May 6, 2020

Mr. Craig Bessinger, City Manager  
City of Ferrysburg  
17290 Roosevelt Road  
PO Box 38  
Ferrysburg, MI  49409-0038

RE: Bridge Inspection Report

Dear Mr. Bessinger:

We have completed routine inspections for the City’s two (2) bridges managed under the National Bridge Inspections Standards. A summary of the significant findings is as follows:

RIDGE AVENUE OVER CSX RAILROAD (SN 8940)

- This is a three-span adjacent box beam structure with asphalt wearing surface concrete sidewalk (north side) and concrete parapet railings. It was constructed in 1987.
- At the east end, the structure shares a pier with the MDOT bridge crossing US-31.
- The structure is in fair to good condition. Several maintenance items were identified to prevent premature deterioration.
- Cracking in the asphalt wearing surface is mostly sealed. We recommend continuing to seal cracking periodically to mitigate leakage through the superstructure.
- The expansion joints are newer construction. Periodic removal of debris is recommended, as debris can prevent proper movement of the structure and damage the expansion gland that seals the joint.
- Damage to the railings was primarily superficial. We noted an offset at the east pier, but it does not appear to have worsened from prior inspections.
- We noted spalling on the face of the concrete sidewalk near each pier. Patching is recommended.
- We noted scattered efflorescence and other signs of leakage on the box beams and one area of cracking in the southeast. Mitigating leakage with crack and joint sealing at the surface is important to slow the rate of deterioration.
- Cracking and minor spalling was noted on the piers. It should be monitored during subsequent inspections and addressed if the condition worsens.
- The slopes around the west abutment have significant tree and brush growth, which is encroaching on the concrete slope paving. Periodic removal is recommended.
- Sandy material appears to be leaking through the bearing area in the northwest. We did not note significant settlement above, but this area should be monitored during subsequent inspections.

**WEST SPRING LAKE ROAD OVER SMITH’S BAYOU (SN 8941)**

- This is an-eight span adjacent box beam structure with asphalt wearing surface, concrete sidewalks and 3-tube railings.
- The condition does not appear to have significantly worsened since our inspection in August of 2019.
- The asphalt wearing surface is in critical condition with widespread alligator cracking and cold patching.
- The joints are in poor condition, with cracking throughout the concrete headers and scattered spalling. Significant leakage was noted on the substructure.
- The railings and sidewalks are in fair condition with scattered minor issues noted.
- Several beams are in poor to critical condition with corner spalling and exposed/broken strands. Many of the beams are in fair to good condition.
- The abutments are in good condition but need additional riprap to protect the surrounding banks and channel bottom.
- The piers are in poor condition with cracking and spalling on the caps and concrete column jackets. Some of the FRP jackets are loose.
- Posting signage is in place to restrict loading on the bridge to 20 tons with no trucks.
- Routine maintenance alone is no longer effective for this structure. An application to the MDOT Local Bridge Program is being prepared to address the condition issues listed above.

We appreciate the opportunity to assist you with this project. Photos taken during our inspections are enclosed, along with inspection reports and quality control information for your bridge files. Please feel free to contact us with any questions.

Sincerely,

FLEIS & VANDENBRINK

Jonathan W. Moxey / P.E.
Project Manager/Lead Bridge Inspector

Enclosures
RIDGE AVENUE OVER CSX RAILROAD
STRUCTURE #: 8940
PHOTOS: APRIL 28, 2020

View of structure from approach area

Elevation view of structure
Sealed cracking in west approach

Sealed cracking in west approach
Sealed and unsealed cracking on asphalt wearing surface, west span

Sealed and unsealed cracking on asphalt wearing surface
Debris in west expansion joint

Ponding on edge of asphalt wearing surface, north side of center span
Ponding on edge of asphalt wearing surface, north side of center span

Minor damage on tube railing
Debris and ponding on east expansion joint

Sidewalk cover plate on east expansion joint
RIDGE AVENUE OVER CSX RAILROAD
STRUCTURE #: 8940
PHOTOS: APRIL 28, 2020

Expansion joint at east end of structure with ponding and debris

Spalling on face of sidewalk near expansion joint
Spalling on face of sidewalk near expansion joint

Ponding on edge of surface, south side of center span
RIDGE AVENUE OVER CSX RAILROAD
STRUCTURE #: 8940
PHOTOS: APRIL 28, 2020

Minor scrapes on south concrete parapet

Railing offset at east pier
Minor vertical cracking in concrete parapet

Brush growth on southwest slope
Vegetation growth in slope paving joints at west abutment

Leakage on concrete pier, north end of west pier
Efflorescence at box beam joint near west pier

Efflorescence at box beam joint
Sandy debris at northwest bearing area

Efflorescence at post tensioning pocket grout
Brush and tree growth encroaching on slope paving in northwest

Evidence of leakage on pier cap
Efflorescence at box beam joints

Efflorescence and grout spalling at box beam joints
Minor spalling on bottom of east pier cap

Efflorescence at box beam joints
Grout spall and beam cracking near southeast corner of structure

Cracking on bottom of east pier cap
Jon Moxey, P.E.
Fleis & VandenBrink Engineering
24
04/28/2020

1. Surface (SIA-58A)
HMA wearing surface with 1/8"-1/4" longitudinal and transverse cracking, mostly sealed. Cracking is primarily near west abutment and west pier, scattered elsewhere. Ponding noted along the edges, especially in the center span. (04/20)
HMA Wearing Surface. Longitudinal cracks near center of West end of Span 1W. Several random cracks in rest of spans. No spalling or segregation. (04/18)
HMA shows no cracks or delaminations. Some aggregate on the A Approach is more prevalent ie it has the appearance of a segregation. (04/16)

2. Expansion Joints
Newer expansion joint devices with cover plates at the sidewalk. Joints are filled with sand/debris. Ponding noted on north side of east abutment (shared with US-31 structure). Superficial spalling and hairline cracking noted in the concrete joint headers. (04/20)
Deck: Strip seal expansion joints. All joints filled with sand/debris. Leaves clogging joint at south end of Joint 1W. Evidence of leakage below Joint 1W over Beams 6S, 9S, & 10S. Edges of surrounding concrete cracked at all joints with some transverse cracking perpendicular to joints. Sidewalk: Sliding plate expansion joints, Sidewalk expansion joints seem to be functioning. Cover plates in place and aligned well. (04/18)
Small leak on Joint 1 over beam 1 and joint 2 over beam 10. (04/16)

3. Other Joints
West reference line has been sealed. (04/20)
Cold joint at West Abutment. Joint has been sealed. (04/18)
Sidewalk expansion joint seems to be functioning. Cover plate is in place and aligned well. (04/16)

4. Railings
Single tube on solid parapet. Concrete surface coating is intact. Scattered hairline to 1/16" vertical cracking in parapets. Minor tube damage west of east pier on north side. Tube railing is offset approximately 1.25" on north and south side at east pier. Minor scrapes on south parapet. (04/20)
Single Tube on solid parapet. Concrete Surface Sealer applied in '13. Minor random vertical and transverse shrinkage cracks < 1/16" in concrete portion of railing along both sides of structure. Tube railing is offset approx. 1.25" at Joint 2W between Spans 2W & 3W. (04/18)
Single Tube on solid parapet. Railing height 41" not 42". Concrete Surface Sealer applied in '13. (04/16)

5. Sidewalks or Curbs
Spalling noted on face of sidewalk - 12"x4"x2" west of east pier, 48"x6"x2" west of west pier. 1/16" cracking and delamination at west pier. Scattered hairline to 1/16" longitudinal and transverse cracking. (04/20)
Spalls in sidewalk curb: approx. 6ft long West of Joint 1W; 12"x4" approx. 3.5ft West of Joint 2W. Longitudinal cracks; middle of Spans 1W & 3W. Transverse cracks: approx. 10ft & 5ft West of Joint 1W; approx. 6ft & 3ft East of Joint 2W. Diagonal crack: approx. 1/8" crack at skewed portion of sidewalk at Joint 3W. (04/18)
Shrinkage cracks present in sidewalk, no change from 2014 inspections. (04/16)

6. Deck Bottom Surface (SIA-58B)
Side by side box beams. (04/20)
Side by Side Box Beams. Deck not visible. (04/18)
side by side boxes, deck not visible, no remarkable change from previous observation. (04/16)
7. Deck
(SIA-58)
Side by side box beams. Rating based on limited deterioration of asphalt wearing surface and no significant deterioration noted on fascias. (04/20)
Side by Side Box Beams. Rating based on HMA Wearing Surface. (04/18)
No observed defects (04/16)

8. Drainage
Surface drains to west approach. (04/20)
No drainage on structure. (04/18)

SUPERSTRUCTURE

9. Stringer
(SIA-59)
Efflorescence at box beam joints is primarily outer 2 joint lines and near reference lines, scattered elsewhere. Efflorescence noted on post tensioning pockets. 3' grout spall span 1W at west pier, joint 2N. 8' long area of cracking and delamination in bottom of beam 2S at east abutment (pier 3W). (04/20)
Efflorescence on almost all grouted joints. Water leaking from grouted joints at Joint 10S near middle of Span 1W; Joints 9S & 10S at Pier 1W. Approx. 8ft long crack in bottom of Beam 2S at Pier 3W. Minor loss of grout in Joint 10S at midspan of Span 3W. Leaks noted in item 2 should be monitored at same location. (04/18)
Leaks noted in item 2 should be monitored at same location. (04/16)

10. Paint
(SIA-59A)
Concrete Superstructure. (04/18)
Concrete surface sealer on fascias, columns, pier caps, abutments all intact. (04/16)

11. Section Loss
No section loss under joints. (04/18)

12. Bearings
Elastomeric bearing pads set back from face of abutment/piers. Sandy debris noted near north bearing area at west abutment - appears to be migrating through the joint. (04/20)
Monitor area on wing wall return north side of West Abutment A. A small amount of sand has migrated thru the open joint. No settlement observed in NW approach slope behind abutment. (04/18)
monitor area on wing wall return north side, abutment A. A small amount of sand has migrated thru the open joint. (04/16)

SUBSTRUCTURE

13. Abutments
(SIA-60)
Conventional abutment on west end. East end is pier-type construction shared with the US-31 structure (rated with piers). No significant deterioration noted. (04/20)
No change since 2016 inspection. (04/18)
No change since 2014 inspection. (04/16)

14. Piers
(SIA-60)
Pier 1W has evidence of leakage at north end and box beam joints 1N and 2N. Cracking and delamination noted on bottom of cap under beam 2N. Pier 2W has 4"x4"x1" spall on bottom of cap between columns 1N and 2N. 18" cracking in cap just north of column 2N. Hairline to 1/16" cracking in bottom of cap at construction joint. Pier 3W has puckered surface coating and evidence of leakage at joint. (04/20)
Pier 1W: Water stains at Beams 6S, 9S, & 10S. Pier 2W: 4"x4" spall on bottom of cap below Beam 8S. Longitudinal crack with some rust staining on bottom of cap at midspan between Columns 3S & 4S. Approx. 1ft long crack in cap approx. 1ft North of Column 3S. Minor cracks in bottom of cap at construction joint. Pier 3W(Aboutment 8): Efflorescence at North side of Pier. Concrete surface coating failure at construction joints. (04/18)
water stains over pier 1 at beam 1 and pier 2 at beam 10. Small pock 3"x 3" mark on bottom of pier 2 below beam 8. (04/16)

15. Slope Protection
Concrete slope paving at west abutment has severe tree/brush growth at north and south ends and scattered vegetation at joints. (04/20)
Concrete slope paving intact with no weed growth problems. (04/18)
Concrete slope paving intact with no weed growth problems. (04/16)
16. Channel (SIA-61)  
N  N  N  (04/20)  
(04/18)  
(04/16)  

17. Scour Inspection  
N  N  N  (04/20)  
(04/18)  
(04/16)  

**APPROACH**

04/16  04/18  04/20  

18. Approach Pavement  
6  6  6  
Approach on west side only (east side is US-31 structure). Asphalt pavement with sealed transverse cracking ~15’ spacing and longitudinal cracking at centerline. Early block cracking and ~1/2” rutting near the structure.  
(04/20)  
Reflective cracks on West approach. Some cracks have been sealed.  
(04/18)  
Reflective cracks on West approach (A side)  
(04/16)  

19. Approach Shoulders Sidewalks  
8  8  7  
North side is concrete curb and gutter and sidewalk. 1/2” sidewalk settlement at reference line.  
Moderate vegetation growth between curb and sidewalk. Scattered popouts noted in sidewalk surface. South side is approach curb and gutter with HMA valley gutter beyond.  
Moderate raveling noted in flow line.  
(04/20)  
Small spill in curb on South side of West approach.  
(04/18)  
Sidewalk on north side only. No problems requiring attention.  
(04/16)  

20. Approach Slopes  
Heavy tree and brush growth noted on the slopes. Approach guardrail both sides.  
(04/20)  
Monitor area behind wing wall return north side of Abutment 1W. A small amount of sand has migrated thru the open joint. No settlement observed in NW approach slope behind abutment.  
(04/18)  
(04/16)  

21. Utilities  
Overhead utility crossings south and east of structure.  
(04/20)  
Overhead utility South of structure.  
(04/16)  

22. Drainage Culverts  
None noted.  
(04/20)  
(04/18)  
(04/16)  

**MISCELLANEOUS**

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<tr>
<th>Guard Rail</th>
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**Critical Feature Inspections (SIA-92)**

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<td>92D. Fatigue Sensitive</td>
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## MICHIGAN DEPARTMENT OF TRANSPORTATION

### STR 8940

#### STRUCTURE INVENTORY AND APPRAISAL

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<th>MDOT Structure ID</th>
<th>Structure Condition</th>
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#### Feature

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#### Location

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#### Region / County

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<th>Last NBI Inspection</th>
<th>Scour Evaluation</th>
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<td>Grand(3) / Ottawa(70)</td>
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### Bridge History, Type, Materials

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<td>36A - Bridge Railing</td>
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<tr>
<td>37</td>
<td>36B - Rail Transition</td>
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<td>36D - Rail Termination</td>
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<td>52 - Bridge Rtg</td>
<td>111 - Pier Protection</td>
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<td>53 - Bridge Rtg</td>
<td>112 - Lift Brdg Vert Clear</td>
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<td>120 - Pier Protection</td>
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<td>62 - Bridge Rtg</td>
<td>121 - Lift Brdg Vert Clear</td>
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### Proposed Improvements

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<th>Proposed Improvements</th>
<th>Miscellaneous</th>
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<tr>
<td>75 - Type of Work</td>
<td>31 - Design Load</td>
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<tr>
<td>76 - Length of Improvement</td>
<td>41 - Open, Posted, Closed</td>
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<tr>
<td>94 - Bridge Cost</td>
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<td>97 - Year of Cost Estimate</td>
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Printed on 04/30/2020
## WORK RECOMMENDATIONS

**Facility**
- **RIDGE STREET**

**Feature**
- **C S X**
  - Length / Width / Spans: 189 / 35.9 / 3

**Location**
- **IN FERRYSBURG**
  - Built / Recon. / Paint / Ovly.: 1987 / / / 2013

**Region / County**
- **Grand(3) / Ottawa(70)**
  - Material / Design: 5 Prestressed Concrete / 05 Box Bm/Gird- Multiple

**Owner**
- City: FERRYSBURG(2326)

**Agency / Company Name**
- Fleis & VandenBrink Engineering

**Inspector Name**
- Jon Moxey, P.E.

**Inspector Date**
- 04/28/2020

### RECOMMENDATIONS & ACTION ITEMS

<table>
<thead>
<tr>
<th>Recommendation Type</th>
<th>Priority</th>
<th>Description</th>
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<tbody>
<tr>
<td>Approach Repair</td>
<td>M</td>
<td>Continue sealing cracks in asphalt pavement periodically.</td>
</tr>
<tr>
<td>Brush Cut</td>
<td>H</td>
<td>Remove trees and brush from around the footprint of the structure.</td>
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<tr>
<td>Sidewalk Rpr</td>
<td>M</td>
<td>Patch spalls in sidewalk. Apply penetrating sealer (MDOT QPL 706.03S Penetrating Water Repellent Treatment) to horizontal cracks in sidewalk surface.</td>
</tr>
<tr>
<td>Joint Repair</td>
<td>M</td>
<td>Remove joint debris periodically.</td>
</tr>
<tr>
<td>Super Repair</td>
<td>H</td>
<td>Continue sealing cracks in asphalt pavement periodically.</td>
</tr>
<tr>
<td>Other</td>
<td>L</td>
<td>Monitor area behind slope wall north side of west abutment for soil migration.</td>
</tr>
</tbody>
</table>
View of structure from approach area

Elevation view of structure
Cracking and cold patching in asphalt wearing surface

Posting signage for northbound traffic
Cracking and cold patching in asphalt wearing surface

Sealed cracking in asphalt wearing surface
Deterioration of expansion joint

Cracking and cold patching on asphalt wearing surface
Ponding on edge of asphalt wearing surface along east sidewalk

Deterioration of asphalt wearing surface and joint
Sealed cracking and cold patch in asphalt wearing surface

Severe deterioration of asphalt wearing surface
Severe deterioration of asphalt wearing surface

Joint deterioration in concrete sidewalk
Severe deterioration of asphalt wearing surface

Severe deterioration of asphalt wearing surface and joint
WEST SPRING LAKE ROAD OVER SMITH'S BAYOU
STRUCTURE #: 8941
PHOTOS: APRIL 28, 2020

View of northeast sidewalk area

Settlement of northeast sidewalk at structure
Sealed cracking in north approach

Shallow spalling on sidewalk surface
WEST SPRING LAKE ROAD OVER SMITH’S BAYOU
STRUCTURE #: 8941
PHOTOS: APRIL 28, 2020

Railing joint at pier

Alligator cracking and cold patching in asphalt wearing surface
Leakage between box beams

Patching and leakage on concrete pier cap
Leakage between box beams

View of south abutment
WEST SPRING LAKE ROAD OVER SMITH’S BAYOU
STRUCTURE #: 8941
PHOTOS: APRIL 28, 2020

Missing riprap in southeast

Heavy leakage on concrete pier cap
WEST SPRING LAKE ROAD OVER SMITH'S BAYOU
STRUCTURE #: 8941
PHOTOS: APRIL 28, 2020

Cracking in concrete pier jacket

Patching and leakage on concrete pier cap
Leakage between box beams

Cracking and delamination on concrete pier cap
Spalling on concrete pier jacket

Honeycombing on concrete pier jacket
Deterioration of concrete pier jacket

Corner spalling on interior face of exterior box beam near bearing
Cracking and delamination on concrete pier jacket

Heavy leakage between box beams
Heavy leakage between box beams

Heavy leakage between box beams
Corner spalling on bottom of box beam

Cracking in concrete pier column jacket
Corner delamination and spalling on box beam at pier

Cracking and delamination at box beam joint
Leakage on pier cap at utility chase

Leakage on pier cap at utility chase
Cracking and delamination on bottom of box beam

Cracking and delamination on bottom of box beam
Corner spalling on bottom of box beam at pier

Severe leakage between box beams
Corner spalling on bottom of box beam

Missing riprap in northeast quadrant
Cracking in bottom of box beam

Utility penetration in northwest backwall
Grinding/spalling on east sidewalk fascia

Advance posting signage for northbound traffic
Advance posting signage for northbound traffic

Posting signage for southbound traffic
Advance posting signage for southbound traffic
**NBI INSPECTION**

<table>
<thead>
<tr>
<th>Inspector Name</th>
<th>Agency / Company Name</th>
<th>Insp. Freq.</th>
<th>Insp. Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jon Moxey, P.E.</td>
<td>Fleis &amp; VandenBrink Engineering</td>
<td>6</td>
<td>04/28/2020</td>
</tr>
</tbody>
</table>

**ONYL**

**GENERAL NOTES**

- Weight limit signs in place on both ends of bridge: YES
- Weight limit shown on signs at bridge: 20_N_N
- Required advance warning weight limit signs in place: YES
- Weight limit shown on advance warning signs: 20_N_N

**DECK**

<table>
<thead>
<tr>
<th>04/19</th>
<th>08/19</th>
<th>04/20</th>
</tr>
</thead>
</table>

1. **Surface (SIA-58A)**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>3</td>
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<td>3</td>
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</tbody>
</table>

Severely deteriorated HMA wearing surface. Severe alligator cracking, spalling and cold patch over much of the northbound lane, scattered in southbound. (04/20)

Asphalt wearing surface is as thin as 1 inch in measurable areas. Severe alligator cracking, spalling and cold patch over much of the northbound lane, scattered in southbound. (08/19)

There is substantial alligator cracking within the wheel lines (worst in the northbound lane). Delamination of the HMA surface in numerous locations has occurred. Large areas of HMA pavement distress are present in all spans of the northbound lane with ponding water during rain events and in spans 2S, 4S, and 5S in the southbound lanes. Most cracks have been sealed. Several small areas of the HMA surface are spalled to the top of box beam. The waterproofing membrane placed below the HMA wearing surface is performing no useful function. It is recommended that the deck/beams be monitored on a 6 month inspection frequency due to concern of failure of the top of the box beams and delaminated/spalled concrete on the bottoms of the beams. Debris, mostly sand, along the toe of sidewalks. The City completed another round of HMA deck patching and sealing in early April or late March prior to the inspection. (04/19)

2. **Expansion Joints**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>4</td>
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</tbody>
</table>

All joints at piers appear to be expansion type. Cracking throughout concrete headers and scattered spalling. Compression seals have failed and have been replaced or supplemented with crack seal. Heavy leakage noted on the pier caps, especially at the utility chases. (04/20)

All joints at piers appear to be expansion type. Cracking throughout concrete headers and scattered spalling. Compression seals have failed and have been replaced or supplemented with crack seal. Heavy leakage noted on the pier caps, especially at the utility chases. (08/19)

The expansion joint headers are cracked coincident with the beam edges and there are numerous spalled areas of concrete in various locations. Some of these spalls are filled with hot poured rubber. The joint seal is not functioning adequately. All joints leak heavily. (04/19)

3. **Other Joints**

<p>| | | |</p>
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<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>N</td>
<td>N</td>
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</tbody>
</table>

Abutment reference lines overlaid with HMA. Cracking along reference lines is sealed. (04/20)

Abutment reference lines overlaid with HMA. (08/19)

Expansion joints on the sidewalk are less severe than the traveled way. However joint 6 over the east fascia beam has deteriorated to a level that is a trip hazard with cracked and missing concrete around the joint gland. The gland is loose in these areas. Joint 2, at the southern fascia is spalled. This spall is not affecting the deck joint/walking surface at this time. (04/19)

4. **Railings**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
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<td>6</td>
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</tr>
</tbody>
</table>

3-tube railings. Scattered surface corrosion noted at bases. Areas of minor misalignment noted. (04/20)

3-tube railings. Scattered surface corrosion noted and bases and scattered missing anchorage hardware. (08/19)

The three tube railing height measured at 40 inches by joint 1. non-crash rated. No damage noted, only light rust at the base plates. Anchor bolt nuts missing at 3 posts (1 post in west railing - north end 2 posts in east railing, 1 at each end of the bridge). (04/19)

**MICHIGAN DEPARTMENT OF TRANSPORTATION**

**STR 8941**

**BRIDGE SAFETY INSPECTION REPORT**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Latitude / Longitude</th>
<th>MDOT Structure ID</th>
<th>Structure Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>WEST SPRING LAKE R</td>
<td>43.0873 / -86.2056</td>
<td>704232600078B01</td>
<td>Serious Condition(3)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Length / Width / Spans</th>
<th>Owner</th>
<th>City:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMITH BAYOU</td>
<td>447.8 / 44 / 8</td>
<td></td>
<td>FERRYSBURG(2326)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Built / Recon. / Paint / Ovly.</th>
<th>Last NBI Inspection</th>
<th>Scour Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT 168TH AVENUE</td>
<td>1972 / / / 2008</td>
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<td>5 Stable w/in footing</td>
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**REGION / COUNTY**

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Modified by: MOXEYJ1234 on 04/30/2020

Printed on 04/30/2020
5. Sidewalks or Curbs

Scattered minor edge spalling. Isolated area of grinding on east fascia at Pier 2S. Scattered hairline cracking noted. (04/20)

6. Deck (SIA-58)

Severe deterioration of the asphalt wearing surface throughout a large portion of the surface area. Heavy leakage at joints and scattered leakage between beams. (04/20)

7. Deck (SIA-58)

Severe deterioration of the asphalt wearing surface throughout a large portion of the surface area. Heavy leakage at joints and scattered leakage between beams. Most of the deck is inaccessible - rating left at 3 until further evaluation can be completed. (08/19)

8. Drainage

Structure is on a vertical curve. Surface drains to curbed approaches. (04/20)

9. Stringer (SIA-59)

Scattered cracking and corner spalling noted. Broken strands noted in the following locations: Span 6s, Beam 11W, 1 strand from midspan to ~15' south of midspan; Span 6s, Beam 11W, 1 strand from midspan to ~15' south of Pier 6S. (04/20)

10. Paint (SIA-59A)

No deck drainage on the bridge. (04/19)
### 12. Bearings

Elastomeric bearings with no significant deterioration noted. Concrete pier caps are deteriorating in bearing areas. Severe spalling on Pier 1S at Beam 9W has undermined the bearing and exposed positioning dowels. (04/20)

Elastomeric bearings with no significant deterioration noted. Concrete pier caps are deteriorating in bearing areas. Severe spalling on Pier 1S at Beam 9W has undermined the bearing and exposed positioning dowels. (08/19)

Elastomeric bearing pads not visible. No tell-tale evidence indicating a problem. However there are stains and efflorescence present on both abutment walls indicating water leakage between the beams. Monitor bearings at beams 9W and 10W, Span 1S, Pier 1S where the bearings are undermined. Continue to monitor Abutment A south End as open wing wall joint may allow approach backfill to filter through the opening. (04/19)

### 13. Abutments

No significant concrete deterioration noted. Scattered areas of missing riprap around abutments. Tree and brush growth encroaching on the abutments. (04/20)

No significant concrete deterioration noted. Scattered areas of missing riprap around abutments. (08/19)

No hollow sounding concrete. Both abutment faces have been painted to cover graffiti. Riprap present and performing well. Some sand aggredation on top of the riprap at Abutment A (south). (04/19)

### 14. Piers

FRP jackets at and below the water line are deteriorating. Scattered honeycombing, cracking and spalling noted on original concrete pile jackets. Map, diagonal and vertical cracking noted on pier caps with scattered spalling and patching. (04/20)

FRP jackets at and below the water line are deteriorating. (08/19)

Horizontal and vertical cracks in pier caps are becoming more prevalent than previous inspection in 2018 with efflorescence noted at many of them. The fiberglass wrap on pier 6A, east column has broken and there is a section missing. This crack extends up into the original concrete encasing the steel pile beneath. Cracks in several pier caps below beams. Vertical cracks in columns at piers 2S thru 6S. Several areas of the pier caps are delaminated. A detailed inspection in 2018 located areas where the delaminated concrete in the pier caps extend below the bearing pads. Spall in Pier 1S cap below beams 9W & 10W spalled with exposed position dowels. (04/19)

### 15. Slope Protection

Structure over waterway. (04/20)

Structure over waterway. (08/19)

(04/19)

### 16. Channel

Minor bank erosion noted. Channel spans a finger of Spring Lake with minimal flow. (04/20)

Minor bank erosion noted. Channel spans a finger of Spring Lake with minimal flow. (08/19)

No observed change in channel condition. Underwater inspection completed in August 2017. (04/19)

### 17. Scour Inspection

None noted. Underwater inspection completed in August 2017 did not indicate any concerns. (04/20)

None noted. Underwater inspection completed in August 2017 did not indicate any concerns. (08/19)

No scour noted during the inspection. The plan of action is to monitor the bridge in the event of a flood flow. Underwater inspection completed in August 2017 did not indicate any concerns. (04/19)

### APPROACH

(04/19 08/19 04/20)
18. Approach Pavement

- Curbed asphalt approaches. Scattered cracking, mostly sealed. Early block cracking in wheel paths. (04/20)
- Curbed asphalt approaches. Scattered cracking, partially sealed. Early block cracking in wheel paths. (08/19)
- Overall good condition. Some map cracking observed. Sealing of cracks in the north approach is recommended. (04/19)

19. Approach Shoulders Sidewalks

- Sidewalk transitions to narrow asphalt on east side and spillway in northwest. No approach sidewalk in southwest. Northeast has settled approximately 2 inches at the structure. (04/20)
- Sidewalk transitions to narrow asphalt on east side and spillway in northwest. No approach sidewalk in southwest. Northeast has settled approximately 2 inches at the structure. (08/19)
- Sidewalks on west side are not connected to the sidewalk in the approaches. Sw quadrant is worn due to pedestrian traffic on the approach behind the curb and gutter. No grass growing and minor erosion was observed just off the end of the bridge and around the first guardrail post. NE quadrant approach sidewalk is settled less that 3/4” in 2 locations. (04/19)

20. Approach Slopes

- Approach guardrail all 4 quadrants. South side is tree and brush covered. North is mix of brush and maintained lawns. Southwest slope is worn from pedestrian traffic. (04/20)
- Approach guardrail all 4 quadrants. South side is tree and brush covered. North is mix of brush and maintained lawns. (08/19)
- Stable and vegetated. (04/19)

21. Utilities

- Bridge lighting on east side with conduit in sidewalk. Phone in west sidewalk. Gas, cable and water main in the chases. (04/20)
- Bridge lighting on east side with conduit in sidewalk. Phone in west sidewalk. Gas, cable and water main in the chases. (08/19)
- Existing telephone and gas lines attached to the bridge between beams 1W and 2W, and 12W and 13W. (04/19)

22. Drainage Culverts

- CMP outlet noted in northeast slope and concrete outlet in southwest. (04/20)
- None noted. (08/19)

MISCELLANEOUS

<table>
<thead>
<tr>
<th>Guard Rail Item</th>
<th>Rating</th>
<th>Other Items Item</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>36A. Bridge Railings</td>
<td>0</td>
<td>71. Water Adequacy</td>
<td>9</td>
</tr>
<tr>
<td>36B. Transitions</td>
<td>1</td>
<td>72. Approach Alignment</td>
<td>8</td>
</tr>
<tr>
<td>36C. Approach Guardrail</td>
<td>1</td>
<td>Temporary Support</td>
<td>0 No Temporary Supports</td>
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<tr>
<td>36D. Approach Guardrail Ends</td>
<td>1</td>
<td>High Load Hit (M)</td>
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<td></td>
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<td>Special Insp. Equipment</td>
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<tr>
<td></td>
<td></td>
<td>Underwater Insp. Method</td>
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False Decking (Timber) Removed to Complete Inspection

N/A - No False Decking

Critical Feature Inspections (SIA-92)

<table>
<thead>
<tr>
<th>Item</th>
<th>Freq</th>
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<tbody>
<tr>
<td>92A. Fracture Critical</td>
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<tr>
<td>92B. Underwater</td>
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<td>08/30/2017</td>
</tr>
<tr>
<td>92C. Other Special</td>
<td>60</td>
<td>08/30/2017</td>
</tr>
<tr>
<td>92D. Fatigue Sensitive</td>
<td>60</td>
<td>08/30/2017</td>
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### Bridge History, Type, Materials

<table>
<thead>
<tr>
<th>Facility</th>
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<td>Serious Condition(3)</td>
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<tr>
<td>Feature</td>
<td>Length / Width / Spans</td>
<td>Owner</td>
<td>City: FERRYSBURG(2326)</td>
</tr>
<tr>
<td>SMITH BAYOU</td>
<td>447.8 / 44 / 8</td>
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### Location

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<thead>
<tr>
<th>Region / County</th>
<th>Material / Design</th>
<th>Last NBI Inspection</th>
<th>Scour Evaluation</th>
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<tbody>
<tr>
<td>AT 168TH AVENUE</td>
<td>5 Prestressed Concrete / 05</td>
<td>04/28/2020 / ONYL</td>
<td>5 Stable w/in footing</td>
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### Structure Dimensions

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<tbody>
<tr>
<td>34 - Skew</td>
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<tr>
<td>35 - Struct Flared</td>
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<tr>
<td>45 - Num Main Spans</td>
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<tr>
<td>46 - Num Apprs Spans</td>
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<tr>
<td>48 - Max Span Length</td>
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<td>49 - Length Structure</td>
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<td>50A - Width Left Curb/SW</td>
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<td>50B - Width Right Curb/SW</td>
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<td>51 - Width Curb to Curb</td>
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<td>52 - Width Out to Out</td>
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<td>112 - NBIS Length</td>
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### Inspection Data

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<tbody>
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<tr>
<td>91 - Inspection Freq</td>
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<tr>
<td>92A - Frac Crit Req/Freq</td>
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<td>92B - Und Water Req/Freq</td>
<td>08/30/2017</td>
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<tr>
<td>93B - Und Water Insp Date</td>
<td>08/30/2017</td>
</tr>
<tr>
<td>92C - Oth Spec Inspect Req/Freq</td>
<td>N</td>
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<tr>
<td>93C - Oth Spec Inspect Date</td>
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<tr>
<td>92D - Fatigue Req/Freq</td>
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<tr>
<td>93D - Fatigue Inspect Date</td>
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<tr>
<td>175A - Und Water Inspect Method</td>
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<tr>
<td>58 - Deck Rating</td>
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<tr>
<td>58A/B - Deck Surface/Bottom</td>
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<tr>
<td>59 - Superstructure Rating</td>
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<td>60 - Substructure Rating</td>
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<tr>
<td>61 - Channel Rating</td>
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<tr>
<td>62 - Culvert Rating</td>
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### Navigation Data

<table>
<thead>
<tr>
<th>Navigation Data</th>
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<tbody>
<tr>
<td>38 - Navigation Control</td>
<td>1</td>
</tr>
<tr>
<td>39 - Vertical Clearance</td>
<td>1</td>
</tr>
<tr>
<td>40 - Horizontal Clearance</td>
<td>52</td>
</tr>
<tr>
<td>111 - Pier Protection</td>
<td>1</td>
</tr>
<tr>
<td>116 - Lift Brdg Vert Clear</td>
<td>0</td>
</tr>
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</table>

### Route Carried By Structure(ON Record)

<table>
<thead>
<tr>
<th>Route Carried By Structure(ON Record)</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>5A - Record Type</td>
<td>1</td>
</tr>
<tr>
<td>5B - Route Signing</td>
<td>5</td>
</tr>
<tr>
<td>5C - Level of Service</td>
<td>0</td>
</tr>
<tr>
<td>5D - Route Number</td>
<td>00000</td>
</tr>
<tr>
<td>5E - Direction Suffix</td>
<td>0</td>
</tr>
<tr>
<td>10L - Best 3m Unclr-Lt</td>
<td>0</td>
</tr>
<tr>
<td>10R - Best 3m Unclr-Rt</td>
<td>99 99</td>
</tr>
<tr>
<td>19 - Detour Length</td>
<td>2</td>
</tr>
<tr>
<td>29 - ADT</td>
<td>5424</td>
</tr>
<tr>
<td>30 - Year of ADT</td>
<td>1996</td>
</tr>
<tr>
<td>32 - Approach Roadway Width</td>
<td>42</td>
</tr>
<tr>
<td>32A/B - Ap Ptv Type/Width</td>
<td>5 41.99</td>
</tr>
<tr>
<td>42A - Service Type On</td>
<td>5</td>
</tr>
<tr>
<td>47L - Left Horizontal Clear</td>
<td>0.0</td>
</tr>
<tr>
<td>47R - Right Horizontal Clear</td>
<td>42.0</td>
</tr>
<tr>
<td>53 - Min Vert Ctl Ov Deck</td>
<td>99 99</td>
</tr>
<tr>
<td>100 - STRAIGHT</td>
<td>0</td>
</tr>
<tr>
<td>102 - Traffic Direct</td>
<td>2</td>
</tr>
<tr>
<td>109 - Truck %</td>
<td>4</td>
</tr>
<tr>
<td>110 - Truck Network</td>
<td>0</td>
</tr>
<tr>
<td>114 - Future ADT</td>
<td>9700</td>
</tr>
<tr>
<td>115 - Year Future ADT</td>
<td>2022</td>
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### Route Under Structure (UNDER Record)

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<tr>
<td>5B - Route Signing</td>
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<td>5C - Level of Service</td>
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</tr>
<tr>
<td>5D - Route Number</td>
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<td>5E - Direction Suffix</td>
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</tr>
<tr>
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<td>0</td>
</tr>
<tr>
<td>10R - Best 3m Unclr-Rt</td>
<td>99 99</td>
</tr>
<tr>
<td>19 - Detour Length</td>
<td>2</td>
</tr>
<tr>
<td>29 - ADT</td>
<td>5424</td>
</tr>
<tr>
<td>30 - Year of ADT</td>
<td>1996</td>
</tr>
<tr>
<td>32 - Approach Roadway Width</td>
<td>42</td>
</tr>
<tr>
<td>32A/B - Ap Ptv Type/Width</td>
<td>5 41.99</td>
</tr>
<tr>
<td>42A - Service Type On</td>
<td>5</td>
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<tr>
<td>47L - Left Horizontal Clear</td>
<td>0.0</td>
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<td>47R - Right Horizontal Clear</td>
<td>42.0</td>
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<tr>
<td>53 - Min Vert Ctl Ov Deck</td>
<td>99 99</td>
</tr>
<tr>
<td>100 - STRAIGHT</td>
<td>0</td>
</tr>
<tr>
<td>102 - Traffic Direct</td>
<td>2</td>
</tr>
<tr>
<td>109 - Truck %</td>
<td>4</td>
</tr>
<tr>
<td>110 - Truck Network</td>
<td>0</td>
</tr>
<tr>
<td>114 - Future ADT</td>
<td>9700</td>
</tr>
<tr>
<td>115 - Year Future ADT</td>
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### Structure Appraisal

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>36A - Bridge Railing</td>
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<tr>
<td>36B - Rail Transition</td>
<td>1</td>
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<tr>
<td>36C - Approach Rail</td>
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</tr>
<tr>
<td>36D - Rail Termination</td>
<td>1</td>
</tr>
<tr>
<td>67 - Structure Evaluation</td>
<td>4</td>
</tr>
<tr>
<td>68 - Deck Geometry</td>
<td>N</td>
</tr>
<tr>
<td>69 - Underclearance</td>
<td>N</td>
</tr>
<tr>
<td>71 - Waterway Adequacy</td>
<td>9</td>
</tr>
<tr>
<td>72 - Approach Alignment</td>
<td>8</td>
</tr>
<tr>
<td>103 - Temporary Structure</td>
<td>5</td>
</tr>
<tr>
<td>113 - Scour Criticality</td>
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### Miscellaneous

<table>
<thead>
<tr>
<th>Miscellaneous</th>
<th>0</th>
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<tr>
<td>37 - Historical Significance</td>
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<tr>
<td>98A - Border Bridge State</td>
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</tr>
<tr>
<td>98B - Border Bridge %</td>
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</tr>
<tr>
<td>101 - Parallel Structure</td>
<td>N</td>
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<tr>
<td>EPA ID</td>
<td>1</td>
</tr>
<tr>
<td>143 - Pin &amp; Hanger Code</td>
<td>1</td>
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<tr>
<td>148 - No. of Pin &amp; Hangers</td>
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### Proposed Improvements

<table>
<thead>
<tr>
<th>Proposed Improvements</th>
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</thead>
<tbody>
<tr>
<td>75 - Type of Work</td>
<td>31 1</td>
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<tr>
<td>76 - Length of Improvement</td>
<td>700</td>
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<tr>
<td>94 - Bridge Cost</td>
<td>332960</td>
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<tr>
<td>95 - Roadway Cost</td>
<td>10115330</td>
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<tr>
<td>96 - Total Cost</td>
<td>10448280</td>
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<td>97 - Year of Cost Estimate</td>
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### Load Rating and Posting

<table>
<thead>
<tr>
<th>Load Rating and Posting</th>
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<tbody>
<tr>
<td>31 - Design Load</td>
<td>4</td>
</tr>
<tr>
<td>41 - Open, Posted, Closed</td>
<td>P</td>
</tr>
<tr>
<td>63 - Fed Oper Rtg Meth</td>
<td>8</td>
</tr>
<tr>
<td>64F - Fed Oper Rtg Load</td>
<td>.74</td>
</tr>
<tr>
<td>64MA - Mich Oper Rtg Meth</td>
<td>8</td>
</tr>
<tr>
<td>64MB - Mich Oper Rtg</td>
<td>.56</td>
</tr>
<tr>
<td>64MC - Mich Oper Truck</td>
<td>8</td>
</tr>
<tr>
<td>65 - Inv Rtg Meth</td>
<td>8</td>
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<tr>
<td>66 - Inventory Load</td>
<td>36</td>
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<tr>
<td>70 - Posting</td>
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<tr>
<td>141 - Posted Loading</td>
<td>20NNNN</td>
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</tbody>
</table>

Printed on 04/30/2020
**WORK RECOMMENDATIONS**

<table>
<thead>
<tr>
<th>Facility</th>
<th>Latitude / Longitude</th>
<th>MDOT Structure ID</th>
<th>Structure Condition</th>
</tr>
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<tbody>
<tr>
<td>WEST SPRING LAKE R</td>
<td>43.0873 / -86.2056</td>
<td>704232600078B01</td>
<td>Serious Condition(3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Length / Width / Spans</th>
<th>Owner</th>
<th>City:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMITH BAYOU</td>
<td>447.8 / 44 / 8</td>
<td></td>
<td>FERRYSBURG(2326)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Built / Recon. / Paint / Ovly.</th>
<th>TSC</th>
<th>Operational Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT 168TH AVENUE</td>
<td>1972 / / / 2008</td>
<td>Muskegon(21)</td>
<td>P Posted for load(20NNNN)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Region / County</th>
<th>Material / Design</th>
<th>Last NBI Inspection</th>
<th>Scour Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand(3) / Ottawa(70)</td>
<td>5 Prestressed Concrete / 05 Box Bm/Gird- Multiple</td>
<td>04/28/2020 / ONYL</td>
<td>5 Stable w/in footing</td>
</tr>
</tbody>
</table>

---

### RECOMMENDATIONS & ACTION ITEMS

<table>
<thead>
<tr>
<th>Recommendation Type</th>
<th>Priority</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brush Cut</td>
<td>M</td>
<td>Remove trees and brush from around the footprint of the structure.</td>
</tr>
<tr>
<td>Joint Repair</td>
<td>H</td>
<td>Replace joints.</td>
</tr>
<tr>
<td>Deck Patching</td>
<td>H</td>
<td>Replace asphalt wearing surface with structural concrete overlay.</td>
</tr>
<tr>
<td>Substr Repair</td>
<td>H</td>
<td>Replace missing riprap at abutments. Repair pier wraps, jackets and caps. Install concrete surface coating.</td>
</tr>
</tbody>
</table>
Introduction

23 CFR 650.313(g) Quality Control and Quality Assurance requires that systematic Quality Control (QC) procedures are being used to maintain a high degree of accuracy and consistency in the inspection program. Accuracy and consistency of the data is important since the bridge inspection process is the foundation of the entire bridge management operation and bridge management systems. Information obtained during the inspection is used for determining needed maintenance and repairs, for prioritizing rehabilitations and replacements, for allocating resources, and for evaluating and improving design for new bridges. The accuracy and consistency of the inspection and documentation is vital because it not only impacts programming and funding appropriations, it also affects public safety. Therefore, Fleis & VandenBrink (F&V) has adopted the following framework for its bridge inspection QC program.

A. Documentation of QC Program
   1. F&V maintains copies (either digital or hard copy or both) of the following bridge inspection manuals and makes them available to its bridge inspectors:
      b. Michigan Bridge Element Inspection Manual
      c. FHWA Bridge Inspector’s Reference Manual
      d. MDOT Coding and Managing Bridges for Scour Vulnerability
      e. Michigan Structure Inventory and Appraisal of Bridges
      f. MDOT NBI Rating Guidelines
      g. MDOT Guidelines for Bridge Inspection Frequencies
      h. MDOT Bridge Analysis Guide
      i. MDOT Bridge Advisories
      j. F&V Procedures Manual
      k. F&V Employee Handbook
      l. This document, which is updated periodically to reflect changes in policies, procedures, etc.
   2. As with all of our work product, F&V strives to provide accurate, efficient and cost effective information to our bridge owners. Our QC program is intended to generate consistency both over time and between projects, keep our bridge owner clients in compliance with federal regulations and state guidelines, assist them in maintaining the safety and integrity of their bridge network, and provide effective guidance for them as they use public funds to preserve and improve their infrastructure.
   3. Definitions
      a. 23 CFR Part 650.305
      b. Bridge Inspector's Reference Manual (various)
      c. AASHTO Manual for Bridge Evaluation, Section 1-5
      d. MDOT Bridge Analysis Guide, Chapter 12
C. Quality Control (QC) Procedures

1. QC Roles and Responsibilities
   a. Internal QC is performed on all Bridge Inspection Reports and other deliverables. Internal QC is performed by a peer or supervisor to review reports and other documents for accuracy and consistency of the work product.
   b. External QC is performed as required. F&V maintains two (2) Qualified Team Leaders (QTLs). When External QC is required, one QTL will perform the inspection and prepare the draft inspection report. The second QTL will perform an independent Quality Control inspection, consisting of field review and/or office review, as required. The QC inspector will utilize the attached QC checklist and redline the inspection forms so that discrepancies can be discussed and resolved prior to finalizing the Bridge Inspection Report. External QC is performed on an inspector basis based on the following:
      i. Office Review on at least 5% of inspections on a calendar year basis.
      ii. Field Review on at least 50% of those inspections (2.5% overall).
      iii. Office Review on at least 5% of load ratings on a calendar year basis.

2. Qualifications
   a. Qualified Team Leader (and QC Manager)
      i. Minimum of 5 years experience in bridge inspection assignments in a responsible capacity (with MDOT approval) or a Professional Engineer license; and
      ii. Successful completion of NHI Course No. 130055 – Safety Inspection of In-Service Bridges; and
      iii. 24 hours of bridge inspection professional development in the preceding 5 years.
   b. Inspection Team Member
      i. An individual meeting the requirements of a Qualified Team Leader, or
      ii. A technical staff person with three years experience in inspection, design or construction of bridges, or
      iii. A recent graduate engineer working at the staff engineer or entry level position.
   c. Load Rater
      i. Licensed professional engineer, and
      ii. Minimum of 3 years experience in bridge analysis or design, or
      iii. A sub-consultant meeting the above criteria.

3. Documentation of Qualifications
   a. Jonathan W. Moxey, P.E. (Qualified Team Leader and Load Rater)
      i. Professional Engineer licensed in the State of Michigan (#6201051462, attached)
      ii. More than 16 years’ experience in bridge analysis, design, construction and inspection
      iii. NHI 130055 - Safety Inspection of In-Service Bridges (February, 2005)
   b. Ken C. Mlcek, P.E. (Qualified Team Leader)
      i. Professional Engineer licensed in the State of Michigan (#6201057048, attached)
      ii. More than 11 years’ experience in bridge construction and inspection.
iii. NHI 130055 - Safety Inspection of In-Service Bridges (December, 2009)
c. Michael P. Mattzela, P.E. (Qualified Team Leader)
   i. Professional Engineer licensed in the State of Michigan (#6201052900, attached)
   ii. More than 6 years’ experience in bridge analysis, design, construction and inspection
   iii. NHI 130055 - Safety Inspection of In-Service Bridges (January, 2017)
d. F&V has a number of staff meeting the qualifications of Inspection Team Member for the Qualified Team Leaders to draw upon as needed.
e. F&V has a number of professional relationships to draw upon for Load Rating services when needed to supplement in-house capabilities.

4. Documentation of Refresher Training
   a. Jonathan W. Moxey, P.E.
      i. NHI Training Courses
         1. NHI 135046 – Stream Stability and Scour at Highway Bridges (February, 2007)
         2. NHI 130053 - Bridge Inspection Refresher Training (October, 2008)
         3. NHI 130078 - Fracture Critical Inspection Techniques for Steel Bridges (March, 2009)
         4. NHI 130099 - Bridge Inspection Non-Destructive Evaluation Showcase (July, 2011)
      ii. Other Bridge Inspection Professional Development
         2. Access Safety Confined Space Entry Training (February, 2008)
         4. MDOT LRFR Seminar (October, 2008)
         5. MDEQ Transportation and the Environment (December, 2008)
         7. University of Wisconsin LRFD Bridge Design Seminar (April, 2010)
        11. MDOT Prefabricated Bridge Technology (August, 2011)
        12. MDEQ Transportation and the Environment (November, 2011)
        14. LTAP Load Rating Training (June, 2012)
        15. Michigan Pre-Conference Bridge Workshop: Introduction to Element-Level Bridge Inspection (March 2014)


b. Ken Mlcek, P.E.
   i. NHI Training Courses
      1. NHI 130078 - Fracture Critical Inspection Techniques for Steel Bridges (February, 2014)
      2. NHI 130053 - Bridge Inspection Refresher Training
   ii. Other Bridge Inspection Professional Development
      1. Michigan Bridge Conference – Bridge Inspection Workshop (March, 2012)

c. Michael P. Mattzela, P.E.
   i. NHI Training Courses (N/A)
   ii. Other Bridge Inspection Professional Development (N/A)

5. Documentation of special skills, training (see above) and equipment needs for specific types of inspections
   a. Types of Inspections
      i. Routine
      ii. Initial
      iii. Special
      iv. Fracture Critical
      v. Fatigue Sensitive
      vi. Underwater (project management only with a sub-consultant)
   b. Equipment (as appropriate)
      i. Cleaning Tools – Brooms, Brushes, Scrapers, Screw Drivers, Shovels, etc.
      ii. Standard Inspection Tools – Pocket Knives, Hammers, Plumb Bobs, Range Poles, etc.
      iii. Visual Aid – Binoculars, Flashlights, Inspection Mirrors, etc.
      iv. Measuring Devices – Tape Measures, Calipers, Optical Crack Gauges, Thermometers, Carpenter’s Levels, String Lines, etc.
      v. Documentation – Clipboards, Field Books, Straight Edges, Digital Cameras, Chalk/Keel/Paint, etc.
      vi. Access Equipment – Ladders, Boat, Rope, Waders, Fall Protection Equipment
      vii. Personal Protective Equipment – Hard Hat, Steel Toe Boots, Ear Plugs, Safety Vest, Life Jacket, Safety Glasses, Gloves, Dust Masks, etc.
      viii. Traffic Controls (In-house and contracted)
      ix. MDOT Under-bridge Inspection Vehicle
      x. Survey Equipment
      xi. Non-Destructive Testing Equipment (contracted)
      xii. Underwater Inspection Equipment (via sub-consultant)
xiii. Miscellaneous – First Aid Kit, Cell Phones, 2-Way Radios

6. Procedures for review and validation of inspection reports and data
   a. Bridge Safety Inspection Reports (BSIRs) and Culvert Safety Inspection Reports (CSIRs)
      i. Review rating values.
      ii. Review the inspection frequency.
      iii. Review the inspection comments.
   b. Structure Inventory and Appraisal Forms (SI&As)
      i. Review Load Rating and Posting section.
      ii. Review Scour Criticality and other pertinent fields.
   c. Work Recommendations Forms
      i. Review recommended repairs.
      ii. Review assigned priority level.
   d. Review other information in the Bridge Inspection Report (channel cross section data, photographs, etc.) as appropriate.

7. Procedures for identification and resolution of data errors, omissions and/or changes
   a. Bridge Safety Inspection Reports (BSIRs) and Culvert Safety Inspection Reports (CSIRs)
      i. Review rating values against prior ratings for significant changes, which may indicate erroneous data entry or items that warrant additional discussion.
      ii. Check that “Not Applicable” ratings are being used in accordance with MDOT Guidelines.
      iii. Check that inspection frequency is appropriate for the degree of deterioration based on the MDOT Guidelines for Bridge Inspection Frequencies.
      iv. Check that comments and other descriptions use proper terminology, spelling and are sufficient for the rating value.
   b. Structure Inventory and Appraisal Forms (SI&As)
      i. Review Load Rating and Posting section for erroneous entries. Compare coded posting to the posting photographs.
      ii. Review Scour Criticality and other pertinent fields for erroneous entries.
   c. Work Recommendations Forms
      i. Review recommended repairs against documented deterioration.
      ii. Check that assigned priority level is reasonable for the deterioration documented.
   d. Review other information in the Bridge Inspection Report (channel cross section data, photographs, etc.) as appropriate.
   e. Review and discuss comments related to the above with the Qualified Team Leader of record and recommend revisions as appropriate. Unresolved differences of opinion or questions will be directed toward a Supervisor or MDOT personnel.
National Highway Institute
Certificate of Training

John Moxey

has participated in
Safety Inspection of In-Service Bridges

hosted by
Michigan Department of Transportation

Location: Lansing

Date: February 4, 2005

Instructor

Moses Ayle

Director, National Highway Institute
Federal Highway Administration

Hours of instruction: 80

Coordinator

Dennis M. LaBry

Director, Office of Professional Development
Federal Highway Administration
National Highway Institute
Certificate of Training

Jon Moxey
has participated in
Stream Stability & Scour at Hwy. Bridges
For Bridge Inspectors
hosted by

Michigan Department of Transportation

Location: Lansing
Date: February 21, 2007

Instructor
Moses Nwacho
Director, National Highway Institute
Federal Highway Administration

Hours of instruction: 8

Coordinator
M. M. Lelby
Director, Office of Professional Development
Federal Highway Administration
Certificate of Training

Jon Moxey

Bridge Inspection Refresher Training

FHWA-NHI-130053

Michigan Department of Transportation

Date: October 16, 2008
Location: Lansing, MI

Hours of Instruction: 18

Instructor: Sean O. Patrick

Local Coordinator:

Joseph S. Tool, Associate Administrator
Office of Professional and Corporate Development
National Highway Institute

Certificate of Training

Jon Moxey

FHWA-NHI 130078 - Fracture Critical Inspection Techniques for Steel Bridges

Michigan Department of Transportation

Date: March 6, 2009
Location: Lansing, MI

Hours of Instruction: 28

Local Coordinator

Instructor

U.S. Department of Transportation
Federal Highway Administration
Certificate of Training

Jonathan Moxey

has participated in

FHWA-NHI 130099-Bridge Inspection Non-Destructive Evaluation Showcase (BINS)

hosted by

Michigan Department of Transportation

National Highway Institute

Hours of Instruction: CEU = 0.6 Units

07/13/2011

Lansing, MI

Mark Moore, Instructor

Richard Barnaby, Director
National Highway Institute
Michigan Department of Transportation
Certificate of Training

This is to certify that

John Moxey

Has successfully completed a course entitled

FHWA'S BRIDGE LOAD RATING

October 21, 2008

Instructor

[Signature]
The College of Engineering and the Department of Engineering Professional Development recognize the educational achievement of

JON MOXLEY

for participation in

Highway Bridge Design on

April 21-23, 2010

2.2 CEU - 22 PDH

C. Allen Worley, Program Director

Philip R. O'Leary, Chairman of the Department

Paul S. Potter, Dean, College of Engineering
Certificate of Participation

This is to certify that

Jon Moxey

Has Participated in

2012 Michigan Bridge Load Rating Workshop

On

June 6, 2012 (12 hours)

Signed:

(MDOT Bridge Safety Inspection Engineer)

(Training Coordinator)
Certificate of Participation

This is to certify that

Jon Moxey

Has Participated in

2012 Michigan Bridge Conference
Bridge Inspection Workshop

on

March 20, 2012 (8 hours)

Signed:

(Richard D. Kottke)
(MDOT Bridge Safety Inspection Engineer)

Signed:

(Debby L. )
(Training Coordinator)
Certificate of Participation

This is to certify that

Jonathan Moxey

Has participated in the

2014 Michigan Pre-Conference Bridge Workshop:
Introduction to Element-Level Bridge Inspection

March 18th, 2014 in Bay City, MI

7.5 Hours of Instruction
8 NBIS Recurrent Training Credit Hours

R. D. K. (MDOT Bridge Safety Inspection Engineer)
(Training Coordinator)
Certificate of Participation

This is to certify that

Jonathan Moxey

has participated in the

2015 Michigan Bridge Pre-Conference Workshop:

Bridge Foundation Design & Construction

March 17th 2015 in Bay City, MI

7.5 Hours of Instruction

(Training Coordinator)
Certificate of Participation

This is to Certify that

Jonathan Moxey

has participated in the

2015 Michigan Bridge Conference

March 18th, 2015 in Bay City, MI

7 Hours of Instruction

(Training Coordinator)
Certificate of Participation

This is to Certify that

Jon Moxey

has participated in the

2016 Michigan Bridge Pre-Conference Workshop:
Bridge Inspection Quality Assurance/Quality Control,
Reporting, & Safety

March 22nd 2016 in Lansing, MI

7.5 Hours of Instruction
8 NBIS Recurrent Training Credit Hours

(Training Coordinator)

Michigan’s Local Technical Assistance Program

Center for Technology & Training
Certificate of Participation

This is to certify that

Jon Moxey

participated in the

2018 Michigan Bridge Conference Day 1 - Educational Sessions

March 20, 2018, in Ann Arbor, MI

7.5 Hours of Instruction

Chris Billerton
Associate Director
Certificate of Participation

This is to certify that
Jon Moxey
participated in the
2018 Michigan Bridge Conference Day 2
March 21, 2018, in Ann Arbor, MI
7.5 Hours of Instruction

Chris Billerton
Associate Director
Certificate of Participation

This is to certify that

Jon Moxey

participated in the

2019 Michigan Bridge Conference Day 1 - Educational Sessions

National Bridge Inspection Program Overview

March 19, 2019, in Pontiac, MI

7.5 Hours of Instruction
8 NBIS Recurrent Training Credit Hours

Michigan’s Local Technical Assistance Program

Chris Billerton

MDOT Bridge Inspection Program Manager

LTPA Associate Director
Certificate of Training

Ken Mlecek

Safety Inspection of In-Service Bridges

FHWA-NHI-130055

hosted by

Michigan Department of Transportation

Date: December 18, 2009
Location: Lansing, MI

Instructor: William J. Haidasz

Local Coordinator: Richard Barnaby, Director National Highway Institute

60 Hours of Instruction

National Highway Institute
U.S. Department of Transportation
Federal Highway Administration
Certificate of Training

Ken Mlcek

has participated in

FHWA-NHI-130078- Fracture Critical Inspection Techniques for Steel Bridges

hosted by:

Ohio Department of Transportation

Date: February 25-28, 2014

Location: Columbus, OH

Hours of Instruction: 25

Instructor

Richard Barnaby, Director
National Highway Institute
STATE OF MICHIGAN
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BUREAU OF PROFESSIONAL LICENSING
PROFESSIONAL ENGINEER
LICENSE

KENNETH CHARLES MLCEK

LICENSE NO. 6201057048
EXPIRATION DATE 10/31/2020
AUDIT NO. 3379226

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National Highway Institute

Certificate of Training

Michael Mattzela

has participated in

FHWA-NHI-130055
Safety Inspection of In-Service Bridges

hosted by
Thompson Engineering, Inc.

Date: January 9-20, 2017
Location: Mobile, Alabama

Instructor

Hours of Instruction: 67

Local Coordinator

Instructor

Valerie Briggs, Director
National Highway Institute
STATE OF MICHIGAN
DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS
BUREAU OF PROFESSIONAL LICENSING

PROFESSIONAL ENGINEER LICENSE

MICHAEL JOE PETER MATTZELA

LICENSE NO. 6201052400
EXPIRATION DATE 10/31/2020
AUDIT NO. 3377685

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