manual for Railway Engineering

Load rating of structures will be governed by the requirements of the following document:

AASHTO Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges (AASHTO LRFR)

5. Design Team

Team Member[(1)]	Office	Role
		Project Manager
		Structure Engineer
		Roadway Engineer
		Hydraulics Engineer
		PS&E Engineer

[(1)] Note: Team member(s) names that will stamp drawings/specifications.

6. Subconsultants

Type	Firm	Contact
Geotechnical		
Archaeological		
Historical		
Asbestos		
Aesthetics		

7. QA/QC Staff/Dates/Scheduled Hours

a. QA/QC team will review the project at preliminary and final design stages. Final design will be reviewed at approximately 50 percent and 95 percent plan completion. The QA/QC reviewers will not be involved in the day-to-day preparation of the plans; however, the reviewers will be involved in key decision making processes as necessary to establish clear direction. QA/QC review dates and times will be included with the monthly scheduling.

b. Name of Key Quality Control Individuals

Staff	Office	Role
		Roadway Plan Checker (RPC)
		Structure Plan Checker (SPC)
		Roadway Technical Reviewer (RTR)
		Structure Technical Reviewer (STR)
		Hydraulics Technical Reviewer (HTR)
		Constructability Reviewer (CR)
		PS&E Reviewer (PSER)

(1) Note: Team member(s) names that will stamp drawings/specifications.

c. Estimated time frame for quality control checks

Review Item	Staff	Target Date	Scheduled Hours
1. Design Criteria	STR,RTR		
2. Preliminary Bridge Design	SPC,STR,HTR		
3. Preliminary Road Design	RPC,RTR		
4. Soils Report	STR		
5. Hydraulics Design	HTR		
6. Final Design 50% Completion	SPC,RPC,STR,RTR		
7. Final Design 95% Completion (PS&E Submittal)	SPC,RPC,STR,RTR,PSER		

8. Preliminary Design Review

a. Design Criteria

(1) QA/QC will review vertical and horizontal alignment and roadway and structure width dimensions for consistency with WisDOT design criteria in the appropriate chapters of the WisDOT LRFD Bridge Manual and Facilities Development Manual. Review will include pedestrian and bicycle needs.

(2) QA/QC will review the preliminary plans for consistency with the aesthetic goals of the project. QA/QC will reference project files for Community Sensitive Design (CSD) requirements.

(3) QA/QC will review the preliminary plans for consistency with project specific design criteria.

b. Structure Selection

(1) QA/QC will review superstructure and substructure design, including bearing and railing type selections for consistency with WisDOT design criteria in the appropriate chapters of the WisDOT LRFD Bridge Manual. Foundation design will be reviewed for consistency with soils report recommendations. For girder structures, the preliminary design will be carried to sufficient detail to determine that girder spacing and girder depth are adequate for the intended span lengths and meet WisDOT minimum vertical clearance requirements. For slab structures, the preliminary design will be based on appropriate tables in the WisDOT LRFD Bridge Manual. The QA/QC will review the slab depth is adequate for the intended span lengths and meets WisDOT minimum vertical clearance requirements.

(2) QA/QC will review hydraulic design for consistency with WisDOT design procedures in the appropriate chapters of the WisDOT LRFD Bridge Manual.

(3) QA/QC will review structure alternative cost analysis.

(4) QA/QC will review SSR/RSSR for consistency with preliminary design drawings.

c. Constructability

(1) QA/QC will confirm existing structure type and location are shown on General Plan sheet. Existing plans will be referenced when available. Conflicts between existing and new structure will be identified.

(2) QA/QC will review roadway profile and abutment, pier, berm, and wing tip length/elevations for consistency with the site topographic map.

(3) QA/QC will review structure layout and utility locations and determine that appropriate correspondence has been initiated.

d. Plan Review

(1) QA/QC will review the bid items in the Total Estimated Quantities table. The most recent online version of the WisDOT Standard Specifications for Highway and Structure Construction will be referenced for bid item numbers. The bid items in the Total Estimated Quantities table in the drawings will be organized in the same order as they appear in the “Schedule of Bid Items” of the Standard Specifications.

(2) Preliminary plan preparation will utilize the Requirements of Drawings summary provided in Chapter 6 of the Bridge Manual. A copy of the summary will be placed in the QA/QC folder and items checked off by the QA/QC reviewer as they are reviewed.

9. Final Design Review

a. Design Computations

(1) Computer inputs/outputs will be checked by the designer and QA/QC reviewer. When appropriate, hand checks may be used to corroborate major structure elements provided in computer outputs.

(2) Drawings will be reviewed for the design loads, ratings, and stresses on the General Plan sheet.

(3) Reinforcing requirements indicated in calculations will be checked against drawings.

(4) Calculations will be initialed by the Structure Design Engineer and Structure Technical Reviewer (STR).

b. Plan Review

(1) Final plan preparation will utilize the Requirements of Drawings summary provided in Chapter 6 of the Bridge Manual. A copy of the summary will be placed in the QA/QC folder and items checked off by the QA/QC reviewer as they are reviewed.

(2) QA/QC will review the final plans for consistency with the archaeological, historical, environmental and utility commitments as summarized in the Design Study Report (DSR).

(3) QA/QC will review the final drawings for consistency with the aesthetic goals of the project. QA/QC will reference project files for Community Sensitive Design (CSD) requirements.

(4) QA/QC will review the final plans for consistency with project specific design criteria. QA/QC will reference project files for project specific design criteria.

(5) QA/QC will review drawings, specifications, and critical calculations and use a red pen to mark up documents. Plans will be clearly marked “QA/QC review by *****”. This set will be signed and dated by the reviewer. The Requirements of Drawings summary and checklist(s) will be reviewed and utilized in the review by the QA/QC reviewer. QA/QC reviewer(s) will meet with Project Manager and appropriate Project Engineers to go over review comments.

(6) QA/QC will pay particular attention to the quantities that make up the top 30 percent of the overall project cost. Such quantities will be earmarked by the Project Manager. These quantities will be reviewed by the QA/QC reviewer while others may be spot-checked. This QC measure will be in addition to that specified below for quantity calculations.

(7) Project Manager will work with Project Engineers to address the comments and develop a disposition of comments. Disposition of comments will be done either with a written record or directly on the QA/QC set of plans.

(8) Project Manager will review the disposition of comments along with completed set of drawings and specifications to determine that appropriate action was made. The disposition(s) and checklist(s) will then also be signed by the Project Engineer AND the Project Manager.

(9) The final QA/QC Review Summary Sheet will be initialed by the project designers and QA/QC team and will be included with the final submittal.

c. Design Quantities

(1) Quantity calculations will be kept in a project folder and will be organized according to bid item number. The bid items in the Total Estimated Quantities table in the drawings will be organized in the same order as they appear in the "Schedule of Bid Items" of the Standard Specifications. Quantities will be developed in accordance with WisDOT manuals. MathCAD and Excel spreadsheets will be used when possible for neatness and accuracy.

(2) The designer will calculate the quantities as the design progresses and will initial and date each calculation sheet.

(3) A project engineer, project manager, or QA/QC Engineer will provide an independent check of the quantities and will initial and date each calculation sheet.

(4) Quantities will be transferred from the project quantity calculation file to the Total Estimated Quantities table using linked spreadsheets.

(5) The Project Manager and QA/QC will confirm the quantities are correctly transferred from the project quantity calculation file to the Total Estimated Quantities table.

d. Special Provisions

(1) Bid items in the Special Provisions will be checked against the bid items used in the Summary and Schedule of Quantities. This will include bid item descriptions and units.

(2) Prior to the QA/QC review, the Project Manager and Project Engineer will independently review the special provisions and the Total Estimated Quantities table.

(3) QA/QC will review the Special Provisions for consistency with the archaeological, historical, environmental, and utility commitments.

e. Opinion of Probable Cost

(1) Design engineer will document the source of the unit cost values and include this with the opinion of probable cost computations. The QA/QC will review the opinion of probable cost including current unit cost values.

(2) QA/QC will review final opinion of probable cost versus the preliminary opinion of probable cost provided in the CDR and DSR. Discrepancies will be brought to the attention of the Project Manager.

f. PS&E and Bidability Review

PS&E preparation will utilize the Bidability Review Guide provided in Chapter 19 of the Facilities Development Manual. A copy of the summary will be placed in the QA/QC folder and items checked off by the QA/QC reviewer as they are reviewed.

10. Communication Plan

a. A QA/QC folder will be included in the project file. The QA/QC drawings, review comments, markups, and comment dispositions will be placed in the folder.

b. Meeting minutes, telephone communications, and other documentation providing project decisions and/or directives will be routed to the project team. The appropriate parties (Owner, WisDOT) will be copied as necessary. Such documentation will be filed in the job file and the correspondence file after the routing process and reviewed periodically.

c. Documentation of decisions and design directives will be provided to the QA/QC team.

d. Contacts

Client Contact:	Primary:	_____	Phone:	_____
	Secondary:	_____	Phone:	_____
Strand Contact:	Primary:	_____	Phone:	_____
	Secondary:	_____	Phone:	_____

11. Project Records

a. Project documentation, correspondence, calculations, field notes, and other information will be filed in the project file in the office of the Project Manager. The Project Manager will be responsible for filing project records. Correspondence will be filed in the offices correspondence file.

b. Computer files will be saved to the network, not to a local hard drive. Strand utilizes a backup system that protects data with on-site and off-site copies of active data. Backups are performed throughout the working day to minimize data loss due to human error or technology failure. Hard copies of output files will be stored in the project file.

12. List of Attachments

_____ Concept Definition Report (If Available)
_____ Agreement Special Provisions
_____ Budget and Manpower Task Breakdown
_____ Initial Project Schedule
_____ DSR
_____ Requirements of Drawings Summary
_____ Bidability Review Guide

13. Acknowledgment of QA/QC Plan

Discipline Coordinator: _____ Date: _____
Project Manager: _____ Date: _____
Structure Plan Checker: _____ Date: _____
Roadway Plan Checker: _____ Date: _____
Structure Technical Reviewer: _____ Date: _____
Roadway Technical Reviewer: _____ Date: _____
Hydraulics Technical Reviewer: _____ Date: _____
PSE Reviewer: _____ Date: _____

14. Distribution After Signatures

Originals: Discipline Coordinator–QA/QC Binder

Copy: Project File–Quality Control Folder