ODOT District 8
2024 In-Depth & NSTM Inspection Report

INSPECTION July/Aug 2024
REPORT Sept 2024

Bridge No. HAM-50-2181N

SFN: 3103390

PID: 105475

Prepared for:

Ohio Department of Transportation

ODOT District 8
505 South SR 741
Lebanon, OH 45036

Prepared by:

TRANSYSTEMS

TranSystems
1100 Superior Avenue, Suite 1000
Cleveland, OH 44114

2024 IN-DEPTH & NONREDUNDANT STEEL TENSION MEMBER (NSTM) INSPECTION REPORT

of

BRIDGE NO. HAM-50-2181N
SFN: 3103404

CINCINNATI, OHIO

Prepared by:

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Inspected on:
August 12, 2024

Inspected by:
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Prepared for:

OHIO DEPARTMENT OF TRANSPORTATION
DISTRICT 8

PID No. 105475 | AGR 38137

Final Report Submitted October 30, 2024

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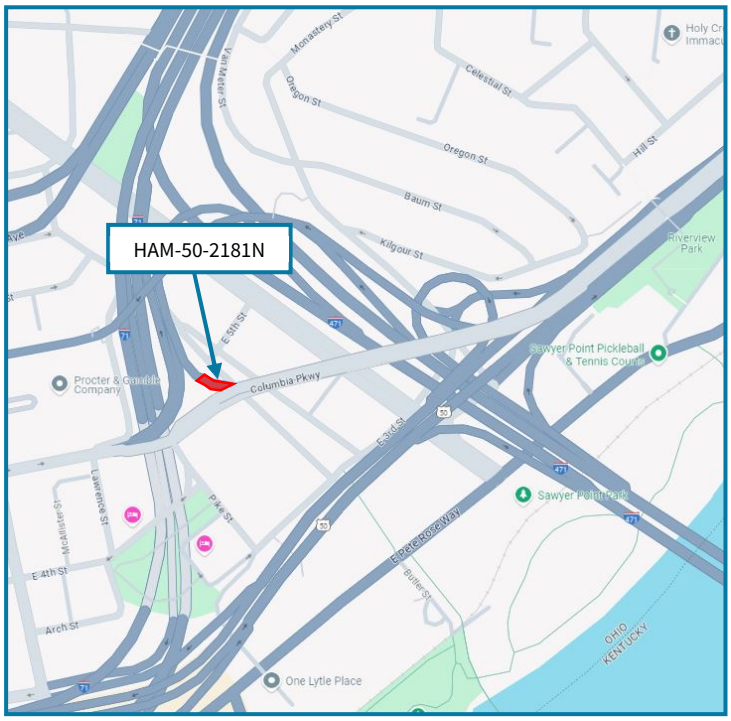
BRIDGE DESCRIPTION

The Columbia Parkway Ramp (Ramp A; HAM-50-2181N) is a three span structure that connects westbound Columbia Parkway to southbound I-471 in Downtown Cincinnati **(see Location Map)**. There is only one lane on the bridge that carries traffic over a parking area and a sidewalk. The bridge was constructed in 1978 and consists of two (2) 3-girder spans and one (1) 1-girder span that widens Span 3 of the existing Columbia Parkway Viaduct (HAM-50-2180N). The bridge has a reinforced concrete deck that is supported by continuous steel girders resting on reinforced concrete piers. The structure is 194'-0" long and has a 25'-0" wide deck. In 2001, the structure was rehabilitated. It received a deck overlay, painting of the steel, and other structure repairs. The spans and substructure units are numbered from north to south. Spans 1 and 2 consist of a steel plate girder 3-girder system and Span 3 consists of a single girder with floorbeams extending between the girder and HAM-50-2180N Girder 1 in Span 3. The girders are labeled from east to west as Girder A, Girder B, and Girder C.



Location Map

BRIDGE LAYOUT & NSTM IDENTIFICATION

The following sketches show the layout and nomenclature of the bridge. NSTMs are highlighted red.

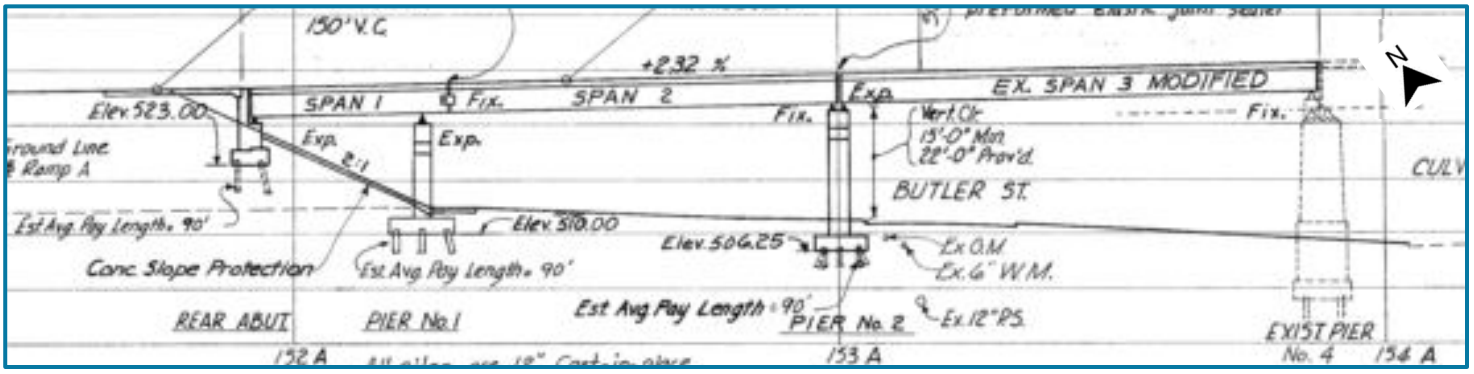


Figure 1 – HAM-50-2181N Overall Bridge Profile

Figure 2 – HAM-50-2181N Bridge Nomenclature (Substructure Layout)

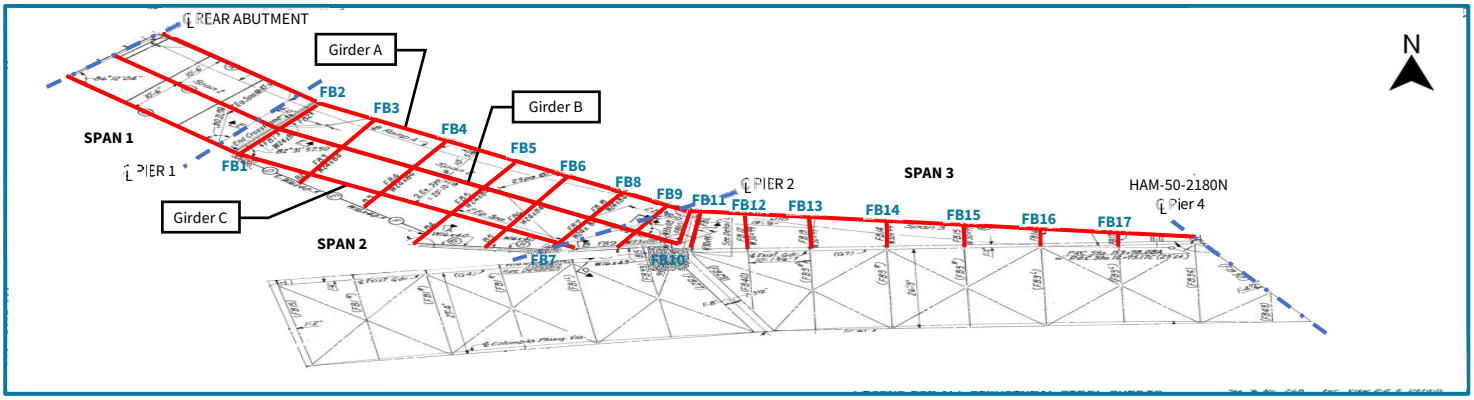


Figure 3 – HAM-50-2181N Bridge Nomenclature (Framing Plan Layout and NSTMs – Spans 1 to 3)

INSPECTION SCOPE AND PROCEDURE

Personnel from TRC performed an in-depth and nonredundant steel tension member (NSTM) inspection of the bridge on August 12, 2024. Access to the structure was gained using one (1) 85-ft bucket manlift and on foot. The 85-ft manlift was used to gain hands-on access to the approach span components and the substructure units. The lower portions of the substructure were accessed from the ground.

Traffic control was not necessary to perform the inspection of the bridge. The bridge is located over a parking lot and a sidewalk.

The inspection findings were recorded on bridge specific field inspection forms. Each of the forms for the bridge element were marked up with defects and notes. Inspection equipment utilized during the inspection included, but was not limited to chipping hammers, wire brushes, measuring tapes, 6-foot carpenter rules, and flashlights. Color digital photographs were taken of areas of deterioration, condition changes, typical details, and any immediate maintenance needs, if found.

INSPECTION TEAM

The inspection team members were as follows:

- Craig Jacob, PE – TRC (Team Leader)
- Lisa Brown, EI – TRC

CONDITION RATING

State and federal guidelines for evaluating the condition of bridges have been developed to promote uniformity in the inspections performed by different teams and at different times. Condition ratings are used to describe the existing, in-place bridge as compared to the as-built condition. Table 1 was used as a guide in evaluating the condition of the various members of the bridge.

SUMMARY ITEMS (SNBI)	CONDITION	DEFECTS
9	Excellent	Isolated inherent defects.
8	Very Good	Some inherent defects.
7	Good	Some minor defects.
6	Satisfactory	Widespread minor or isolated moderate defects.
5	Fair	Some moderate defects; strength and performance of the component are not affected.
4	Poor	Widespread moderate or isolated major defects; strength and/or performance of the component is affected.
3	Serious	Major defects; strength and/or performance of the component is seriously affected. Condition typically necessitates more frequent monitoring, load restrictions, and/or corrective actions.
2	Critical	Major defects; component is severely compromised. Condition typically necessitates frequent monitoring, significant load restrictions, and/or corrective actions in order to keep the bridge open.
1	"Imminent" Failure	Bridge is closed to traffic due to component condition. Repair or rehabilitation may return the bridge to service.
0	Failed	Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.

Table 1 – Codes and descriptions for component condition ratings (SNBI Table 20).

The inspection of this bridge was performed in accordance with the following documents:

1. Manual of Bridge Inspection, Ohio Department of Transportation (ODOT), 2014.
2. Manual for Bridge Element Inspection, 2nd Edition, AASHTO, 2019 (rev 2022).
3. Manual for Bridge Evaluation, AASHTO, 2018 (3rd edition with 2020 and 2022 Interim Revisions).
4. Bridge Inspector's Reference Manual, U. S. Department of Transportation, 2022 NBIS (rev 2023).
5. National Bridge Inspection Standards, U.S. Department of Transportation, 2022.
6. Specifications for the National Bridge Inventory, Federal Highway Administration, 2022.
7. Ohio Manual of Uniform Traffic Control Devices (OMUTCD), ODOT, 2012 (rev 2011).

EXECUTIVE SUMMARY

The HAM-50-2181N Bridge (Columbia Parkway Ramp) is in GOOD CONDITION [7-NBIS] overall. Significant findings include:

- The compression seals are deteriorated with tears and portions missing. The joint armor has surface corrosion over the full length.
- There is a 1'-6" L x 1' W x 6" D spall in the deck overhang between Spans 1-2 outboard of Girder A.
- There are isolated locations of section loss to the bearing anchor bolts.
- The rocker bearings have up to 1/2" pack rust between the rocker and the masonry plate.
- Girder A is up against the backwall at the Rear Abutment due to a frozen bearing.
- The north approach has vegetation growing in the shoulder area.
- The crash attenuator has impact damage at the beginning of the exit ramp.

The overall item ratings can be summarized in Table 2:

Bridge Condition Summary Ratings		
ITEM	**RATING**	**TYPICAL NOTES**
DECK	**6**	**Isolated deck haunch spalls. Isolated spall in the deck overhang near Pier 1.**
SUPERSTRUCTURE	**8**	**Isolated locations of light surface corrosion at the north ends of the girders, near the Rear Abutment.**
SUBSTRUCTURE	**7**	**Scattered hairline cracks on the pier caps and stems.**

Table 2 – Bridge Condition Summary Ratings

INSPECTION FINDINGS

B.C.01 – DECK CONDITION RATING (ITEM 58)

The deck is in SATISFACTORY CONDITION [6-SNBI] overall with isolated haunch spalls and hairline cracks, some with efflorescence. There is one large spall in the deck soffit outboard of Girder A. The wearing surface has hairline cracking with shallow spalls along Pier 1. The bridge railings have isolated locations of cracking with rust staining. The expansion joints have surface corrosion to the armor and the seals have some tears.

ELEMENT 12 – REINFORCED CONCRETE DECK

The reinforced concrete deck is in satisfactory condition with isolated haunch spalls **(see Photo 1)** and hairline cracks, some with light efflorescence. In Span 2, along Girder A, there is an 8' L shallow haunch spall **(see Photo 2)**. At Pier 1, the east soffit, outboard of Girder A, has a 1'-6" L x 1' W x 6" D spall with exposed steel **(see Photo 3)**.

Photo 2 – 8' L shallow haunch spall in the deck (Girder A, Span 2, looking northeast).

ELEMENT 805 – WEARING SURFACE – MONOLITHIC CONCRETE

The monolithic concrete wearing surface is in good condition overall with some hairline transverse cracks, isolated shallow spalls along the joint near Pier 1 **(see Photo 4)**, and hairline map cracking near the east end of the bridge.

Photo 1 – 2' L haunch spall in the deck (Girder B, Span 2, looking southwest).

Photo 3 – 1'-6" L x 1' W x 6" D spall in the deck overhang (Girder A, Spans 1-2, looking west).

Photo 4 – Shallow spalls along the joint at Pier 1 and missing/deteriorated compression seals (Pier 1, Spans 1-2, looking east).

B.C.05 – BRIDGE RAILING CONDITION RATING

The bridge railings are in GOOD CONDITION [7-SNBI] overall with isolated longitudinal cracks with rust staining

ELEMENT 331 – REINFORCED CONCRETE BRIDGE RAILING

The reinforced concrete bridge railings run the full length of both sides of the ramp and are the New Jersey barrier style. The railing has locations of longitudinal cracking with rust staining along the lower portion **(see Photo 5)**.

Photo 5 – Bridge railing with longitudinal cracking with rust stains (looking east).

B.C.06 – BRIDGE RAILING TRANSITION CONDITION RATING

The bridge railing transitions are in GOOD CONDITION [7-SNBI] overall with isolated chips in the concrete. At the northwest railing transition, there is vegetation growing in the shoulder along the base of the railing **(see Photo 6)**. At the northeast corner, the transition is a continuation of the New Jersey barrier. The northwest corner transitions into a steel guardrail. At the south end, the southeast corner is the concrete panel rail that smoothly transitions into the New Jersey rail and the southwest corner has a crash attenuator. The condition of the crash attenuator is detailed in the approach guardrail section.

B.C.08 – BRIDGE JOINTS CONDITION RATING

The joints are in FAIR CONDITION [5-SNBI] overall due to corrosion on the joint armor and deteriorated, torn, and partially missing compression seals. The Rear Abutment, Pier 1, and Pier 2 have compression seals. Previously noted evidence of leakage at the joints was not observed during the 2024 inspection cycle. A lane closure was not provided for the 2024 inspection; therefore, joint measurements were not taken due to inspector safety concerns.

Photo 6 – Transition at the north end. Vegetation in the shoulder (North Approach, looking north).

ELEMENT 302 – COMPRESSION JOINT SEAL

The compression seal expansion joints located at the Rear Abutment, Pier 1, and Pier 2 are in fair condition overall. The joint material is deteriorated with tears and portions missing **(see Photo 4)**. The joint armor has surface corrosion over the entire length.

ELEMENT 815 – DRAINAGE

The bridge deck drainage is in good condition with a small amout of trash sitting on top of the scupper near the Rear Abutment.

B.C.02 – SUPERSTRUCTURE CONDITION RATING (ITEM 59)

The superstructure is in VERY GOOD CONDITION [8-NBIS] overall. There are isolated locations of light surface corrosion at the north ends of the girders near the Rear Abutment. The protective coating system is in good condition.

Photo 7 – Surface corrosion to the girder bottom flange (Girder A, Span 1, looking north).

ELEMENT 107 – STEEL OPEN BEAMS/GIRDERS

The steel built-up plate girders are in very good condition. There are no significant deficiencies noted. There is surface corrosion to the underside of the bottom flanges at the ends near the Rear Abutment **(see Photo 7)**.

ELEMENT 152 – STEEL FLOORBEAM

The steel floorbeams are located in Spans 2 and 3 and are in very good condition. No significant deficiencies are noted.

ELEMENT 161 – PIN, PIN AND HANGER ASSEMBLY

At Pier 1, there are hinges at all three girders made up of a pin with a plate on each side. The pins are in very good condition with no significant deficiencies noted. The plate on the interior face of Girder A has 1/32" gouges in it near the top **(see Photo 8)**.

Photo 8 – Gouges in the plate at the hinge over Pier 1 (Pier 1, Girder A, looking east). The markings on the bridge as shown in the photo are incorrect.

B.C.07 – BRIDGE BEARING CONDITION RATINGS

The bridge bearings are in SATISFACTORY CONDITION [6-SNBI] overall due to some locations of corrosion and pack rust as well as section loss to the anchor nuts. Girder A bearing is frozen at the Rear Abutment and the girder is contacting the backwall. There are a total of 7 rocker bearings: 3 at the Rear Abutment, 3 at Pier 1, and 1 at Pier 2, Span 3. There are a total of 4 fixed bearings: 3 at Pier 2, Span 2 and 1 in Span 3 on Pier 4 of HAM-50-2180N.

ELEMENT 311 – MOVABLE BEARING

The rocker bearing devices are in satisfactory condition overall with up to 1/2" pack rust between the rocker and the masonry plate at Pier 2 **(see Photo 9)**. The masonry plates at the rocker bearings have both surface corrosion and laminar corrosion. The rockers also have laminar corrosion on them at this location. Girder A is contacting the backwall at the Rear Abutment **(see Photo 10)**.

Photo 9 – 1/2" pack rust between the rocker and the masonry plate (Girder A, Pier 2, Span 3, looking south).

Photo 10 – Corrosion to the bearing and Girder A contacting the backwall (Girder A, Rear Abutment, 4, looking west).

ELEMENT 313 – FIXED BEARING

The fixed bearing devices are in satisfactory condition overall. The bearing at Pier 4 of HAM-50-2180N has a loose anchor bolt nut and two anchor nuts that have up to 30% section loss **(see Photo 11)**. The masonry plate has minor laminar corrosion.

Photo 11 – Loose anchor nut and section loss (Girder A, Pier 4 (HAM-50-2180N), Span 3, looking east).

B.C.14 – NSTM INSPECTION CONDITION

The NSTMs are in VERY GOOD CONDITION [8-NBIS] overall. No significant deficiencies are noted for the girders or the floorbeams.

NON-INVENTORIED SUPERSTRUCTURE ITEMS

Alignment

The alignment is in very good condition. There is no horizontal or vertical misalignment.

Crossframes

The crossframes are in good condition. In Span 2, the 3rd crossframe south of Pier 1 has insufficient weld length and there are no connection bolts at the top east connection and the bottom west connection between Girders A and B **(see Photo 12)**.

Photo 12 – Insufficient weld length and missing connection (Girder A, Span 2, looking north).

Utilities

There are lights mounted to Girder B in Span 2. They are located over the parking lot and are in good condition. The support bracket for the

lighted exit ramp sign has no apparent deficiencies. The mounted anchor for the pole could not be reached from the lift position below. The other light pole is off the bridge.

B.C.03 – SUBSTRUCTURE CONDITION RATING (ITEM 60)

The substructure is in GOOD CONDITION [7-NBIS] overall. No significant deficiencies were observed during the 2024 inspection.

ELEMENT 205 – REINFORCED CONCRETE COLUMN

The reinforced concrete column is part of HAM-50-2180N, Pier 4. The condition is described in that structure's report and consists of only the details for Pier 4.

ELEMENT 210 – REINFORCED CONCRETE PIER WALL

The reinforced concrete pier walls are in good condition and are located at Piers 1 and 2. There are scattered hairline cracks in the walls. There is a small delamination on the south face of Pier 2 near the bottom.

ELEMENT 215 – REINFORCED CONCRETE ABUTMENT

The reinforced concrete abutment is in very good condition. No joint seepage, spalls, discernible crack patterns, or other deficiencies were observed in the abutment.

ELEMENT 234 – REINFORCED CONCRETE PIER CAP

The reinforced concrete pier caps are in good condition and located at Piers 1 and 2 and at Pier 4 of HAM-50-2180N. Notes on the pier cap at Pier 4 is in the report for HAM-50-2180N. The pier caps at the ramp have scattered hairline cracks.

ELEMENT 830 – ABUTMENT BACKWALL

The reinforced concrete backwall is in very good condition. No spalls, discernible crack patterns, or other deficiencies were observed.

NON-INVENTORIED SUBSTRUCTURE ITEMS

Wingwalls

The wingwalls are in good condition. There are no significant deficiencies noted.

Slope Protection

The slope protection is in good condition. There are no significant deficiencies noted.

APPROACH SUMMARY

The approaches are in GOOD CONDITION [7-NBIS] overall with no deficiencies noted.

ELEMENT 321 – REINFORCED CONCRETE APPROACH SLABS

The reinforced concrete approach slab is in good condition. There is vegetation growing in the shoulders **(see Photo 6)**.

NON-INVENTORIED APPROACH ITEMS

Approach Pavement

The approach pavement is in very good condition with no deficiencies noted.

Approach Guardrail

The approach guardrail is in poor condition due to the condition of the crash attenuator at the southwest corner. It has impact damage with loose panels, loose cables, and deployed cushions **(see Photo 13)**. See the report for HAM-50-2080N for details on the crash attenuator. The guardrail near the Rear Abutment is a W-beam rail with no noted deficiencies.

Photo 13 – Impact damage to the crash attenuator at the exit (South Approach, looking west).

Embankment

The embankment at the Rear Abutment is in very good condition with no deficiencies noted.

Sign Supports

There is an exit sign at the beginning of the ramp near Pier 4 of HAM-50-2180N. The sign support is in very good condition. No significant deficiencies are noted.

RECOMMENDATIONS

The four categories of recommendations for the HAM-50-2181N Bridge are as follows:

- Priority Work: (Within 1 Year Period) — Work which should be performed as soon as possible to address deficiencies which affect the capacity of the structure or public safety.
- Rehabilitation/Evaluation: (Within 5 Year Period) — Recommendations for large-scale deficiencies which are extensive in nature and require engineering analysis.
- Maintenance: (As Scheduled) — Recommendations that are minor in nature and can be easily repaired.
- Monitoring: (As Recommended) — Regular field observation of defects which are not currently in need of repair but will require corrective action if deterioration continues.

Priority Work: None.

Rehabilitation/Evaluation:

Deck

1. Replace the expansion joint material at Pier 1.

Maintenance:

Deck

2. Replace the crash attenuator at the Sixth St. Downtown exit ramp.

Monitoring:

Bearings

3. Monitor the corrosion and section loss.

Superstructure

4. Monitor the Girder A where it is contacting the backwall.

APPENDIX A

ASSETWISE REPORT

Inspector:	Griessmann,Ann	**Structure Number:**	3103390
Inspection Date:	08/16/2024	**Facility Carried:**	COLUMBIA PARKWAY

HAM-00050-2180N_(3103390)

ODOT District:	District 08					Date Built:	07/01/1938
Major Maint:	01 - State Highway Agency	Facility Carried:	COLUMBIA PARKWAY	Traffic On:	1 - Highway	Rehab Date:	07/01/1997
Routine Maint:	04 - City or Municipal Highway Agency	Feature Inters:	IR471,RAMP,EGG,CUL	Traffic Under:	1 - Highway, with or w/out pedestrian	Insp. Resp A:	01 - State Highway Agency
FIPS Code:	15000 - CINCINNATI (HAM county)	Location:	DISTRICT 08		N OF I471 & US50 INT	Insp Resp B:	

Inspector Griessmann,Ann Inspection Date 08/16/2024 Reviewer Hammerschmidt,Steven

Inspector Comments - Deck and Approach

Deck

Floor/Deck

Isolated haunch spalls and some hairline longitudinal and transverse cracks with light buildup of efflorescence. The longitudinal cracks are located between the floorbeams. There are isolated areas of hairline map cracking adjacent to the haunches. There are also isolated spalls in the floorbeam haunches measuring up to 1 ft in diameter. Majority of the transverse cracks are located in the deck overhangs and have light to moderate build-up of efflorescence

Bridge Wearing Surface

Some minor longitudinal and transverse cracking throughout. There are isolated locations of moderate to wide cracks near drainage scuppers and expansion joints. At the drainage scuppers, the cracks are propagating from the corners of the scupper grate. For the expansion joints, the cracking is typically near the areas where the joint armor bends.

Isolated hairline longitudinal and transverse cracks were observed throughout the sidewalk. No other deficiencies were noted.

Strip Seal Expansion Joint

The strip seal expansion joints are located at Abutment 1 (Rear Abutment), Piers 2 through 5, Pier 7, Pier 10, Piers 12 through 17, and Abutment 18 (Forward Abutment). All joint openings have some level of debris impaction ranging from partially full to completely full of debris. The debris does not appear to be affecting the overall movement of the joints at this time. The joint armor at Abutment 1 (Rear Abutment), Piers 2, 7, 10, 13-16, and Abutment 18 (Forward Abutment) have areas of surface corrosion that vary from initiation to fully developed. Majority of the surface corrosion is located in the shoulder area, but at Piers 2, Piers 13-15, and Abutment 18 (Forward Abutment), the surface corrosion is more abundant across the entire length of the joint armor. Minor popouts and edge spalls are present along the entire length of all the joints and there are isolated tears in the seal material. At Pier 3, the expansion joint has a 1/2" vertical offset. At Abutment 18 (Forward Abutment), the header has isolated shallow edge spalls and hairline transverse cracks, but at Abutment 1 (Rear Abutment), the spalling is larger in size and the adjacent

construction joint is detaching and being pulled away.

Reinforced Concrete Bridge Railing

Between Pier 5 and Pier 6 of the north railing, the decorative extension to the post is cracked and fully delaminated. Between Pier 6 and Pier 7 of the north railing, there is a 2' H x 1' W delamination at the stem. Throughout the length of the railing, there are several locations of various sizes of spalls up to 5" W x 1' H, some with exposed and corroded rebar. Two locations were noted as having map cracking with efflorescence on the south railing between Piers 7-8 and between Piers 17-18. The protective coating system is faded and is chipping off throughout. In the westbound lane just east of I-471, there is a crash attenuator at the exit ramp for Sixth St Downtown. The crash attenuator has been damaged and has panels hanging loose, deployed cushions, and loose cables.

Drainage

There are isolated locations where the deck scupper has debris build-up as a result of trash being discarded, but all appear to be draining. At Pier 5, near the north column, the drain is partially clogged and has minor obstruction to the flow. The drainpipe is aimed near the edge of the drain rather than the center.

Approach

Approach Wearing Surface

Majority of the deficiencies noted are located at the east approach pavement. There is abundant wide map cracking near the East Approach Slab and wide random cracking to the remainder of the pavement at the east end. The approach pavement at the west end exhibits less deterioration

Approach Slabs

No significant deficiencies are noted. There is hairline cracking and some wear to the tines in the wheel lines.

Approach Embankment

No significant deficiencies are noted.

Approach Guardrail

The protective coating system is chipping and there are isolated hairline cracks.

Signs and Sign Supports

No significant deficiencies are noted.

Inspector:	Griessmann,Ann	**Structure Number:**	3103390
Inspection Date:	08/16/2024	**Facility Carried:**	COLUMBIA PARKWAY

Inspector Comments - General Appraisal

Superstructure

Note that "inactive" as used in this report refers to areas where rusting/corrosion (pack rust, pitting, etc.) was once actively occurring, but is currently arrested with paint.

Superstructure Alignment

No deficiencies were
observed where there was any horizontal or vertical misalignment.

Steel Open Girder/Beam

There are isolated
locations of stiffeners with distortion.
The distortion noted does not exceed 1/4" over 4" to 12". In Span 14, the South Girder has 1'-2" of torch cut edges on the bottom flange. In Span 12, there are
multiple locations where the bottom flange is distorted. Each occurs over a small area (8" to 12"). Tack welds are present at
several floorbeam connection angles and at isolated diaphragm connection angles
where the fill plates are attached to the girder. Throughout the approach
spans, there are random locations where either rivet heads are missing or there
are blind holes. In Span 16, the South Girder at FB 6 has 4
plug welds in the fill plate to web connection. No distress was
observed in the surrounding area. The
girders commonly have areas ranging from 1/16" to 1/4" of pitting near the
girder ends. The pitting is commonly in the end section
above the bearing. There is also
commonly 1/16" pack rust between the cover plates along the bottom flange of
the girders. In Span 13, the South Girder has a 2"
diameter corrosion hole in the web behind the bearing.

Steel Protective Coating

The bridge received spot painting in areas with active corrosion during the 2017-2018 rehabilitation. The PCS still has areas of surface corrosion, peeling paint, and areas of chalking.

Diaphragm/X-Frames

No significant deficiencies are noted on the crossframes.

Steel Truss

Lower
Chord

Throughout the truss length, the lower chord has various levels of pack rust between the web and flange components and internal stiffeners. The pack rust is commonly located on both sides and varies from 1/16” to 1” thick. The areas of thicker pack rust have caused the web plate to warp giving it a wavelike appearance. At locations where there are internal stiffeners, typically near the bearings, the pack rust measures up to 1-1/2” wide. Other areas that are being affected by pack rust include at fill plates where the lower chord connects to the vertical (panel points) and at the batten plates.
At isolated locations, the pack rust is prying the plate away from the connected member. Inside the panel points, bird debris is common. Near L40 of the North Truss, Span 9, a 4 SF area of paint has peeled off exposing the primer below. Isolated locations inside the panel points have the paint peeled up exposing bare metal with surface corrosion present. The lower chord components typically have areas of section loss ranging from 1/16” to 3/16” depth with isolated areas that have corrosion holes.
The areas tend to be focused mainly around the panel points and typically are located on the batten plate, top flange ends, or web plates adjacent to the gusset plate. Rivet head loss up to 50% is noted at isolated panel points within the lower chord. Corrosion holes are noted in several batten plates near the truss bearings. Throughout the length of the truss, there are various locations of blind holes and missing fasteners. The blind holes are commonly located in the lower chord top flange near the panel point where a batten plate or lacing bar is installed or in the lower chord web adjacent to a bearing, where previous jacking plates were installed or are still installed. There are missing rivets at the batten plates at several locations. Three locations of rivet heads, inside the lower chord, show deformation due to clearance with the interior gusset plate. The rivet heads were not properly shaped as a result, but they are currently still functioning.

Upper Chord

Pack rust is located at isolated locations. U42U43 bottom batten plate has 3/4” pack rust between the plate and the upper chord bottom flange. The top batten plates or splice plates also have isolated locations of pack rust underneath averaging 1/2". There are isolated locations of pack rust distorting the fill plates. Painted over and active section loss is present throughout the upper chord.
Section loss on the upper chord is most commonly noted on the bottom flanges at the ends of the members and on the web plates under the floorbeam connections. The bottom flanges exhibit corrosion holes, some with active corrosion, and painted over pitting up to 1/16” deep. Under the floorbeam connections, painted over pitting up to 1/8” deep is noted. There is an isolated

location of section loss to the fill plate at U9U10 of the Center Truss in Span 6. There is 100% section loss over an 8" L x 2" W area at the end of the plate. The exposed top flange has initial pitting developing and the remaining end of the fill plate is warped. There are isolated misdrilled holes in the upper chord member.
Two misdrilled holes are noted in the splice plate at U9U10 of the Center Truss in Span 10. One misdrilled hole is noted at the floorbeam connection to U1 of the Center Truss in Span 7.
At U25 of the North Truss in Span 8, there are four plug welds on each side of the upper chord. No issues were seen during the inspection.

Verticals

At the lower connection to the gusset plate, there is typically pack rust between the vertical and the fill plate. The pack rust thickness varies from 1/8" up to 9/16", causing distortion of the fill plate.
The verticals also have isolated locations of painted over section loss. U6L6 of the South Truss in Span 10 has 1/8" painted over pitting over the length of the north flange. There is commonly section loss across the width of the flange adjacent to the lower gusset plate measuring 1/8". Several of the welds attaching items to the vertical are of poor quality. Throughout the truss, there are locations where the remains of a previously welded attachment are still on the vertical. The attachment was torch cut off and the partial pieces of steel remain welded. Many verticals have errant welds attached to the flange and locations of gouging. At U40 of the North Truss, Span 9, there are gaps at three bolted connections. The bolts are not loose to the touch, but they have not been properly tightened. At U11 of the Center Truss, Span 7, there are three plug welds near the top end of the vertical. No deficiencies are noted in this area. Two rivet heads have been torch cut off at U20 of the North Truss, Span 11.

Diagonals

There is an isolated location at U16L17 that has 1/8" pack rust between the fill plate and the diagonal. At L33 of U32L33, Span 9 of the North Truss, there is surface corrosion with an area of pack rust forming. A plug weld exists at U3L4, Center Truss, Span 5. There are misdrilled holes at the several locations. At U18 of L17U18, North Truss, Span 6, there is a 1-1/2" long cracked tack weld between the diagonal and the north gusset plate.

Steel Floor Beams

There are isolated locations of pack rust ranging from 3/16” to 3/8” at the intersection with the girders and at the floorbeam cantilever connection to the girder top flange. The protective coating system is faded. There are isolated locations of surface corrosion with the largest being a 2’ L x 3” W area on the bottom flange of Floorbeam 24. The floorbeams have some locations of painted over pitting. The pitting is typically across the length of the bottom flange and up to 4” H on the lower portion of the web. In this area, the bottom flange has areas of reduced flange thickness. The floorbeam on the south side of U39, Center Truss, Span 9, has a 3/8” vertical overcut. No additional issues are noted at this location. There is a misdrilled hole at the floorbeam connection to the gusset plate at U15, South Truss, Span 6. Over Pier 10, North Truss, Span 10, there is a blind hole in the top floorbeam flange.

Gusset Plates

Stiffening angles have been added to several gusset plates. At U33 of the South Truss in Span 9, there is an isolated location of deformation in the gusset plate in an area where pack rust is not contributing, but a stiffening angle is in place. Pack rust up to 1/2" is typical throughout the truss between the gusset plates and truss members. In Span 5 of the South Truss at L0, there is up to 1” pack rust between the lower lateral bracing fill plate and the inboard gusset plate. The protective coating system of the gusset plates is in good condition. There are isolated locations of light surface corrosion, but most have some level of paint covering them. Some of the paint has faded and some gusset plates have been spot painted following the rehabilitation. At L44 of the Center Truss in Span 9, the paint has failed along the interface with the lower chord and the exposed steel has surface corrosion. There are several misdrilled holes. At L28, Center Truss, Span 8, a rivet is being deformed at the gusset plate due to a conflict with the sway bracing connection angle. There are plug welds at some locations with no issues noted. The gusset plates have widespread section loss. The section loss typically comes in one of two forms. The most abundant being painted over pitting ranging from 1/16” to 3/16” depth at various locations of the gusset plate. This section loss is typically found over the entire gusset plate as scattered shallower pitting or it is focused in an area adjacent to another member where it is typically deeper. The second form is section loss along the interface with the lower chord where the corrosion is active. This area typically holds debris or water.

Lateral Bracing

The batten plates at the

ends of the members typically have painted over pitting up to 3/16", similar to the sway bracing bottom struts. In Span 8, 6' south of L18 near the Center Truss, the lateral bracing member has some distortion, possibly due to impact damage. There is also impact damage to the top flange of the lateral bracing near L8, Center Truss, Span 7. At L20, North Truss, Span 11, the connection of the lateral bracing to the south gusset plate has up to 1" pack rust. The paint has failed on lateral bracing member near the Floorbeam 0, South Girder, Span 14.

Sway Bracing

The batten plates commonly have painted over pitting up to 3/16". At the ends of the bottom strut, there are isolated locations where there is pack rust between the flange angles and either the batten plate or the lower gusset plate. There are two broken rivet heads at the sway bracing connection at L0 of the Center Truss, Span 10.

Fatigue

There are no Category E or E' details, but there are problematic details. There are tack welds on the gusset plates, fill plates, and splice plates. Some of these are broken or cracked, but none have propagated into the base metal. Many of the cracked locations are due to pack rust occurring between the plates.

Protective Coating System

Exterior paint has faded and chalked in isolated areas. Some areas of corrosion.

Utilities

No significant deficiencies are noted.

Substructure

Abutments

The abutment walls have isolated spalls with exposed rebar and cracking (some with rust staining and/or efflorescence).

Pier Columns/Bents

The columns typically have various locations of large spalls with exposed rebar and areas of delaminations on the faces. There are also several locations of hairline cracking or map cracking, some with rust staining. There are isolated locations on the top of the column with spalls that have exposed rebar.

Pier Caps

The pier caps have isolated

spalls with exposed rebar, cracking, areas of rust staining, and failed repair patches.

Wingwalls

There is hairline
horizontal cracking in the wingwall at the northwest corner.

Slope Protection

At Pier 11, near the south column, the slope protection is broken and undermined. At Pier 12, near the north column, the slope protection is broken and has a void directly underneath the drainpipe. At Pier 13, near the south column, the adjacent slope protection and approach slab are undermined.

Culvert

N/A

Inspector Comments - Waterway

Waterway Adequacy

N/A

Channel

N/A

Scour Critical

N/A

APPENDIX B

ELEMENT LEVEL QUANTITIES

Inspector: Griessmann,Ann
Inspection Date: 08/16/2024

Structure Number: 3103390
Facility Carried: COLUMBIA PARKWAY

	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
12-Reinforced Concrete Deck	3 - Mod.	119448	sq. ft.	91926	27511	11	0
	CS2 -There are hairline to 0.025" multi-directional cracking in all spans throughout. -The cantilevered overhangs exhibit transverse cracks with efflorescence. -There are hairline vertical cracks on the haunches at the ends of isolated cantilever brackets on the north side of the deck. -Small spalls were observed on the deck soffit. CS3 -There are spalls up to 1' in diameter in the deck haunches at isolated floorbeam ends and isolated cantilever bracket ends on the north side of the deck.						
805-Wearing Surface - Monolithic Concrete		93170	sq. ft.	82921	9701	548	0
	CS2 -Isolated hairline to 0.030" wide longitudinal and transverse cracks were observed randomly throughout the deck. These are typically spaced around 5' to 10'. -Small shallow spalls are present along the joint armor. CS3 -Wide cracks were observed emanating from the deck drains and deck joints.						
107-Steel Open Girder/Beam	3 - Mod.	2262	ft.	2064	177	21	0
	CS2 -Surface corrosion is present on the top flange in isolated areas and on rivet heads throughout. -The bottom flange of the South Girder in Span 12 is bent 1' out of plane. -There are isolated locations of stiffeners with distortion. The distortion noted does not exceed 1/4” over 4” to 1'. CS3 -The ends of the girder web and bottom flange below the joints exhibit locations of section loss up to 1/4" deep, and knife edging. Typically, this section loss occurs past the bearing area. -Active and inactive pack rust is present causing distortion up to 1/2" thick between flange plates. -There is a corrosion hole in the bottom of the web of the South Girder of Span 13 at Pier 14 past the bearing area. -There are gouges caused by welds/flame cuts in the bottom flanges of Spans 13-15.						
515-Steel Protective Coating		50614	sq. ft.	49543	506	565	0
	CS2 -Paint on the outside has faded and chalked in isolated areas. -There are isolated areas of peeling or chipped paint. CS3 -There are isolated areas of active corrosion.						

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
120-Steel Truss	3 - Mod.	2705	ft.	1899	136	670	0
	CS2 -Surface corrosion is present at various locations throughout the truss. -Random lacing bars are deformed throughout the lower chord. -Cracked and or undercut tack welds are present on the verticals and diagonals, but the cracks do not propagate into the base metal. CS3 -Pack rust up to 1" thick between web plates and cover/splice plates are present throughout the truss. The pack rust is mostly inactive, but some areas are reactivating. In many locations the pack rust is prying the component plates. Areas of thicker pack rust are causing the web plate of the lower chord to have a wavelike appearance. Lower chord internal stiffeners have pack rust up to 1-1/2" thick. -There are isolated gouges up to 3/8" deep in the lower chord and verticals. -Isolated painted over pitting up to 3/16" deep are present throughout the truss. -There are isolated corrosion holes in tie plates and batten plates in the lower chord. -There are isolated active and inactive corrosion holes in the upper chord flanges, primarily at the supports. -10 cracked welds throughout the verticals. Many are at the fill plate and two are at the catwalk support. -Rivet head loss up to 50% at isolated panel points within the lower chord.						
515-Steel Protective Coating		95362	sq. ft.	93422	1435	505	0
	CS2 -There are isolated areas where the paint is peeling or chipped. -There are isolated areas with light surface corrosion. -In some areas the paint is beginning to exhibit surface dulling/ chalking. -Area of paint has peeled off exposing the primer below. CS3 -There are isolated areas of active corrosion, pack rust, and laminar corrosion.						
152-Steel Floor Beam	3 - Mod.	9256	ft.	9116	50	90	0
	CS2 -There is a 5/8" long gouge on the west face of Floorbeam 4 in Span 12 at the South Girder. -Active surface corrosion is present at isolated locations throughout the bridge. Largest location is 2' L x 3" W at the bottom flange of Floorbeam 24. CS3 -Painted over pack rust of up to 3/8" thick with painted over pitting to 1/8" deep exists at some floorbeam connections. These locations have not reactivated since the rehabilitation. The heaviest location of this situation was observed in Span 9 at Floorbeam 36, where pack rust of 1/2" thick and pitting up to 1/4" deep was observed. -Painted over pitting up to 1/8" is present at isolated locations. Painted over pitting is present in the flanges, webs, and connection angles at isolated locations, typically at expansion joints. -Laminar corrosion between the top flange and the haunch is present at isolated locations. -3/8" vertical overcut at U39, Center Truss, Span 9.						
515-Steel Protective Coating		96487	sq. ft.	95662	800	25	0
	CS2: -There are isolated areas where the paint is peeling or chipped. -There are isolated areas with light surface corrosion. -In some areas the paint is beginning to exhibit surface dulling/ chalking. CS3: -There are isolated areas of active corrosion, pack rust, and laminating corrosion.						
162-Steel Gusset Plate	3 - Mod.	522	each	443	27	52	0

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Structure Number: 3103390
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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
	CS2 -Tack welds are present between gusset and fill plates at isolated locations. Some tack welds and fill plates are cracked but none of the cracks propagate into the base metal of the gussets. CS3 -There are missing rivets or bolts at isolated locations. -There is bowing along gusset plate edges due to pack rust in several locations. This bowing ranges from 1/8" to 1" and have been retrofitted with stiffening angles. Active and inactive pack rust up to 1" thick is between the gusset plates, fill plates, bracing connections, and truss members in many locations. -Painted over section loss up to 3/16" is present at some gusset plates.						
515-Steel Protective Coating		33408	sq. ft.	33083	75	250	0
	CS2 -There are isolated areas where the paint is peeling or chipped. -There are isolated areas with light surface corrosion. -In some areas the paint is beginning to exhibit surface dulling/ chalking. CS3 -There are isolated areas of active corrosion and pack rust.						
205-Reinforced Concrete Column	3 - Mod.	54	each	32	10	12	0
	CS2 -The pier columns generally exhibited vertical cracks, usually hairline in width, but up to 0.013" wide. -There are areas of delaminations throughout. CS3 -1' H x 6" W x 1" D spall with exposed rebar at the SE corner of the Center Column of Pier 2. -2' H x 1' W x 2" D spall with exposed rebar at the Center Column, Pier 3, east face. -2' L x 1' H x 2" D spall with a delamination at the Center Column, Pier 3, west face. -3' H x 1' W x 2" D spall with exposed rebar at the South Column, Pier 3, east face. -4' L x 8" W x 6" D spall with exposed rebar at the Center Column, Pier 5, north face. -2' L x 5' H delamination with a 1 SF spall at the South Column, Pier 7, SE corner. -1' L x 4' H x 1-1/2" D spall with exposed rebar at the North Column, Pier 7, south face. -2' L x 3' H x 1-1/2" D spall with exposed rebar at the North Column, Pier 7, west face. -1'-9" L x 8" H x 2" D spall with exposed rebar at the South Column, Pier 8, north face. -1'-6" L x 3' H x 3" D spall with exposed rebar at the North Column, Pier 10, SW corner. -1'-6" L x 2'-1" H x 1" D spall with exposed rebar at the South Column, Pier 11, NE corner. -HL cracking with rust staining at the North Column, Pier 12, over the full east face. -2' L x 2' H x 2" D spall with exposed rebar at the Center Column, Pier 13, SE corner. -2' L x 3' H x 1" D spall with exposed rebar at the South Column, Pier 17, west face.						
215-Reinforced Concrete Abutment	3 - Mod.	144	ft.	81	37	26	0

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
	CS2 -Hairline cracking with efflorescence present at the Rear Abutment (Abutment 1). -Hairline map cracking over an area of 5' L x 2' H at the Forward Abutment (Abutment 18). CS3 -Hairline cracking with rust staining present on the Rear Abutment (Abutment 1). -3' L x 2' H x 1" D spall with exposed rebar at the Forward Abutment (Abutment 18). -18' L sealed horizontal crack with rust staining and efflorescence at the Forward Abutment (Abutment 18).						
234-Reinforced Concrete Pier Cap	3 - Mod.	1137	ft.	859	137	141	0
	CS2 -1 SF delamination on the underside of Pier 2 between the Center Column and the South Column. -10 SF delamination on the underside of Pier 5 between the Center Column and the North Column. -180 SF delamination on the west face of Pier 10 between the Center Column and the South Column. -11 SF of delaminations on the west face of Pier 11 between the Center Column and the North Column. -8' L crack with a delamination on the east bottom of Pier 12 between the Center Column and the North Column. -106 SF delamination on the west face of Pier 13 between the Center Column and the South Column. -(2) 45 SF delaminations on the west face of Pier 13 between the Center Column and the North Column. -20 SF delamination on the west face of Pier 16 between the Center Column and the North Column. CS3 -(2) 1'-4" diameter x 1-1/2" D spall with exposed rebar at the top of Pier 8. -95 SF of repair patch cracking at the west bottom of Pier 10. -1/16" wide x full length crack at the top of Pier 10. -4' L x 1/16" wide crack with rust staining at the west bottom of Pier 12. -1' L x 1'-6" H x 1" D spall with exposed rebar and a 6' L x 1/16" crack on the east bottom of Pier 13. -1' L x 3' H x 1" D and 1' L x 1' H x 1" D spalls with exposed rebar on the east bottom of Pier 13. -10' L cracked patch that extends 1' underneath on the east face of Pier 15. -3'-8" L x 1'-1" H x 3" D spall with exposed rebar with section loss on the east face of Pier 16. -1'-8" diameter x 2" D spall with exposed rebar on the west face of Pier 16. -6' L x 1/16" wide crack on the west face of Pier 17.						
300-Strip Seal Expansion Joint	3 - Mod.	973	ft.	335	630	8	0
	CS2 -The expansion joints are filled with debris. -There is typically surface corrosion on the joint armor (Abutment 1 (Rear Abutment), Piers 2, 7, 10, 13-16, and Abutment 18 (Forward Abutment)). CS3 -Joint seal is torn in isolated areas. Spalls in the joint slab header with damaged and loose joint material. -1/2" vertical offset at the Pier 3 joint.						

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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
310-Elastomeric Bearing	3 - Mod.	30	each	14	10	6	0
	CS2 -There is surface corrosion on the bearing plates in isolated locations. -The Rear Abutment, north bearing, has a manufacturing defect on the pin nut. CS3 -The elastomeric bearings have painted over pitting at the following locations: Pier 3, Span 3, north bearing; Pier 4, Span 4, all bearings; Pier 13, Span 12, north bearing; Pier 13, Span 13, north bearing. -Isolated location of pack rust between the lower chord member and the sole plate in Span 4, North Girder, Floorbeam 0. -Missing bolt attaching the sole plate to the girder at this location.						
515-Steel Protective Coating		30	sq. ft.	20	0	10	0
	CS2 -There is surface corrosion on the bearing plates in isolated locations.						
313-Fixed Bearing	3 - Mod.	39	each	13	11	15	0
	CS2 -There is surface corrosion on the bearings in isolated locations. CS3 -The fixed bearings have painted over pitting at the following locations: Pier 2, Span 1, north and center bearing; Pier 3, Span 2, north and center bearing; Pier 4, Span 3, all bearings; Pier 5, Span 4, all bearings; Pier 7, Span 6, all bearings; Pier 12, Span 12, center bearing. -The Pier 3, Span 2 center fixed bearing has laminar corrosion. -Pier 4, Span 3, Center Girder has 40% section loss to the anchor nuts. -The Pier 12, Span 12, center bearing has a gouge in the pin nut. -The Pier 14, Span 13, center bearing has section loss on one of the anchor nuts.						
515-Steel Protective Coating		39	sq. ft.	28	0	11	0
	CS3 -There is surface corrosion on the bearings in isolated locations.						
314-Pot Bearing	3 - Mod.	21	each	9	6	6	0
	CS2 -There is surface corrosion on the bearings in isolated locations. CS3 -The pot bearings have painted-over pitting at the following locations: Pier 5, Span 5, all bearings; Pier 7, Span 7, all bearings. -There is pack rust developing between the bearing and the truss member near the pin at L44, Center Truss, Span 9.						
515-Steel Protective Coating		21	sq. ft.	15	0	6	0
	CS2 -There is surface corrosion on the bearings in isolated locations.						
321-Reinforced Concrete Approach Slab	3 - Mod.	2310	sq. ft.	2110	200	0	0
	CS2 -The west approach slab exhibits hairline longitudinal cracks spaced at approximately 3 ft.						

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Structure Number: 3103390
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	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
331-Reinforced Concrete Bridge Railing	3 - Mod.	4980	ft.	3643	1245	92	0
	CS2 -The railings typically exhibit hairline vertical, horizontal, and map cracking throughout the entire length of the bridge. -The protective coating is peeling and chipped throughout the railing, and scaling is present in some locations. CS3 -At isolated locations, primarily at the fence posts on the south side of the bridge, the railing exhibits heavy map cracking with areas of delaminated concrete, spalls with exposed rebar, and rust staining. This condition is present on both the interior and exterior faces of the bridge railing.						
815-Drainage	3 - Mod.	32	each	23	8	1	0
	CS2 - There is light debris build up in a few of the drainage grates at the end of the downspouts, but drainage flow is not yet inhibited. -A few of the downspouts exhibit surface corrosion. CS3 -The downspout termination is aligned at the catch basins edge instead of the center at Pier 5.						