Montgomery County

Department of Transportation

Division of Transportation Engineering

2021 BIENNIAL BRIDGE INSPECTION REPORT

January 13, 2021

BRIDGE NO. M-K-04001

KENT STREET

OVER

SILVER CREEK

Prepared by

CONSOR

Montgomery County

Department of Transportation

Division of Transportation Engineering

2021 BIENNIAL BRIDGE INSPECTION REPORT

BRIDGE NO. M-K-04001

KENT STREET

OVER

SILVER CREEK

Prepared by

CONSOR

1/14/2021

Inspection Team Leader: Michael Scorpa — Date

2/11/2021

Quality Assurance: Todd Eckhart, P.E. — Date

3/4/2021

Professional Engineer: Noelle Ziobro, P.E. — Date

STATE OF MARYLAND
NOELLE RENEE ZIOBRO
No. 23179
PROFESSIONAL ENGINEER

I hereby certify that this inspection report was prepared under my supervision. The condition data and recommendations contained within this report are based upon a visual inspection of accessible portions of the existing structure. No responsibility is accepted for the presence of any latent structural defects that cannot be detected by such visual inspection.

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No.: 23179, Expiration Date: August 1, 2021.

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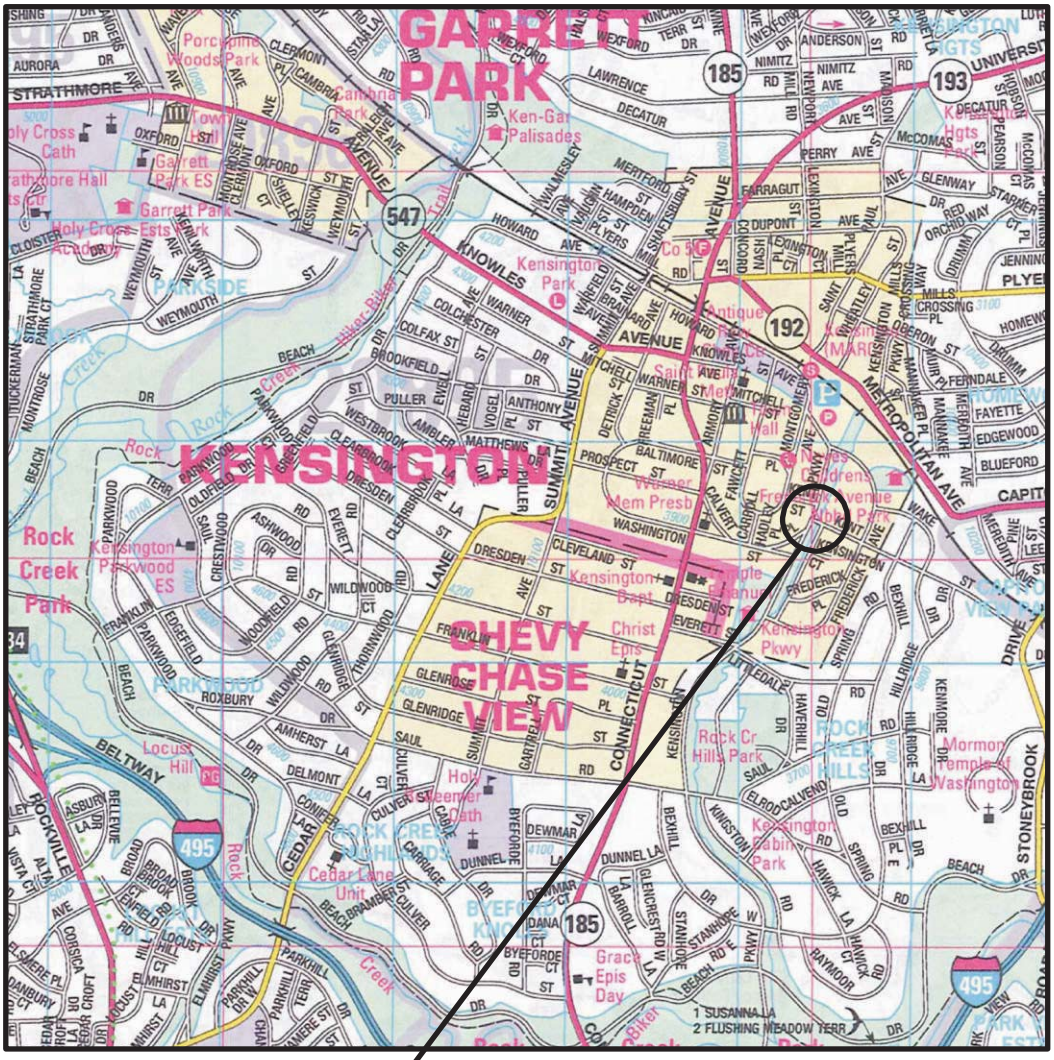
2021 BRIDGE INSPECTION REPORT

BRIDGE DESCRIPTION SUMMARY

Roadway	KENT STREET
Bridge Orientation	East-West
Crossing	Silver Creek
Crossing Orientation	North-South
Inspection Date	01/13/2021
Inspected By	CONSOR Engineers, LLC
Spans	1
Type	STRUCTURAL PLATE ARCH (SPA)
Structure Organization	The numbering convention for reporting purposes is from the North and the West
Deck	N/A
Railing	Metal handrail
Abutments	N/A
Wing Walls	Concrete
Piers	N/A
Overall Length	20'-0"
Clear Roadway	26'-6"
No. of Lanes	2
Out-to-Out Width	43'-0"
Year Built	1940
Year Reconstructed	N/A
Approach Section	26'-6" wide asphalt roadway
Shoulders	No
Alignment	There are "T" intersections on both approaches
Profile	The roadway is fairly level on the West Approach and across the structure. There is a minor downgrade to the structure on the East Approach.
Guardrail	None
Current Postings	14,000 lbs GVW Single Unit 26,000 lbs GCW Combination Unit
Overall Condition	Fair
Remarks	Based on the 2014 load rating performed by others, the load posting and advanced warning signs for this structure can be removed at the discretion of the County.

N



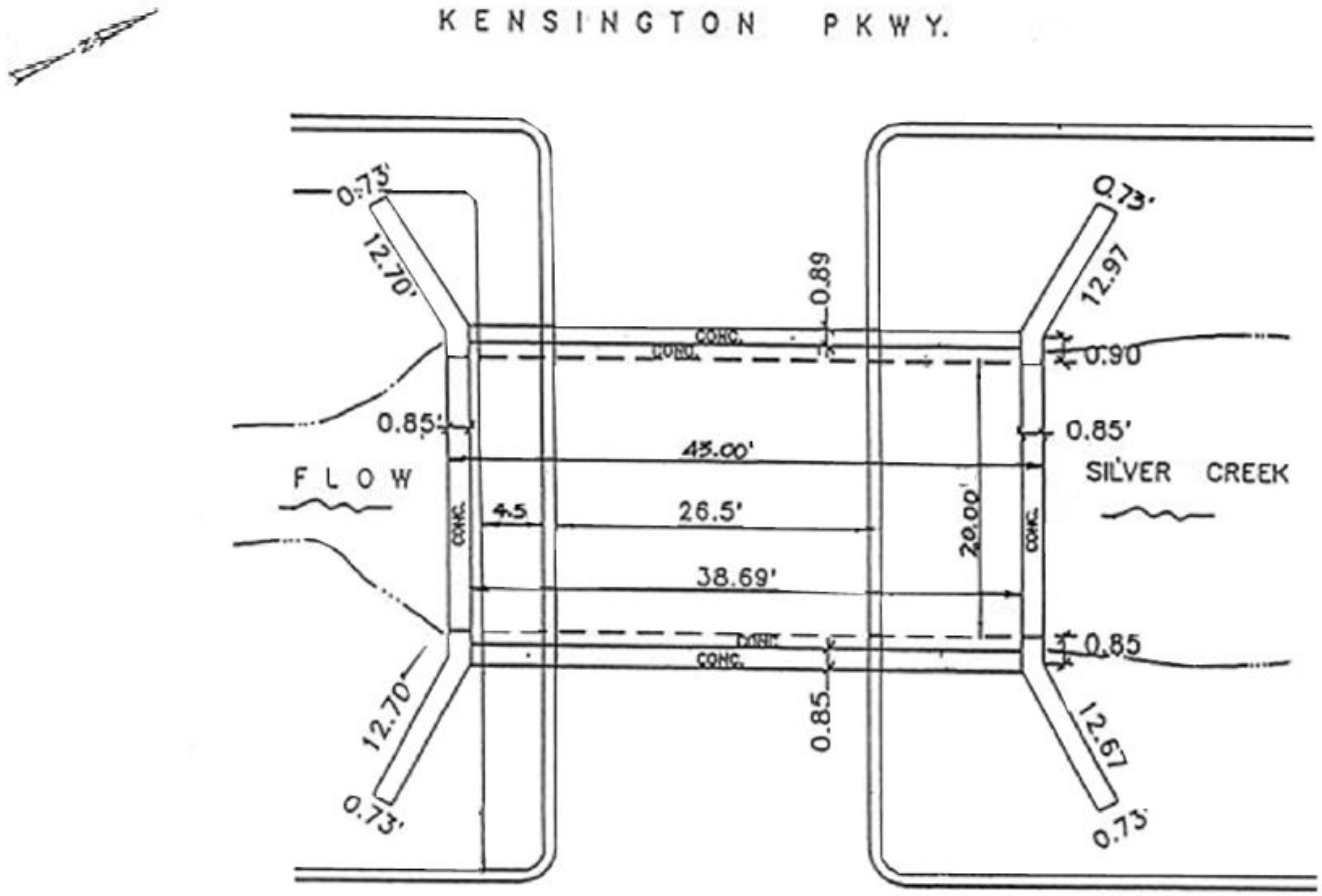
Bridge No. M-K-04
Kent Street over
Silver Creek

ADC Street Grid Location: 5285-J-7

LOCATION MAP

SCALE: 1" = 2,000'

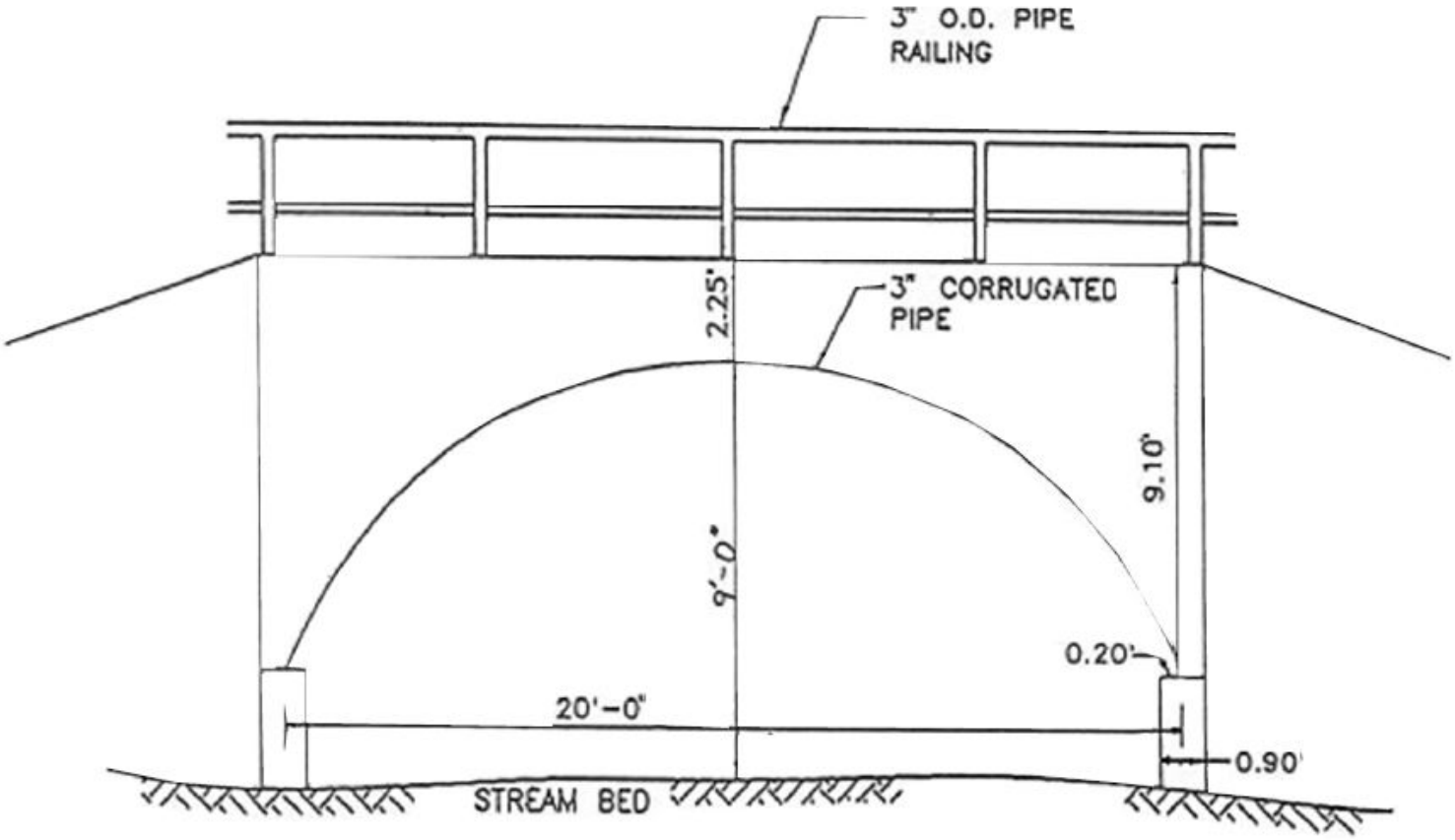
Copyright ADC, The Map People



PLAN

NOT TO SCALE

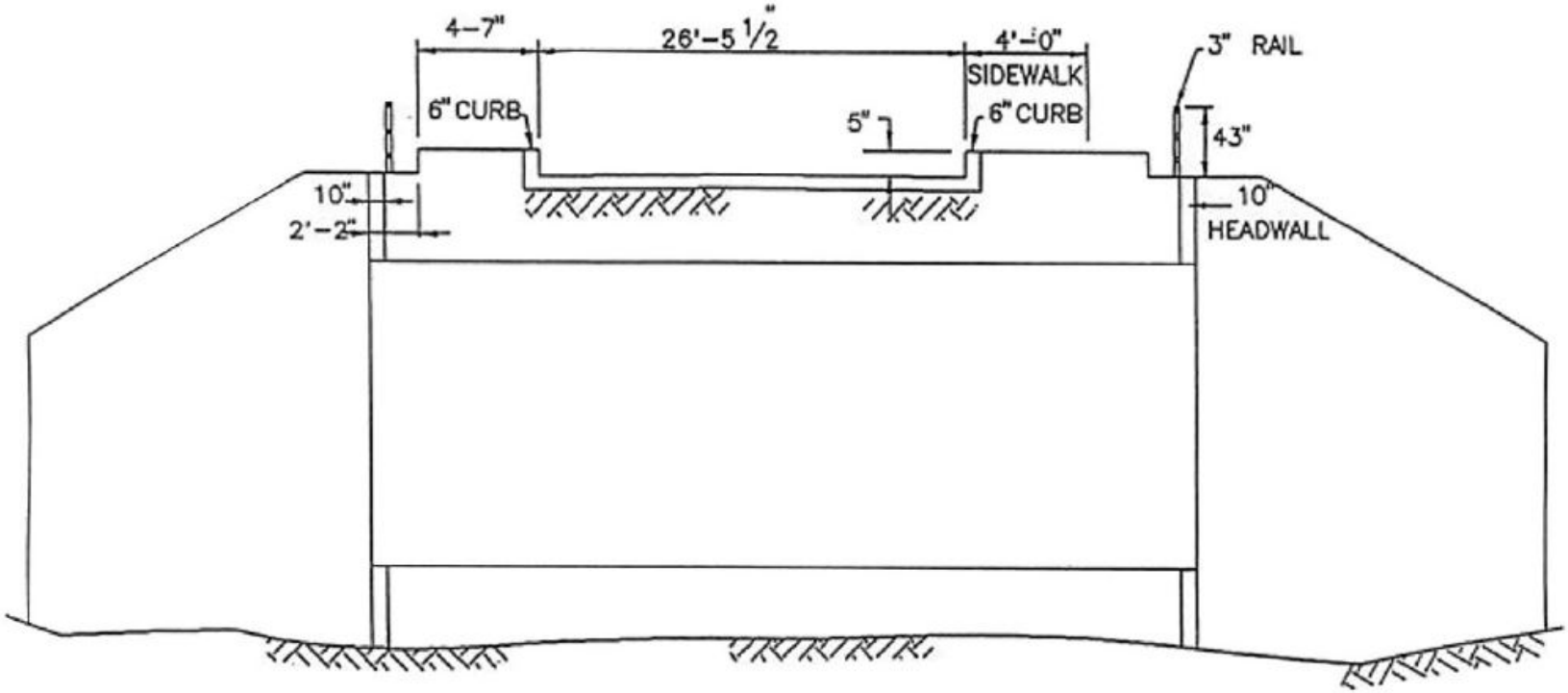
MONTGOMERY COUNTY
BRIDGE NO. M-K-004
KENT STREET
OVER
SILVER CREEK



ELEVATION

NOT TO SCALE

MONTGOMERY COUNTY
BRIDGE NO. M-K-004
KENT STREET
OVER
SILVER CREEK



SECTION
NOT TO SCALE

MONTGOMERY COUNTY
BRIDGE NO. M-K-004
KENT STREET
OVER
SILVER CREEK

COMPARATIVE EVALUATION SUMMARY TABLE

PONTIS ELEMENT	STATUS	CONDITION	REMARKS
Approach Roadways	⬌	Fair	
Sidewalk (8062)	⬌	Good	
Railings (330)	⬌	Satisfactory	
Arch (141)	⬌	Fair	
Spandrel Walls (8255)	⬌	Good	
Wingwalls (8251)	⬌	Satisfactory	
Footings (220)	⬌	Satisfactory	
Channel (8345)	⬌	Good	
Overall	⬌	Fair	

⬆ = Condition Improved ⬌ = Condition Unchanged ⬇ = Condition Worse

CONDITION SUMMARY

Approach Roadways — 26'-6" wide asphalt roadway, with no shoulders

The approach roadways are in fair condition. The East approach transition, Eastbound lane, has a 4'-0" wide x 20'-0" long area of pattern cracking up to 1/4" wide. The South end of the East approach transition pavement has settled up to 1 1/2" deep.

The West approach pavement within 20'-0" of the structure, has three partial-width transverse cracks up to 1/4" wide. At the West approach centerline approximately 15'-0" from the structure, there is a 4'-0" long x 6'-0" wide area of pattern cracking up to 1/4" wide. The Westbound lane has a 7'-0" long x 8'-0" wide asphalt patch with an embedded gas cap that has settled unevenly.

There are no approach traffic barriers along the approach roadways.

No object markers are present at the structure.

Sidewalk (8062) — Concrete

The sidewalk is in good condition. No deficiencies noted at time of inspection.

Railings (330) — Metal handrail

The handrails are in satisfactory condition. There are metal handrails on top of the spandrel walls that have minor areas of chipped paint and oxidation on 5% to 10% of all surfaces.

Arch (141) — Steel structural plate arch

The arch is in fair condition. Pneumatically applied mortar (PAM) has been applied to the intrados of the arch. The PAM on the West side of the arch from the springline to 5'-0" above the springline for the full length of the arch sounds hollow, suggesting a large area of debonding. The most recent load rating accounts for up to 50% section loss in the steel arch plates, but the section loss in the steel could not be verified due to PAM coverage. Along the East side of the arch, there are map cracks with minor efflorescence, light rust stains, and intermittent horizontal hairline cracks with efflorescence. There are six patches with isolated map cracking located along the crown of the arch throughout. Along the crown and bolt lines are seventeen intermittent full-circumference hairline transverse cracks in the PAM. Along the crown of the arch, there are several cracks up to 1/32" wide extending 2/3 of the total length.

Spandrel Walls (8255) — Concrete

The spandrel walls are in good condition. At the South spandrel wall, below railing Post 2, an 11" long x 6" wide x 3/4" deep spall undermines 75% of the post base plate. At the South spandrel wall, a minor spall undermines the railing Post 1 base plate by 1/2". Minor scaling exists along the top of both walls, up to 1/16" deep.

CONDITION SUMMARY

Wingwalls (8251) Concrete

The wingwalls are in satisfactory condition. At the Southeast wingwall, there is an 8'-0" long vertical hairline crack at the interface with the spandrel wall. The Southeast and Southwest wingwall PAM overspray areas exhibit minor chipping and hollow sounding. The Southeast wingwall has a 21" outfall pipe with several pipe sections that are vertically misaligned (settled) up to 4" high. Below the pipe penetration is moderate scaling, 2'-0" long x 2'-0" wide x up to 1/2" deep. All wingwalls exhibit minor scaling along top faces, up to 1/16" deep. The Northeast wingwall is displaced 1/2" toward the creek at the top and is covered by vegetation growth.

Footings (220) Concrete Arch Footings

The footings are in satisfactory condition. The abutment footings have been covered with pneumatically applied mortar (PAM). At the North end of both abutments, there is random efflorescence throughout the PAM. The concrete overpour at both abutments is undermined full-length x up to 12" high x up to 1'-10" horizontal penetration; however, the undermining does not extend to the abutment footings. At the interface of the spandrel wall and the Northeast, Southwest, and Southeast wingwalls, there are vertical gaps up to 1/16" wide along the joints; the Southeast location has rust staining at bottom 2'-0" high.

Channel (8345) Silt with sand and rocks

Silver Creek flows from North to South on a tangent alignment under the structure. The streambed consists of silt, gravel, and cobbles. The Southwest embankment is cut vertically up to 5'-0" high and undercut up to 2'-0" deep with exposed tree roots. The remaining stream banks have minor erosion. Riprap is in place behind the Northwest wingwall.

BRIDGE DESCRIPTION SUMMARY

LOAD RATING SUMMARY

A load rating calculation was performed by others in July 2014. The bridge is currently posted; however the 2014 rating calculations do not require posting. After reviewing the existing bridge conditions, it was determined that no significant changes in condition have occurred to the rated elements since the last rating calculations were performed; therefore, re-rating of the structure is not warranted at this time. Our review was not a check of the means or the methods used to determine the load ratings, but was limited to a comparison of the structure condition. CONSOR Engineers, LLC assumes no responsibility for the correctness or accuracy of these load rating calculations. The load ratings for the Maryland Legal vehicles are as follows:

Vehicle	Gross Vehicle Weight (Tons)	Inventory Rating (Tons)	Operating Rating (Tons)
H-15	15	26	43
HS-20	36	46	78
MD Type 3	33	N/A	N/A
MD Type 3S2	40	98	99

Note: MD Type 3 no longer considered for posting.

Vehicle	Gross Vehicle Weight (Tons)	Inventory Rating (Tons)	Operating Rating (Tons)
MD Type-4	35	63	99

Based on the above chart and in accordance with Montgomery County's current policy, the recommended posting is as follows:

No Posting Required.

The bridge is currently posted at 14,000 LB G.V.W. and 26,000 LB G.C.W. This posting may be removed at the discretion of the County.

REVIEW OF ITEM 113 - SCOUR POTENTIAL RATING

Item 113 was previously rated 5B which indicates the bridge foundations have been determined to be stable due to assessment of scour conditions. Scour is determined to be within the limits of the footings or piles. Scour has been found during an inspection of this bridge. The potential risk of failure during or immediately after a flood event is considered to be moderate. No other actions are planned other than monitoring. Based on the observed conditions, this rating is still valid and does not require re-evaluation.

GUARDRAIL REQUIREMENT FORM

Corners	Bridge Railings Meet SHA Standard		Transition					Approach Guardrail									Approach Rail Ends				
			Approach Guardrail at Corners of Struct.		Attached to Bridge		Average Post Spacing Near Struct.	Type of Posts			Type of Rail			Spacing of Approach Guardrail			Flared	Buried	Shielded	Hazard	Breakaway
	Yes	No	Yes	No	Yes	No		Timber	Steel	Jersey	Cable	Steel	Timber	12'-6"	6'-3"	Other					
1		✓		✓																	
2		✓		✓																	
3		✓		✓																	
4		✓		✓																	

Bridge No.: M-K-04

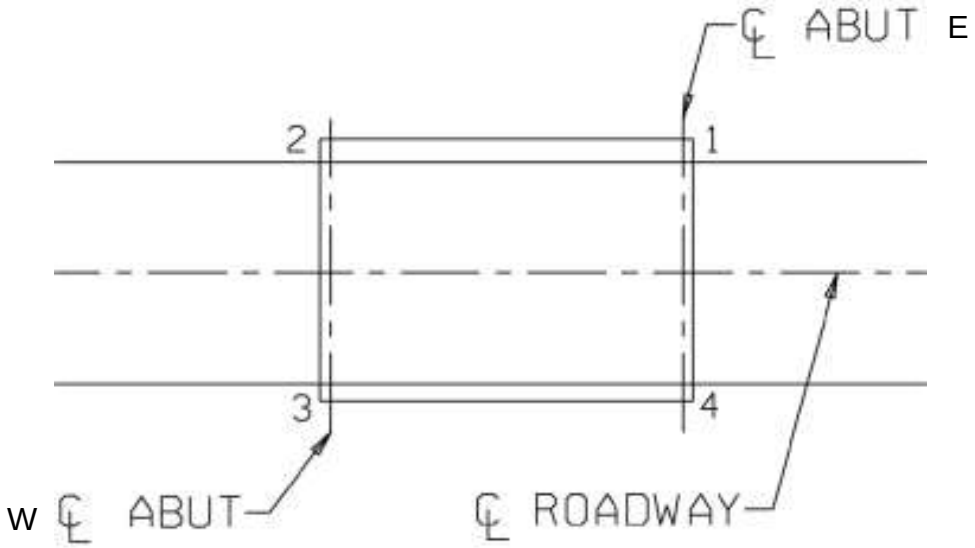
County: Montgomery

Road Carried: KENT STREET

Crossing: SILVER CREEK

Date Inspected: 01/13/2021

Inspector: M. Scorpa, J. Connor



DOES THE APPROACH GUARDRAIL EXTEND A LONG ENOUGH DISTANCE TO PROTECT TRAFFIC AT BRIDGE AREA FROM EMBANKMENT?

☐ YES ☐ NO

IS THE FACE OF THE GUARDRAIL MORE THAN 6" BACK FROM THE GUTTER LINE AT THE BRIDGE?

☐ YES ☐ NO

IF YES, SUCH AS WHERE A SIDEWALK IS ON THE BRIDGE, HAS A RAMP OF CONCRETE BEEN PROVIDED TOWARD TRAFFIC?

☐ YES ☐ NO ☐ N/A

Comments: There is no traffic barrier on the approach roadways. There is only a metal handrail on each side of the structure mounted along the top of the spandrel walls.

Montgomery County, MD Dept. of Transportation Bridge Coating Rating Form

Bridge No. M-K-04 Name KENT STREET Date 01/13/2021

Weathering Steel No Crossing SILVER CREEK

Inspectors M. Scorpa, J. Connor

COMPONENTS

	% Rating 1	% Rating 2	% Rating 3	% Rating 4	Total
Girders					
Fascias					
Bearings					
Edges					
End Dam					
Deck Pans (☐Galv ☐Paint)					
Railings	90	10	0	0	1.1
Other					
1)					
2)					
3)					
4)					
5)					
				Overall Rating	1.1

Comments:

The arch has been coated with pneumatically applied mortar. No steel is exposed.

Recommendations:

None.

BRIDGE INSPECTION NOTES

VISUAL INSPECTION NOTE

The condition report and recommendations presented herein are based upon a visual/hands-on inspection of accessible portions of the existing structure. CONSOR Engineers, LLC assumes no responsibility for the presence of any latent structural defects which cannot be detected by such an inspection.

BRIDGE SKETCHES NOTE

The bridge sketches included in this report were previously prepared by others and reproduced herein from materials furnished by Montgomery County. No responsibility is assumed by CONSOR Engineers, LLC for the accuracy of these sketches and the correctness of any detail dimensions.

INSPECTION ACCESS NOTE

The following equipment was used to access Bridge No. M-K-04:

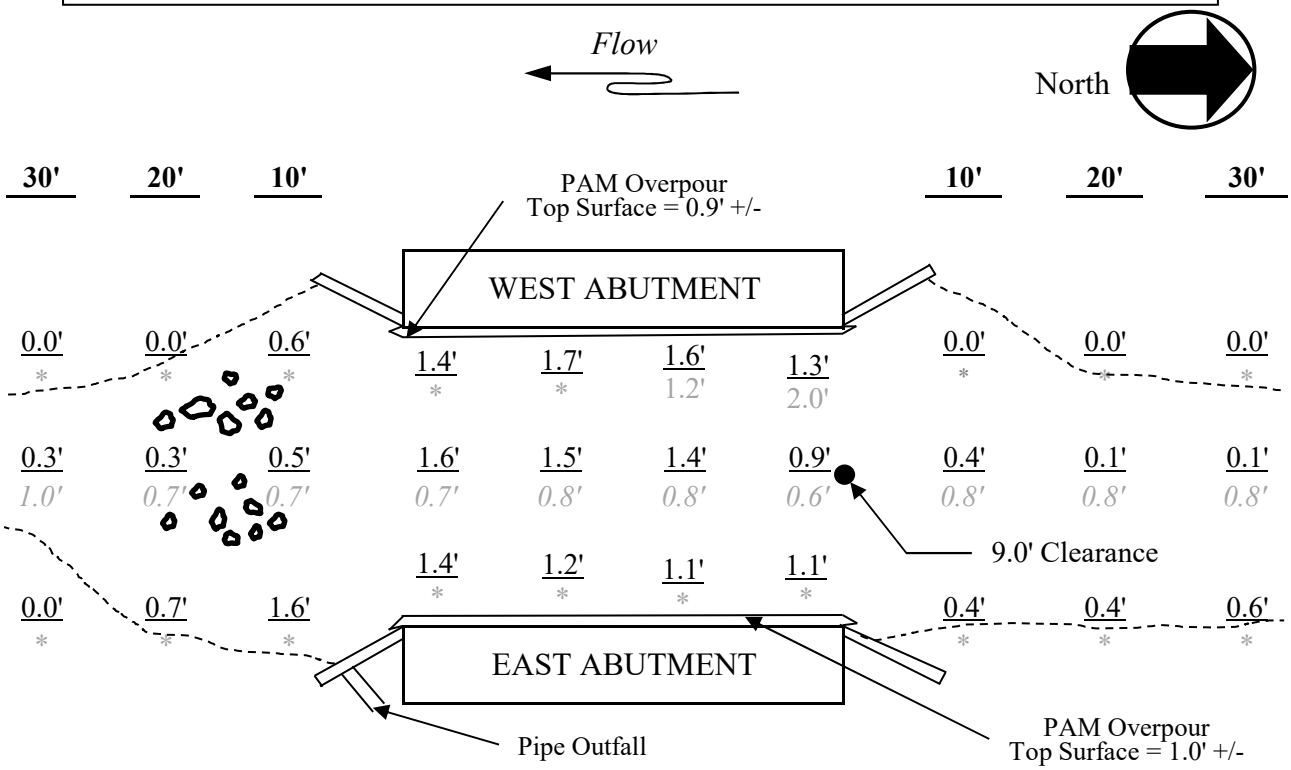
Waders

SOUNDING SHEET

(All measurements are in feet)

Bridge No.:	M-K-04001	Inspection Date:	1/13/2021
Inspectors:	MJS/JAC	Clearance Location:	Crown of Arch
			Midspan to WL = 9.0'

Clearance is the distance measured from the water surface to the clearance location.



Notes: The streambed consists of silt, gravel, and cobbles. The Southwest embankment has erosion with vertical cuts up to 5' high. All soundings taken in front of pneumatically applied mortar (PAM).

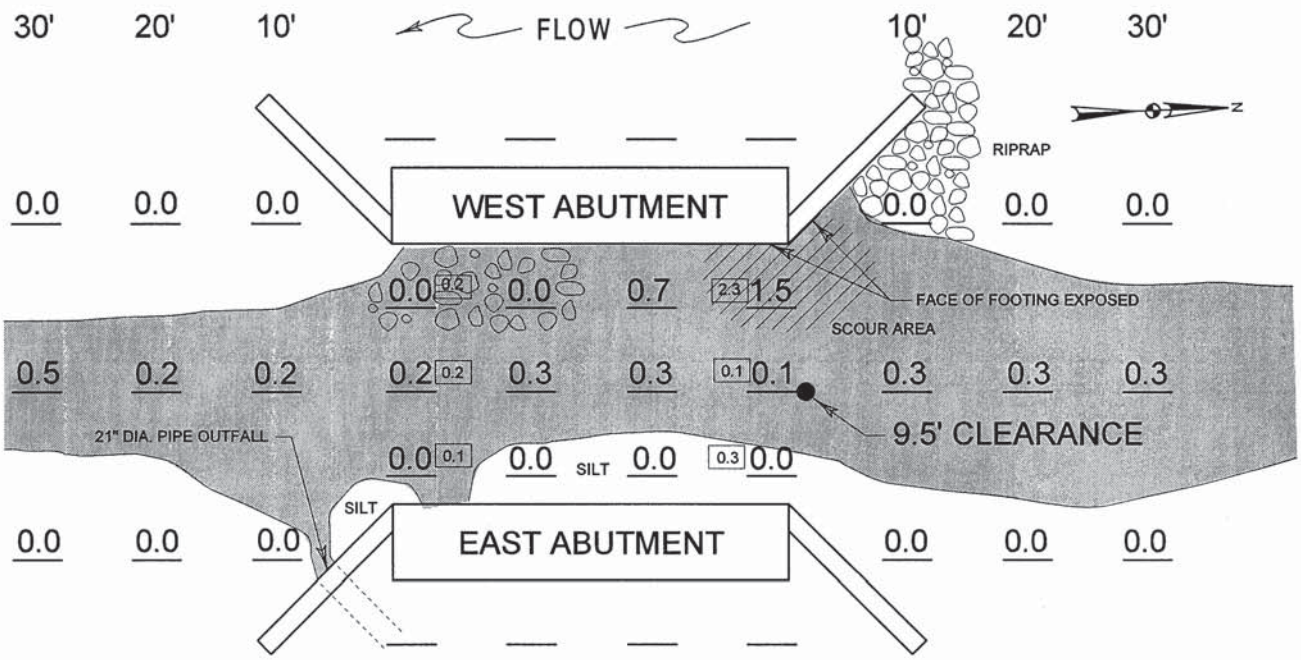
Legend: X.X Denotes Current Soundings
X.X Denotes 2003 Base Year Soundings (Adjusted)
* Sounding was dry during the Base Year

BASE YEAR
SOUNDING SHEET
(All measurements are in feet)

Bridge No. MK-04 Sheet 1 of 1

Date: 5/15/03 Inspectors: LEM/TTH Clearance Location: CROWN OF INTRADOS

Clearance is the measured distance from the surface of the water to the clearance location.



0.3 DENOTES MAY 3,1993 READINGS

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

BRIDGE INSPECTOR'S RECOMMENDATIONS FOR MAINTENANCE REPAIRS

DESCRIPTION	PRIORITY	QUANTITY	UNIT COST	TOTAL COST
1. Repair the spalls in the South Spandrel Wall that undermine the bridge rail post base plates.	2	2 SF	$60/S.F.	$120
2. Install traffic barrier transitions at all corners of the structure.	2	4 EA	$2500/Ea.	$10000
3. Install End Treatments meeting current MDOT-SHA standards at all approach corners.	2	4 EA	$3500/Ea.	$14000
4. Install object markers at all corners of the structure.	2	4 EA	$100/Ea.	$400
5. Replace the hand railings on the structure with a crash tested bridge railing.	2	48 LF	$250/L.F.	$12000
6. Repair drainage pipe behind the Southeast Wingwall.	3	LS	$3000	$3000
			Total:	$ 39520

BRIDGE NO. M-K-04001 - KENT STREET OVER SILVER CREEK

1. West Approach Looking East

2. East Approach Looking West

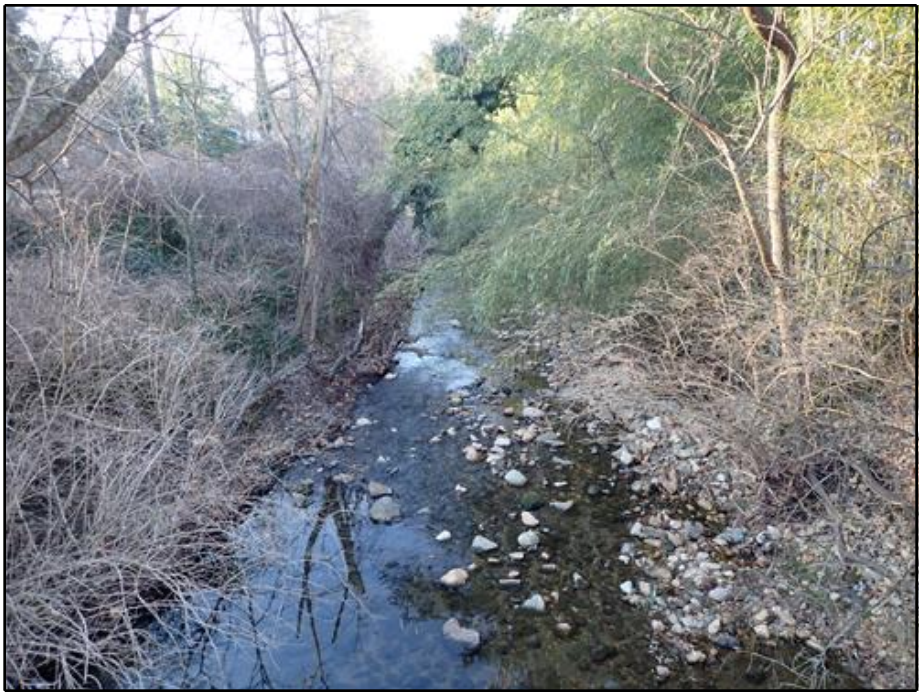
BRIDGE NO. M-K-04001 - KENT STREET OVER SILVER CREEK

3. North Elevation (Upstream)

4. South Elevation (Downstream)

BRIDGE NO. M-K-04001 - KENT STREET OVER SILVER CREEK

5. Looking North (Upstream)



6. Looking South (Downstream)

7. General View of Roadway over Arch Looking South

8. Typical Underside (Looking South)

9. Wearing Surface, Midspan at South Side - Transverse Crack, Half Width x Up to 1/4" Wide

10. Northwest Drainage Flume - Cracked and Settled at End, Full Width x 3" Wide x 3" of Settlement

11. Northwest Drainage Flume - Undermined at End, 1'-10" Wide x 5" High x Up to 1'-6" of Penetration

12. Arch Superstructure, East Side - Typical Hairline Map Cracks with Efflorescence in Pneumatically Applied Mortar

13. South Spandrel Wall Below Railing Post 2 - Spall, 11" Long x 6" Wide x 3/4" Deep

14. Southeast Wingwall, Outfall Pipe - Vertical Misalignment at First Joint, Up to 4" High

15. Southeast Wingwall, Below Outfall Pipe - Moderate Scaling, 2'-0" Wide x 2'-0" High x Up to 1/2" Deep

16. Footings, Pneumatically Applied Mortar Overpour - Undermined Full Length of Both Footings, Up to 1" High x Up to 1'-10" Penetration (Does Not Extend to Footings)

17. East Abutment Footing, South Face at Pneumatically Applied Mortar/Footing Interface - Vertical Crack, 5'-0" High x Up to 1/16" Wide with Efflorescence

18. Southwest Embankment - Vertically Cut Up to 5'-0" High and Undercut Up to 2'-0" Deep with Exposed Tree Roots

19. Upstream Channel at Northwest Wingwall - Timber Debris

20. West Approach, Centerline, 15' from Structure - Pattern Cracking, 4'-0" Long x 6'-0" Wide x Up to 1/4" Wide

21. East Approach - Load Posting on Kent Street

22. West Approach - Northbound Load Posting Sign on Kensington Pkwy

23. West Approach - Southbound Load Posting Sign on Kensington Pkwy

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

58 DECK

	CONDITION RATING	
1. Wearing Surface (302)	6	Asphalt
2. Deck - Topside (301)	-	
3. Deck - Underside (301)	-	
4. Curbs (304)	7	Concrete
5. Median (304)	-	
6. Sidewalks (304)	7	4' concrete (South side only)
7. Parapets (303)	-	
8. Railing (303)	6	Metal handrail
9. Roadway Joints	-	
10. Drainage System (314)	6	Concrete flume
11. Lighting Standards	-	
12. Utilities	-	
13. Other	-	

Inspector's Condition Rating (58) N

The structure is under fill with an asphalt overlay. Do not code Item 58.

58.1 - The wearing surface is in satisfactory condition (see Photo 7). Several transverse cracks, up to 6'-0" long x 1/4" wide. South gutter line has an area of pattern cracking, 6'-0" long x 2'-0" wide, with up to 1/8" wide cracks. South side at midspan has a transverse crack up to 1/4" wide x half length (see Photo 9).

58.4 - The curbs are in good condition. No observed deficiencies at time of inspection.

58.6 - The sidewalk is in good condition. No observed deficiencies at time of inspection.

58.8 - The handrails are in satisfactory condition. Metal handrails are on top of the spandrel walls that have minor areas of chipped paint and oxidation on 5% to 10% of all surfaces.

58.10 - The drainage system is in satisfactory condition. The Northwest drainage flume has a full width x 3" wide crack and has settled 3" (see Photo 10). The end of the flume is undermined, 1'-10" wide x 5" high x up to 1'-6" penetration (see Photo 11).

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

59 ARCH SUPERSTRUCTURE

Number of Spans 1

Type of Construction Structural Plate Arch

	CONDITION RATING	
1. Intrados (Underside of Arch Ring)	NV	Galvanized steel structural plate arch concealed by pneumatically applied mortar.
2. Extrados (Topside of Arch Ring)	-	
3. Spandrel Walls	7	Concrete
4. Columns	-	
5. Tie Walls	-	
6. Girders	-	
7. Floorbeams	-	
8. Stringers	-	
9. Base of Arch (Springline)	5	
10. Construction Joints	-	
11. Scour / Undermine	6	

Inspector's Condition Rating (59) 5

Pipe Size 19'-0" Pipe Thickness 7 Ga

Corrugation Pitch 6" Corrugation Height 2"

Helical / Annular

59.1 - The arch is in fair condition (see Photo 8). Pneumatically applied mortar (PAM) has been applied to the intrados of the arch. The PAM on the West side of the arch from the springline to 5'-0" above the springline for the full length of the arch sounds hollow, suggesting a large area of debonding. The most recent load rating accounts for up to 50% section loss in the steel arch plates, but the section loss in the steel could not be verified due to PAM coverage. Along the East side of the arch, there are map cracks with minor efflorescence, light rust stains, and intermittent horizontal hairline cracks with efflorescence (see Photo 12). Six patches located along the crown of the arch have isolated areas of hairline map cracking. Along the crown and bolt lines are seventeen intermittent full-circumference hairline transverse cracks in the PAM. Along the crown of the arch, there are several cracks up to 1/32" wide extending 2/3 of the total length.

59.3 - The spandrel walls are in good condition. At the South spandrel wall, below railing post 2, an 11" long x 6" wide x 3/4" deep spall undermines 75% of the post base plate (see Photo 13). At the South

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

spandrel wall, a minor spall undermines the railing post 1 base plate by 1/2". Minor scaling exists along the top of both walls, up to 1/16" deep.

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

60 SUBSTRUCTURE

		CONDITION RATING	
1. Abutments	-Wingwalls	6	Concrete
	-Backwalls	-	
	-Stems	-	
	-Footings	6	Concrete
	-Piles	-	
	-Scour/Erosion	6	
	-Settlement	7	
Overall Abutment Rating (322)		6	Abutment Type Concrete Footing
2. Piers or Bents	-Caps	-	
	-Columns	-	
	-Footings	-	
	-Piles	-	
	-Scour/Erosion	-	
	-Settlement	-	
Overall Pier Rating		-	Pier Type
3. Pile Bents	-Caps	-	
	-Piles (324)	-	
4. Concrete Cracking or Spalling		6	
5. Steel Corrosion		-	
6. Timber Decay		-	
7. Other		-	
8. Debris on Seats		-	
9. Paint		-	
10. Collision Damage		-	
11. Overall Undermining/Scour		6	

Inspector's Condition Rating (60) 6

60.1 - The wingwalls are in satisfactory condition. At the Southeast wingwall, there is an 8'-0" long vertical hairline crack at the interface with the spandrel wall. The Southeast and Southwest wingwall PAM overspray areas exhibit minor chipping and hollow sounding. The Southeast wingwall has a 21" outfall pipe with several pipe sections that are vertically misaligned (settled) up to 4" high (see

Photo 14). Below the pipe penetration is moderate scaling, 2'-0" long x 2'-0" wide x up to 1/2" deep (see Photo 15). All wingwalls exhibit minor scaling along top faces, up to 1/16" deep. The Northeast wingwall is displaced 1/2" toward the creek at the top and is covered by vegetation growth.

Footings: The footings are in satisfactory condition. The abutment footings have been covered with pneumatically applied mortar (PAM). At the North end of both abutments, there is random efflorescence throughout the PAM. The concrete overpour at both abutments is undermined full-length x up to 12" high x up to 1'-10" horizontal penetration; however, the undermining does not extend to the abutment footings (see Photo 16). At the interface of the spandrel wall and the Northeast, Southwest, and Southeast wingwalls, there are vertical gaps up to 1/16" wide along the joints; the Southeast location has rust staining at bottom 2'-0" high (see Photo 17).

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

61 CHANNEL AND CHANNEL PROTECTION

	CONDITION RATING	
1. Channel Scour	7	
2. Embankment Erosion	6	
3. Drift/Debris	6	
4. Vegetation	7	
5. Channel Alignment	7	
6. Fender System	-	
7. Spur Dikes and Jetties	-	
8. Riprap/Slope Protection	6	Riprap along Northeast embankment and Northwest slope

Inspector's Condition Rating (61) 7

61.1 - The streambed consists of silt, gravel, and cobbles. When compared to the base year soundings, the current soundings indicate that the channel has remained essentially unchanged, with minor variations of less than 1'-0" in the channel bottom.

61.2 - The Southwest embankment is cut vertically up to 5'-0" high and undercut up to 2'-0" deep with exposed tree roots (see Photo 18). The remaining stream banks have minor erosion.

61.3 - Silver Creek flows from North to South on a tangent alignment under the structure. Several timbers are in the channel adjacent to the Northwest wingwall, up to approximately 3 cubic yards (see Photo 19).

61.8 - Riprap is in place behind the Northwest wingwall.

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

71 WATERWAY ADEQUACY

Opening	Good	Fair	Poor	
Alignment	Good	Fair	Poor	
Frequency of Overtopping	Remote	Slight	Occasional	Frequent

Inspector's Condition Rating (71) 7

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

72 APPROACH ROADWAY ALIGNMENT APPRAISAL RATING

1. Vertical Alignment	E	[Good]	Fair	Poor	Minor downgrade to the structure
	W	[Good]	Fair	Poor	Fairly level
2. Horizontal Alignment	E	Good	[Fair]	Poor	"T" intersection
	W	Good	Fair	[Poor]	"T" intersection
3. Speed Limit Reduction		None	Minor	[Substantial]	"T" intersection
4. Sight Distance		[Adequate]	Not Adequate		

Inspector's Condition Rating (72) [4]

APPROACH ROADWAY

	CONDITION RATING	
5. Approach Guardrail	-	
6. Approach Pavement	5	Asphalt
7. Approach Embankments	6	
8. Approach Slabs	-	
9. Relief Joints	-	
10. Signing - Legibility and Visibility	[Good] Fair Poor	Posting and Advanced Posting Signs

11. Posted Load Limits	14,000 lbs GVW	Posted Bridge Speed Limit	-	MPH
	26,000 lbs GCW	Normal Roadway Speed Limit	25	MPH

12. Traffic Safety Features (36)

a. Bridge Railing	0	1	N	Metal handrail
b. Transitions	0	1	N	No transitions present
c. Approach Traffic Barrier	0	1	N	No approach barrier present
d. Approach Traffic Barrier Ends	0	1	N	No end treatments present

72.5 - There are no approach traffic barrier along the approach roadways.

72.6 - The approach pavement is in fair condition.

The East approach transition, Eastbound lane, has a 4'-0" wide x 20'-0" long area of pattern cracking up to 1/4" wide. The South end of the East approach transition pavement has settled up to 1 1/2" deep.

2021 BRIDGE INSPECTION REPORT

Bridge No. M-K-04 Inspection Crew M. Scorpa, J. Connor Date 01/13/2021

Name KENT STREET Crossing SILVER CREEK

Bridge Type STRUCTURAL PLATE ARCH (SPA) Year Built 1940

The West approach pavement within 20'-0" of the structure, has three partial-width transverse cracks up to 1/4" wide. At the West approach centerline approximately 15'-0" from the structure, there is a 4'-0" long x 6'-0" wide area of pattern cracking up to 1/4" wide (see Photo 20). The Westbound lane of the has a 7'-0" long x 8'-0" wide asphalt patch with an embedded gas cap that has settled unevenly. Westbound lane beginning at structure has pattern cracking, 10'-0" long x 3'-0" wide x 1/4" wide.

Throughout the wheel paths there is minor to moderate rutting up to 3/8" deep.

72.10 - No object markers are present at the structure.

A load posting sign is in place at the East approach (see Photo 21). There is no advanced East approach load posting sign.

On the West approach, advanced posting signs are in place on Kensington Parkway in both the Northbound and Southbound directions (see Photos 22 & 23 respectively).

72.12 - Metal handrail over structure does not meet current crash test standards. No approach barrier or end treatments located at approaches.

Bridge Inspection Report
Element Form

Bridge No: M-K-04001 | Inspection Date: 01/13/2021

KENT STREET OVER SILVER CREEK | Milepoint: 0000010

(58) Deck	N	(59) Superstructure	5	(60) Substructure	6
(61) Channel	7	(62) Culvert	N		

Element	Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
141 - Steel Arch	1 - Ben.	20	ft.	0	20	0	0
☐ Eng Req ☐ FYI ☐ District ☑ Inaccessible? ☐ Eng Comments							
220 - Reinforced Concrete Pile Cap/Footing	1 - Ben.	86	ft.	86	0	0	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							
330 - Metal Bridge Railing	1 - Ben.	48	ft.	43	5	0	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							
515 - Steel Protective Coating		166	sq. ft.	136	30	0	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							
8062 - Sidewalk, Reinforced Concrete	1 - Ben.	21	Ft.	21	0	0	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							
8251 - Wingwalls, Reinforced Concrete	1 - Ben.	52	Ft.	48	2	2	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							
8255 - Spandrel Wall, Reinforced Concrete	1 - Ben.	42	Ft.	34	7	1	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							
8345 - Stream Channel	1 - Ben.	1	Entire Bridge	1	0	0	0
☐ Eng Req ☐ FYI ☐ District ☐ Inaccessible? ☐ Eng Comments							

STRUCTURE INVENTORY AND APPRAISAL REPORT

BRIDGE NUMBER: M-K-04001

IDENTIFICATION

FORM 1 OF 13

(8) STRUCTURE NUMBER: 2 00000 Major Structure M- K-04 01 Major Structure > 20' 0" 0 Single Structure
(8) FHWA NUMBER:
(7) FACILITY CARRIED: KENT STREET
(6) FEATURE INTERSECTED: SILVER CREEK
(255) FEDERAL SUBMITTAL INDICATOR: Y Yes
(262) NAME OF STRUCTURE:
(27) YEAR BUILT: 1940 (106) YEAR RECONSTRUCTED: 0000
(263) ADDITIONAL RECONSTRUCTION YEARS: N N
(1) STATE CODE: 243 Maryland (2) DISTRICT CODE: 03 03
(3) COUNTY CODE: 031 Y (4) PLACE CODE: 43500
(5) INVENTORY ROUTE: 1 Route carried "on" the structure 5 City Street (Route Prefix) 1 Mainline (Level of Service) 00192 (Number) 0 Always (Direction)
(9) LOCATION: 0.1 MI E KENSINGTON PKWY
(11) MILEPOINT: 0000010
(12) BASE HIGHWAY NETWORK: 0 Inv. Route is NOT on the Base Network
(266) GIS ROUTE ID: 15085MU00192 01EE**********
(267) GIS MILEPOINT: 0.01
(268) SCENIC ROUTE: N
(13) LRS INVENTORY ROUTE, SUBROUTE NUMBER: 601920850000
(16) LATITUDE: (A) 39012197 (B) 39012236 (C) 39012249 (D) 39012206
(17) LONGITUDE: (A) 077041876 (B) 077041854 (C) 077041885 (D) 077041899
(28) LANES ON: 02 LANES UNDER: 00
(42) TYPE OF SERVICE ON: 5 Highway-Pedestrian
TYPE OF SERVICE UNDER: 5 Waterway
(98) BORDER STATE: BORDER STATE'S SHARE %:
(99) BORDER STATE'S NUMBER:

CLASSIFICATION

FORM 2 OF 13

(104) HWY SYSTEM: N No, Inventory Route is not on the NHS
(103) TEMPORARY STRUCTURE:
(105) FEDERAL LANDS HWYS: 0 Not applicable
(110) NATIONAL NETWORK: N No, the inventory route is not part of the national network for trucks.
(26) FUNCTIONAL CLASS: 19 Urban Local
(20) TOLL: 3 On free road
(100) DEFENSE HWY: 0 The inventory route is not a STRAHNET route
(21) MAINTENANCE: 04 City or Municipal Highway Agency
(101) PARALLEL STRUCTURE: N No parallel structure
(22) OWNER: 04 City or Municipal Highway Agency
(102) DIRECTION: 2 2-way traffic
(37) HISTORICAL SIGNIFICANCE: 5 Not eligible

BRIDGE NUMBER: M-K-04001

TRAFFIC

FORM 3 OF 13

(19) DETOUR:	01	(109) TRUCK ADT %:	05
(29) ADT:	003296	(30) ADT YEAR:	2019
(114) FUTURE ADT:	003879	(115) FUTURE ADT YEAR:	2039

STRUCTURE TYPE AND MATERIAL

FORM 4 OF 13

(43) STRUCT TYPE:	C	Steel	24	Arch-Deck (Filled)		
(44) STRUCT TYPE - APPR:	0	Not Applicable	00	Other		
(232) BOX CULVERT ON PILES:						
(208) STRUCT TYPE - WIDENED/EXTENDED:	N		N		N	
(219) SLOPE PROTECTION:	5	Crushed stone				
(228) FOOTING - ABUTMENT:	1	Concrete	0	None	0	Entire Structure
(229) SUBSTRUCT ABUTMENT:	1	Concrete	1	Pedestal	0	Entire Structure
(230) FOOTING - PIER:	N	Not Applicable				
(231) PIER TYPE:	N	Not Applicable				
(242) BEARING TYPE:	N	None or N/A	N	None or N/A	N	None or N/A
(108) WEARING SURFACE:	N	Not Applicable	N	Not Applicable	N	Not Applicable
(243) JOINT TYPE:	N	None	N	None	N	None

(206) STRUCT SUBTYPE - MAIN:	N	Not Applicable	(207) STRUCT SUBTYPE - APPR:	N Not Applicable
(257) SCOUR PROTECTION:	3		(270) CONC. DECK SPECIAL TYPE:	N Not Applicable
(221) STRUCTURAL STEEL:	N	Not Applicable	(233) DECK - COMP/NON-COMP:	0 Non-Composite
(107) DECK STRUCTURE TYPE:	N	Not applicable	(259) STAY-IN-PLACE FORMS:	N

(235) PARAPET:	N	No parapet (pipes, etc.)					
(236) RAILING:	3	Steel	4	- Two Strand (non-structural)	0	None	0 - None
(237) FENCING:	0	None	0	- None			
(278) PAINT SYSTEM:	N	Not Applicable					
(344) PAINT COLOR/NUMBER:	N	Not Applicable					
(345) YEARS PAINTED:	N	N					

GEOMETRICS

(112) NBIS BRIDGE LENGTH:	Y	(49) STRUCTURE LENGTH:	0000200
(210) NUMBER OF SPANS:	0001	(45) # SPANS IN MAIN UNIT:	001
(46) # APPROACH SPANS:	N	(209) CONTINUOUS SPANS:	N
(48) LENGTH MAX SPAN:	0020	(238) # STRINGERS - ORIGINAL:	N
(240) SPACING - ORIGINAL:	N	(239) # STRINGERS - WIDENED:	N
(241) SPACING - WIDENED:	N	(33) BRIDGE MEDIAN:	0
(50) CURB/SIDEWALK WIDTHS:	000 045	(205) MEDIAN WIDTH:	000
(51) DECK CURB-CURB WIDTH:	0265	(32) APPROACH ROAD WIDTH:	00 026 00
(52) DECK OUT-OUT WIDTH:	0430	(10) INVENT ROUTE, MIN VERT CLEAR:	9999
(53) BRIDGE ROADWAY, MIN VERTCLEAR:	9999	(47) INVENT ROUTE, TOTAL HORIZ CLEAR:	265
(54) MIN. VERT. UNDERCLEARANCE:	N Feature not a highway or a railroad		A < 10'
(55) MIN. LAT. CLEARANCE (RIGHT):	N Feature not a highway or a railroad		000
(56) MIN. LAT. CLEARANCE (LEFT):	000	(342) HORIZ CLEARANCE (ON):	02606
(34) SKEW, IN DEGREES:	00	(280) HORIZ CLEARANCE (UNDER):	N
(35) STRUCTURE FLARED:	N	(253) NUMBER OF CELLS:	N
(256) SPAN OF CELLS:	N	(254) RISE:	0900
		(258) EARTH FILL:	02
		(343) CENTERLINE LENGTH (Culverts/Pipes):	0043

(223) SHOULDER WIDTHS: 0000 N N 0000

(264) TYPE AND SPAN: STA = 20' R = 9'-0"

LOAD RATINGS AND POSTINGS

(41) STATUS: P Posted for load

(31) DESIGN LOAD: 5 HS 20

(398) PEDESTRIAN LOADING: N

(399) RAILROAD LOADING: N

(70) POSTING: 5 Equal to or above legal loads

(224) WEIGHT POSTED: 14 26 (New Split)

(66) INVENTORY RATING: 469

(64) OPERATING RATING: 783

(400) DATE OF RATING: 08 2014

(65) METHOD USED TO DETERMINE INVENTORY RATING: 1 1 Load Factor (LF)

(63) METHOD USED TO DETERMINE OPERATING RATING: 1 1 Load Factor (LF)

	INVENTORY RATING		OPERATING RATING	
HL-93 Vehicle	(402)		(401)	
H-15 Vehicle	(404)	261	(403)	436
T3 (Dump Truck) Vehicle	(406)	N/A	(405)	N/A
T4 Reduced Lift Axle Vehicle	(408)	635	(407)	999
HS Vehicle	(410)	469	(409)	783
3S2 Vehicle	(412)	989	(411)	999
150K Vehicle	(414)	999	(413)	999
90K Permit Combination Vehicle	(416)	698	(415)	999
90K Mobile Crane Vehicle	(418)	698	(417)	999
90K Cargo Vehicle	(420)	853	(419)	999
80K Cargo Vehicle	(422)	989	(421)	999
120K Vehicle	(424)	931	(423)	999
108K Mobile Crane Vehicle	(426)	838	(425)	999
120K Mobile Crane Vehicle	(428)	999	(427)	999

(225) SPEED LIMIT ON STRUCTURE: 25

(226) MIN VERT CLEARANCE OVER ROADWAY POSTED: X Posting signs not required

(227) MIN VERT UNDERCLEARANCE POSTED: X Posting signs not required

BRIDGE NUMBER: M-K-04001

CONDITION INSPECTION

	Inspection Month	(91) Frequency	Due Date	(90) Inspection Date	(290) Inspection Report Completion Date
Routine Inspection	01	24	01/13/2023	01/13/2021	08/13/2019

Critical Feature Inspections	(291) Inspection Month	(92) Frequency	Due Date	(93) Critical Feature Inspection Date
(A) Fracture Critical Members		N		
(B) Underwater Inspection		N		
(C) Special Inspection		N		
(D) Hands-on Railroad		N		
(E) Confined Space		N		
(F) Ultrasonic Testing (UT) Pin		N		
(G) Ultrasonic Testing (UT) Anchor		N		
(H) Post Tensioning Bar		N		
(I) Cathodic Protection		N		
(J) Consultant		N		
(K) Movable Bridge		N		
(L) Suspension Bridge		N		
(M) Cable		N		
(N) Monitor		N		
(P) Flood				07/31/2017
(Q) Damages				
(R) Inquires				09/19/2014

(58) DECK: N Not Applicable

(59) SUPERSTRUCTURE: 5 Fair Condition

(60) SUBSTRUCTURE: 6 Satisfactory Condition

(61) CHANNEL/PROTECTION: 7 Bank protection needs minor repairs

(62) CULVERTS: N Not Applicable

(310) INSPECTION DATA UPDATE DATE: 07/12/2016

(312) LEAD INSPECTOR: Michael Scorpa

(311) INSPECTION TEAM: YCO

(313) BRIDGE INSPECTOR: Justin Connor

(314) HOURS TO INSPECT: 002

(316) DECK PLANKING %: N

(315) DECK PUNCTURES %: N

(317) DECK PATCHING %: N

(318) BLOCKING: N

(319) POWER WASHING: N

(320) IDENTIFICATION NO.: N

(321) INVENTORY DIRECTION: NORTH

(323) PERMIT: N

(324) NIGHT WORK: N

(325) WEEKEND WORK: N

(322) LOOKING TOWARD: KENSINGTON PARKWAY

(326) MAINTENANCE OF TRAFFIC STANDARDS: N

(327) MOT COMMENTS:

(328) LOCATION OF MIN. VERT. UNDERCLEARANCE: N

BRIDGE NUMBER: M-K-04001

(329A) CRITICAL FINDINGS: N (329B) CRITICAL FINDINGS DATE:

(330) CRITICAL FINDINGS COMMENTS:

(331) CAUTION COMMENTS:

(332) UNDERCLEARANCE POSTING SIGNS: X Posting signs not required

(340) INSPECTION EQUIPMENT:

W Waders

(333) MHOI: N (334) MHOI LOCATIONS:

(335) ADVANCED NOTIFICATION: N

(336) ADVANCED NOTIFICATION COMMENTS:

BRIDGE NUMBER: M-K-04001

APPRAISAL

FORM 8 OF 13

(67) STRUCTURAL EVALUATION:	5	BSR 64.5	(68) DECK GEOMETRY:	3
(69) UNDERCLEARANCE:	N		(72) APPROACH ALIGNMENT:	4
(71) WATERWAY ADEQUACY:	7			

(36) TRAFFIC SAFETY FEATURES — RAILINGS:	0	Does NOT meet Standards
TRANSITIONS:	0	Does NOT meet Standards
APPROACH BARRIER:	0	Does NOT meet Standards
APPROACH BARRIER ENDS:	0	Does NOT meet Standards
(113) SCOUR EVALUATION:	5B	Bridge foundations determined to be stable due to assessment of scour conditions. Scour is determined to be within the limits of footings or piles. Scour has been found during an inspection.
(DT) DEDUCT CODE:	A	
(STAT) STATUS:	2	Functionally Obsolete

NAVIGATION

FORM 9 OF 13

(38) NAVIGATION CONTROL:	0	(39) NAV VERT CLEARANCE:	000
(40) NAV HORIZONTAL CLEARANCE:	0000		
(111) PIER/ABUTMENT PROTECTION:			
(116) MIN NAV VERT CLEARANCE, VERT LIFT BRIDGE:			
(247) DESIGN YEAR STORM:	0000	(248) RUN-OFF Q:	000000
(249) DRAINAGE AREA:	000000	(250) STRUCTURE IN TIDAL AREA:	N No
(251) HIGH WATER ELEVATION:	000		
(252) YEAR HIGH WATER ELEVATION - LATEST:	0000		

HISTORY AND PROPOSED IMPROVEMENTS

FORM 10 OF 13

(201) CONTRACT NUMBERS:						
(203) SHA SPEC- YEAR:	1939	N	N	N		
(204) AASHTO SPEC-YEAR:	1935	N	N	N		
(75) TYPE OF PROPOSED WORK:	31	1	(76) LENGTH OF IMPROVEMENT:	000040		
(94) BRIDGE IMPROVE COST:	000140		(95) ROADWAY IMPROVE COST:	000014		
(96) TOTAL PROJECT COST:	000154		(97) YEAR OF IMPROVEMENT:	2013		

MISCELLANEOUS

FORM 11 OF 13

(244) SIGNS ON STRUCTURE: N No

(245) BRIDGE ROADWY LIGHTING: N No

(246) PROVISION FOR ROADWAY LIGHTING: N No

(260) UTILITIES - ON:

0 Not Applicable
0 Not Applicable
0 Not Applicable
0 Not Applicable
0 Not Applicable

(261) UTILITIES - UNDER:

0 Not Applicable
0 Not Applicable
0 Not Applicable
0 Not Applicable
0 Not Applicable

REMARKS:

1995 ADT=2700; 2011 estimated ADT and Future ADT values were revised based on an MNCPPC annual growth rate of 0.83%

NOISE BARRIER

FORM 12 OF 13

(501) TYPE:

(502) ALIGNMENT:

(503) LENGTH:

(504) MAXIMUM HEIGHT:

(505) FOUNDATION TYPES:

(506) FOUNDATION LENGTH:

(507) PANEL WIDTH:

(508) NUMBER OF SPECIAL PANEL(S):

(509) PANEL MATERIAL:

(510) FACING (Acoustic Treatment):

(511) PANEL FINISH:

(512) PANEL COLOR:

(513) FEDERAL COLOR:

(514) STACKED PANELS:

(515) NOISE BARRIER POST MATERIAL:

(516) ACCESS DOORS:

(517) FIRE HYDRANTS:

(518) RETROFITS:

RETAINING WALL

FORM 13 OF 13

(550) TYPE:

(551) ALIGNMENT:

(552) SEGMENT LENGTH(S):

(553) MAX. EXPOSED HEIGHT:

(554) FOUNDATION TYPES:

(555) TIEBACK:

(556) FACING:

(557) WITH FENCE OR RAIL:

(558) WITH NOISE BARRIER:

(559) PURPOSE:

Appendix A - Load Rating Computations

LOAD RATING ANALYSIS

MONTGOMERY COUNTY, MARYLAND

BRIDGE NO. MK-04

KENT STREET
OVER
SILVER CREEK

AUGUST 2014

STATE OF MARYLAND
IGNAMARA B. PETROWICZ
No. 40233
PROFESSIONAL ENGINEER

Signature **Date** 08/29/14

Professional Certification: I hereby certify that this document was prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland, License No. 40233 Expiration Date: 4/14/2015

PREPARED BY:
THE WILSON T. BALLARD COMPANY
17 GWYNNS MILL COURT
OWINGS MILLS, MD 21117

Load Rating Standard Summary Sheet

Bridge No.: M-K-04 on Kent Street over Silver Creek

Date of Rating: 08/29/2014 **LARS Program:** Yes ☐ No ☒ Program Used: In-House Program

Rating Method: LRFR ☐ LFR ☒ ASR ☐ Engineering Judgment ☐ Load Testing ☐ **HMA Wearing Surface (in.)** 0

Rating Type: As-Built ☐ As Inspected ☒ **Condition Report Date:** 5/24/2013

Comments/Defects/Assumptions: **The numbering convention is from the North and the West. There is 50% section loss of the wall area.**

*LRFR Design/Load Rating Vehicle (Limit States are Strength I for all materials, Service II for Steel only, or Service III for prestressed concrete Inventory only)			
Truck/ Axle/ Tons	Rating Details	Inventory	Operating
	Controlling Member	Limit State	Limit State
	Controlling Stress (Moment, Shear, Service)	Rating Factor	Rating Factor
HL-93/3/36 Tons		Limit State	Limit State
	Select the Controlling Stress	X.XX	X.XX

Legal Loads (For LRFR the Limit States are Strength I for all materials or Service II for steel only)			
Truck/ Axle/ Tons	Controlling Member	**Inventory or Limit State	Operating
	Controlling Stress (Moment, Shear, Service)	Tons (XX.X)	Tons (XX.X)
H-15 / 2 / 15	All Cells	26.1	43.6
	Wall Area		
T-3 / 3 / 33	All Cells	53.1	88.7
	Wall Area		
T-4 / 4/ 35	All Cells	63.5	106.1
	Wall Area		
HS-20 / 3 / 36	All Cells	46.9	78.3
	Wall Area		
3S2 / 5 / 40	All Cells	98.9	165.1
	Wall Area		

Permit Loads - (For LRFR the Limit State is Strength II)			
Truck/ Axle/ Tons	Controlling Member	**Inventory	Operating
	Controlling Stress (Moment, Shear, Service)	Tons (XX.X)	Tons (XX.X)
150K / 8 / 75	All Cells	120.7	201.6
	Wall Area		
90K Comb./ 5 / 45	All Cells	69.8	116.5
	Wall Area		
90K Crane/ 4 / 45	All Cells	69.8	116.5
	Wall Area		
90 Cargo/ 5 / 45	All Cells	85.3	142.4
	Wall Area		
80 Cargo/ 5 / 40	All Cells	98.9	165.1
	Wall Area		
120K Spec./ 5 / 60	All Cells	93.1	155.4
	Wall Area		
108K Crane/ 5/ 54	All Cells	83.8	139.8
	Wall Area		
120 Crane/ 5 / 60	All Cells	104.5	174.4
	Wall Area		

TABLE OF CONTENTS

BRIDGE NO. MK-04

KENT STREET
OVER
SILVER CREEK

1.0 SUMMARY OF LEGAL LOADS
2.0 SUMMARY OF PERMIT LOADS
3.0 RATING INFORMATION
4.0 STRUCTURAL DESCRIPTION
5.0 MATERIAL PROPERTIES
6.0 CAPACITY
7.0 PLANS
8.0 RATING VEHICLES
9.0 DEAD LOAD SUMMARY
10.0 LIVE LOAD SUMMARY
11.0 HAND CALCULATIONS

Excel File Reference: U:\Str\20021405-Montgomery11\2013 Load Ratings\Spreadsheets\MK-04.xlsx

M-K-04001

THE WILSON T. BALLARD CO.
RATED BY: AWK
CHECKED BY: IP
DATE: AUGUST 2014
BRDIGE NO. MK-04

RATING SUMMARY - LEGAL LOADS

H-15		HS-20		T-3		T-3S2		T-4	
INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING
26.13	43.61	46.91	78.31	53.14	88.71	98.96	165.19	63.56	106.10

RECOMMENDED POSTING: N/A TONS SINGLE
N/A TONS COMBINATION

01/13/2021

THE WILSON T. BALLARD CO.
RATED BY: AWK
CHECKED BY: IP
DATE: AUGUST 2014
BRDIGE NO. MK-04

RATING SUMMARY - PERMIT VEHICLES

90 KIP COMBINATION		120 KIP COMBINATION		150 KIP VEHICLE		108 KIP CRANE		120 KIP CRANE		80 KIP CARGO		90 KIP CARGO		90 KIP CRANE	
INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING	INVENTORY	OPERATING
69.83	116.57	93.11	155.43	120.78	201.62	83.80	139.88	104.51	174.46	98.96	165.19	85.35	142.47	69.83	116.57

THE WILSON T. BALLARD COMPANY
RATED BY: AWK
CHECKED BY: IP
DATE: AUGUST 2014
BRIDGE NO.: MK-04

RATING INFORMATION:

1. THE RATING ANALYSIS IS BASED ON THE FOLLOWING METHOD:
   LOAD FACTOR

2. THE RATING IS BASED ON THE FOLLOWING:
   SECTION LOSS

3. BRIDGE INFORMATION:

YEAR BUILT:	1940
YEAR REHAB:	Gunite applied to all of structure (b/n 1993 and 2007)
ADT AND YEAR:	3080, 2011
CURRENT POSTING:	14,000 LBS SINGLE 26,000 LBS COMBINATION

4. BRIDGE NUMBERING SYSTEM: FROM THE NORTH AND THE WEST

5. REFERENCES:

   BIENNIAL BRIDGE INSPECTION REPORT DATED: May 2013

   AASHTO MANUAL FOR CONDITION EVALUATION OF BRIDGES
   17th EDITION

   AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES
   2nd EDITION

   SHA PPM D-97-47 (4) DATED JUNE 28, 2013

   HANDBOOK OF STEEL DRAINAGE & HIGHWAY CONSTRUCTION
   PROJECTS, 3RD EDITION

   NCSPA DESIGN DATA SHEET NO. 19, JUNE 1995

   PREVIOUS BRIDGE RATING: Dated: May 1995; By: KPA, Inc.

6. ASSUMPTIONS:

   The previous bridge rating assumed 75% section loss, per the 1993 bridge inspection. Since the 1993 bridge inspection and the 2007 bridge inspection, gunite was applied to the whole structure, covering up all section loss. The report states that the gunite sounds solid, but there are soft sounding areas, which suggests that the gunite is not fully bonded to the structure plate underneath.

THE WILSON T. BALLARD COMPANY
RATED BY: AWK
CHECKED BY: IP
DATE: AUGUST 2014
BRIDGE NO.: MK-04

STRUCTURAL DESCRIPTION:

NO. OF CELLS:	**1**
TYPE OF CULVERT:	**STRUCTURAL PLATE PIPE**
CORRUGATIONS:	**6" x 2"**
CULVERT MATERIAL:	**STEEL**
BOLTS:	4 BOLTS/FT.
NO. OF LANES:	**2**
CLEAR ROADWAY WIDTH:	**26'-6"**
MAX. DEPTH OF FILL, d (ft.):	**2.00**
NOTES:	**N/A**

DIMENSIONS:

LENGTH OF CULVERT (ft.):	**43.00**
**SPAN, s (ft.):	**19.00**
MAX WIDTH (ft.):	**19.00**
THICKNESS:	**7 Gauge (0.188")**
% SECTION LOSS:	**50%**
**NOTES:	s = the span of the pipe

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MATERIAL PROPERTIES:

MECHANICAL PROPERTIES: AASHTO 12.6.4.2

Min. Tensile Strength, f_u (psi)	Min. Yield Point, f_y (psi)	Mod. Of Elasticity, E_m (psi)
45,000	33,000	29,000,000

SECTION PROPERTIES: AASHTO 12.6.3.1

Area, A_s (in.^{2}/ft.)	Radius of Gyration, r (in.)	Moment of Inertia, I (in.^{4}/in.)
2.739	0.688	108.0E-03

SEAM STRENGTH: AASHTO 12.6.2

Seam Strength, SS (kips/ft.)
93.0

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CAPACITY

Capacity Modification Factor, Φ

Φ =	1.0	for Wall Area and Buckling	AASHTO 12.6.1.3
	0.67	for Seam Strength	

Check Buckling (AASHTO 12.3.2)

$$if \quad s < \frac{r}{k} * \sqrt{\frac{24 * E_m}{f_u}} \quad then \quad f_{cr} = f_u - \frac{f_u^2}{48 * E_m} * (ks/r)^2$$ AASHTO eq. 12-8

$$if \quad s > \frac{r}{k} * \sqrt{\frac{24 * E_m}{f_u}} \quad then \quad f_{cr} = \frac{12E_m}{(ks/r)^2}$$ AASHTO eq. 12-9

Soil Stiffness factor (k) = 0.22
f_{cr} = Cricital buckling stress (psi)

use AASHTO eq. 12-8
f_{cr} = 37,267.43 psi > fy = 33,000 psi

$T_L = \% S.L. * \phi * A_s * f_{cr}$ T_L = BUCKLING DOES NOT CONTROL

WALL AREA

$T_L = \% S.L. * \phi * A_s * f_y$ AASHTO eq. 12-7

T_L = 45.19 k/ft.

SEAM STRENGTH

$T_L = \phi * SS$ AASHTO eq. 12-10

T_L = 62.31 k/ft.

CONTROLLING CAPACITY

T_L = **45.19** k/ft

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DEAD LOAD THRUST (AASHTO 12.1.4.2)

Soil Unt Weight, γ_{soil} (kcf)	P_{DL} (ksf)	T_{DL} (klf)
0.120	0.24	**2.28**

$$P_{DL} = \gamma_{soil} * d$$

$$T_{DL} = P_{DL} * (S/2)$$ AASHTO eq. 12-1

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LIVE LOAD THRUST (AASHTO 12.1.3)

LIVE LOAD PRESSURE (ksf)

H-15	HS-20	T-3	T-3S2	T-4
0.98	1.31	1.06	0.69	0.94

90K	120K	150K	C108	C120	CG80	CG90	CR90
1.1	1.1	1.06	1.1	0.98	0.69	0.9	1.1

IMPACT FACTOR (AASHTO 3.8.2.3)

For Culvert with cover:
0' to 1'-0: inc. I = 30%
1'-1" to 2'-0" inc. I = 20%
2'-1" to 2'-11" inc. I = 10%

Impact Factor (AASHTO 3.8.2.3) 20%

LIVE LOAD THRUST + IM (klf)

H-15	HS-20	T-3	T-3S2	T-4
11.172	**14.934**	**12.084**	**7.866**	**10.716**

90K	120K	150K	C108	C120	CG80	CG90	CR90
12.540	**12.540**	**12.084**	**12.540**	**11.172**	**7.866**	**10.260**	**12.540**

$$T_{LL} = \frac{P_{LL} * S}{2} * (1 + I)$$

P_{LL} = Live Load Pressure
S = Span/Diameter
I = Impact Factor

Live Load Pressure (AASHTO 12.1.3), (AASHTO 6.4)

depth of fill = 2'

2' x 1.75 = 3.5'

3.5' x 3.5' = 12.25 ft²

Live Load pressure = $\frac{P}{12.25\ ft^2}$

Max wheel Load For Truck		Live Load pressure k/ft²
H-15	12 kips	.98
HS-20	16 kips	1.31
T-3	13 kips	1.06
T-3S2	8.5 kips	.69
T-4	11.5 kips	.94
90 K	13.5 kips	1.10
120 K	13.5 kips	1.10
150 K	13 kips	1.06
C108	13.5 kips	1.10
C120	12 kips	.98
CG80	8.5 kips	.69
CG90	11 kips	.90
CR90	13.5 kips	1.10

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Truck	Weight (Tons)	Live Load Thrust (Klf)	Inventory		Operating	
			RF	Rating	RF	Rating
H-15	15	11.17	1.74	26.1	2.91	43.6
HS-20	36	14.93	1.30	46.9	2.18	78.3
T-3	33	12.08	1.61	53.1	2.69	88.7
T-3S2	40	7.87	2.47	99.0	4.13	165.2
T-4	35	10.72	1.82	63.6	3.03	106.1
90-Combo	45	12.54	1.55	69.8	2.59	116.6
120-Combo	60	12.54	1.55	93.1	2.59	155.4
150	75	12.08	1.61	120.8	2.69	201.6
108- Crane	54	12.54	1.55	83.8	2.59	139.9
120-Crane	60	11.17	1.74	104.5	2.91	174.5
80-Cargo	40	7.87	2.47	99.0	4.13	165.2
90-Cargo	45	10.26	1.90	85.4	3.17	142.5
90-Crane	45	12.54	1.55	69.8	2.59	116.6

Capacity (klf)= 45.19
Dead Load (klf)= 2.28

$$(Inventory\ RF) = \frac{Capacity - 1.3 * Deadload}{2.17 * Liveload}$$

$$(Operating\ RF) = \frac{Capacity - 1.3 * Deadload}{1.3 * Liveload}$$

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