INDOT

Bridge and Culvert Preservation Initiative

Policy Statement

July 11, 2014

Approved:

Jason Wasson, Deputy Commissioner of INDOT, Engineering & Asset Management Business Unit

Date: 7/23/2014

Concurrence:

Richard J. Marquis, Indiana Division Administrator Federal Highway Administration

Date: 8/15/2014
1.0 General

1.1 Program Description

Bridge and Culvert Preservation consists of activities performed on bridge or culvert elements or components that aim to prevent, delay, or mitigate deterioration. Preservation actions may be scheduled or condition driven. Preservation activities do not entail structural or operational improvements of an existing asset beyond its originally designed strength or capacity.

The goal of the Bridge and Culvert Preservation Initiative (BCPI) is to implement a strategic, long term program of identifying, programming, budgeting, and completing bridge and culvert preservation projects to improve the statewide condition of these assets at the lowest possible cost to taxpayers. BCPI is only one component of INDOT’s overall bridge and culvert program, which includes elements of INDOT’s capital and maintenance programs, as managed by the Bridge Asset Management Team (BAMT).

The BCPI is subdivided into 3 categories, due to differing inspection and management practices. INDOT’s approximate inventory of each category:

1. Bridges and Bridges Under Fill (Span > 20’) Approximately 5,500
2. Large Culverts (Span between 4’ and 20’) Approximately 9,000
3. Small Culverts (Span < 4’) Approximately 90,000

1.2 Benefits

The long-term benefits of the BCPI will be:

1. A reduction in the number of bridges, large culverts, and small culverts with key condition ratings going from good/fair to poor.
2. An overall network increase in the percentage of bridges, large culverts, and small culverts with key condition ratings of fair or better.
3. Support INDOT’s mission statements: “INDOT will plan, build, maintain and operate a superior transportation system enhancing safety, mobility and economic growth.”
4. Supports INDOT’s Open Roads (Practical Design) Initiative by implementing low-cost project solutions that enhance the overall condition and function of bridges without sacrificing safety.
### 1.3 Measures

INDOT’s network of bridge conditions will be determined by INDOT’s Bridge Inspection Application System (BIAS) Database. Large culvert conditions will be determined by District maintained large culvert databases. Small culvert conditions will be determined by the Work Management System (WMS).

The BCPI will allow INDOT to maintain structures in good or fair condition and as a component of INDOT’s overall structure program will assist with improving the overall condition of INDOT structures. Benefits will be measured annually by assessing condition ratings in the following criteria:

1. A reduction in the number of bridges and culverts with key condition ratings going from good/fair to poor:
   a. **Bridges**: measure the number of bridges with Wearing Surface, Deck, Superstructure, Substructure, or Culvert rating that changed from 5 or higher (≥ 5) to 4 or below (≤ 4) the past year
   
   b. **Bridges Under Fill**: measure the number of bridges with Culvert rating that changed from 5 or higher (≥ 5) to 4 or below (≤ 4) the past year
   
   c. **Large Culverts**: measure the number of culverts with Culvert rating that changed from 5 or higher (≥ 5) to 4 or below (≤ 4) the past year
   
   d. **Small Culverts**: measure the number of culverts with Culvert rating that changed from 5 or higher (≥ 5) to 4 or below (≤ 4) the past year

2. An overall network increase in the percentage of bridges and culverts with key condition ratings of fair or better.
   a. **Bridges**: measure the percentage of bridges with:
      i. Wearing Surface rated 5 or higher (≥ 5)
      ii. Deck rated 5 or higher (≥ 5)
      iii. Superstructure rated 5 or higher (≥ 5)
      iv. Substructure rated 5 or higher (≥ 5)
   
   b. **Bridges Under Fill**: measure the percentage of bridges with Culvert rated 5 or higher (≥ 5)
   
   c. **Large Culverts**: measure the percentage of culverts with Culvert rated 5 or higher (≥ 5)
   
   d. **Small Culverts**: measure the percentage of culverts with Culvert rated 5 or higher (≥ 5)
2.0 Available Treatments

Qualified BCPI treatments may be considered as:

1. **Preventive Maintenance** – Specific activities that are scheduled on a fixed cycle that are intended to maintain a structure at its current level, and prevent or reduce deterioration.

2. **Corrective Maintenance** – Specific activities that are condition driven, intended to correct defects and prevent or reduce deterioration.

2.1 Preventive Maintenance Activities and Treatments

**Bridge preventive maintenance** activities include:

1. Cleaning/Flushing Bridge Decks
2. Substructure/Superstructure Washing
3. Cleaning Deck Drains
4. Cleaning/Lubricating Bearings
5. Cleaning Joints
6. Deck Sealing

2.2 Corrective Maintenance Treatments

**Bridge Corrective Maintenance** activities include:

1. Bridge Culvert Liner
2. Deck Patching (shallow/deep) – maximum 10% deck area
3. Approach Slab Repair/Replacement
4. Joint Repair/Replacement
5. Mudwall Patching
6. Thin Deck Overlay (e.g. Polymeric Overlay)
7. Spot Coating
8. Substructure Patching/Sealing
9. Superstructure Crack Mitigation
10. Erosion Mitigation
11. Debris Removal/Channel Cleaning
12. Latex Modified Concrete (LMC) Overlay
13. SlopeWall Repair/Replacement
14. Bearing Repair/Replacement
15. Scour Mitigation
16. Deck Crack Sealing
17. Brush Cutting/Herbicide Application*
18. Railing Repair*
19. Relief Joint Repairs*
20. Upgrading end treatments, guardrail, railing, attenuators* **
Large Culvert Corrective Maintenance activities include:

1. Culvert Liner
2. Structural Patching
3. Scour/Erosion Mitigation
4. Cutoff Wall Repair/Replacement
5. Headwall/Wingwall Repair/Replacement
6. Tiedown/Anchor Repair/Replacement
7. Debris Removal/Culvert Cleaning
8. Paved Invert
9. Brush Cutting/Herbicide Application*
10. Railing Repair*
11. Upgrading end treatments, guardrail, railing, attenuators* **

Small Culvert Corrective Maintenance activities include:

1. Culvert Liner
2. Structural Patching
3. Erosion Mitigation
4. Cutoff Wall Repair/Replacement
5. Headwall/wingwall Repair/Replacement
6. Tiedown/Anchor Repair/Replacement
7. Debris Removal/Culvert Cleaning
8. Brush Cutting/Herbicide Application*
9. Guardrail Repair*
10. Upgrading end treatments, guardrail, railing, attenuators* **

*Item may only be included in a project incorporating other preservation treatments  
**When found to be cost-effective (See Section 5.0 Planning and Project Development)
3.0 Selection Criteria

3.1 Candidate Project Generation

Bridges and culverts are inspected on a regular cycle. In general, bridges are inspected by bridge inspection crews on a 2-year cycle, large culverts are inspected by bridge inspection crews on a 3-year cycle. Small culverts are inspected by Maintenance personnel on a 4-year cycle. Candidates for preservation treatments will be generated from inspection data contained in BIAS, District maintained large culvert databases, and WMS.

Eligibility criteria for each treatment listed in Section 2.0 Available Treatments are listed on the following tables:

3.1.1 Bridge Candidate Selection

3.1.1.1 Bridge Candidate Criteria: Preventative Treatments

<table>
<thead>
<tr>
<th>Preventive Treatments</th>
<th>Bridge Component</th>
<th>Condition Rating</th>
<th>Cycle (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning/Flushing Bridge Decks</td>
<td>Item 58</td>
<td>&gt;4</td>
<td>1</td>
</tr>
<tr>
<td>Substructure/Superstructure Washing</td>
<td>Item 59; AND Item 60</td>
<td>&gt;4</td>
<td>1</td>
</tr>
<tr>
<td>Cleaning Deck Drains</td>
<td>Item 58</td>
<td>&gt;4</td>
<td>1</td>
</tr>
<tr>
<td>Cleaning/Lubricating Bearings</td>
<td>Item 59A</td>
<td>&gt;4</td>
<td>1</td>
</tr>
<tr>
<td>Cleaning Joints</td>
<td>Item 58.15; AND Item 58.16; AND Item 58.16 A; AND Item 58.16 B; AND Item 58.16 C</td>
<td>&gt;4</td>
<td>1</td>
</tr>
<tr>
<td>Deck Sealing</td>
<td>Item 58.01 &amp; Item 58.02</td>
<td>&gt;5</td>
<td>5</td>
</tr>
</tbody>
</table>
### 3.1.1.2 Bridge Candidate Criteria: Corrective Treatments

<table>
<thead>
<tr>
<th>Corrective Treatments</th>
<th>Bridge Component</th>
<th>Condition Rating</th>
<th>Other Criteria (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Culvert Liner</td>
<td>Item 62</td>
<td>= 2-5</td>
<td>N/A (3)</td>
</tr>
<tr>
<td>Deck Patching (shallow/deep)</td>
<td>Item 58.01</td>
<td>&gt; 4</td>
<td>D/SS &gt; 4 ; AND Maximum 10% Deck Patching</td>
</tr>
<tr>
<td>Approach Slab Repair/Replacement</td>
<td>Item 72X.02</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Joint Repair/Replacement</td>
<td>Item 58.16</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Mudwall Patching</td>
<td>Item 60.02</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Thin Deck Overlay (e.g. Polymeric Overlay)</td>
<td>Item 58.01</td>
<td>&gt; 5</td>
<td>D/SS &gt; 4 ; AND Maximum 10% Deck Patching</td>
</tr>
<tr>
<td>Spot Coating</td>
<td>Item 59B.01</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Substructure Patching/Sealing</td>
<td>Item 60</td>
<td>N/A</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Superstructure Crack Mitigation</td>
<td>Item 59A.06 ;</td>
<td>Check Box Indicating Cracks</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td></td>
<td>OR Item 59A.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erosion Mitigation</td>
<td>Item 61</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Debris Removal/Channel Cleaning</td>
<td>Item 61.03</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Latex Modified Concrete (LMC) Overlay</td>
<td>Item 58.01</td>
<td>&gt; 3</td>
<td>D/SS &gt; 5 ; AND Maximum 15% Deck Patching</td>
</tr>
<tr>
<td>Slopewall Repair/Replacement</td>
<td>Item 60</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Bearing Repair/Replacement</td>
<td>Item 59A</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Scour Mitigation</td>
<td>Item 113</td>
<td>= 2-3</td>
<td>Not Programmed for Bridge Replacement</td>
</tr>
<tr>
<td>Deck Crack Sealing</td>
<td>Item 58.01</td>
<td>&gt; 5</td>
<td>D/SS &gt; 5</td>
</tr>
<tr>
<td>Brush Cutting/Herbicide Application (1)</td>
<td>Deficiency Noted</td>
<td>N/A</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Railing Repair (1)</td>
<td>Deficiency Noted</td>
<td>N/A</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Relief Joint Repairs (1)</td>
<td>Item 72X.03</td>
<td>&lt; 6</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>Upgrading end treatments, guardrail, railing,</td>
<td>N/A</td>
<td>N/A</td>
<td>WS/D/SS &gt; 4</td>
</tr>
<tr>
<td>attenuators (1)(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Item may only be included in a project incorporating other preservation treatments
(2) WS = Wearing Surface (58.01); D = Deck (58); SS = Superstructure (59) AND Substructure (60)
(3) Preservation treatment shall raise the condition rating to 5 or higher (≥5)
(4) When found to be cost-effective (See Section 5.0 Planning and Project Development)
### 3.1.2.1 Large Culvert Candidate Criteria

<table>
<thead>
<tr>
<th>Corrective Treatments</th>
<th>Culvert Component</th>
<th>Condition Rating</th>
<th>Barrel/Box Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert Liner (Both Type I &amp; 2 Structures)</td>
<td>Barrel/Box</td>
<td>= 2-5</td>
<td>N/A(2)</td>
</tr>
<tr>
<td>Structural Patching</td>
<td>Slab/Barrel/Box</td>
<td>&gt; 4</td>
<td>N/A</td>
</tr>
<tr>
<td>Scour/Erosion Mitigation</td>
<td>Channel Scour</td>
<td>&lt; 6</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Cutoff Wall Repair/Replacement</td>
<td>Footings</td>
<td>&lt; 6</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Headwall/Wingwall Repair/Replacement</td>
<td>Headwall/Anchors/Wingwalls</td>
<td>&lt; 6</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Tiedown/Anchor Repair/Replacement</td>
<td>Headwall/Anchors</td>
<td>&lt; 6</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Debris Removal/ Culvert Cleaning</td>
<td>Drift/Sediment/Unobstructed Flow Box</td>
<td>&lt; 6 ; AND checkbox &quot;unchecked&quot;</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Paved Invert</td>
<td>Barrel/Box</td>
<td>= 2-5</td>
<td>N/A</td>
</tr>
<tr>
<td>Brush Cutting/Herbicide application(1)</td>
<td>Embankment</td>
<td>&lt; 6</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Railing Repair(1)</td>
<td>Guardrail/Concrete Barrier</td>
<td>&lt; 6</td>
<td>&gt; 5</td>
</tr>
<tr>
<td>Upgrading end treatments, guardrail, railing, attenuators(1)(3)</td>
<td>N/A</td>
<td>N/A</td>
<td>&gt; 5</td>
</tr>
</tbody>
</table>

(1) Item may only be included in a project incorporating other preservation treatments
(2) Preservation treatment shall raise the condition rating to 5 or higher (≥5)
(3) When found to be cost-effective (See Section 5.0 Planning and Project Development)
### 3.1.3 Small Culvert Candidate Selection

#### 3.1.3.1 Small Culvert Candidate Criteria

<table>
<thead>
<tr>
<th>Corrective Treatments</th>
<th>Culvert Element</th>
<th>Condition Rating</th>
<th>Barrel Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culvert Liner</td>
<td>Culvert Condition</td>
<td>2-5</td>
<td>N/A</td>
</tr>
<tr>
<td>Structural Patching</td>
<td>Culvert Condition</td>
<td>&lt;6</td>
<td>N/A</td>
</tr>
<tr>
<td>Erosion Mitigation</td>
<td>Flow line/End Section</td>
<td>&lt;6</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Cutoff Wall Repair/Replacement</td>
<td>Flow line/End Section</td>
<td>&lt;6</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Headwall/Wingwall Repair/Replacement</td>
<td>End Section</td>
<td>&lt;6</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Tiedown/Anchor Repair/Replacement</td>
<td>End Section</td>
<td>&lt;6</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Debris Removal/Culvert Cleaning</td>
<td>Flow Line/ Culvert Condition</td>
<td>&lt;6</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Brush Cutting/Herbicide Application(^1)</td>
<td>Embankment</td>
<td>&lt;6</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Guardrail Repair(^1)</td>
<td>N/A</td>
<td>N/A</td>
<td>&gt;5</td>
</tr>
<tr>
<td>Upgrading end treatments, guardrail, railing, attenuators(^1)((^3))</td>
<td>N/A</td>
<td>N/A</td>
<td>&gt;5</td>
</tr>
</tbody>
</table>

\(^1\) Item may only be included in a project incorporating other preservation treatments  
\(^2\) Preservation treatment shall raise the condition rating to 5 or higher (≥5)  
\(^3\) When found to be cost-effective (See Section 5.0 Planning and Project Development)
3.2 Candidate Project Selection and Approval

The Central Office Division of Bridges will prepare a candidate list of BCPI projects from the appropriate databases. The District Bridge Asset Management (BAM) Engineer will review the candidate project list and develop a list of proposed structures and treatments from the candidate project list or develop a list of proposed structures and treatments using their own methodology. Regardless of the methodology used to develop the list of proposed projects, all structures must meet the criteria identified for the treatment(s) proposed. Preservation projects should not typically be considered if future rehabilitation or complete replacement work is programmed within the life of the preservation treatment.

The District BAM Engineer will rank the projects on their list according to priority and the method of performing the work (INDOT work forces or contract). After the candidate projects are approved by the appropriate District Management, the Bridge Asset Management office within the Bridge Division will review the proposed projects for compliance with the BCPI policy statement. The final candidate list of proposed projects will be reviewed and approved by the BAMT according to Section VII. “Exception to the Rules for Scoring” and prioritized to match the available funding.

The approved candidate list will be submitted to the Project Management Group (PMG) and Executive Funds Team (EFT) for approval.
4.0 Funding

BCPI contracts utilizing treatments detailed in Sections 2.1 and 2.2 are eligible for federal funding. Because INDOT and FHWA do not have a Force Account Cost Effectiveness Determination Agreement covering the treatments detailed in Sections 2.1 and 2.2, projects performed by INDOT forces are not eligible for federal funding. Projects on the NHS are eligible for National Highway Performance Program (NHPP) or Surface Transportation Program (STP) funding; projects not on the NHS are eligible for Surface Transportation Program (STP) funding.

5.0 Planning and Project Development

Once project are approved, Districts will be notified to input their respective approved and funded projects in the Scheduling Project Management System (SPMS). All BCPI contracts must be programmed in SPMS; and be included in the State Transportation Improvement Plan (STIP) and TIP if in a Metropolitan Planning Organization. For bridge and large culvert projects, a separate DES number will be programmed for each structure.

Districts are generally responsible for developing the approved list of structures and treatments into projects and contracts. All INDOT contracting procedures, NEPA, ROW, permitting requirements, Indiana Design Manual, and INDOT Standard Specifications are applicable to BCPI projects.

BCPI projects should consider appropriate means to maintain or enhance the current level of safety. Isolated or obvious deficiencies should always be addressed. Safety enhancements such as the installation or upgrading of guardrail and end treatments/impact attenuators should be encouraged and included in projects where they are determined to be a cost-effective way to improve safety. In no way should BCPI projects adversely impact the safety of the traveled way or its users.

BCPI projects will use SPMS program class “Bridge/Culvert Preservation Initiative” and the FMIS Improvement Code “Bridge Preservation”.

The Bridge Rehabilitation Office of the Bridge Division will be involved during the scoping process by attending field checks, assisting and advising the District BAM Engineer to ensure the proper scope of work is recommended. As a minimum, the Bridge Rehabilitation Office will review and approve the scope of work for all Latex Modified Concrete Overlay projects.

All other SPMS entries and programming requirements for contract work should be the same as for any other structure project (NBI#, location, RP’s, work type, etc.).
6.0 Reporting
At the end of each State fiscal year, the Division of Bridges will prepare a summary report on the status of this initiative. As a minimum, the report will include the following:

1. List of structures and treatments by District and contract
   a) Including structure numbers
   b) Total contract and unit costs
2. Measures described in Section 1.3 Measures tracked over the previous 5 years.

7.0 Supporting Information
The following sources have been used in support of this procedure:

1. INDOT Procedure for Pavement Preservation Initiative
2. INDOT Small Structure Preservation Program
3. 2008 Annual Report on Condition of INDOT Bridges
4. Programmatic Approach for Pipe Lining Projects (October 2009)
5. INDOT Bridge and Structure Information System
6. INDOT Work Management System
7. IDM Chapter 412 - Bridge Rehabilitation
8. IDM Chapter 203 – Hydraulic and Drainage Design
9. INDOT Crew Leader’s Handbook
10. INDOT Project Scoring Guidelines and Business Rules for Bridge and Large Culvert Asset Program (August 27, 2013)
11. FHWA Preventive Maintenance Eligibility memo (October 2004)
8.0 Glossary of Terms

The following is a list of terms and abbreviations used in this document.

BAMT - Bridge Asset Management Team
BCPI - Bridge and Culvert Preservation Initiative
BIAS - Bridge Inspection Application System
DES Number - Designation Number, Unique project identifier in SPMS
FHWA - Federal Highway Administration
FY - Fiscal Year. Indiana’s fiscal year runs July 1 thru June 30.
IDM - Indiana Design Manual
MPO - Metropolitan Planning Organization
NCPP - National Center for Pavement Preservation
PM - Preventive Maintenance
SPMS - Scheduling Project Management System, INDOT’s project scheduling and tracking system
STIP - Statewide Transportation Improvement Plan
TIP - Transportation Improvement Program, managed by an MPO
Appendix A: Sample Reporting of Measures

The following are sample charts of the measures to be reported per Sections 0 and 5.0.

Sample chart per Section 0.1.a.

![Number of Bridges w/ Components that Changed from Good/Fair to Poor the Past Year]

Sample chart per Sections 0.1.b., 0.1.c., and 0.1.d.

![Number of Structures w/ Culvert Rating that Changed from Good/Fair to Poor the Past Year]
Sample chart per Section 0.2.a.

Number/Percentage of Bridges with Components in Good/Fair Condition

Sample chart per Section 0.2.b., 0.2.c., and 0.2.d.

Number/Percentage of Structures w/ Culvert Rating in Good/Fair Condition