90 Inspection Date - 8/27/15
Inspector - GCOCHRAN (23)

019B00050N - **8 Bridge ID**
Standard -**Primary Inspection Type**

Inspection Report with SI&A Data

Structure Description: 312.75 Foot - Single Span Steel Arch - Deck
2 District: 06 **3 County:** Campbell **16 Latitude:** 39°04'26.00" **7 Longitude:** 84°27'55.00"
7 Facility Carried HIGHLAND AVE **Milepoint:** 0.320
6A Feature Intersected: HILAND AVE OVR I-471 @MP
9 Location: .2 MI E -JCT US 27
Structure Description: 312.75 Foot - Single Span Steel Arch - Deck

NBI	X
Element	X
Fracture Critical	
Underwater	
Special	

NBI CONDITION RATINGS

58 Deck:	6	**61 Channel:**	N
59 Superstructure:	7	**62 Culvert:**	N
60 Substructure:	7	**Sufficiency Rating:**	93

DESIGN

Substandard:	No
Fracture Critical:	Yes
43A Main Span Material:	(3) Steel
43B Main Span Design:	(11) Arch-Deck
45 Number of Spans Main:	1
44A Approach Span Material:	(3) Steel
44B Approach Span Design:	Unknown
46 Number of Approach Spans:	4
107 Deck Type:	(1) Concrete-Cast-in-Place
108A Wearing Surface:	(1) Monolithic Concrete
108B Membrane:	(0) None
108C Deck Protection:	Unknown
Overlay Y/N:	No
Overlay Type:	None
Overlay Thickness:	-1.000 in
Overlay Date:	

APPRAISAL

36A Bridge Railings:	(0) Substandard
36B Transitions	(0) Substandard
36C Approach Guardrail:	(0) Substandard
36D Approach Guardrail Ends:	(0) Substandard
71 Waterway Adequacy:	(N) Not Applicable
72 Approach Alignment:	(6) Equal Minimum Crit
113 Scour Critical:	(N) Not over Waterway
Recommended Scour Critical:	(N) Not over Waterway

LOAD RATINGS

63 Operating Type:	(1) Load Factor (LF)
64 Operating Rating:	60.0 tons
65 Inventory Type:	(1) Load Factor (LF)
66 Inventory Rating:	36.0 tons
Truck Capacity Type I:	tons
Truck Capacity Type II:	tons
Truck Capacity Type III:	tons
Truck Capacity Type IV:	tons

GEOMETRIC DATA

48 Max Length Span:	173.901 ft
49 Structure Length:	312.749 ft
32 Approach Roadway:	-3.281 ft
33 Median:	(1) Open Median
34 Skew:	0°
35 Flare:	No Flare
50A Curb/Sidewalk Width L:	3.937 ft
50B Curb/Sidewalk Width R:	3.937 ft
47 Horiz. Clearance:	35.761 ft
51 Width Curb to Curb:	-3.281 ft
52 Width Out to Out:	46.260 ft
48 Max Length Span:	173.901 ft

ADMINISTRATIVE

27 Year Built:	1977
106 Year Reconstructed:	0
42A Type of Service On:	(5) Hyw - Ped
42B Type of Service Under:	(1) Highway
37 Historical Significance:	(5) Not Eligible
21 Maintenance Responsibility:	(01) State Hwy Agency
22 Owner:	(01) State Hwy Agency
101 Parallel Structure:	(N) No II Structure Exists
52 Width Out to Out:	46.260 ft

CLEARANCES

10 Vert. Clearance:	29.249 ft
53 Min. Vert. Clearance Over:	99.999 ft
54A Vert. Under Reference:	(H) Hwy beneath struct.
54B Min. Vert. Underclearance:	16.998 ft
55A Lateral Under Reference:	(H) Hwy beneath struct.
55B Min. Lat. Underclearance R:	22.638 ft
56 Min. Lat. Underclearance L:	22.638 ft
10 Vert. Clearance:	99.999 ft

POSTINGS

41 Posting Status:	(A) Open, No Restriction
Signs Posted Cardinal:	No
Signs Posted Non-Cardinal:	No
Field Postings Gross:	-1 tons
Field Postings Type I:	-1 tons
Field Postings Type II:	-1 tons
Field Postings Type III:	-1 tons
Field Postings Type IV:	-1 tons

Inspection Report with SI&A Data

12: Re Concrete Deck

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
SQ.FT	14,467.74	13,599.74	94%	868	6%	0	0%	0	0%

Re Concrete Deck-
Transverse cracking conditions were found randomly throughout wearing surface of deck area.
Wearing surface has a minor loss of texture typical throughout, with areas along wheel tracks showing the most loss at this time.
Stone aggregates of surface system were found starting to become exposed and highly polished.
Random areas of transverse cracking with efflorescence were found in deck soffit, along with random areas of delamination and spalling. Note that some locations of subject delamination and spalling were found starting to occurring out into spans at or near areas over traveled roadway below. All loose material and/or material that could become loose should be removed from areas.
(See Photos)

1080: Delamination/Spall/Patched Area

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
SQ.FT	128	0	0%	128	100%	0	0%	0	0%

Delamination/Spall/Patched Area-
Random areas of transverse cracking with efflorescence were found in deck soffit, along with random areas of delamination and spalling. Note that some locations of subject delamination and spalling were found starting to occurring out into spans at or near areas over traveled roadway below. All loose material and/or material that could become loose should be removed from areas.
(See Photos)

113: Steel Stringer

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
FT	2,168.25	2,168.25	100%	0	0%	0	0%	0	0%

Steel Stringer-
Note that a large amount of the stringer members throughout structure were found to be located at height, preventing close up view of members for inspection, during ground view Bi-Annual Inspection performed. However; stringer members that could be closely seen/viewed for inspection this date, were found to be performing as designed at this time.

Due to such conditions noted above, the following notes were left in place from previous In-Depth Inspection of structure, which was performed/completed in February of 2014.
Stringer elements throughout structure are of Painted Steel I design.
Note that stringer elements throughout structure were found to be performing as designed at this time, but several connection bolts in vertical clip angle of stringer #2 at ahead face of floor beam #7 were found to be very loose. Repairs are needed.
Horizontal connection welds between horizontal gusset/shelf plates of lateral bracing material to stringer and floor beam webs were found to be cracked or showing possible cracking in several locations throughout structure. See attached file in the Media Tab or hard copy in bridge file, as well as photos. All cracks detected were found located in 45 degree turn of weld or running along plate face of weld bead and not along web section of members. These weld details need to remain closely watched for further conditions.
(See Photos)

Inspection Report with SI&A Data

515: Steel Protective Coating									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
FT	0.3	0.3	100%	0	0%	0	0%	0	0%

Steel Protective Coating-
What could be seen/viewed during Bi-Annual Inspection this date of steel protective coating system throughout stringer members was found performing well at this time.
(See Photos)

141: Stl Arch									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
FT	173.9	173.9	100%	0	0%	0	0%	0	0%

Stl Arch-
Note that a large amount of arch chord system throughout structure was found to be located at height, preventing close up view of system for inspection, during ground view Bi-Annual Inspection performed this date. However; portions of the arch system that could be seen/viewed for inspection were found to be performing as designed at this time, with the exception of a minor amount of surface rusting conditions and flaking occurring in protective paint coating system.
Small areas of light surface rusting conditions were found in random locations throughout steel arch, which appear to be mostly during to light covering of protective paint coating system on material.
Note that several nuts were found to be missing from studs along access panels/doors of both arch chords, which are in need of being replaced.
(See Photos)

515: Steel Protective Coating									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
FT	0.3	0	0%	0.3	100%	0	0%	0	0%

Steel Protective Coating-
Small areas of light surface rusting conditions were found in random locations throughout steel arch, which appear to be mostly during to light covering of protective paint coating system on material.
Note that several nuts were found to be missing from studs along access panels/doors of both arch chords, which are in need of being replaced.
(See Photos)

Inspection Report with SI&A Data

152: Steel Floor Beam

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
FT	1	1	100%	0	0%	0	0%	0	0%

Steel Floor Beam-
Note that several floor beam members throughout structure are located at height, preventing close view of members for inspection during ground view Bi-annual Inspection.

Due to such conditions, the following notes were left in place from the previous inspection, which was an In-Depth Inspection performed and completed in February of 2014:
Floor beam elements throughout structure are of Painted Steel I design.
Light surface rusting conditions were found starting to occur in both the rear most floor beam #1 as well as at the forward most #12, due mostly to light covering and or light failure occurring in newer protective paint coating system as well as seepage from joints above.
Horizontal connection welds between horizontal gusset plates of lateral bracing material to stringer and floor beam webs were found to be cracked or showing possible cracking in several locations throughout structure. Cracks and possible cracks do not appear to have grown since last inspection according to the cracks end point marks made at those locations during previous inspections.
Noted/Subject areas are as followed:
Due to restricted length of Characters in this section, see attached file located in the Media Tab or hard copy in the bridge file for further details.

515: Steel Protective Coating

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
FT	0.3	0	0%	0.3	100%	0	0%	0	0%

Steel Protective Coating-
What could be seen/viewed during Bi-Annual Inspection this date of steel protective coating system throughout Floor Beam members of structure was found exposing light surface rusting conditions starting to occur in both the rear most floor beam #1, as well as at the forward most floor beam #12, due mostly to light covering and/or light failure occurring in newer protective paint coating system, as well as seepage from joints above.

162: Stl Gus Plate

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
EACH	1	1	100%	0	0%	0	0%	0	0%

Stl Gus Plate-
Horizontal connection welds between horizontal gusset/shelf plates of lateral bracing material to stringer and floor beam web areas were found to be cracked or showing possible cracking in several locations throughout structure. See attached note file located in the Media Tab or hard copy located in the bridge file, as well as photos from previous In-Depth Inspection.
All cracks detected were found located in 45 degree turn of weld or running along plate face of weld bead and not along web section of members. These weld details need to remain closely watched for further change/conditions.
(See Photos)

Inspection Report with SI&A Data

515: Steel Protective Coating									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
EACH	1	1	100%	0	0%	0	0%	0	0%

Steel Protective Coating-
What could be seen/viewed during Bi-Annual Inspection this date of steel protective coating system throughout Steel Gusset Plate material of structure, was found performing well at this time.

202: Steel Column									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
EACH	20	16	80%	4	20%	0	0%	0	0%

Steel Column-
Note that several column elements throughout structure are located at height, preventing close view of members for inspection during this ground view Bi-annual Inspection.

The following notes were left in place from the previous inspection, which was an In-Depth Inspection performed and completed in February of 2014:
Spandrel column elements from arch to floor beam connections are showing misalignment. Random bolt anchors of spandrel columns were also found to have misalignment, with several bolts found to be loose or may have never been properly placed during original construction.
Note that all vertical spandrel bearing columns/beams along topside of steel arch section were found showing horizontal displacement/movement at lower pin connections to masonry plates attached to arch. Spandrel columns along south side of arch were found to have moved horizontally south on pins, with columns along the north side showing movement towards the north direction. The columns in these locations are against the sides of masonry plates and at this time are not exposing any damages done as a result.

515: Steel Protective Coating									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
EACH	0.09	0.09	100%	0	0%	0	0%	0	0%

Steel Protective Coating-
What could be seen/viewed during Bi-Annual Inspection this date of steel protective coating system throughout Steel Column elements of structure, was found performing well at this time.
(See Photos)

Inspection Report with SI&A Data

215: Re Conc Abutment

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
FT	91	68	75%	23	25%	0	0%	0	0%

Re Conc Abutment-
Note that due to previous joint failure in the past, as well as at this time, a moderate amount of staining conditions were found along both abutment backwalls and breastwall fascias.
Abutment backwalls were found showing random hairline vertical cracking conditions throughout, along with random areas of light delamination occurring.
Note that a minor amount of dirt and debris buildup was found on beam seat locations of both abutments.
(See Photos)

302: Compressn Joint Seal

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
FT	72.19	0	0%	72.19	100%	0	0%	0	0%

Compressn Joint Seal-
Expansion joint devices throughout structure are of Compression Seal design.
Seal material throughout expansion joints was found to be showing failure at this time, with bond between seals and armored edge material being lost. Failure of joint seal material is allowing seepage conditions to random structural elements below (abutments, bearing devices, girder ends, etc.).
Areas of seals throughout joints were found to be filling and/or filled with roadway dirt and debris buildup.
(See Photos)

2350: Debris Impaction

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
FT	72.19	0	0%	72.19	100%	0	0%	0	0%

Debris Impaction-
Areas of seals throughout joints were found to be filling and/or filled with roadway dirt and debris buildup.
(See Photos)

Inspection Report with SI&A Data

311: Moveable Bearing

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
EACH	8	6	75%	2	25%	0	0%	0	0%

Moveable Bearing-
Moveable bearing devices located at seat on abutments were found showing minor section loss, which appears to be from preexisting rusting conditions before newer protective paint system placement. Bearing devices at seat on abutment are now starting to showing light rusting conditions again at this time.
Note that due to height from ground level, the bearings at the end portions arch chords could not be closely viewed for inspection.
Note that all vertical spandrel bearing columns/beams along topside of steel arch section were found showing horizontal displacement/movement at lower pin connections to masonry plates attached to arch. Spandrel arch columns along south side of arch were found to have moved horizontally south on pins, with columns along the north side showing movement towards the north direction. Column elements were also found showing misalignment at floor beam union, along with vertical connection bolts found loose and showing misalignment as well.
(See Photos)

515: Steel Protective Coating

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
EACH	0.09	0	0%	0.09	100%	0	0%	0	0%

Steel Protective Coating-
Moveable bearing devices located at seat on abutments were found showing minor section loss, which appears to be from preexisting rusting conditions before newer protective paint system placement. Bearing devices at seat on abutment are now starting to showing light rusting conditions again at this time.

313: Fixed Bearing

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
EACH	4	4	100%	0	0%	0	0%	0	0%

Fixed Bearing-
All fixed bearing devices throughout raised pedestals for arch portion of structure were found starting to show light surface rusting conditions; otherwise elements were found to be performing as designed at this time.

Inspection Report with SI&A Data

515: Steel Protective Coating									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
EACH	0.09	0	0%	0.09	100%	0	0%	0	0%

Steel Protective Coating-
All fixed bearing devices throughout raised pedestals for arch portion of structure were found starting to show light surface rusting conditions.

331: Re Conc Bridge Railing									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
FT	625.5	587.5	94%	38	6%	0	0%	0	0%

Re Conc Bridge Railing
Bridge railing system throughout structure is of Reinforced Concrete design, with aluminum tubing material attached along topside.
Concrete bridge railing system was found to have randomly spaced vertical cracking throughout, along with horizontal fascia cracking and minor spalls in random locations.
A minor to moderate loss of protective coating system was found typical throughout railing system.
Railing system throughout structure is starting to show general age and weathering conditions.
(See Photos)

804: Sidewalk									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
(LF)	625.5	571.5	91%	54	9%	0	0%	0	0%

Sidewalk-
Sidewalk elements throughout structure were found showing random areas of surface scaling and spalling, and transverse cracking with efflorescence along their interior fascias.
Transverse cracks were found at random spacings typical throughout sidewalk elements.
All four approach sidewalk transitions to structure were found showing concrete deteriorating conditions during previous inspection, but note that areas have been repaired since, which was found performing well at this time.
(See Photos)

Inspection Report with SI&A Data

850: 2nd Elem

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
(EA)	1	0	0%	0	0%	1	100%	0	0%

2nd Elem-
Note that several horizontal connection welds along connection locations of horizontal gusset/shelf plates of lateral bracing material to stringers and floor beam elements, were found to be cracked or have possible cracking conditions occurring. See attached file located in the Media Tab or hard copy located in bridge file, as well as photos. All cracks detected were found located in 45 degree turn of weld or running along plate face of weld bead and not along web section of members. These weld details need to remain closely watched for further change/conditions.
(See Photos)

851: Transitions

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
(EA)	1	0	0%	0	0%	1	100%	0	0%

Transitions-
Approach roadway transitions to structure were found showing a moderate amount of settlement at this time, along with random areas of crack formation. Noted conditions in approach transitions need to remain watched for worsening change and repairs performed as needed.
Note that the concrete pavement material of the rear approach transition was found to have longitudinal and transverse cracking conditions, along with pothole formation. Rear transition was found to have settlement in the center portion, which is causing cracking conditions at this time.
(See Photos)

860: Erosion Ctrl/Prt

Units	Total Qty	Qty. St. 1	% in 1	Qty. St. 2	% in 2	Qty. St. 3	% in 3	Qty. St. 4	% in 4
(EA)	1	0	0%	0	0%	1	100%	0	0%

Erosion Ctrl/Prt-
Local embankments along front of abutment elements, in behind the ends of the arch portion of structure, were found steep and have been covered with vertically poured concrete slabs, which are acting as retaining wall protection systems.
In front of both abutments, subject concrete material is badly cracked and showing shifting conditions (displacement). Much of the concrete is discolored and damp from water coming through in between the pours (cold/construction joints) and through locations of cracked areas, with a large amount of transverse, random and diagonal cracking. Many of the cracks were found to be opened wide from movement/displacement noted in walls. These noted conditions need to remain watched during future inspection.
Repairs are needed to subject walls.
(See Photos)

Inspection Report with SI&A Data

1220: Deterioration (Other)									
Units	**Total Qty**	**Qty. St. 1**	**% in 1**	**Qty. St. 2**	**% in 2**	**Qty. St. 3**	**% in 3**	**Qty. St. 4**	**% in 4**
(EA)	1	0	0%	0	0%	1	100%	0	0%

Deterioration (Other)-
Local embankments along front of abutment elements, in behind the ends of the arch portion of structure, were found steep and have been covered with vertically poured concrete slabs, which are acting as retaining wall protection systems.
In front of both abutments, subject concrete material is badly cracked and showing shifting conditions (displacement). Much of the concrete is discolored and damp from water coming through in between the pours (cold/construction joints) and through locations of cracked areas, with a large amount of transverse, random and diagonal cracking. Many of the cracks were found to be opened wide from movement/displacement noted in walls. These noted conditions need to remain watched during future inspection.
Repairs are needed to subject walls.
(See Photos)

STRUCTURE NOTES

Structure Stamped 1977 HS 20-44

INSPECTION NOTES

Inspection performed and completed by KYTCs Gary Cochran.
Note that this inspection performed was a Bi-Annual Inspection, which was completed from ground view only, with a large amount of structural members being located at height. Such conditions prevent close up thorough review of members; therefore notes from previous In-Depth Inspection, as well as Work Orders were left in place throughout report as needed.

*Note that this inspection report has a attached file located in both the Media Tab and structure file dated (02/19/2014)

*Note that Steel Protective Coating qualities need to be obtained for all Element Descriptions #113, #141, #152, #162, #202, #311 and #313 as soon as possible. (08/27/2015)

*Note that a Metal Vandal Protection Fencing system is attached along both the left and right sides of structure.

*Note that graffiti art cover was found along interior face of concrete parapet wall at all four corners of structure, which is in need of being removed. (08/27/2015)

Inspection Report with SI&A Data

WORK	
Action:	1004 - Approach Roadway

Generated by user "gcochran" on 8/27/2015
Local City Crew may be responsible for this action (?).

-Repair both the rear and forward approach roadway transitions to structure, due to settlement and cracking found in concrete pavement.

Action:	1029 - Deck-Patch spalls->Deck-Repair (Potholes)

Generated by user "gcochran" on 08/27/2015

-Repair areas of delamination and spalling found occurring in random locations throughout deck soffit.

Action:	-1 - Converted Work Candidates

Generated by user "gcochran" on 8/27/2015
No Action for such Work Order

-Remove all graffiti art cover from interior fascias of concrete parapet walls, all four corners of structure.

Action:	-1 - Converted Work Candidates

Generated by user "gcochran" on 8/27/2015
No Action for such Work Order

-Repair/Replace concrete retainment walls along face of both the rear and forward abutment embankments, due to poor conditions noted.

Action:	-1 - Converted Work Candidates

Generated by user "gcochran" on 8/27/2015
No Action for such Work Order

-Replace missing nuts on access panels of arch chords throughout structure.