APPENDIX A

BUREAU OF BRIDGES AND STRUCTURES QUALITY CONTROL PLAN

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A.01 Purpose

The methods utilized on an annual basis by the Bureau of Bridges and Structures (BOBS) to measure and maintain quality inspection practices in accordance with the National Bridge Inspection Standards (NBIS) are documented in this appendix. The content is intended to supplement the information provided in Chapter 2 and serve as a resource for bridge owners to verify that adequate Quality Control (QC) procedures are being adhered to on an annual basis for each team leader they employ. Team leaders are encouraged to review this information and formulate a plan to address deficiencies identified by members within their organization, the Federal Highway Administration (FHWA), or the Michigan Department of Transportation (MDOT).

A.02 Inventory

BOBS is responsible for the inspection of structures designated as Big Bridges, which include large deck, unique, and complex structures. In addition, BOBS is delegated the responsibility of performing statewide fracture critical and fatigue sensitive element inspections for all region owned structures. This results in 51 routine and element NBI inspections with more than 5,000,000 square feet of structural deck, 64 fracture critical inspections on NBI bridges, and an additional 189 fatigue sensitive element inspections.

Routine and fracture critical inspections of bridges owned by the Department of Natural Resources (DNR) that meet or exceed NBIS length requirements are also completed by MDOT through a partnership agreement with the DNR. Although assistance from region bridge staff and consultants is periodically utilized, BOBS maintains overall inspection responsibility for DNR bridges.

A.03 Structure Selection

In accordance with the requirements specified in Chapter 2, QC file reviews must be conducted on a minimum of 5% of the NBI bridges inspected annually by each team leader. Field reviews must be subsequently completed on at least 50% of the files selected. All QC reviews must be completed within 18 months of the previous inspection date.

BOBS will select structures for review by both random and deliberate methods to assure quality inspections and enhanced safety. Prior to April of each year, a list of the applicable structures that were inspected by each team leader is generated. BOBS will make every effort to ensure that selection is representative of the entire bridge inventory and doesn't rely heavily on one structure type or condition. A series of random numbers are used to generate the initial subset of locations and the list is then organized by condition ratings for each type of inspection.

A.04 QC Program Organization

The QC program within BOBS is conducted by individuals within the Structure Preservation and Management Section. Every individual in the Bridge Inspection Unit meets and maintains NBIS inspection certification. In addition, certain Statewide Reachall Crew members also meet NBIS requirements as their assistance can mitigate repetitive site visits which adversely affect public mobility and worker safety. The individuals performing inspections for BOBS and their designated QC roles are provided in Table A.04.01. Region staff may also assist in BOBS QC reviews.

Table A.04.01 Bureau of Bridges and Structures Quality Control Roles

Name	Work Area	File Review	Field Review
Allie Nadjarian	Bridge Inspection	Primary	Primary
Andrew Bouvy	Bridge Inspection	Primary	Primary
James Covey	Bridge Inspection	Primary	Primary
Christopher Zube	Bridge Inspection	Primary	Primary
Jason Barnhart	Statewide Reachall Crew	Secondary	Primary
Dan Wisneski	Statewide Reachall Crew	Secondary	Primary

A.05 File Reviews

File review activities will be performed periodically throughout the calendar year to ensure the contents of the applicable files are complete. The file review will commence by using a BOBS quality control checklist which will serve as a guide for the QC reviewer, permit consistent and accurate reviews, and provide documentation of necessary changes. The form will be reviewed and updated annually to account for any changes to the NBIS, AASHTO, or MDOT policies and guidelines.

A.05.01 Structure Inventory and Appraisal File Review

The Structure Inventory and Appraisal (SI&A) report will be reviewed first and several key items will be recorded on the checklist. This will serve as an aid in determining whether there are any outstanding data deficiencies.

A.05.02 Bridge Safety Inspection Report File Review

The Bridge Safety Inspection Report (BSIR) will be reviewed for structures designated as Big Bridges and DNR bridges. The most current inspection report should be submitted in MiBRIDGE within 30 days of completing the inspection. Comments should be provided to the region bridge engineer when discrepancies are identified during the review of either the fracture critical inspection report (FCIR) or fatigue sensitive inspection report (FSIR).

The file review of the BSIR will focus on determining whether the quality of comments provided support the condition rating. Comments should be included for all items on the BSIR and the level of detail should increase as condition ratings decrease. MDOT's NBI Rating Guidelines should be used when recording

comments. The File QC checklist will be used to note deficient comments and document follow up discussion with the team leader.

All complex bridges in the inventory require bridge specific inspection procedures and qualification requirements. These will be reviewed during the QC process to determine if any improvements may be incorporated.

The inspection frequency will be reviewed to determine whether it is appropriate for condition. When the inspection interval does not conform to the MDOT Guidelines for Bridge Inspection Frequencies the inconsistency will be identified on the QC checklist. The factors contributing to a decrease in condition rating will be reviewed in order to determine whether the frequency should be modified. If the frequency is not increased a justification shall be provided on the BSIR.

MDOT policy requires stream bed cross sections, scour evaluations, bridge plans, load rating calculations and photos of posting signs to be uploaded to the Documents tab in MiBRIDGE. The QC reviewer should confirm that all documentation has been uploaded, and that waterway data is in compliance with MDOT Bridge Inspection Frequency Guidelines. The stream bed cross sections, scour evaluation, scour plan of action, high flow inspection, and scour inspection should be reviewed for accuracy.

A.05.03 Fracture Critical and Fatigue Sensitive Inspection Report File Review

Highlighted drawings of fracture critical elements must be included in the bridge file. If the drawings are missing a new document must be generated prior to the next scheduled inspection. The QC reviewer should review the drawings and determine if all applicable fracture critical members have been accounted for on the FCIR and drawing.

In addition, bridge specific inspection procedures should be included in the report or as a separate document that adequately describe the unique requirements for each structure. Recommended items to account for include the traffic control, specialized equipment for hands-on inspection access, and type of elements requiring inspection. Continued improvement and development of the procedures during subsequent inspections should be emphasized during the QC review with specific examples of additional information that may benefit subsequent inspections.

Fatigue Sensitive reports should also include identification of the detail to be inspected on the FSIR. Historical information related to cracking, retrofits, or repairs should be identified in the comments section.

Both the FCIR and FSIR assigned condition codes and comments should be reviewed to determine if the condition rating provided is supported. The process for identifying and resolving deficient comments will be completed as described above.

A.05.04 Underwater Diving Inspection Report File Review

The Underwater Diving Inspection Report (UDIR) should be reviewed during annual QC reviews to verify that the information presented in the report has been reviewed by the team leader conducting routine

inspections and that any pertinent information potentially impacting the condition ratings has been accounted for in the BSIR.

The QC review should verify that the underwater diving team leader's credentials are in the bridge file. This information is subject for examination during annual FHWA program reviews, quality assurance assessments, and bridge program audits. Missing information should be requested.

The QC review should also confirm that the inspection procedures identified on the report are adequate. At a minimum, the procedures should include information regarding the required number of team members, a description of qualifications, the level of inspection required, location(s) identified, and a process for identifying deteriorated elements. The submerged components and any unique risk factors must be clearly described.

The recommended inventory and appraisal ratings should be reviewed to verify that they are consistent with the data entered by the team leader performing the routine inspection. If the recommended rating coding varies by more than one, additional evaluation will be necessary to confirm the accuracy of the data. In these cases, an explanation should be provided to clarify the cause or basis relating to the dissimilarity in data.

Understanding the locations of reported scour is important for monitoring stream bed elevation changes during routine inspections. The QC reviewer should review the information in the UDIR including sketches or cross-sections to identify areas where scour is concerning. The BSIR should note the locations of active scour and any action taken to verify changes.

A.05.05 Element Inspection Report File Review

The bridge file should contain calculations for determination of the overall quantities of the elements listed on the report. The dimensions and calculations may be rounded to the nearest whole number and condition states identified as an overall percentage in relation to the total quantity calculated. The primary purpose of the QC review will be to determine if any elements are missing and to identify any grossly misrepresented quantities of deterioration.

A.05.06 Additional Inspection Reports

The QC reviewer shall identify any additional reports that should be contained within the individual bridge file. The information contained within the report should be thoroughly examined to determine whether additional follow-up actions are necessary, to confirm the inspection frequency is adequate, and to verify if the work is being conducted in accordance with the practices identified in the NBIS and MiSIM.

A.05.07 Load Rating Documentation

The QC reviewer should verify that the Load Rating Assumption and Summary Sheets have been completed in MiBRIDGE and that the rating considers the field condition of members.

A.06 Field Reviews

Field reviews will include verifying applicable SI&A/SNBI items are coded correctly and confirm that the condition ratings and supporting comments on the inspection reports are accurate. A copy of the BSIR should be marked up to document the recommendations along with filling out the Field Quality Control Checklist. When possible, the team leader should accompany those performing the QC review to answer questions.

A brief summary will be provided to Bridge Inspection Program Manager if ratings are found to deviate by more than +/- 1, comments are severely lacking, or a safety issue was identified.