APPENDIX “E” TO SPECIAL PROVISIONS

STRUCTURES DESIGN CALCULATIONS

STRUCTURES DESIGN CALCULATIONS

FOR

Project Number:

PW Project No. 20200315, EDP-MT-20200315

Rehabilitation Design

For

Matheson Hammock Park Road (Bridge No.874294) over Matheson Hammock Canal

MIAMI-DADE

DEPARTMENT OF TRANSPORTATION AND PUBLIC WORKS

1/25/2022

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1.0 LRFR BRIDGE CONDITION EVALUATION

1.1 LOAD RATING ANALYSIS APPROACH

Introduction

Bridge 874294, constructed in 1967, carries Matheson Hammock Road over Matheson Hammock Canal in Miami-Dade County. According to the the latest NBIS inspection report dated 04/06/2020 and subsequent interim reports, the ADT for this section of roadway is around 736 vehicles per day with a truck percentage of 1%.

Purpose and Need

The purpose of this analysis is to assess the existing bridge conditions and determine the added capacity required to restore the bridge to a non-posted state and able to load rate for anticipated construction vehicles for an upcoming park sea-level improvement project and able to safely maintain current traffic until the complete bridge replacement.

Bridge Configuration

The bridge superstructure consists of three simply-supported prestressed concrete 17"x36" sonovoid slab units. There is evidence at the bridge site of reflective longitudinal cracks in the asphalt wearing surface across the bridge indicating that the slab units are acting independently due to possible deterioration or broken transverse post-tensioned cables. The span configuration is 30.0 feet – 40.0 feet – 30.0 feet, with 11 prestressed slab units in each span. A variable asphalt wearing surface is present along the bridge spans.

Analysis Approach

This current load rating was performed using Load and Resistance Factor Rating (LRFR) methodology from the AASHTOWare Bridge Rating (Version 6.8.4) software. The previous load rating was performed on January 13, 2020 using LRFR methodology and Smart Bridge Suite Version 3.1 software. Since the most recent inspection (performed on 4/26/2021 by Marlin Engineering, Inc.) rated the deck and superstructure as "3 Serious", and the substructure as "4 Poor", this current load rating was performed using a Condition Factor of 0.85 for significantly deteriorated prestressed slab units, and a Condition Factor of 0.90 for non-deteriorated prestressed slab units per AASHTO MBE Table 6A.4.2.3-1.

Moreover, given the damage sustained by the controlling interior slab units 2-8 and 2-9 in span no. 2 (severed strand), and as per the 2007 Revision to Publication 238 Bridge Safety Inspection Manual from the Pennsylvania Department of Transportation, under section 6.6.3.3.1I, the following conservative assumptions were considered in the analysis:

> "*Load ratings of beams with deteriorated and/or damaged prestressing strands are to be based on the following procedures:*
>
> - *Visually observed strands + 25% - Deduct 100% of all exposed strands plus an additional 25% (125% of the total area of the exposed strands) from capacity calculations.*
> - *Strands adjacent to or intersecting a crack shall be considered ineffective in the region immediately adjacent to the crack.*
> - *If significant strand loss is noted (>20%), especially for fascia beams, contact BQAD for further instructions.*
> - *For beams with no exposed strands but which appear to have internal damage (as evidenced by bottom flange cracking with rust and/or delamination), contact BQAD for further instructions.*

- *For fascia beams with Capacity/Dead Load < 1.5 or an Operating Rating < 1.5 based on a conventional analysis, an analysis that considers biaxial stresses will be performed by BQAD.*
- *These analysis methods may also be applicable to other pre-stressed box beam bridges*"

Therefore, a load rating analysis was performed to evaluate the existing capacity of the slab units within all three spans and provide recommendations for repair and strengthening as needed.

Evaluation of Existing Bridge (Current Conditions)

As stated above, the intent of the load rating analysis is to restore the bridge to a non-posted state able to safely carry the anticipated construction loads and the continuing traffic loading for a period not to exceed five years after the repairs, until the bridge is replaced. As such, only the Florida legal loads (SU2, SU3, SU4, C3, C4, C5 and ST5) were considered in this evaluation to provide a minimum rating factor of 1.0. The bridge does not carry interstate traffic nor is it State-owned or lying within 1 mile driving distance of an interstate interchange. Therefore, no Emergency Vehicles were investigated for this analysis (EV2 and EV3 were omitted). Load and Resistance Factor Rating (LRFR) was used for this assessment, as the preferred method for bridge rehabilitation per the FDOT Load Rating Manual.

Assumptions used in the analysis:

1) Assume independent action of the slab units: slab units are considered non-composite and the following criteria was used in the distribution of live loads for moment and shear applications:
   a. Interior slab units assumed a wheel load distribution factor = 1.0 (no wheel load distribution between units assuming that the transverse post-tensioning system is ineffective).
   b. Exterior (fascia) slab units located underneath the sidewalk assumed a wheel load distribution factor = 0.0 due to location of sidewalk curb directly above the units and no transfer of live from the adjacent units.
2) Assume a condition factor of 0.9, conservatively, to account for the age-related deterioration of the non-deteriorated units (units with minor or no deterioration identified in the most current interim inspection report).
3) Assume a condition factor of 0.85, conservatively, to account for the severe deterioration noted in the most current interim inspection report (Slab Units 1-6, 1-8, 2-8, 2-9).
4) For Slab Units 2-8 and 2-9 assume 100% section loss of a total of 7 strands in addition to the condition factor of 0.85.

Evaluation of Rehabilitated Bridge (Repaired Condition)

Additional analysis was conducted to evaluate the existing slab units assuming the replacement of the transverse post-tensioning system and the repair of cracks, delamination and spalls noted in the inspection report. The slab units were analyzed as integral, assuming a live load distribution factor in accordance with the AASHTO LRFD, Section 4.6.2.2.

The following assumptions were made:

1. Assume a condition factor of 0.9 for all slab units.

For Slab Units 2-8 and 2-9 assume 100% section loss of a total of 7 strands in addition to the condition factor of 0.9.

References

This current load rating was performed in accordance with the following manuals, specifications, and software:

- FDOT Structures Manual, January 2021 (SM) (Volume 1 - Structures Design Guidelines - (SDG))
- AASHTO LRFD Bridge Design Specifications, 9th Edition (AASHTO)
- FDOT Bridge Load Rating Manual, January 2021 (BLRM)
- The Manual for Bridge Evaluation, 3rd Edition 2018 (MBE) with 2019 Interims
- PCI Design Handbook, 8th Edition (PCI)
- AASHTOWare Bridge Rating, Version 6.8.4.
- Commonwealth of Pennsylvania Department of Transportation, Revision to Publication 238 Bridge Safety Inspection Manual, 2007.

It should be noted that the 2021 BLRM uses the 9th Edition of the AASHTO LRFD design specifications, and that AASHTOWare Bridge Rating Version 6.8.4 uses the 8th Edition of the AASHTO LRFD design specifications. However, since this bridge uses normal weight concrete and does not have prestressed slab units subjected to significant torsion, the applicable portions of the design codes have not changed between the two editions. Therefore, the software still meets the BLRM requirements for evaluating flexure and shear.

Summary of Results

Existing Bridge (Current Conditions)

The complete evaluation of all non-deteriorated and deteriorated slab units is shown in Sections 1.2 through 1.4 of the report. Given that no distribution is assumed between slab units, the exterior slab units were not evaluated for vehicular live loads and therefore do not control the results. By observations, the SU4 legal truck is the controlling live load; the resulting LRFR rating factors are summarized in the table below.

SUMMARY OF LRFR LOAD RATING RESULTS - SONOVOID SLAB UNITS (Existing Condition)								
Vehicle	Condition Factor	Member Condition	Live Load Type	Limit State	Controlling Member	Controlling Location (% Span)	Controlling Limit State	Rating Factor
SU 4	0.90	Non-Deteriorated	Axle Load	Legal	Interior Unit (Span 1)	50.0	STRENGTH-I Concrete Flexure	0.684
		Non-Deteriorated			Interior Unit (Span 2)	50.0	STRENGTH-I Concrete Flexure	0.624
	0.85	Deteriorated			Interior Unit (Unit 1-6 or 1-8)	50.0	STRENGTH-I Concrete Flexure	0.634
		Deteriorated			Interior Unit (Unit 2-8 or 2-9)	30.0	STRENGTH-I Concrete Shear	0.324

Figure 1-4.1 Summary of LRFR Load Rating Results for Existing Sonovoid Slab Units under Current Conditions.

As indicated in the table above, none of the slab units present an acceptable rating factor which would satisfy the demand for the anticipated construction loads. As such, re-establishing the post-tensioning of the existing non-deteriorated slabs and deteriorated slab units is required.

Rehabilitated Bridge (Repaired Condition)

The complete evaluation of all non-deteriorated slab units and repaired deteriorated slab units is shown in Sections 1.2 through 1.4 of the report. The interior and exterior slab units were both evaluated for vehicular live loads. By observations, the SU4 legal truck is the controlling live load; the resulting LRFR rating factors are summarized in the table below.

SUMMARY OF LRFR LOAD RATING RESULTS – SONOVOID SLAB UNITS (w/ Concrete Repairs and Post Tensioning Restored)								
Vehicle	Condition Factor	Member Condition	Live Load Type	Limit State	Controlling Member	Controlling Location (% Span)	Controlling Limit State	Rating Factor
SU 4	0.90	Non-Deteriorated	Axle Load	Legal	Interior Unit (Span 1)	50.0	STRENGTH-I Concrete Flexure	1.387
		Non-Deteriorated			Interior Unit (Span 2)	50.0	STRENGTH-I Concrete Flexure	1.461
		Deteriorated (repaired)			Interior Unit (Unit 1-6 or 1-8)	50.0	STRENGTH-I Concrete Flexure	1.387
		Deteriorated (repaired)			Interior Unit (Unit 2-8 or 2-9)	50.0	STRENGTH-I Concrete Flexure	0.931

Figure 1-4.2 Summary of LRFR Load Rating Results for Rehabilitated Sonovoid Slab Units with Concrete Repairs completed, and Post Tensioning restored.

As indicated above, the deteriorated slab units in Span 2 (2-8 & 2-9) did not achieve a minimum rating factor of 1.0 even when analyzed as integral. Consequently, the remaining capacity that is required to satisfy a minimum LRFR legal rating of 1.0 was computed as a final step in the evaluation process to determine the level of strengthening required to restore the bridge to a non-posted stated, as shown in the table below.

LOAD RATING SUMMARY - (Assuming Post Tensioning)					
Span 2 - INTERIOR Unit 2-8 (LRFR) - SU4					
Location	**Condition Factor**	**Existing Flexural Capacity (kip-ft) ****	**Existing Shear Capacity (kip) ****	**Required Flexural Capacity (kip-ft) ***	**Required Shear Capacity (kip) ***
0.00	0.90	135.08	-	-	-
1.12		-	94.16	-	-
1.48		293.46	89.01	-	-
3.85		344.64	70.05	-	-
7.7		344.64	70.05	-	-
11.55		344.64	49.78	-	-
15.4		344.64	38.99	359.34	-
19.25		344.64	-38.35	368.62	-
23.1		344.64	-38.99	359.34	-
26.95		362.07	-53.70	-	-
30.8		344.64	-70.05	-	-
34.65		344.64	-70.05	-	-
37.02		293.46	-89.01	-	-
37.39		-	-94.28	-	-
38.5		108.44	-	-	-

* Minimum Required capacity to meet a minimum Inventory Rating Factor of 1.1, conservatively.

** Existing condition assumes the removal of 7 strands, and 1 exterior stirrup leg to account for the controlling deterioration along the bottom face of the slab units.

Figure 1-4.3 Required Capacity of Rehabilitated Slab Units to satisfy LRFR Legal Rating.

1.2 SUMMARY OF LOAD RATING PARAMETERS

CONSOR

Project No:	D210107FL.00	Calculated by:	YRA	Date:	9/21/2021
Bridge No.:	874294	Checked by:	HGD	Date:	9/24/2021
Feature Carried:	Matheson Hammock Park			Page:	1 of 1

SUMMARY OF DEFICIENCIES

SONOVOID SLABS (UNDERSIDE) - SPAN 1

BEAM NO.	LOCATION	DEFICIENCY
1-1	EB1	Outward location with 1/4" height difference to top of cap
1-6	9-ft from EB1	15" x 6" x 1/2" - spall w/ exposed rebar / minor section loss
	EB1 / East	5'L x 6"W delamination with associated 1/16" cracks
	Pier 2 / East	9'L x 12"W delamination with associated 1/16" cracks
1-7	EB1 / East	24"L x 12"W spall/delamination with associated 1/32" cracks
	Pier 2 / East	7'L x 4"W delamination with associated 1/16" cracks
1-8	EB1 / West	15'L x 15"W delamination with associated 1/4" cracks
	9'' from EB1 / West	4' x 6" x 2" - spall
	Pier 2 / East	4'L x 15"W delamination with associated 1/32" cracks
	Pier 2	8'L x 3'W delamination with associated 1/16" cracks
1-9	EB1	36"L x 24"W x 2.5" spall/delamination with exposed stirrup (no loss)
	Pier 2 / West	9'L x 10"W delamination with associated 1/16" cracks

SONOVOID SLABS (UNDERSIDE) - SPAN 2

BEAM NO.	LOCATION	DEFICIENCY
2-6	Pier 2 / East	30"L x 4"W delamination
2-7	Pier 2 / West	24"L x 4"W delamination
	full length	16"W delamination with associated 1/4" cracks
2-8	Pier 2	36"L x full width with associated cracks
	Pier 2 / West	15' x 18"W (average) delamination with associated 1/4" cracks
	Midspan	15'x34"x4" with 7 exposed and corroded transverse rebars w/ 60% section remaining and 5 exposed and corroded strands (3 broken strands) - 0% section remaining
	Pier 3 / West	15' x 18"W (average) delamination with associated 1/4" cracks
2-9	Pier 2 / West	5'L x 5" delamination with associated 1/4" cracks
	Midspan	15'x12"x2" spall/delamination with 2 strands and 7 transverse rebars having up to 90% section remaining

SONOVOID SLABS (UNDERSIDE) - SPAN 3

BEAM NO.	LOCATION	DEFICIENCY
3-6	Pier 3 / East	24"L x 6"W delamination with associated 1/16" crack
	~10' from EB 4 / East	42"L x 8" W with associated 1/16" cracks
3-7	Pier 3	8'L x 15"W delamination with associated cracks
	Midspan	3'L x 30" W
	EB 4	12'L x 36"W unsound repair / hollow sounding
3-8	Pier 3	8'L x 3'W x 1" with associated cracks
	EB4	42"' x 30"W unsound repair/ delamination with associated 1/16" cracks
	5.5' from EB 4	74"' x 36"W unsound repair/ delamination with associated 1/16" cracks

SUBSTRUCTURE

COMPONENT	LOCATION	DEFICIENCY
PIER CAPS	PIER 2 / South Face	48"L X 17" H X 3/4" Spall / Delamination over column 2-2
	PIER 2 / North Face	20"L x 12" H delamination over column 2-2
	PIER 3 / bottom / North F	2~ 30"L x 24"W unsound repairs with 1/64" associated cracks between columns 3-1 and 3-2.
	PIER 3 / top & Bottom / N	3'L x 16" delamination between columns 3-1 and 3-2
COLUMNS	Column 2-2	55"H x 32"W x 4"D spall delamination with exposed longitudinal rebars and 5 stirrups (up to 80% remaining)
	Column 2-2	Delamination (entire column height / circumference) with associated 1/4" cracks
	Columns 2-1, 3-1, 3-2	Delamination (entire length) with associated 1/16" cracks (full height)

SPAN 1 OR 3 - SUPPLEMENTAL CALCULATIONS - LOADING PARAMETERS

Bridge Type: **Prestressed Voided Slab Unit - 17"x36"**
Standard Drawing:

Total Superimposed Dead Load:	**1.396 k/ft**
Bridge Railing/ Guardrail Dead Load:	0.148 k/ft
Curb/Sidewalk Dead Load:	1.248 k/ft
Attached Utility Dead Load:	0.000 k/ft
Asphalt W.S. Dead Load (DW):	0.379 k/ft

Number of Spans = 3
Structure Length = 100 ft.
Brg.-to-Brg. Span Length = 28.2917 ft. (Assumed at Centerline of 1/4"x6" wide asbestos graphite pads)
Analyzed Span Length = 30.00 ft.
Clear Roadway Width = 26.00 ft.
Wearing Surface: Yes A 1.0-inch wearing surface is present at the supports, and 1.5-in present at midspan.
The wearing surface dead loads are calculated by BrR and included in the analysis.

Location	Thickness	Average Thickness		
Begin span	1.00 in	1.167 in	0.040833	4.085469
Mid Span	1.50 in			
End Span	1.00 in			

Bridge Railing/Guardrail: Yes Bridge Railing is present.
Per SCDOT Load Rating guidance, guardrail dead loads are applied only to fascia beams.
Curb/Sidewalk: Yes A curbs or sidewalks are present. See below for curb/sidewalk dimensions and dead load calculations.
Parapet: No No parapets are present.
Attached Utilities: Yes See below for dead load calculations.

Rail 1 Type: Other Metal Posts and Pipes - Assume 10 lb/ft per SDG Table 2.2-1, Bullet Railing **0.010 k/ft**
10 lb/ft

Rail 2 Type: Rect. Conc. Beam Rectangular Concrete Beam Guardrail **0.125 k/ft**
125 lb/ft

Rail Post:	Concrete	Quantity	Length/Height	Shape	Area (Standard shapes per AISC 7-14)	
						0.013 k/ft
	150 pcf	3 / span	0.83 ft	Rect. 10x10	100.00 in^2	
	150 pcf	2 / span	0.83 ft	Rect. 8x10	80.00 in^2	

Rail Blockout: none

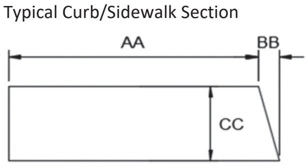
Curb/Sidewalk: (South End)			
	AA	29.0 in	**0.325 k/ft**
	BB	1.0 in	
	CC	10.563 in	

- Superstructure is modeled withouth the sidewalk overhang, that is removing the additional 6" of overhang.
- To account for the actual weight of curb/sidewalk, compute an equivalent Thickness of sidewalk corresponding to a rectangulan sidewalk with an equivalent with of:

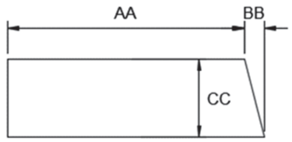
Equiv. Width of Sidewalk = 24 in (Equivalent width of rectangular sidewalk inputed in AASHTOWare software)

Equiv. CC = **12.9831** in (Equivalent thickness of rectangular sidewalk inputed in AASHTOWare software)

Typical Curb/Sidewalk Section



Curb/Sidewalk: (North End)			
	AA	77.0 in	**0.923 k/ft**
	BB	1.0 in	
	CC	11.4 in	



- Superstructure is modeled withouth the sidewalk overhang, that is removing the additional 6" of overhang.
- The 1-ft utility opening will be neglected, leaving 1-ft of additional solid sidewalk material assumed to account for the weight of utilities and attachements at the opening. The resulting width of sidewalk to be inputed in the sofware shall be:

Equiv. Width of Sidewalk = 60 in (Equivalent width of rectangular sidewalk inputed in AASHTOWare software)

- No information is available on the utilities and attachements along the North side of the bridge.
- The Concrete sidewalk will be assumed to be solid at the location of the utility opening to account for the weight of the utilities and attachments, conservatively.
- Assume weight of sidewalk taken by the exterior slab units.

Diaphragm:

Width of Slab Unit = 36 in
Depth of Slab Unit = 17 in
No. of Voids = 2.0000
Diameter of Voids = 10.0000 in

	Begin Span				
	Start Dist. From Left End* (FT)	Diaphragm Spacing (FT)	No. of Spaces	Width/ Thickness (IN)	Diaphragm Weight (KIP)
Span 1, Begin	0.00	1.00	1	24.0	**0.3272**
Span 1, 1/4 Point	1.00	6.25	1	12.0	**0.1636**
Span 1, 3/4 Point	7.25	15.00	1	12.0	**0.1636**
Span 1, End	22.25	6.25	1	24.0	**0.3272**
Span 3, Begin	0.00	1.00	1	24.0	**0.3272**
Span 3, 1/4 Point	1.00	6.25	1	12.0	**0.1636**
Span 3, 3/4 Point	7.25	15.00	1	12.0	**0.1636**
Span 3, End	22.25	6.25	1	24.0	**0.3272**

LLDF (Post-Tensioned - LFD): (Assuming Members are sufficiently connected to act as a unit, meaning accounting for effective post tensioning)

For Interior/Exterior Slab Units: (Moment & Shear) ***[AASHTO LFD 3.23.4.3]***

S = 3.0 ft. (Width of precast member)
W = 34.0 ft. (Assumed total width of Bridge Superstructure - ignore opening at the N end sidewalk)
L = 28.291667 ft. (Brg.-to-Brg. Span Length - Span 2)
NL = 2.0 (Number of traffic lanes)
Nb = 11.0 (Number of concrete slab units)
μ = 0.2 (Assumed Poisson's Ratio for concrete slab units)

I = 13330.10 in^4 (Moment of Inertia of Slab Unit - from BrM software)
J = 14593.77 in^4 (Saint-Venant Torsion constant - from BrM software)

K = $[(1+\mu)\cdot I/J]^{1/2}$ = 1.04694

C = $if\left[\frac{W}{L}<1, K\left(\frac{W}{L}\right), K\right]$ = 1.04694

D = $(5.75-0.5N_L)+0.7N_L(1-0.2C)^2$ = 5.6251

LLDF (INT-M) = S/D = **0.5333** (Live Load Distribution Fraction for Moment)

LLDF (Post-Tensioned - LRFR): (Assuming Members are sufficiently connected to act as a unit, meaning accounting for effective post tensioning)

LLDF(INT - OneLane) = 0.296 (LLDF for One lane loaded for Moment and Shear computed for Interior Slab unit in AASHTOWare BrR in accordance with AASHTO LRFD Tables 4.6.2.2.2b-1 and 4.6.2.2.2d-1)

LLDF(INT - MultiLane) = 0.273 (LLDF for Multi lanes loaded for Moment and Shear computed for Interior Slab unit in AASHTOWare BrR in accordance with AASHTO LRFD Tables 4.6.2.2.2b-1 and 4.6.2.2.2d-1)

For Exterior Slab Units: (Moment) ***[AASHTO LRFD Table 4.6.2.2.2d-1]***

$d_{e,G11}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior beam/slab unit along the south end at deck level to interior edge of curb or traffic barrier) - (Ext.web = 5"; outboard of curb) - limited to -1.0 since de computed is = 1.8' per AASHTO LRFD 4.6.2.2.2d.

$d_{e,G1}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior slab unit along the south end at deck level to interior edge of curb or traffic barrier) - (Ext. web = 5"; outboard of curb) - limited to -1.0 since d_e computed is = 4.8' per AASHTO LRFD 4.6.2.2.2d.

- One Design Lane Loaded:

$e_{OneLane\_G1}$ = $1.125+\frac{d_{e,G1}}{30}\geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{OneLane\_G11}$ = $1.125+\frac{d_{e,G11}}{30}\geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.G1-$M_{OneLane}$) = $e\cdot LLDF(INT-M)$ = **0.2960** (Live Load Distribution Fraction for Moment for One lane Loaded - Unit G1)

LLDF (EXT.G11-$M_{OneLane}$) = $e\cdot LLDF(INT-M)$ = **0.2960** (Live Load Distribution Fraction for Moment for One lane Loaded - Unit G11)

- Two or More Design Lanes Loaded:

$e_{OneLane\_G1}$ = $1.04+\frac{d_{e,G1}}{25}\geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{OneLane\_G11}$ = $1.04+\frac{d_{e,G11}}{25}\geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.-$M_{MultiLane}$) = $e\cdot LLDF(INT-M)$ = **0.2730** (Live Load Distribution Fraction for Moment for Multi-Lanes Loaded - Unit G1)

LLDF (EXT.-$M_{MultiLane}$) = $e\cdot LLDF(INT-M)$ = **0.2730** (Live Load Distribution Fraction for Moment for Multi-Lanes Loaded - Unit G11)

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For Exterior Slab Units: (Shear) ***[AASHTO LRFD Table 4.6.2.2.3b-1]***

$d_{e,G1}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior slab unit along the south end at deck level to interior edge of curb or traffic barrier) - (Ext. web = 5"; outboard of curb) - limited to -1.0 since d_e computed is = 4.8' per AASHTO LRFD 4.6.2.2.2d.

$d_{e,G11}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior beam/slab unit along the south end at deck level to interior edge of curb or traffic barrier) - (Ext.web = 5"; outboard of curb)

b = 36.0 in. (Width of precast member)

- One Design Lane Loaded:

$e_{OneLane\_G1} = 1.25 + \frac{d_{e,G1}}{20} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{OneLane\_G11} = 1.25 + \frac{d_{e,G11}}{20} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.G1-$M_{OneLane}$) = $e_{OneLane\_G1} \cdot LLDF(INT,V)$ = **0.2960** (Live Load Distribution Fraction for Shear for One lane Loaded - Unit G1)

LLDF (EXT.G11-$M_{OneLane}$) = $e_{OneLane\_G11} \cdot LLDF(INT,V)$ = **0.2960** (Live Load Distribution Fraction for Shear for One lane Loaded - Unit G11)

- Two or More Design Lanes Loaded:

$e_{MultiLane\_G1} = 1.0 + \left(\frac{d_{e,G1} + \frac{b}{12} - 2.0}{40}\right)^{0.5} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{MultiLane\_G11} = 1.0 + \left(\frac{d_{e,G11} + \frac{b}{12} - 2.0}{40}\right)^{0.5} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.-$M_{MultiLane}$) = $e_{MultiLane\_G1} \cdot LLDF(INT,V)$ = **0.2730** (Live Load Distribution Fraction for Shear for Multi-Lanes Loaded - Unit G1)

LLDF (EXT.-$M_{MultiLane}$) = $e_{MultiLane\_G11} \cdot LLDF(INT,V)$ = **0.2730** (Live Load Distribution Fraction for Shear for Multi-Lanes Loaded - Unit G11)

LLDF (Exist.Condition - LFD): (Assuming Slab Members acting independently - no effective post tensioning)

S =	3.0	ft.	(Width of precast member)
W =	34.0	ft.	(Assumed total width of Bridge Superstructure - ignore opening at the N end sidewalk)
L =	28.291667	ft.	(Brg.-to-Brg. Span Length - Span 2)
NL =	2.0		(Number of traffic lanes)
Nb =	11.0		(Number of concrete slab units)

D = 3.0000 (Assumed equal to Precast member width since slab unit will behave indepedently. Therefore, individual unit can be assumed to take on the full wheel load)

LLDF (INT - LFD) = S/D = **1.0000** (Live Load Distribution Fraction for Moment and Shear)

LLDF (Exist.Condition - LRFR): (Assuming Slab units acting independently - no effective post tensioning)

LLDF (INT - OneLane - LRFR) = 0.5 x Axle = **0.5000** (Live Load Distribution Fraction for Moment and Shear - Half of Axle Load)

LLDF (INT - OneLane - LRFR) = 0.5 x 1.2 x Axle = **0.6000** (Live Load Distribution Fraction for Moment and Shear - Half of Axle Load)

Analysis Case: A) For the purpose of the Load Rating, the following Cases were assumed for AASHTOWare BrR runs:
- *Case 1:* Run model to account for the condition where the slab units have been rehabilitated with Post Tensioning.
- *Case 2:* Run model to account for the existing condition without repairs.

B) Per current inspection report, the following are assumed in the analysis to account for the deterioration of the slab unit 1-8:
- West edge of slab unit intermittently delaminated with efflorescence and corrosion bleed-out and associated spalling.
- Assume a condition factor of 0.85 to account for the analysis of the worst case deteriorated slab unit from spans 1 & 3.

SPAN 2 - SUPPLEMENTAL CALCULATIONS - LOADING PARAMETERS

Bridge Type: Prestressed Voided Slab Unit - 17"x36"
Standard Drawing:

Total Superimposed Dead Load:	**1.395 k/ft**
Bridge Railing/ Guardrail Dead Load:	0.147 k/ft
Curb/Sidewalk Dead Load:	1.248 k/ft
Attached Utility Dead Load:	0.000 k/ft
Asphalt W.S. Dead Load (DW):	0.420 k/ft
Asphalt W.S. Dead Load per Slab Unit (DW):	0.038 k/ft

Number of Spans:	3	
Number of Sonovoids:	11	
Structure Length:	100	ft.
Brg.-to-Brg. Span Length:	38.5	ft. (Assumed at Centerline of 1/4"x6" wide asbestos graphite pads)
Analyzed Span Length:	40.00	ft.
Clear Roadway Width:	26.00	ft.
Slab Unit Width:	36.00	in.
Wearing Surface:	Yes	A 1.0-inch wearing surface is present at the supports, and 1.875-in present at midspan.

The wearing surface dead loads are calculated by BrR and included in the analysis.

Location	Thickness	Average Thickness
Begin span	1.00 in	1.292 in
Mid Span	1.88 in	
End Span	1.00 in	

Bridge Railing/Guardrail:	Yes	Bridge Railing is present.
		Per SCDOT Load Rating guidance, guardrail dead loads are applied only to fascia beams.
Curb/Sidewalk:	Yes	A curbs or sidewalks are present. See below for curb/sidewalk dimensions and dead load calculations.
Parapet:	No	No parapets are present.
Attached Utilities:	Yes	See below for dead load calculations.

Rail 1 Type: Other — Metal Posts and Pipes - Assume 10 lb/ft per SDG Table 2.2-1, Bullet Railing — **0.010 k/ft**
10 lb/ft

Rail 2 Type: Rect. Conc. Beam — Rectangular Concrete Beam Guardrail — **0.125 k/ft**
125 lb/ft

Rail Post: Concrete	Quantity		Length/Height	Shape	Area (Standard shapes per AISC 7-14)
150 pcf	4	/ span	0.83 ft	Rect. 10x10	100.00 in^2
150 pcf	2	/ span	0.83 ft	Rect. 8x10	80.00 in^2

Rail Post: **0.012 k/ft**

Rail Blockout: none

Curb/Sidewalk: (South End) — **0.325 k/ft**

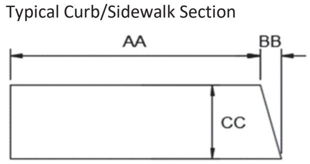
AA	29.0 in
BB	1.0 in
CC	10.6 in

- Superstructure is modeled withouth the sidewalk overhang, that is removing the additional 6" of overhang.
- To account for the actual weight of curb/sidewalk, compute an equivalent Thickness of sidewalk corresponding to a rectangulan

Equiv. Width of Sidewalk = 24 in (Equivalent width of rectangular sidewalk inputed in AASHTOWare software)

Equiv. CC = **12.9831** in (Equivalent thickness of rectangular sidewalk inputed in AASHTOWare software)

Typical Curb/Sidewalk Section

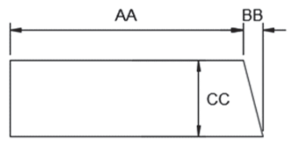


Curb/Sidewalk: (North End)		
	AA	77.0 in
	BB	1.0 in
	CC	11.4 in

0.923 k/ft

- Superstructure is modeled withouth the sidewalk overhang, that is removing the additional 6" of overhang.
- The 1-ft utility opening will be neglected, leaving 1-ft of additional solid sidewalk material assumed to account for the weight of utilities and

Equiv. Width of Sidewalk = 60 in (Equivalent width of rectangular sidewalk inputed in AASHTOWare software)



- No information is available on the utilities and attachements along the North side of the bridge.
- The Concrete sidewalk will be assumed to be solid at the location of the utility opening to account for the weight of the utilities and attachments, conservatively.
- Assume weight of sidewalk taken by the exterior slab units.

Diaphragm:

Width of Slab Unit = 36 in

Depth of Slab Unit = 17 in

No. of Voids = 2.0000

Diameter of Voids = 10.0000 in

	Begin Span				
	Start Dist. From Left End* (FT)	Diaphragm Spacing (FT)	No. of Spaces	Width/ Thickness (FT)	Diaphragm Weight (KIP)
Span 2, Begin	0.00	1.00	1	2.0	**0.3272**
Span 2, 1/4 Point	1.00	8.96	1	1.0	**0.1636**
Span 2, 3/4 Point	9.96	20.00	1	1.0	**0.1636**
Span 2, End	29.9583	8.96	1	2.0	**0.3272**

LLDF (Post-Tensioned - LFD): (Assuming Members are sufficiently connected to act as a unit, meaning accounting for effective post tensioning)

For Interior Slab Units: *[AASHTO LRFD Table 4.6.2.2.2b-1]*

S = 3.0 ft. (Width of precast member)

W = 34.0 ft. (Assumed total width of Bridge Superstructure - ignore opening at the N end sidewalk)

L = 38.5 ft. (Brg.-to-Brg. Span Length - Span 2)

NL = 2.0 (Number of traffic lanes)

Nb = 11.0 (Number of concrete slab units)

μ = 0.2 (Assumed Poisson's Ratio for concrete slab units)

I = 13330.10 in^4 (Moment of Inertia of Slab Unit - from BrM software)

J = 14593.77 in^4 (Saint-Venant Torsion constant - from BrM software)

K = $[(1+\mu)\cdot I/J]^{1/2}$ = 1.04694

CONSOR	Project No:	D210107FL.00	Calculated by:	YRA	Date:	9/21/2021
	Bridge No.:	874294	Checked by:	MAP	Date:	12/29/2021
	Feature Carried:	Matheson Hammock Road			Page:	3 of 4

C = $if\left[\frac{W}{L} < 1, K\left(\frac{W}{L}\right), K\right]$ = 0.92457

D = $(5.75 - 0.5N_L) + 0.7N_L(1 - 0.2C)^2$ = 5.6801

LLDF (INT - LFD) = S/D = **0.5282** (Live Load Distribution Fraction for Moment and Shear)

For Exterior Slab Units: *[AASHTO LRFD Table 4.6.2.2.2d-1]*

d_e = 3.0 ft. (Width of precast member)

LLDF (Post-Tensioned - LRFR): (Assuming Members are sufficiently connected to act as a unit, meaning accounting for effective post tensioning)

LLDF(INT - OneLane) = 0.254 (LLDF for One lane loaded for Moment and Shear computed for Interior Slab unit in AASHTOWare BrR in

LLDF(INT - MultiLane) = 0.256 (LLDF for Multi lanes loaded for Moment and Shear computed for Interior Slab unit in AASHTOWare BrR in

For Exterior Slab Units: (Moment) *[AASHTO LRFD Table 4.6.2.2.2d-1]*

$d_{e,G11}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior beam/slab unit along the south end at deck

$d_{e,G1}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior slab unit along the south end at deck level to

- One Design Lane Loaded:

$e_{OneLane\_G1}$ = $1.125 + \frac{d_{e,G1}}{30} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{OneLane\_G11}$ = $1.125 + \frac{d_{e,G11}}{30} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.G1-$M_{OneLane}$) = $e_{OneLane\_G1} \cdot LLDF(INT, M)$ = **0.2540** (Live Load Distribution Fraction for Moment for One lane Loaded - Unit G1)

LLDF (EXT.G11-$M_{OneLane}$) = $e_{OneLane\_G11} \cdot LLDF(INT, M)$ = **0.2540** (Live Load Distribution Fraction for Moment for One lane Loaded - Unit G11)

- Two or More Design Lanes Loaded:

$e_{MultiLane\_G1}$ = $1.04 + \frac{d_{e,G1}}{25} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{MultiLane\_G11}$ = $1.04 + \frac{d_{e,G11}}{25} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.-$M_{MultiLane}$) = $e_{MultiLane\_G1} \cdot LLDF(INT, M)$ = **0.2560** (Live Load Distribution Fraction for Moment for Multi-Lanes Loaded - Unit G1)

LLDF (EXT.-$M_{MultiLane}$) = $e_{MultiLane\_G11} \cdot LLDF(INT, M)$ = **0.2560** (Live Load Distribution Fraction for Moment for Multi-Lanes Loaded - Unit G11)

For Exterior Slab Units: (Shear) ***[AASHTO LRFD Table 4.6.2.2.3b-1]***

$d_{e,G1}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior slab unit along the south end at deck level to

$d_{e,G11}$ = -1.0 ft. (Horizontal distance from centerline of exterior web of exterior beam/slab unit along the south end at deck

b = 36.0 in. (Width of precast member)

- One Design Lane Loaded:

$e_{OneLane\_G1} = 1.25 + \frac{d_{e,G1}}{20} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{OneLane\_G11} = 1.25 + \frac{d_{e,G11}}{20} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.G1-$M_{OneLane}$) = $e_{OneLane\_G1} \cdot LLDF(INT,V)$ = **0.2540** (Live Load Distribution Fraction for Shear for One lane Loaded - Unit G1)

LLDF (EXT.G11-$M_{OneLane}$) = $e_{OneLane\_G11} \cdot LLDF(INT,V)$ = **0.2540** (Live Load Distribution Fraction for Shear for One lane Loaded - Unit G11)

- Two or More Design Lanes Loaded:

$e_{MultiLane\_G1} = 1.0 + \left(\frac{d_{e,G1} + \frac{b}{12} - 2.0}{40}\right)^{0.5} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G1)

$e_{MultiLane\_G11} = 1.0 + \left(\frac{d_{e,G11} + \frac{b}{12} - 2.0}{40}\right)^{0.5} \geq 1.0$ = 1.000 (Correction factor for LL distribution on exterior slab unit G11)

LLDF (EXT.-$M_{MultiLane}$) = $e_{MultiLane\_G1} \cdot LLDF(INT,V)$ = **0.2560** (Live Load Distribution Fraction for Shear for Multi-Lanes Loaded - Unit G1)

LLDF (EXT.-$M_{MultiLane}$) = $e_{MultiLane\_G11} \cdot LLDF(INT,V)$ = **0.2560** (Live Load Distribution Fraction for Shear for Multi-Lanes Loaded - Unit G11)

LLDF (Exist.Condition - LFD): (Assuming Members acting independently - no effective post tensioning)

S = 3.0 ft. (Width of precast member)
W = 34.0 ft. (Assumed total width of Bridge Superstructure - ignore opening at the N end sidewalk)
L = 38.5 ft. (Brg.-to-Brg. Span Length - Span 2)
NL = 2.0 (Number of traffic lanes)
Nb = 11.0 (Number of concrete slab units)

D = 3.0000 (Assumed equal to Precast member width since slab unit will behave indepedently. Therefore, individual unit can be assumed to take on the full wheel load)

LLDF (LFD) = S/D = **1.0000** (Live Load Distribution Fraction for Moment and Shear)

LLDF (Exist.Condition - LRFR): (Assuming Slab units acting independently - no effective post tensioning)

LLDF (INT - OneLane - LRFR) = 0.5 x Axle = **0.5000** (Live Load Distribution Fraction for Moment and Shear - Half of Axle Load)

LLDF (INT - OneLane - LRFR) = 0.5 x 1.2 x Axle = **0.6000** (Live Load Distribution Fraction for Moment and Shear - Half of Axle Load)

Analysis Case: A) For the purpose of the Load Rating, the following Cases were assumed for AASHTOWare BrR runs:
- *Case 1:* Run model for non deteriorated units to account for the condition where the slab units have been rehabilitated.
- *Case 2:* Run model for non-deteriorated and deteriorated units to account for the existing condition without repairs.
- *Case 3:* Run model for deteriorated units to account for the condition where the slab units have been rehabilitated, but no strands have been replaced.

B) Per current inspection report, the following are assumed in the analysis to account for the deterioration of the slab unit 2-8:
- 5 exposed strands, with 3 broken: Remove a total of 5 strands from the bottom layer of strands.
- Assume 50% of the adjacent strands along the same layer have been affected to account for the potential of damage in the adjacent strands. That is: Remove 1 additional strand from the bottom layer of strands.
- Assume 50% of the adjacent strands at the next layer have been affected to account for the potential of damage in the adjacent strands. That is: Remove 1 additional strand from the next layer of strands.
- Per recommendation from "Structural Technologies" on 10/01/2021, assume exterior stirrup leg to be deteriorated. In BrR, use 2 legs of shear reinforcement, conservatively for the critical case.

1.3 LRFR LOAD RATING ANALYSIS INPUT

Username: BrR
Date: Wednesday, September 22, 2021 11:21:02

Bridge ID 874294D Matheson Hmck Bridge over Matheson Hammock Canal

NBI Structure ID (8): 874294D
Description: Rating by YRA, from As-built plans [LAST UPDATED: 9/22/2021]

DETERIORATED MODEL:
Three spans (30'-40'-30') non-composite PS Concrete voided slab unit superstructure comprised of eleven (11) 17"x36" units. Deck width is 35'-0" out-to-out with a 26'-0" clear roadway width. Wearing surface is present along the bridge with an average thickness of 1.167" along end spans 1 and 3, and 1.292" for interior span 2.
Per current inspection report, the following controlling cases apply:
- Prestressed slab unit 1-8 displaying severe cracking with corrosion stain along the bottom face of the slab unit.
- Prestressed slab unit 2-8 displaying the worst deterioration: Five (5) exposed strands with three (3) broken.

The load rating analysis for the prestressed voided slab units was initially performed using the Load and Resistance factor Rating methodology in accordance with the AASHTO LRFD Bridge Design Specifications (9th edition, 2020), the Manual for Bridge Evaluation (3rd edition with interims through 2019), and the FDOT Bridge Load Rating Manual (January 2021). However, the resulting design and legal rating factors were less than 1, which granted the need to evaluate the structure using the Load Factor Rating methodology.

Description

Location:	Matheson Hammock Park
Total Length:	100.33 *(ft)*
Facility Carried:	Matheson Hmk Road
Route Number:	00000
Feature Intersected:	Matheson Hammock Canal
Mi Post:	0.08 *(mi)*
Units:	US Customary
Year Built:	1967
Recent ADTT:	11
District:	District 6
County:	
Owner:	County Hwy Agency
National Highway System:	0 Not on NHS
Functional Class:	09 Rural Local

Global Reference Point

X Coordinate:	0.000 *(ft)*
Y Coordinate:	0.000 *(ft)*
Elevation:	*(ft)*
Longitude:	80.26 *(Degrees)*
Latitude:	25.68 *(Degrees)*

Materials

No steel materials.

Concrete

Name: **Class P (5000)**
Description: Class 5000 cement concrete
Specified compressive strength at 28 days (f'c): 5.000 *(ksi)*
Initial specified compressive strength (f'ci): 4.000 *(ksi)*
Coefficient of thermal expansion: 0.0000060000 *(1/F)*
Density (for dead loads): 0.150 *(kcf)*
Density (for modulus of elasticity): 0.145 *(kcf)*
Std Modulus of elasticity (Ec): 4074.28 *(ksi)*
LRFD Modulus of elasticity (Ec): 4291.19 *(ksi)*
Poisson's ratio: 0.200
Modulus of rupture: 0.537 *(ksi)*
Shear factor: 1.000
Composition of concrete: Normal
Std Initial modulus of elasticity (Eci): 3644.15 *(ksi)*
LRFD Initial modulus of elasticity (Eci): 3986.55 *(ksi)*
Splitting tensile strength (fct): *(ksi)*

Name: **Class A (3000)**
Description: Class A cement concrete (3000 psi)
Specified compressive strength at 28 days (f'c): 3.000 *(ksi)*
Initial specified compressive strength (f'ci): *(ksi)*
Coefficient of thermal expansion: 0.0000060000 *(1/F)*
Density (for dead loads): 0.150 *(kcf)*
Density (for modulus of elasticity): 0.145 *(kcf)*
Std Modulus of elasticity (Ec): 3150.39 *(ksi)*
LRFD Modulus of elasticity (Ec): 3617.02 *(ksi)*
Poisson's ratio: 0.200
Modulus of rupture: 0.416 *(ksi)*
Shear factor: 1.000
Composition of concrete: Normal
Std Initial modulus of elasticity (Eci): *(ksi)*
LRFD Initial modulus of elasticity (Eci): *(ksi)*
Splitting tensile strength (fct): *(ksi)*

Reinforcing Steel

Name: **Grade 40**
Description: 40 ksi reinforcing steel
Specified yield strength (Fy): 40.000 *(ksi)*
Modulus of elasticity (Es): 29000.00 *(ksi)*
Ultimate strength (Fu): 70.000 *(ksi)*
Type: Plain

Prestressing Strand

Name: **7/16" (7W-250) SR**
Description: Stress relieved 7/16"/Seven Wire/fpu = 250

Specified yield strength (Fy):	212.500 *(ksi)*
Ultimate Tensile strength (Fu):	250.000 *(ksi)*
Modulus of elasticity (Es):	28500.00 *(ksi)*
Load per unit length:	0.367 *(lb/ft)*
Cross sectional area (A):	0.108 *(in^2)*
Nominal diameter (d):	0.4375 *(in)*
Transfer length (Std):	21.8750 *(in)*
Transfer length (LRFD):	26.2500 *(in)*
Type:	Stress Relieved
Epoxy coated:	FALSE

No timber materials.

Beam Shapes

Steel Shapes

No steel shapes.

Prestressed Shapes

No prestressed I shapes.

Prestressed Box Shapes

Name: **17"x36" PSU**

Description: 17"x36" Prestressed Slab Unit for units E thru G

Type:	Circular Void
Nominal Depth:	17.0000 *(in)*
Depth (d):	17.0000 *(in)*
Top flange width:	35.0000 *(in)*
Bottom flange width:	36.0000 *(in)*
Three-void (D1, D2, D1) shape:	FALSE
Circular void diamater:	10.0000 *(in)*
Distance to CG of void(s) from bottom:	9.0000 *(in)*
Number of circular voids:	2
Center to center distance of voids:	16.0000 *(in)*
Vertical location of shear key:	2.0000 *(in)*
Shear key height:	6.0000 *(in)*
Shear key depth:	1.5000 *(in)*
Nominal load:	457.107 *(lb/ft)*
Cross sectional area:	438.822 *(in^2)*
Ixx:	13330.101 *(in^4)*
CG from bottom:	8.1667 *(in)*
Bottom Sxx:	1632.246 *(in^3)*
Top Sxx:	1509.078 *(in^3)*

Volume/Surface Ratio:	3.175	*(in)*
Half Depth Area for Positive Flexure:		*(in^2)*
Half Depth Area for Negative Flexure:		*(in^2)*
St. Venant's Torsional Constant:	14593.772	*(in^4)*

Strand Grid

Row Number	Number of Strands	Vertical Location *(in)*	Horizontal Spacing *(in)*
1	16	2.5000	2.0000
2	6	4.5000	2.0000
3	16	14.5000	2.0000

No prestressed U shapes.

No prestressed tee shapes.

Timber Shapes

No timber shapes.

Appurtenances

No concrete railings.

Railings

Name: **Conc Guardrail w/ metal Post and Rail**
Description: Conc. Post and beam guardrail with post and tube rail mounted

Effective Wind Height:	36.0000	*(in)*
Railing Load:	0.166	*(kip/ft)*
Distance From Edge to Centroid:	5.0000	*(in)*
Width:	10.0000	*(in)*

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states:	15.0	*(%)*
All other limit states:	33.0	*(%)*

Factors

Factors - LFD

Name: 2002 AASHTO Std. Specifications
Description: AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002

Load Factors

Load Group	Gamma	D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

<u>Resistance Factors</u>

Reinforced concrete:	
Flexure:	0.900
Reinforced concrete:	
Shear:	0.850
Prestressed concrete:	
Flexure:	1.000
Prestressed concrete:	
Shear:	0.900
Prestressed concrete:	
Flexure in Non-P/S Components:	0.900
Steel:	
Flexure:	1.000
Steel:	
Shear:	1.000
Steel:	
Bearing Stiffeners:	1.000

Name: 2002 AASHTO Std. Specifications(CD=0.90)

Description: AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002

<u>Load Factors</u>

Load Group	Gamma	D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

<u>Resistance Factors</u>

Reinforced concrete:	
Flexure:	0.810
Reinforced concrete:	
Shear:	0.765
Prestressed concrete:	
Flexure:	0.900
Prestressed concrete:	
Shear:	0.810
Prestressed concrete:	
Flexure in Non-P/S Components:	0.810

Steel:
 Flexure: 0.900
Steel:
 Shear: 0.900
Steel:
 Bearing Stiffeners: 0.900

Name: 2002 AASHTO Std. Specifications(CD=0.85)
Description: AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002

Load Factors

Load Group	Gamma D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

Resistance Factors
Reinforced concrete:
 Flexure: 0.765
Reinforced concrete:
 Shear: 0.723
Prestressed concrete:
 Flexure: 0.850
Prestressed concrete:
 Shear: 0.765
Prestressed concrete:
 Flexure in Non-P/S Components: 0.765
Steel:
 Flexure: 0.850
Steel:
 Shear: 0.850
Steel:
 Bearing Stiffeners: 0.850

No LRFD Factors specified.

Bridge Alternatives End Span 1 (or 3) - Bridge Alt.

Reference Line
Reference Line Length: *(ft)*
Starting Station: *(ft)*
Bearing: N 90^ 0' 0.00" E
Global Positioning
Distance: 0.000 *(ft)*

Offset: 0.000 *(ft)*
Elevation: *(ft)*

Structures
Name: Exist. EXT Span 1(or 3) SuperStr
Description:

Structure Alternatives
Name: Exist. END Span 1(or 3) Alt.
Description:
Superstructure Definition: End Span 1 (or 3) - PS Conc PSU

Bridge Alternatives INT Span 2 - Bridge Alt.

Reference Line
Reference Line Length: *(ft)*
Starting Station: *(ft)*
Bearing: N 90^ 0' 0.00" E
Global Positioning
Distance: 0.000 *(ft)*
Offset: 0.000 *(ft)*
Elevation: *(ft)*

Structures
Name: Exist. INT Span 2 Superstruct.
Description:

Structure Alternatives
Name: Exist. INT Span 2 Alt.
Description:
Superstructure Definition: INT Span 2 - PS Conc PSU

Superstructure Definition End Span 1 (or 3) - PS Conc PSU

Definition
Units: US Customary
Number of spans: 1
Number of girders: 11

Span	Length *(ft)*
1	28.2917

Frame Structure Simplified Definition:

Support	Frame Connection
1	
2	

Girder Spacing Display Type: Perpendicular

Average Humidity: 70.000 *(%)*

Analysis

Default Library Factors

Factor Override

Analysis Module

Analysis Method: ASD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LRFD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module:
Analysis Module Component:
Properties:

Default rating method: LFD

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*
All other limit states: 33.0 *(%)*

Structure Framing Plan Details

Layout

Support	Skew *(Degrees)*
1	0.0000
2	0.0000

Girder Spacing Orientation: Perpendicular

Girder Bay	Girder Spacing Start *(ft)*	End *(ft)*

1	3.0000	3.0000
2	3.0000	3.0000
3	3.0000	3.0000
4	3.0000	3.0000
5	3.0000	3.0000
6	3.0000	3.0000
7	3.0000	3.0000
8	3.0000	3.0000
9	3.0000	3.0000
10	3.0000	3.0000

Diaphragms

Girder Bay 1
Girder Bay 2
Girder Bay 3
Girder Bay 4
Girder Bay 5
Girder Bay 6
Girder Bay 7
Girder Bay 8
Girder Bay 9
Girder Bay 10

Structure Typical Section

Deck

Left start width: 18.00 *(ft)*
Left end width: 18.00 *(ft)*
Right start width: 15.00 *(ft)*
Right end width: 15.00 *(ft)*
Left start overhang: 1.50 *(ft)*
Left end overhang: 1.50 *(ft)*

Deck (Cont'd)

Deck concrete:
Total deck thickness: *(in)*
Deck crack control parameter: *(kip/in)*
Sustained modular ratio factor: 3.000

Railing

Name	Load Case	Measure To	Measured From	Distance At Start	Distance At End	Front Face Orientation
Conc Guar...	DC1 - R...		Left Ed...	0.00	0.00	Right
Conc Guar...	DC1 - R...		Right E...	0.00	0.00	Left

Sidewalk

Width	Thickness At End	Material	Load Case	Measure to	Measured From		At Start
60.0000	11.4375	Class A...	DC1 - C...		Left Ed...	0.00	...
24.0000	10.5630	Class A...	DC1 - C...		Right E...	0.00	...

Lane Position

Offset Left Start: -13.00 *(ft)*
Offset Left End: -13.00 *(ft)*

Offset Right Start: 0.00 *(ft)*
Offset Right End: 0.00 *(ft)*
Offset Left Start: 13.00 *(ft)*
Offset Left End: 13.00 *(ft)*
Offset Right Start: 0.00 *(ft)*
Offset Right End: 0.00 *(ft)*

Wearing Surface

Wearing surface material: Asphalt
Description: Asphalt Wearing Surface
Wearing surface thickness: 1.1670 *(in)*
Wearing surface density: 145.000 *(pcf)*
Load case: DW - A.W.S.

Load Case Description

Load Case Name	Description	Stage	Type	Time *(Days)*
DC1 - Railing	DC acting on non-comp...	Non-composite (Sta...	D,DC	
DC1 - Curb	DC acting on non-comp...	Non-composite (Sta...	D,DC	
DW - A.W.S.	DW acting on long-ter...	Composite (long te...	D,DW	

Superstructure Loads

DL Distribution

Stage 1 Dead Load Distribution: Tributary Area
Stage 2 Dead Load Distribution: Uniformly to All Girders

Stiffener Definitions

Stress Limits

Name: **PS Conc Stress Limits**
Description:
Concrete material: Class P (5000)
Initial allowable tension (LFD): 0.190 *(ksi)*
Initial allowable compression (LFD): 2.400 *(ksi)*
Final allowable slab compression (LFD): *(ksi)*
Final allowable tension (LFD): 0.425 *(ksi)*
Final allowable DL compression (LFD): 2.000 *(ksi)*
Final allowable compression (LFD): 3.000 *(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LFD): 2.000 *(ksi)*
Initial allowable tension (LRFD): 0.190 *(ksi)*
Initial allowable compression (LRFD): 2.600 *(ksi)*
Final allowable slab compression (LRFD): *(ksi)*
Final allowable tension (LRFD): 0.425 *(ksi)*
Final allowable DL compression (LRFD): 2.250 *(ksi)*
Final allowable compression (LRFD): 3.000 *(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LRFD): 2.000 *(ksi)*

Prestress Properties

Name: **PS Strands Properties**

General Pretress Data

Prestressing Strand:	7/16" (7W-250) SR
Loss Method:	AASHTO Approximate
Jacking stress ratio:	0.700
Transfer stress ratio:	
Transfer time:	24.0 *(Hours)*
AASHTO - Dead load percent:	0.0 *(%)*
<u>Loss Data - PCI</u>	
PCI - Maturity coefficient:	
PCI - Ultimate creep loss:	*(ksi)*
PCI - Ultimate shrinkage loss:	*(ksi)*
PCI - Additional time 1:	*(Days)*
PCI - Additional time 2:	*(Days)*
PCI - Additional time 3:	*(Days)*
PCI - Additional time 4:	*(Days)*
PCI - Additional time 5:	*(Days)*
PCI - Additional time 6:	*(Days)*
PCI - Additional time 7:	*(Days)*
PCI - Additional time 8:	*(Days)*
PCI - Additional time 9:	*(Days)*
PCI - Additional time 10:	*(Days)*
<u>Loss Data - Lump-sum</u>	
Lump-sum - Composite loss:	*(ksi)*
Lump-sum - Continuous loss:	*(ksi)*
Lump-sum - Final loss:	*(ksi)*

<u>Shear Reinforcement Definitions - Vertical</u>

Name: **#4 Bent Shear Reinf.**

Vertical Reinforcement:	Grade 40
Vertical Rebar:	4
Number of legs (Vertical):	3.00
Inclination angle alpha (Vertical):	90.0 *(Degrees)*

<u>Shear Reinforcement Definitions - Horizontal</u>

Name: **#3 - 2'-7" long**

Reinforcement (Horz. 1):	Grade 40
Rebar (Horz. 1):	3
Number of legs (Horz. 1):	1.00
Inclination angle alpha (Horz. 1):	90.0 *(Degrees)*
Reinforcement (Horz. 2):	
Rebar (Horz. 2):	
Number of legs (Horz. 2):	
Inclination angle alpha (Horz. 2):	90.0 *(Degrees)*

<u>Member</u> G1

Link with: None

Description:

Existing:	17"x36" EXT PSU -
Current:	17"x36" EXT PSU -

Number of Spans:	1

Span	Span Length
Number	*(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" EXT PSU

Description:

Description

Material Type:	Prestressed Concrete
Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	

Analysis Method:	LFD
Analysis Module:	AASHTO LFD

Analysis Module Component:
Properties:

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method: LRFR
LRFD shear computation method: General Procedure

<u>Factors</u>
Factor Override
LRFD:
LFD: 2002 AASHTO Std. Specifications(CD=0.85)
ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

<u>Default Materials</u>

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

<u>Impact</u>
Standard Impact Factor
Type: Standard - AASHTO
LRFD Dynamic Load Allowance

Fatigue and fracture limit states:	15.0	*(%)*
All other limit states:	33.0	*(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.100	0.100	0.100	0.100
Multi-Lane	0.100	0.100	0.100	0.100

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Deflectio...	0.100	0.100
0.00	28.292	Moment	0.100	0.100
0.00	28.292	Shear	0.100	0.100

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			
	Left						
	Right						
1		1	7	Straight/Debonded			
	Left						
	Right						
1		1	8	Straight/Debonded			
	Left						
	Right						
1		1	9	Straight/Debonded			
	Left						
	Right						
1		1	10	Straight/Debonded			
	Left						
	Right						
1		1	11	Straight/Debonded			

	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.62	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.62	1	8.0000	

#3 - 2'-7" long	1	27.29	4	6.0000

Member G2

Link with: None

Description:

Existing: 17"x36" INT PSU -

Current: 17"x36" INT PSU -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	
Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	
Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	
Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	
Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method: LRFR
LRFD shear computation method: General Procedure

<u>Factors</u>

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CD=0.85)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

<u>Default Materials</u>

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)

Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states:	15.0 *(%)*
All other limit states:	33.0 *(%)*

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.167	0.167	0.167	0.167
Multi-Lane	0.167	0.167	0.167	0.167

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Deflectio...	0.167	0.200
0.00	28.292	Moment	0.167	0.200
0.00	28.292	Shear	0.167	0.200

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time:	20.00 *(Days)*
Service life:	75.00 *(Years)*
Analysis time:	54.00 *(Years)*
Composite time:	60.00 *(Days)*
Continuous time:	45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance	Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			
	Left						
	Right						
1		1	7	Straight/Debonded			
	Left						
	Right						
1		1	8	Straight/Debonded			
	Left						

	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance	Spacing	No of Spaces	Thickness	Weight
	(ft)	*(ft)*		*(in)*	*(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.62	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.62	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G3

Link with: None
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type:	Prestressed Concrete
Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	

Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method:	LRFR
LRFD shear computation method:	General Procedure

Factors

Factor Override

LRFD:	
LFD:	2002 AASHTO Std. Specifications(CD=0.85)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		

Stirrup	
Timber	NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

Lanes Loaded	Distribution Factor (Wheels) Shear	Shear at Supports	Moment	Deflection
1 Lane	1.000	1.000	1.000	1.000
Multi-Lane	1.000	1.000	1.000	1.000

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Deflectio...	0.500	0.600
0.00	28.292	Moment	0.500	0.600
0.00	28.292	Shear	0.500	0.600

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape	Concrete Material	Prestress Properties	Left	Right

	Use Projection	n Creep		Projection	
				(in)	*(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL	Support Distance on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	0	-0.750	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance Count	Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	*(in)*	*(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						

1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck

		(ft)		(in)	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.62	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
		(ft)		(in)	(ft)
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.62	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G4

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length
	(ft)
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: (lb/ft)

Member G5

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length
	(ft)
1	28.291666

Support	Frame Connection

1
2

Pedestrian load: *(lb/ft)*

Member G6

Link with: G3
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G7

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G8

Link with: G9
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G9

Link with: None
Description:

Existing: 17"x36" INT PSU - w/ Post Tensioning -
Current: 17"x36" INT PSU - w/ Post Tensioning -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU - w/ Post Tensioning

Description:
<u>Description</u>

Material Type:	Prestressed Concrete
Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method: ASD
Analysis Module: AASHTO ASD
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module: AASHTO LFD
Analysis Module Component:
Properties:

Analysis Method: LRFD
Analysis Module: AASHTO LRFD
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module: AASHTO LRFR
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module: Legacy BrR Dist Fact
Analysis Module Component:
Properties:

Default rating method: LRFR
LRFD shear computation method: General Procedure

<u>Factors</u>

Factor Override

LRFD:
LFD: 2002 AASHTO Std. Specifications(CD=0.90)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		

Stirrup
Timber NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.533	0.000	0.533	0.182
Multi-Lane	0.533	0.000	0.533	0.364

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Moment	0.296	0.273
0.00	28.292	Shear	0.296	0.273
0.00	28.292	Deflectio...	0.109	0.182

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape	Concrete Material	Prestress Properties	Left	Right

	Use	n			
				Projection	
	Projection	Creep			
				(in) *(in)*	
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL	Support Distance on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	0	-0.750	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span	Material	Left Support Distance	Bar	Bar	Right Support Material		Distance
	Bar	Bar					
No.			Count	Size		Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	*(in)*	*(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						

1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck

		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.62	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.62	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G10

Link with: G9
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G11

Link with: G1
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support Frame Connection

1
2

Pedestrian load: *(lb/ft)*

Superstructure Definition INT Span 2 - PS Conc PSU

Definition

Units: US Customary
Number of spans: 1
Number of girders: 11

Span	Length *(ft)*
1	38.5000

Frame Structure Simplified Definition:

Support	Frame Connection
1	
2	

Girder Spacing Display Type: Perpendicular
Average Humidity: 70.000 *(%)*

Analysis

Default Library Factors
Factor Override
Analysis Module

Analysis Method: ASD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LRFD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module:
Analysis Module Component:
Properties:

Default rating method: LFD

Impact

Standard Impact Factor

Type:	Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states:	15.0 *(%)*
All other limit states:	33.0 *(%)*

Structure Framing Plan Details

Layout

Support	Skew *(Degrees)*
1	0.0000
2	0.0000

Girder Spacing Orientation: Perpendicular

Girder Bay	Girder Spacing Start *(ft)*	End *(ft)*
1	3.0000	3.0000
2	3.0000	3.0000
3	3.0000	3.0000
4	3.0000	3.0000
5	3.0000	3.0000
6	3.0000	3.0000
7	3.0000	3.0000
8	3.0000	3.0000
9	3.0000	3.0000
10	3.0000	3.0000

Diaphragms

Girder Bay 1

Girder Bay 2

Girder Bay 3

Girder Bay 4

Girder Bay 5

Girder Bay 6

Girder Bay 7

Girder Bay 8

Girder Bay 9

Girder Bay 10

Structure Typical Section

Deck

Left start width:	18.00 *(ft)*
Left end width:	18.00 *(ft)*
Right start width:	15.00 *(ft)*
Right end width:	15.00 *(ft)*
Left start overhang:	1.50 *(ft)*
Left end overhang:	1.50 *(ft)*

Deck (Cont'd)

Deck concrete:
Total deck thickness: *(in)*
Deck crack control parameter: *(kip/in)*
Sustained modular ratio factor: 3.000

Railing

Name	Load Case	Measure To	Measured From	Distance At Start	Distance At End	Front Face Orientation
Conc Guar...	DC1 - R...		Left Ed...	0.00	0.00	Right
Conc Guar...	DC1 - R...		Right E...	0.00	0.00	Left

Sidewalk

Width	Thickness At End	Material	Load Case	Measure to	Measured From		At Start
60.0000	11.4375	Class A...	DC1 - C...		Left Ed...	0.00	...
24.0000	10.5630	Class A...	DC1 - C...		Right E...	0.00	...

Lane Position

Offset Left Start: -13.00 *(ft)*
Offset Left End: -13.00 *(ft)*
Offset Right Start: 0.00 *(ft)*
Offset Right End: 0.00 *(ft)*
Offset Left Start: 13.00 *(ft)*
Offset Left End: 13.00 *(ft)*
Offset Right Start: 0.00 *(ft)*
Offset Right End: 0.00 *(ft)*

Wearing Surface

Wearing surface material: Asphalt
Description: Asphalt Wearing Surface
Wearing surface thickness: 1.1670 *(in)*
Wearing surface density: 145.000 *(pcf)*
Load case: DW - A.W.S.

Load Case Description

Load Case Name	Description	Stage	Type	Time *(Days)*
DC1 - Railing	DC acting on non-comp...	Non-composite (Sta...		D,DC
DC1 - Curb	DC acting on non-comp...	Non-composite (Sta...		D,DC
DW - A.W.S.	DW acting on long-ter...	Composite (long te...		D,DW

Superstructure Loads

DL Distribution

Stage 1 Dead Load Distribution: Tributary Area
Stage 2 Dead Load Distribution: Uniformly to All Girders

Stiffener Definitions

Stress Limits

Name: **PS Conc Stress Limits**
Description:

Concrete material:	Class P (5000)	
Initial allowable tension (LFD):	0.190	*(ksi)*
Initial allowable compression (LFD):	2.400	*(ksi)*
Final allowable slab compression (LFD):		*(ksi)*
Final allowable tension (LFD):	0.425	*(ksi)*
Final allowable DL compression (LFD):	2.000	*(ksi)*
Final allowable compression (LFD):	3.000	*(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LFD):	2.000	*(ksi)*
Initial allowable tension (LRFD):	0.190	*(ksi)*
Initial allowable compression (LRFD):	2.600	*(ksi)*
Final allowable slab compression (LRFD):		*(ksi)*
Final allowable tension (LRFD):	0.425	*(ksi)*
Final allowable DL compression (LRFD):	2.250	*(ksi)*
Final allowable compression (LRFD):	3.000	*(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LRFD):	2.000	*(ksi)*

<u>Prestress Properties</u>

Name: **PS Strands Properties**

<u>General Pretress Data</u>

Prestressing Strand:	7/16" (7W-250) SR	
Loss Method:	AASHTO Approximate	
Jacking stress ratio:	0.700	
Transfer stress ratio:		
Transfer time:	24.0	*(Hours)*
AASHTO - Dead load percent:	0.0	*(%)*

<u>Loss Data - PCI</u>

PCI - Maturity coefficient:		
PCI - Ultimate creep loss:		*(ksi)*
PCI - Ultimate shrinkage loss:		*(ksi)*
PCI - Additional time 1:		*(Days)*
PCI - Additional time 2:		*(Days)*
PCI - Additional time 3:		*(Days)*
PCI - Additional time 4:		*(Days)*
PCI - Additional time 5:		*(Days)*
PCI - Additional time 6:		*(Days)*
PCI - Additional time 7:		*(Days)*
PCI - Additional time 8:		*(Days)*
PCI - Additional time 9:		*(Days)*
PCI - Additional time 10:		*(Days)*

<u>Loss Data - Lump-sum</u>

Lump-sum - Composite loss:		*(ksi)*
Lump-sum - Continuous loss:		*(ksi)*
Lump-sum - Final loss:		*(ksi)*

<u>Shear Reinforcement Definitions - Vertical</u>

Name: **#4 Bent Shear Reinf.**

Vertical Reinforcement:	Grade 40
Vertical Rebar:	4
Number of legs (Vertical):	3.00

Inclination angle alpha (Vertical): 90.0 *(Degrees)*

Shear Reinforcement Definitions - Horizontal

Name: **#3 - 2'-7" long**

Reinforcement (Horz. 1):	Grade 40	
Rebar (Horz. 1):	3	
Number of legs (Horz. 1):	1.00	
Inclination angle alpha (Horz. 1):	90.0	*(Degrees)*
Reinforcement (Horz. 2):		
Rebar (Horz. 2):		
Number of legs (Horz. 2):		
Inclination angle alpha (Horz. 2):	90.0	*(Degrees)*

Member G1

Link with: None

Description:

Existing: 17"x36" EXT PSU -

Current: 17"x36" EXT PSU -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				

Member Alternative 17"x36" EXT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module: Legacy BrR Dist Fact

Analysis Module Component:

Properties:

Default rating method: LRFR

LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CD=0.90)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		

PS Moment Cap.	
Reinforcement	
Bearing Stiffener	
Stirrup	
Timber	NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

Lanes Loaded	Distribution Factor (Wheels) Shear	Shear at Supports	Moment	Deflection
1 Lane	0.100	0.100	0.100	0.100
Multi-Lane	0.100	0.100	0.100	0.100

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.100	0.100
0.00	38.500	Moment	0.100	0.100
0.00	38.500	Shear	0.100	0.100

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time:	20.00 *(Days)*
Service life:	75.00 *(Years)*
Analysis time:	54.00 *(Years)*
Composite time:	60.00 *(Days)*
Continuous time:	45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape	Concrete Material	Prestress Properties	Left	Right
	Use	n			
				Projection	
	Projection	Creep			
				(in)	*(in)*
1	17"x36" PSU	Class P (5000...	PS Strands Pr...	8.5000	8.5000
	TRUE	6.64...			

Continuous Support Details

Support Number	Support Distance on Left, SL	Support Distance on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span	Material	Left Support			Right Support		
		Distance	Bar	Bar	Material		Distance
	Bar	Bar					
No.			Count	Size		Count	Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	*(in)*	*(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						

1		1	3	Straight/Debonded
	Left			
	Right			
1		1	4	Straight/Debonded
	Left			
	Right			
1		1	5	Straight/Debonded
	Left			
	Right			
1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	12	Straight/Debonded
	Left			
	Right			
1		1	13	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		2	1	Straight/Debonded
	Left			
	Right			
1		2	2	Straight/Debonded
	Left			
	Right			
1		2	3	Straight/Debonded
	Left			

	Right			
1	Left Right	2	4	Straight/Debonded
1	Left Right	2	5	Straight/Debonded
1	Left Right	2	6	Straight/Debonded
1	Left Right	3	1	Straight/Debonded
1	Left Right	3	7	Straight/Debonded
1	Left Right	3	10	Straight/Debonded
1	Left Right	3	16	Straight/Debonded

Deck Profile

Interior Diaphragms

Span	Start Distance	Spacing	No of Spaces	Thickness	Weight
	(ft)	*(ft)*		*(in)*	*(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.96...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length

		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G2

Link with: None
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:
Description
Material Type: Prestressed Concrete

Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	

Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method:	LRFR
LRFD shear computation method:	General Procedure

<u>Factors</u>

Factor Override

LRFD:	
LFD:	2002 AASHTO Std. Specifications(CD=0.90)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.167	0.167	0.167	0.167
Multi-Lane	0.167	0.167	0.167	0.167

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.167	0.200
0.00	38.500	Moment	0.167	0.200
0.00	38.500	Shear	0.167	0.200

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection	Right

				(in)	*(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL	Support Distance on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type: Monolithic
Interface width: *(in)*
Deck cohesion factor: 0.400 *(ksi)*
Deck friction factor: 1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance Count	Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	*(in)*	*(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	4	Straight/Debonded			
	Left						
	Right						

1		1	5	Straight/Debonded
	Left			
	Right			
1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	12	Straight/Debonded
	Left			
	Right			
1		1	13	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		2	1	Straight/Debonded
	Left			
	Right			
1		2	2	Straight/Debonded
	Left			
	Right			
1		2	3	Straight/Debonded
	Left			
	Right			
1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			

	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance (ft)	Spacing (ft)	No of Spaces	Thickness (in)	Weight (kip)
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.95...	20.00	1	1.0000	0.1636
1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Composite Length (ft)
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G3

Link with: None
Description:

Existing:	17"x36" INT PSU - w/ Conc Repair Only -
Current:	17"x36" INT PSU - w/ Conc Repair Only -
Number of Spans:	1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU - w/ Conc Repair Only

Description:

Description

Material Type:	Prestressed Concrete
Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	

Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method: LRFR
LRFD shear computation method: General Procedure

<u>Factors</u>
Factor Override
LRFD:
LFD: 2002 AASHTO Std. Specifications(CD=0.90)
ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

<u>Default Materials</u>

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40

Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states:	15.0 *(%)*
All other limit states:	33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.000	1.000	1.000	1.000
Multi-Lane	1.000	1.000	1.000	1.000

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.500	0.600
0.00	38.500	Moment	0.500	0.600
0.00	38.500	Shear	0.500	0.600

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time:	20.00 *(Days)*
Service life:	75.00 *(Years)*
Analysis time:	54.00 *(Years)*
Composite time:	60.00 *(Days)*
Continuous time:	45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support	Support Distance	Support Distance

Number	on Left, SL	on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance Count	Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	*(in)*	*(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	4	Straight/Debonded			
	Left						
	Right						
1		1	5	Straight/Debonded			
	Left						
	Right						
1		1	12	Straight/Debonded			
	Left						
	Right						

1		1	13	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		2	1	Straight/Debonded
	Left			
	Right			
1		2	2	Straight/Debonded
	Left			
	Right			
1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			
	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance (ft)	Spacing (ft)	No of Spaces	Thickness (in)	Weight (kip)
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636

1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G4

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length
	(ft)
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G5

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G6

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G7

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G8

Link with: None

Description:

Existing:	17"x36" INT PSU -
Current:	17"x36" INT PSU -
Number of Spans:	1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type:	Prestressed Concrete
Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	

Properties:

Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method:	LRFR
LRFD shear computation method:	General Procedure

<u>Factors</u>

Factor Override

LRFD:	
LFD:	2002 AASHTO Std. Specifications(CD=0.85)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

<u>Default Materials</u>

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type:	Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states:	15.0 *(%)*
All other limit states:	33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.000	1.000	1.000	1.000
Multi-Lane	1.000	1.000	1.000	1.000

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.500	0.600
0.00	38.500	Moment	0.500	0.600
0.00	38.500	Shear	0.500	0.600

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time:	20.00 *(Days)*
Service life:	75.00 *(Years)*
Analysis time:	54.00 *(Years)*
Composite time:	60.00 *(Days)*
Continuous time:	45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		

2

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material	Left Support Distance	Bar Count	Bar Size	Right Support Material	Distance	Bar Count	Bar Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	4	Straight/Debonded			
	Left						
	Right						
1		1	5	Straight/Debonded			
	Left						
	Right						
1		1	12	Straight/Debonded			
	Left						
	Right						
1		1	13	Straight/Debonded			
	Left						
	Right						

1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		2	1	Straight/Debonded
	Left			
	Right			
1		2	2	Straight/Debonded
	Left			
	Right			
1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			
	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G9

Link with: G8
Description:

Existing: 17"x36" INT PSU - w/ Conc. Repair + Post Tensioning -
Current: 17"x36" INT PSU - w/ Conc. Repair + Post Tensioning -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G10

Link with: None
Description:

Existing: 17"x36" INT PSU - w/ Conc. Repair + Post Tensioning -
Current: 17"x36" INT PSU - w/ Conc. Repair + Post Tensioning -
Number of Spans: 1

Span Number	Span Length *(ft)*

1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU - w/ Conc. Repair + Post Tensioning

Description:

Description

Material Type: Prestressed Concrete
Girder Type: PS Precast Box
Member units: US Customary
Girder property input method: Schedule based
Additional Self Load: *(kip/ft)*
Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD
Analysis Module: AASHTO ASD
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module: AASHTO LFD
Analysis Module Component:
Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module: AASHTO LRFR
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module: Legacy BrR Dist Fact
Analysis Module Component:
Properties:

Default rating method: LRFR
LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:
LFD: 2002 AASHTO Std. Specifications(CD=0.90)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete: Class A (3000)
Deck reinforcement: Grade 40
Beam concrete: Class P (5000)
Beam reinforcement: Grade 40
Stirrup reinforcemt: Grade 40
Prestressing strand: 7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*
All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
	Distribution Factor (Wheels)			
1 Lane	0.527	0.000	0.527	0.182
Multi-Lane	0.527	0.000	0.527	0.364

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Moment	0.254	0.256
0.00	38.500	Shear	0.254	0.256
0.00	38.500	Deflectio...	0.109	0.182

Shrinkage/Time

Deck curing method: Moist-cured
Deck drying time: 3.000 *(Days)*
Consider deck differential shrinkage loads: FALSE
Beam Curing method: Steam-cured
Curing time: 20.00 *(Days)*
Service life: 75.00 *(Years)*
Analysis time: 54.00 *(Years)*
Composite time: 60.00 *(Days)*
Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape / Use / Projection	Concrete Material / n / Creep	Prestress Properties	Left Projection *(in)*	Right Projection *(in)*
1	17"x36" PSU / TRUE	Class P (5000... / 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material		Distance Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	4	Straight/Debonded			
	Left						
	Right						
1		1	5	Straight/Debonded			
	Left						
	Right						
1		1	12	Straight/Debonded			
	Left						
	Right						
1		1	13	Straight/Debonded			
	Left						
	Right						
1		1	14	Straight/Debonded			
	Left						
	Right						
1		1	15	Straight/Debonded			
	Left						
	Right						
1		1	16	Straight/Debonded			
	Left						

	Right			
1		2	1	Straight/Debonded
	Left			
	Right			
1		2	2	Straight/Debonded
	Left			
	Right			
1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			
	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance	Spacing	No of Spaces	Thickness	Weight
	(ft)	*(ft)*		*(in)*	*(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE

#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G11

Link with: G1

Description:

Existing:

Current:

Number of Spans: 1

Span Number	Span Length
	(ft)
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Username:	BrR
Date:	Wednesday, September 22, 2021 10:06:29

Bridge ID 874294 Matheson Hmck Bridge over Matheson Hammock Canal

NBI Structure ID (8): 874294
Description: Rating by YRA, from As-built plans, 9/14/2021

Three spans (30'-40'-30') non-composite PS Concrete voided slab unit superstructure comprised of eleven (11) 17"x36" units. Deck width is 35'-0" out-to-out with a 26'-0" clear roadway width. Wearing surface is present along the bridge with an average thickness of 1.167" along end spans 1 and 3, and 1.292" for interior span 2.
The load rating analysis for the prestressed voided slab units was initially performed using the Load and Resistance factor Rating methodology in accordance with the AASHTO LRFD Bridge Design Specifications (9th edition, 2020), the Manual for Bridge Evaluation (3rd edition with interims through 2019), and the FDOT Bridge Load Rating Manual (January 2021). However, the resulting design and legal rating factors were less than 1, which granted the need to evaluate the structure using the Load Factor Rating methodology.

Description

Location:	Matheson Hammock Park
Total Length:	100.33 *(ft)*
Facility Carried:	Matheson Hmk Road
Route Number:	00000
Feature Intersected:	Matheson Hammock Canal
Mi Post:	0.08 *(mi)*
Units:	US Customary
Year Built:	1967
Recent ADTT:	11
District:	District 6
County:	
Owner:	County Hwy Agency
National Highway System:	0 Not on NHS
Functional Class:	09 Rural Local
Global Reference Point	
X Coordinate:	0.000 *(ft)*
Y Coordinate:	0.000 *(ft)*
Elevation:	*(ft)*
Longitude:	80.26 *(Degrees)*
Latitude:	25.68 *(Degrees)*

Materials

No steel materials.

Concrete

Name:	**Class P (5000)**
Description:	Class 5000 cement concrete
Specified compressive strength at 28 days (f'c):	5.000 *(ksi)*

Initial specified compressive strength (f'ci): 4.000 *(ksi)*
Coefficient of thermal expansion: 0.0000060000 *(1/F)*
Density (for dead loads): 0.150 *(kcf)*
Density (for modulus of elasticity): 0.145 *(kcf)*
Std Modulus of elasticity (Ec): 4074.28 *(ksi)*
LRFD Modulus of elasticity (Ec): 4291.19 *(ksi)*
Poisson's ratio: 0.200
Modulus of rupture: 0.537 *(ksi)*
Shear factor: 1.000
Composition of concrete: Normal
Std Initial modulus of elasticity (Eci): 3644.15 *(ksi)*
LRFD Initial modulus of elasticity (Eci): 3986.55 *(ksi)*
Splitting tensile strength (fct): *(ksi)*

Name: **Class A (3000)**
Description: Class A cement concrete (3000 psi)
Specified compressive strength at 28 days (f'c): 3.000 *(ksi)*
Initial specified compressive strength (f'ci): *(ksi)*
Coefficient of thermal expansion: 0.0000060000 *(1/F)*
Density (for dead loads): 0.150 *(kcf)*
Density (for modulus of elasticity): 0.145 *(kcf)*
Std Modulus of elasticity (Ec): 3150.39 *(ksi)*
LRFD Modulus of elasticity (Ec): 3617.02 *(ksi)*
Poisson's ratio: 0.200
Modulus of rupture: 0.416 *(ksi)*
Shear factor: 1.000
Composition of concrete: Normal
Std Initial modulus of elasticity (Eci): *(ksi)*
LRFD Initial modulus of elasticity (Eci): *(ksi)*
Splitting tensile strength (fct): *(ksi)*

Reinforcing Steel

Name: **Grade 40**
Description: 40 ksi reinforcing steel
Specified yield strength (Fy): 40.000 *(ksi)*
Modulus of elasticity (Es): 29000.00 *(ksi)*
Ultimate strength (Fu): 70.000 *(ksi)*
Type: Plain

Prestressing Strand

Name: **7/16" (7W-250) SR**
Description: Stress relieved 7/16"/Seven Wire/fpu = 250
Specified yield strength (Fy): 212.500 *(ksi)*
Ultimate Tensile strength (Fu): 250.000 *(ksi)*
Modulus of elasticity (Es): 28500.00 *(ksi)*
Load per unit length: 0.367 *(lb/ft)*
Cross sectional area (A): 0.108 *(in^2)*
Nominal diameter (d): 0.4375 *(in)*
Transfer length (Std): 21.8750 *(in)*
Transfer length (LRFD): 26.2500 *(in)*

Type:	Stress Relieved
Epoxy coated:	FALSE

No timber materials.

Beam Shapes

Steel Shapes

No steel shapes.

Prestressed Shapes

No prestressed I shapes.

Prestressed Box Shapes

Name:	**17"x36" PSU**
Description:	17"x36" Prestressed Slab Unit for units E thru G
Type:	Circular Void
Nominal Depth:	17.0000 *(in)*
Depth (d):	17.0000 *(in)*
Top flange width:	35.0000 *(in)*
Bottom flange width:	36.0000 *(in)*
Three-void (D1, D2, D1) shape:	FALSE
Circular void diamater:	10.0000 *(in)*
Distance to CG of void(s) from bottom:	9.0000 *(in)*
Number of circular voids:	2
Center to center distance of voids:	16.0000 *(in)*
Vertical location of shear key:	2.0000 *(in)*
Shear key height:	6.0000 *(in)*
Shear key depth:	1.5000 *(in)*
Nominal load:	457.107 *(lb/ft)*
Cross sectional area:	438.822 *(in^2)*
Ixx:	13330.101 *(in^4)*
CG from bottom:	8.1667 *(in)*
Bottom Sxx:	1632.246 *(in^3)*
Top Sxx:	1509.078 *(in^3)*
Volume/Surface Ratio:	3.175 *(in)*
Half Depth Area for Positive Flexure:	*(in^2)*
Half Depth Area for Negative Flexure:	*(in^2)*
St. Venant's Torsional Constant:	14593.772 *(in^4)*

Strand Grid

Row Number	Number of Strands	Vertical Location *(in)*	Horizontal Spacing *(in)*
1	16	2.5000	2.0000

2	6	4.5000	2.0000
3	16	14.5000	2.0000

No prestressed U shapes.

No prestressed tee shapes.

Timber Shapes

No timber shapes.

Appurtenances

No concrete railings.

Railings

Name: **Conc Guardrail w/ metal Post and Rail**
Description: Conc. Post and beam guardrail with post and tube rail mounted
Effective Wind Height: 36.0000 *(in)*
Railing Load: 0.166 *(kip/ft)*
Distance From Edge to Centroid: 5.0000 *(in)*
Width: 10.0000 *(in)*

Impact

Standard Impact Factor
Type: Standard - AASHTO
LRFD Dynamic Load Allowance
Fatigue and fracture limit states: 15.0 *(%)*
All other limit states: 33.0 *(%)*

Factors

Factors - LFD

Name: 2002 AASHTO Std. Specifications
Description: AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002

Load Factors

Load Group	Gamma	D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

Resistance Factors

Reinforced concrete: Flexure:	0.900
Reinforced concrete: Shear:	0.850
Prestressed concrete: Flexure:	1.000
Prestressed concrete: Shear:	0.900
Prestressed concrete: Flexure in Non-P/S Components:	0.900
Steel: Flexure:	1.000
Steel: Shear:	1.000
Steel: Bearing Stiffeners:	1.000

Name: 2002 AASHTO Std. Specifications(CF=0.9)

Description: AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002

Load Factors

Load Group	Gamma	D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

Resistance Factors

Reinforced concrete: Flexure:	0.810
Reinforced concrete: Shear:	0.765
Prestressed concrete: Flexure:	0.900
Prestressed concrete: Shear:	0.810
Prestressed concrete: Flexure in Non-P/S Components:	0.810
Steel: Flexure:	0.900
Steel: Shear:	0.900
Steel: Bearing Stiffeners:	0.900

Name: 2002 AASHTO Std. Specifications(CF=0.95)

Description: AASHTO Standard Specifications for Highway Bridges, 17th Edition, 2002

Load Factors

Load Group	Gamma	D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

Resistance Factors

Reinforced concrete:
 Flexure: 0.855

Reinforced concrete:
 Shear: 0.807

Prestressed concrete:
 Flexure: 0.950

Prestressed concrete:
 Shear: 0.855

Prestressed concrete:
 Flexure in Non-P/S Components: 0.855

Steel:
 Flexure: 0.950

Steel:
 Shear: 0.950

Steel:
 Bearing Stiffeners: 0.950

Name: 2002 AASHTO Std. Specifications(CF=0.85)

Description: AASHTO Standard Specifications for Highway Bridges,
17th Edition, 2002

Load Factors

Load Group	Gamma	D	(L+I)n	(L+I)p	CF	E	B
Inventory	1.300	1.000	1.670	0.000	1.000	1.000	1.000
Operating	1.300	1.000	1.000	0.000	1.000	1.000	1.000

Load Group	SF	W	WL	LF	R+S+T	EQ	ICE
Inventory	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Operating	1.000	0.000	0.000	0.000	0.000	0.000	0.000

Resistance Factors

Reinforced concrete:
 Flexure: 0.765

Reinforced concrete:
 Shear: 0.723

Prestressed concrete:
 Flexure: 0.850

Prestressed concrete:

Shear: 0.765
Prestressed concrete:
Flexure in Non-P/S Components: 0.765
Steel:
Flexure: 0.850
Steel:
Shear: 0.850
Steel:
Bearing Stiffeners: 0.850

No LRFD Factors specified.

Bridge Alternatives End Span 1 (or 3) - Bridge Alt.

Reference Line
Reference Line Length: *(ft)*
Starting Station: *(ft)*
Bearing: N 90^ 0' 0.00" E
Global Positioning
Distance: 0.000 *(ft)*
Offset: 0.000 *(ft)*
Elevation: *(ft)*

Structures
Name: Exist. EXT Span 1(or 3) SuperStr
Description:

Structure Alternatives
Name: Exist. END Span 1(or 3) Alt.
Description:
Superstructure Definition: End Span 1 (or 3) - PS Conc PSU

Bridge Alternatives INT Span 2 - Bridge Alt.

Reference Line
Reference Line Length: *(ft)*
Starting Station: *(ft)*
Bearing: N 90^ 0' 0.00" E
Global Positioning
Distance: 0.000 *(ft)*
Offset: 0.000 *(ft)*
Elevation: *(ft)*

Structures
Name: Exist. INT Span 2 Superstruct.

Description:

Structure Alternatives
Name: Exist. INT Span 2 Alt.
Description:
Superstructure Definition: INT Span 2 - PS Conc PSU

Superstructure Definition End Span 1 (or 3) - PS Conc PSU

Definition
Units: US Customary
Number of spans: 1
Number of girders: 11

Span	Length *(ft)*
1	28.2917

Frame Structure Simplified Definition:

Support	Frame Connection
1	
2	

Girder Spacing Display Type: Perpendicular
Average Humidity: 70.000 *(%)*
Analysis
Default Library Factors
Factor Override
Analysis Module
Analysis Method: ASD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LRFD
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module:

Analysis Module Component:
Properties:

Default rating method: LFD

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Structure Framing Plan Details

Layout

Support	Skew *(Degrees)*
1	0.0000
2	0.0000

Girder Spacing Orientation: Perpendicular

Girder Bay	Girder Spacing Start *(ft)*	End *(ft)*
1	3.0000	3.0000
2	3.0000	3.0000
3	3.0000	3.0000
4	3.0000	3.0000
5	3.0000	3.0000
6	3.0000	3.0000
7	3.0000	3.0000
8	3.0000	3.0000
9	3.0000	3.0000
10	3.0000	3.0000

Diaphragms

Girder Bay 1
Girder Bay 2
Girder Bay 3
Girder Bay 4
Girder Bay 5
Girder Bay 6
Girder Bay 7
Girder Bay 8
Girder Bay 9
Girder Bay 10

Structure Typical Section

Deck

Left start width: 18.00 *(ft)*

Left end width: 18.00 *(ft)*

Right start width: 15.00 *(ft)*
Right end width: 15.00 *(ft)*
Left start overhang: 1.50 *(ft)*
Left end overhang: 1.50 *(ft)*

Deck (Cont'd)
Deck concrete:
Total deck thickness: *(in)*
Deck crack control parameter: *(kip/in)*
Sustained modular ratio factor: 3.000
Railing

Name	Load Case	Measure To	Measured From	Distance At Start	Distance At End	Front Face Orientation
Conc Guar...	DC1 - R...		Left Ed...	0.00	0.00	Right
Conc Guar...	DC1 - R...		Right E...	0.00	0.00	Left

Sidewalk

Width	Thickness At End	Material	Load Case	Measure to	Measured From		At Start
60.0000	11.4375	Class A...	DC1 - C...		Left Ed...	0.00	...
24.0000	10.5630	Class A...	DC1 - C...		Right E...	0.00	...

Lane Position
Offset Left Start: -13.00 *(ft)*
Offset Left End: -13.00 *(ft)*
Offset Right Start: 0.00 *(ft)*
Offset Right End: 0.00 *(ft)*
Offset Left Start: 13.00 *(ft)*
Offset Left End: 13.00 *(ft)*
Offset Right Start: 0.00 *(ft)*
Offset Right End: 0.00 *(ft)*
Wearing Surface
Wearing surface material: Asphalt
Description: Asphalt Wearing Surface
Wearing surface thickness: 1.1670 *(in)*
Wearing surface density: 145.000 *(pcf)*
Load case: DW - A.W.S.

Load Case Description

Load Case Name	Description	Stage	Type	Time *(Days)*
DC1 - Railing	DC acting on non-comp...	Non-composite (Sta...	D,DC	
DC1 - Curb	DC acting on non-comp...	Non-composite (Sta...	D,DC	
DW - A.W.S.	DW acting on long-ter...	Composite (long te...	D,DW	

Superstructure Loads
DL Distribution
Stage 1 Dead Load Distribution: Tributary Area
Stage 2 Dead Load Distribution: Uniformly to All Girders

Stiffener Definitions

Stress Limits

Name: **PS Conc Stress Limits**
Description:
Concrete material: Class P (5000)
Initial allowable tension (LFD): 0.190 *(ksi)*
Initial allowable compression (LFD): 2.400 *(ksi)*
Final allowable slab compression (LFD): *(ksi)*
Final allowable tension (LFD): 0.425 *(ksi)*
Final allowable DL compression (LFD): 2.000 *(ksi)*
Final allowable compression (LFD): 3.000 *(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LFD):2.000 *(ksi)*
Initial allowable tension (LRFD): 0.190 *(ksi)*
Initial allowable compression (LRFD): 2.600 *(ksi)*
Final allowable slab compression (LRFD): *(ksi)*
Final allowable tension (LRFD): 0.425 *(ksi)*
Final allowable DL compression (LRFD): 2.250 *(ksi)*
Final allowable compression (LRFD): 3.000 *(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LRFD): 2.000 *(ksi)*

Prestress Properties

Name: **PS Strands Properties**
General Pretress Data
Prestressing Strand: 7/16" (7W-250) SR
Loss Method: AASHTO Approximate
Jacking stress ratio: 0.700
Transfer stress ratio:
Transfer time: 24.0 *(Hours)*
AASHTO - Dead load percent: 0.0 *(%)*
Loss Data - PCI
PCI - Maturity coefficient:
PCI - Ultimate creep loss: *(ksi)*
PCI - Ultimate shrinkage loss: *(ksi)*
PCI - Additional time 1: *(Days)*
PCI - Additional time 2: *(Days)*
PCI - Additional time 3: *(Days)*
PCI - Additional time 4: *(Days)*
PCI - Additional time 5: *(Days)*
PCI - Additional time 6: *(Days)*
PCI - Additional time 7: *(Days)*
PCI - Additional time 8: *(Days)*
PCI - Additional time 9: *(Days)*
PCI - Additional time 10: *(Days)*
Loss Data - Lump-sum
Lump-sum - Composite loss: *(ksi)*
Lump-sum - Continuous loss: *(ksi)*
Lump-sum - Final loss: *(ksi)*

Shear Reinforcement Definitions - Vertical

Name: **#4 Bent Shear Reinf.**

Vertical Reinforcement:	Grade 40
Vertical Rebar:	4
Number of legs (Vertical):	3.00
Inclination angle alpha (Vertical):	90.0 *(Degrees)*

Shear Reinforcement Definitions - Horizontal

Name: **#3 - 2'-7" long**

Reinforcement (Horz. 1):	Grade 40
Rebar (Horz. 1):	3
Number of legs (Horz. 1):	1.00
Inclination angle alpha (Horz. 1):	90.0 *(Degrees)*
Reinforcement (Horz. 2):	
Rebar (Horz. 2):	
Number of legs (Horz. 2):	
Inclination angle alpha (Horz. 2):	90.0 *(Degrees)*

Member G1

Link with: None

Description:

Existing: 17"x36" EXT PSU -

Current: 17"x36" EXT PSU -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" EXT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module: Legacy BrR Dist Fact

Analysis Module Component:

Properties:

Default rating method: LRFR

LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

	Inventory	Operating
Structural steel		

Concrete	
PS Concrete Comp.	
PS Concrete Tens.	
PS Moment Cap.	
Reinforcement	
Bearing Stiffener	
Stirrup	
Timber	NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

Lanes Loaded	Distribution Factor (Wheels) Shear	Shear at Supports	Moment	Deflection
1 Lane	0.010	0.010	0.010	0.010
Multi-Lane	0.010	0.010	0.010	0.010

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Deflectio...	0.010	0.010
0.00	28.292	Moment	0.010	0.010
0.00	28.292	Shear	0.010	0.010

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection (in)	Right (in)
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL (in)	Support Distance on Right, SR (in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance (ft)	Length (ft)
PS Conc Stress Lim...	1	0.000	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	(in)
Deck cohesion factor:	0.400 (ksi)
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance (ft)	Debond Distance (in)	Harp Curvature (in)
1		1	1	Straight/Debonded			
	Left						
	Right						

1		1	2	Straight/Debonded
	Left			
	Right			
1		1	3	Straight/Debonded
	Left			
	Right			
1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance (ft)	Spacing (ft)	No of Spaces	Thickness (in)	Weight (kip)
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636

1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.63	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Composite Length (ft)
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.63	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G2

Link with: None
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length (ft)
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal (in)	Vertical (in)	Rotational (Radians)	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module: Legacy BrR Dist Fact

Analysis Module Component:

Properties:

Default rating method: LRFR

LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.167	0.017	0.017	0.017
Multi-Lane	0.167	0.017	0.017	0.017

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Deflectio...	0.167	0.200
0.00	28.292	Moment	0.167	0.200
0.00	28.292	Shear	0.167	0.200

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*
Consider deck differential shrinkage loads: FALSE
Beam Curing method: Steam-cured
Curing time: 20.00 *(Days)*
Service life: 75.00 *(Years)*
Analysis time: 54.00 *(Years)*
Composite time: 60.00 *(Days)*
Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)* *(in)*	Right
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	29.50

Slab Interface

Deck interface type: Monolithic
Interface width: *(in)*
Deck cohesion factor: 0.400 *(ksi)*
Deck friction factor: 1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	 Count	Distance Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			
	Left						
	Right						
1		1	7	Straight/Debonded			
	Left						
	Right						
1		1	8	Straight/Debonded			
	Left						
	Right						
1		1	9	Straight/Debonded			
	Left						
	Right						
1		1	10	Straight/Debonded			
	Left						
	Right						
1		1	11	Straight/Debonded			
	Left						
	Right						
1		1	14	Straight/Debonded			
	Left						
	Right						
1		1	15	Straight/Debonded			
	Left						
	Right						
1		1	16	Straight/Debonded			
	Left						
	Right						
1		3	1	Straight/Debonded			
	Left						
	Right						
1		3	16	Straight/Debonded			
	Left						
	Right						

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.63	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.63	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G3

Link with: None
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors
Analysis Module: Legacy BrR Dist Fact
Analysis Module Component:
Properties:

Default rating method: LRFR
LRFD shear computation method: General Procedure

Factors
Factor Override
LRFD:
LFD: 2002 AASHTO Std. Specifications(CF=0.9)
ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete: Class A (3000)
Deck reinforcement: Grade 40
Beam concrete: Class P (5000)
Beam reinforcement: Grade 40
Stirrup reinforcemt: Grade 40
Prestressing strand: 7/16" (7W-250) SR

Impact

Standard Impact Factor
Type: Standard - AASHTO
LRFD Dynamic Load Allowance
Fatigue and fracture limit states: 15.0 *(%)*
All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.000	1.000	1.000	1.000
Multi-Lane	1.000	1.000	1.000	1.000

LRFD

Distance	Length	Type	1 Lane	Multi-Lane
(ft)	*(ft)*			
0.00	28.292	Moment	0.500	0.600
0.00	28.292	Shear	0.500	0.600
0.00	28.292	Deflectio...	0.500	0.600

Shrinkage/Time

Deck curing method: Moist-cured
Deck drying time: 3.000 *(Days)*
Consider deck differential shrinkage loads: FALSE
Beam Curing method: Steam-cured
Curing time: 20.00 *(Days)*
Service life: 75.00 *(Years)*
Analysis time: 54.00 *(Years)*
Composite time: 60.00 *(Days)*
Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL	Support Distance on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	0	-0.750	29.50

Slab Interface

Deck interface type: Monolithic
Interface width: *(in)*
Deck cohesion factor: 0.400 *(ksi)*
Deck friction factor: 1.400

Continuity Diaphragm

	Left Support	Right Support

Span No.	Material Bar	Distance Bar	Bar Count	Bar Size	Material	Distance Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			
	Left						
	Right						
1		1	7	Straight/Debonded			
	Left						
	Right						
1		1	8	Straight/Debonded			
	Left						
	Right						
1		1	9	Straight/Debonded			
	Left						
	Right						
1		1	10	Straight/Debonded			
	Left						
	Right						
1		1	11	Straight/Debonded			
	Left						
	Right						
1		1	14	Straight/Debonded			
	Left						
	Right						
1		1	15	Straight/Debonded			
	Left						
	Right						
1		1	16	Straight/Debonded			
	Left						
	Right						
1		3	1	Straight/Debonded			

	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance	Spacing	No of Spaces	Thickness	Weight
	(ft)	*(ft)*		*(in)*	*(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.63	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.63	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G4

Link with: G3

Description:

Existing:

Current:

Number of Spans: 1

Span	Span Length

Number *(ft)*
1 28.291666

Support Frame Connection
1
2

Pedestrian load: *(lb/ft)*

Member G5

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G6

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G7

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G8

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G9

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G10

Link with: None

Description:

Existing: 17"x36" INT PSU - (w/ Post Tensioning) -

Current: 17"x36" INT PSU - (w/ Post Tensioning) -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU - (w/ Post Tensioning)

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	

Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method: LRFR
LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40

Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.533	0.000	0.533	0.182
Multi-Lane	0.533	0.000	0.533	0.364

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Moment	0.296	0.273
0.00	28.292	Shear	0.296	0.273
0.00	28.292	Deflectio...	0.109	0.182

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support	Support Distance	Support Distance

Number	on Left, SL	on Right, SR
	(in)	*(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	*(ft)*
PS Conc Stress Lim...	0	-0.750	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span	Material	Left Support Distance	Bar	Bar	Right Support Material	Distance	
	Bar	Bar					
No.			Count	Size		Count	Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	*(in)*	*(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			
	Left						
	Right						
1		1	7	Straight/Debonded			
	Left						
	Right						
1		1	8	Straight/Debonded			
	Left						
	Right						

1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance	Spacing	No of Spaces	Thickness	Weight
	(ft)	*(ft)*		*(in)*	*(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.63	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.63	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Member G11

Link with: None

Description:

Existing: 17"x36" EXT PSU (w/ Post Tensioning) -

Current: 17"x36" EXT PSU (w/ Post Tensioning) -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	28.291666

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" EXT PSU (w/ Post Tensioning)

Description:

Description

Material Type:	Prestressed Concrete
Girder Type:	PS Precast Box
Member units:	US Customary
Girder property input method:	Schedule based
Additional Self Load:	*(kip/ft)*
Additional Self Load %:	1.0 *(%)*

Analysis Module

Analysis Method:	ASD
Analysis Module:	AASHTO ASD
Analysis Module Component:	
Properties:	

Analysis Method:	LFD
Analysis Module:	AASHTO LFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFD
Analysis Module:	AASHTO LRFD
Analysis Module Component:	
Properties:	

Analysis Method:	LRFR
Analysis Module:	AASHTO LRFR
Analysis Module Component:	
Properties:	

Analysis Method:	Distribution Factors
Analysis Module:	Legacy BrR Dist Fact
Analysis Module Component:	
Properties:	

Default rating method:	LRFR
LRFD shear computation method:	General Procedure

Factors

Factor Override

LRFD:	
LFD:	2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		

Timber	NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.100	0.100	0.100	0.100
Multi-Lane	0.100	0.100	0.100	0.100

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	28.292	Deflectio...	0.100	0.100
0.00	28.292	Moment	0.100	0.100
0.00	28.292	Shear	0.100	0.100

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use	Concrete Material n	Prestress Properties	Left	Right

	Projection	Creep		Projection	
				(in) (in)	
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	6.0000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL	Support Distance on Right, SR
	(in)	(in)
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance	Length
		(ft)	(ft)
PS Conc Stress Lim...	1	0.000	29.50

Slab Interface

Deck interface type:	Monolithic
Interface width:	(in)
Deck cohesion factor:	0.400 (ksi)
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Count	Distance Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance	Debond Distance	Harp Curvature
					(ft)	(in)	(in)
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			

	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	6.25	1	1.0000	0.1636
1	7.25...	15.00	1	1.0000	0.1636
1	22.25...	6.25	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Extends into Deck

#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	8.0000	FALSE
#4 Bent Shear R...	1	2.88	19	15.0000	FALSE
#4 Bent Shear R...	1	26.62	1	8.0000	FALSE
#4 Bent Shear R...	1	27.29	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	8.0000	
#3 - 2'-7" long	1	2.88	19	15.0000	
#3 - 2'-7" long	1	26.62	1	8.0000	
#3 - 2'-7" long	1	27.29	4	6.0000	

Superstructure Definition INT Span 2 - PS Conc PSU

Definition

Units: US Customary

Number of spans: 1

Number of girders: 11

Span	Length *(ft)*
1	38.5000

Frame Structure Simplified Definition:

Support	Frame Connection
1	
2	

Girder Spacing Display Type: Perpendicular

Average Humidity: 70.000 *(%)*

Analysis

Default Library Factors

Factor Override

Analysis Module

Analysis Method: ASD

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module:

Analysis Module Component:

Properties:

Analysis Method: LRFR
Analysis Module:
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module:
Analysis Module Component:
Properties:

Default rating method: LFD

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*
All other limit states: 33.0 *(%)*

Structure Framing Plan Details

Layout

Support	Skew *(Degrees)*
1	0.0000
2	0.0000

Girder Spacing Orientation: Perpendicular

Girder Bay	Girder Spacing Start *(ft)*	End *(ft)*
1	3.0000	3.0000
2	3.0000	3.0000
3	3.0000	3.0000
4	3.0000	3.0000
5	3.0000	3.0000
6	3.0000	3.0000
7	3.0000	3.0000
8	3.0000	3.0000
9	3.0000	3.0000
10	3.0000	3.0000

Diaphragms

Girder Bay 1
Girder Bay 2
Girder Bay 3
Girder Bay 4
Girder Bay 5
Girder Bay 6
Girder Bay 7

Girder Bay 8
Girder Bay 9
Girder Bay 10

Structure Typical Section

Deck

Left start width:	18.00 *(ft)*
Left end width:	18.00 *(ft)*
Right start width:	15.00 *(ft)*
Right end width:	15.00 *(ft)*
Left start overhang:	1.50 *(ft)*
Left end overhang:	1.50 *(ft)*

Deck (Cont'd)

Deck concrete:	
Total deck thickness:	*(in)*
Deck crack control parameter:	*(kip/in)*
Sustained modular ratio factor:	3.000

Railing

Name	Load Case	Measure To	Measured From	Distance At Start	Distance At End	Front Face Orientation
Conc Guar...	DC1 - R...		Left Ed...	0.00	0.00	Right
Conc Guar...	DC1 - R...		Right E...	0.00	0.00	Left

Sidewalk

Width	Thickness At End	Material	Load Case	Measure to	Measured From		At Start
60.0000	11.4375	Class A...	DC1 - C...		Left Ed...	0.00	...
24.0000	10.5630	Class A...	DC1 - C...		Right E...	0.00	...

Lane Position

Offset Left Start:	-13.00 *(ft)*
Offset Left End:	-13.00 *(ft)*
Offset Right Start:	0.00 *(ft)*
Offset Right End:	0.00 *(ft)*
Offset Left Start:	13.00 *(ft)*
Offset Left End:	13.00 *(ft)*
Offset Right Start:	0.00 *(ft)*
Offset Right End:	0.00 *(ft)*

Wearing Surface

Wearing surface material:	Asphalt
Description:	Asphalt Wearing Surface
Wearing surface thickness:	1.1670 *(in)*
Wearing surface density:	145.000 *(pcf)*
Load case:	DW - A.W.S.

Load Case Description

Load Case Name	Description	Stage	Type	Time *(Days)*
DC1 - Railing	DC acting on non-comp...	Non-composite (Sta...	D,DC	
DC1 - Curb	DC acting on non-comp...	Non-composite (Sta...	D,DC	
DW - A.W.S.	DW acting on long-ter...	Composite (long te...	D,DW	

Superstructure Loads

DL Distribution

Stage 1 Dead Load Distribution: Tributary Area

Stage 2 Dead Load Distribution: Uniformly to All Girders

Stiffener Definitions

Stress Limits

Name:	**PS Conc Stress Limits**	
Description:		
Concrete material:	Class P (5000)	
Initial allowable tension (LFD):	0.190	*(ksi)*
Initial allowable compression (LFD):	2.400	*(ksi)*
Final allowable slab compression (LFD):		*(ksi)*
Final allowable tension (LFD):	0.425	*(ksi)*
Final allowable DL compression (LFD):	2.000	*(ksi)*
Final allowable compression (LFD):	3.000	*(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LFD):	2.000	*(ksi)*
Initial allowable tension (LRFD):	0.190	*(ksi)*
Initial allowable compression (LRFD):	2.600	*(ksi)*
Final allowable slab compression (LRFD):		*(ksi)*
Final allowable tension (LRFD):	0.425	*(ksi)*
Final allowable DL compression (LRFD):	2.250	*(ksi)*
Final allowable compression (LRFD):	3.000	*(ksi)*
Final allowable compression (LL + 1/2(Pe+DL)) (LRFD):	2.000	*(ksi)*

Prestress Properties

Name: **PS Strands Properties**

General Pretress Data

Prestressing Strand:	7/16" (7W-250) SR	
Loss Method:	AASHTO Approximate	
Jacking stress ratio:	0.700	
Transfer stress ratio:		
Transfer time:	24.0	*(Hours)*
AASHTO - Dead load percent:	0.0	*(%)*

Loss Data - PCI

PCI - Maturity coefficient:		
PCI - Ultimate creep loss:		*(ksi)*
PCI - Ultimate shrinkage loss:		*(ksi)*
PCI - Additional time 1:		*(Days)*
PCI - Additional time 2:		*(Days)*
PCI - Additional time 3:		*(Days)*
PCI - Additional time 4:		*(Days)*
PCI - Additional time 5:		*(Days)*
PCI - Additional time 6:		*(Days)*
PCI - Additional time 7:		*(Days)*
PCI - Additional time 8:		*(Days)*
PCI - Additional time 9:		*(Days)*

PCI - Additional time 10: *(Days)*

Loss Data - Lump-sum

Lump-sum - Composite loss: *(ksi)*

Lump-sum - Continuous loss: *(ksi)*

Lump-sum - Final loss: *(ksi)*

Shear Reinforcement Definitions - Vertical

Name:	**#4 Bent Shear Reinf.**
Vertical Reinforcement:	Grade 40
Vertical Rebar:	4
Number of legs (Vertical):	3.00
Inclination angle alpha (Vertical):	90.0 *(Degrees)*

Shear Reinforcement Definitions - Horizontal

Name:	**#3 - 2'-7" long**
Reinforcement (Horz. 1):	Grade 40
Rebar (Horz. 1):	3
Number of legs (Horz. 1):	1.00
Inclination angle alpha (Horz. 1):	90.0 *(Degrees)*
Reinforcement (Horz. 2):	
Rebar (Horz. 2):	
Number of legs (Horz. 2):	
Inclination angle alpha (Horz. 2):	90.0 *(Degrees)*

Member G1

Link with: None

Description:

Existing: 17"x36" EXT PSU -

Current: 17"x36" EXT PSU -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" EXT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module: Legacy BrR Dist Fact

Analysis Module Component:

Properties:

Default rating method: LRFR

LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD:

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.100	0.100	0.100	0.100
Multi-Lane	0.100	0.100	0.100	0.100

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.100	0.100
0.00	38.500	Moment	0.100	0.100
0.00	38.500	Shear	0.100	0.100

Shrinkage/Time

Deck curing method: Moist-cured
Deck drying time: 3.000 *(Days)*
Consider deck differential shrinkage loads: FALSE
Beam Curing method: Steam-cured
Curing time: 20.00 *(Days)*
Service life: 75.00 *(Years)*
Analysis time: 54.00 *(Years)*
Composite time: 60.00 *(Days)*
Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type: Monolithic
Interface width: *(in)*
Deck cohesion factor: 0.400 *(ksi)*
Deck friction factor: 1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Distance Count	Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			
	Left						
	Right						
1		1	4	Straight/Debonded			
	Left						
	Right						
1		1	5	Straight/Debonded			
	Left						
	Right						
1		1	6	Straight/Debonded			
	Left						
	Right						
1		1	7	Straight/Debonded			
	Left						
	Right						
1		1	8	Straight/Debonded			
	Left						
	Right						
1		1	9	Straight/Debonded			
	Left						
	Right						
1		1	10	Straight/Debonded			
	Left						
	Right						
1		1	11	Straight/Debonded			
	Left						
	Right						
1		1	12	Straight/Debonded			
	Left						
	Right						
1		1	13	Straight/Debonded			
	Left						
	Right						
1		1	14	Straight/Debonded			
	Left						
	Right						
1		1	15	Straight/Debonded			
	Left						

	Right			
1	Left Right	1	16	Straight/Debonded
1	Left Right	2	1	Straight/Debonded
1	Left Right	2	2	Straight/Debonded
1	Left Right	2	3	Straight/Debonded
1	Left Right	2	4	Straight/Debonded
1	Left Right	2	5	Straight/Debonded
1	Left Right	2	6	Straight/Debonded
1	Left Right	3	1	Straight/Debonded
1	Left Right	3	7	Straight/Debonded
1	Left Right	3	10	Straight/Debonded
1	Left Right	3	16	Straight/Debonded

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.96...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear	Span	Start	Number	Spacing	Extends into

Reinforcement	No	Distance	Spaces		Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length
		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G2

Link with: None
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free

2	Roller	Free	Fixed	Free

Elastic Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type: Prestressed Concrete
Girder Type: PS Precast Box
Member units: US Customary
Girder property input method: Schedule based
Additional Self Load: *(kip/ft)*
Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD
Analysis Module: AASHTO ASD
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module: AASHTO LFD
Analysis Module Component:
Properties:

Analysis Method: LRFD
Analysis Module: AASHTO LRFD
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module: AASHTO LRFR
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module: Legacy BrR Dist Fact
Analysis Module Component:
Properties:

Default rating method: LRFR
LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:
LFD:

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		
Reinforcement		
Bearing Stiffener		
Stirrup		
Timber	NA	

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.167	0.167	0.167	0.167
Multi-Lane	0.167	0.167	0.167	0.167

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.167	0.200
0.00	38.500	Moment	0.167	0.200
0.00	38.500	Shear	0.167	0.200

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*
Composite time: 60.00 *(Days)*
Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type: Monolithic
Interface width: *(in)*
Deck cohesion factor: 0.400 *(ksi)*
Deck friction factor: 1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Count	Distance Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*

1		1	1	Straight/Debonded
	Left			
	Right			
1		1	2	Straight/Debonded
	Left			
	Right			
1		1	3	Straight/Debonded
	Left			
	Right			
1		1	4	Straight/Debonded
	Left			
	Right			
1		1	5	Straight/Debonded
	Left			
	Right			
1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	12	Straight/Debonded
	Left			
	Right			
1		1	13	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		2	1	Straight/Debonded
	Left			

	Right			
1		2	2	Straight/Debonded
	Left Right			
1		2	3	Straight/Debonded
	Left Right			
1		2	4	Straight/Debonded
	Left Right			
1		2	5	Straight/Debonded
	Left Right			
1		2	6	Straight/Debonded
	Left Right			
1		3	1	Straight/Debonded
	Left Right			
1		3	7	Straight/Debonded
	Left Right			
1		3	10	Straight/Debonded
	Left Right			
1		3	16	Straight/Debonded
	Left Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.95...	20.00	1	1.0000	0.1636
1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE

#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G3

Link with: None
Description:

Existing: 17"x36" INT PSU -
Current: 17"x36" INT PSU -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				

Member Alternative 17"x36" INT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module: Legacy BrR Dist Fact

Analysis Module Component:

Properties:

Default rating method: LRFR

LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		

PS Moment Cap.
Reinforcement
Bearing Stiffener
Stirrup
Timber NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	1.000	1.000	1.000	1.000
Multi-Lane	1.000	1.000	1.000	1.000

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.500	0.600
0.00	38.500	Moment	0.500	0.600
0.00	38.500	Shear	0.500	0.600

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time: 20.00 *(Days)*

Service life: 75.00 *(Years)*

Analysis time: 54.00 *(Years)*

Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	 Count	 Distance Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						

1	Left Right	1	3	Straight/Debonded
1	Left Right	1	4	Straight/Debonded
1	Left Right	1	5	Straight/Debonded
1	Left Right	1	6	Straight/Debonded
1	Left Right	1	7	Straight/Debonded
1	Left Right	1	8	Straight/Debonded
1	Left Right	1	9	Straight/Debonded
1	Left Right	1	10	Straight/Debonded
1	Left Right	1	11	Straight/Debonded
1	Left Right	1	12	Straight/Debonded
1	Left Right	1	13	Straight/Debonded
1	Left Right	1	14	Straight/Debonded
1	Left Right	1	15	Straight/Debonded
1	Left Right	1	16	Straight/Debonded
1	Left Right	2	1	Straight/Debonded
1	Left Right	2	2	Straight/Debonded
1	Left	2	3	Straight/Debonded

	Right			
1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			
	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance	Spacing	No of Spaces	Thickness	Weight
	(ft)	*(ft)*		*(in)*	*(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Extends into Deck
		(ft)		*(in)*	
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance	Number Spaces	Spacing	Composite Length

		(ft)		*(in)*	*(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G4

Link with: G3

Description:

Existing:

Current:

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G5

Link with: G3

Description:

Existing:

Current:

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G6

Link with: G3

Description:

Existing:

Current:

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G7

Link with: G3

Description:

Existing:

Current:

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G8

Link with: G3

Description:

Existing:

Current:

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G9

Link with: G3
Description:

Existing:
Current:
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member G10

Link with: None
Description:

Existing: 17"x36" INT PSU - w/ post Tensioning -
Current: 17"x36" INT PSU - w/ post Tensioning -
Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation (kip/ft)	Y Translation (kip/ft)	Z Rotation (kip-in/rad)	Override Computed Z Rotation
1				
2				

Member Alternative 17"x36" INT PSU - w/ post Tensioning

Description:

Description

Material Type: Prestressed Concrete
Girder Type: PS Precast Box
Member units: US Customary
Girder property input method: Schedule based
Additional Self Load: *(kip/ft)*
Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD
Analysis Module: AASHTO ASD
Analysis Module Component:
Properties:

Analysis Method: LFD
Analysis Module: AASHTO LFD
Analysis Module Component:
Properties:

Analysis Method: LRFD
Analysis Module: AASHTO LRFD
Analysis Module Component:
Properties:

Analysis Method: LRFR
Analysis Module: AASHTO LRFR
Analysis Module Component:
Properties:

Analysis Method: Distribution Factors
Analysis Module: Legacy BrR Dist Fact
Analysis Module Component:
Properties:

Default rating method: LRFR
LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:
LFD: 2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

Inventory Operating

Structural steel
Concrete
PS Concrete Comp.
PS Concrete Tens.
PS Moment Cap.
Reinforcement
Bearing Stiffener
Stirrup
Timber NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor
Type: Standard - AASHTO
LRFD Dynamic Load Allowance
Fatigue and fracture limit states: 15.0 *(%)*
All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

Distribution Factor (Wheels)

Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.527	0.000	0.527	0.182
Multi-Lane	0.527	0.000	0.527	0.364

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Moment	0.254	0.256
0.00	38.500	Shear	0.254	0.256
0.00	38.500	Deflectio...	0.109	0.182

Shrinkage/Time

Deck curing method: Moist-cured
Deck drying time: 3.000 *(Days)*
Consider deck differential shrinkage loads: FALSE
Beam Curing method: Steam-cured
Curing time: 20.00 *(Days)*
Service life: 75.00 *(Years)*
Analysis time: 54.00 *(Years)*
Composite time: 60.00 *(Days)*

Continuous time: 45.0 *(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type: Monolithic
Interface width: *(in)*
Deck cohesion factor: 0.400 *(ksi)*
Deck friction factor: 1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	Count	Distance Size

Prestressing Force Information

Strand Layout

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1	Left	1	1	Straight/Debonded			

1	Right Left	1	2	Straight/Debonded
1	Right Left	1	3	Straight/Debonded
1	Right Left	1	4	Straight/Debonded
1	Right Left	1	5	Straight/Debonded
1	Right Left	1	6	Straight/Debonded
1	Right Left	1	7	Straight/Debonded
1	Right Left	1	8	Straight/Debonded
1	Right Left	1	9	Straight/Debonded
1	Right Left	1	10	Straight/Debonded
1	Right Left	1	11	Straight/Debonded
1	Right Left	1	12	Straight/Debonded
1	Right Left	1	13	Straight/Debonded
1	Right Left	1	14	Straight/Debonded
1	Right Left	1	15	Straight/Debonded
1	Right Left	1	16	Straight/Debonded
1	Right Left	2	1	Straight/Debonded
1	Right	2	2	Straight/Debonded

	Left			
	Right			
1		2	3	Straight/Debonded
	Left			
	Right			
1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			
	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance *(ft)*	Spacing *(ft)*	No of Spaces	Thickness *(in)*	Weight *(kip)*
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.95...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance *(ft)*	Number Spaces	Spacing *(in)*	Composite Length *(ft)*
#3 - 2'-7" long	1	0.21	4	6.0000	
#3 - 2'-7" long	1	2.21	1	10.5000	
#3 - 2'-7" long	1	3.08	27	15.0000	
#3 - 2'-7" long	1	36.83	1	10.5000	
#3 - 2'-7" long	1	37.71	4	6.0000	

Member G11

Link with: None

Description:

Existing: 17"x36" EXT PSU -

Current: 17"x36" EXT PSU -

Number of Spans: 1

Span Number	Span Length *(ft)*
1	38.500000

Support	Frame Connection
1	
2	

Pedestrian load: *(lb/ft)*

Member Loads

Member Loads - Settlement

Support Number	Horizontal *(in)*	Vertical *(in)*	Rotational *(Radians)*	Load Case Name
1				
2				

Support Constraints

General

Support Number	Support Type	X Translation	Y Translation	Z Rotation
1	Pinned	Fixed	Fixed	Free
2	Roller	Free	Fixed	Free

Elastic

Support Number	X Translation *(kip/ft)*	Y Translation *(kip/ft)*	Z Rotation *(kip-in/rad)*	Override Computed Z Rotation
1				
2				

Member Alternative   17"x36" EXT PSU

Description:

Description

Material Type: Prestressed Concrete

Girder Type: PS Precast Box

Member units: US Customary

Girder property input method: Schedule based

Additional Self Load: *(kip/ft)*

Additional Self Load %: 1.0 *(%)*

Analysis Module

Analysis Method: ASD

Analysis Module: AASHTO ASD

Analysis Module Component:

Properties:

Analysis Method: LFD

Analysis Module: AASHTO LFD

Analysis Module Component:

Properties:

Analysis Method: LRFD

Analysis Module: AASHTO LRFD

Analysis Module Component:

Properties:

Analysis Method: LRFR

Analysis Module: AASHTO LRFR

Analysis Module Component:

Properties:

Analysis Method: Distribution Factors

Analysis Module: Legacy BrR Dist Fact

Analysis Module Component:

Properties:

Default rating method: LRFR

LRFD shear computation method: General Procedure

Factors

Factor Override

LRFD:

LFD: 2002 AASHTO Std. Specifications(CF=0.9)

ASD Factors

	Inventory	Operating
Structural steel		
Concrete		
PS Concrete Comp.		
PS Concrete Tens.		
PS Moment Cap.		

Reinforcement	
Bearing Stiffener	
Stirrup	
Timber	NA

Default Materials

Deck concrete:	Class A (3000)
Deck reinforcement:	Grade 40
Beam concrete:	Class P (5000)
Beam reinforcement:	Grade 40
Stirrup reinforcemt:	Grade 40
Prestressing strand:	7/16" (7W-250) SR

Impact

Standard Impact Factor

Type: Standard - AASHTO

LRFD Dynamic Load Allowance

Fatigue and fracture limit states: 15.0 *(%)*

All other limit states: 33.0 *(%)*

Live Load Distribution

Standard

	Distribution Factor (Wheels)			
Lanes Loaded	Shear	Shear at Supports	Moment	Deflection
1 Lane	0.100	0.100	0.100	0.100
Multi-Lane	0.100	0.100	0.100	0.100

LRFD

Distance *(ft)*	Length *(ft)*	Type	1 Lane	Multi-Lane
0.00	38.500	Deflectio...	0.100	0.100
0.00	38.500	Moment	0.100	0.100
0.00	38.500	Shear	0.100	0.100

Shrinkage/Time

Deck curing method: Moist-cured

Deck drying time: 3.000 *(Days)*

Consider deck differential shrinkage loads: FALSE

Beam Curing method: Steam-cured

Curing time:	20.00	*(Days)*
Service life:	75.00	*(Years)*
Analysis time:	54.00	*(Years)*
Composite time:	60.00	*(Days)*
Continuous time:	45.0	*(Days)*

Beam Details

Span Details

Span	Prestress Shape Use Projection	Concrete Material n Creep	Prestress Properties	Left Projection *(in)*	Right *(in)*
1	17"x36" PSU TRUE	Class P (5000... 6.64...	PS Strands Pr...	8.5000	8.5000

Continuous Support Details

Support Number	Support Distance on Left, SL *(in)*	Support Distance on Right, SR *(in)*
1		
2		

Stress Limit Ranges

Stress Limit	Span	Start Distance *(ft)*	Length *(ft)*
PS Conc Stress Lim...	1	0.000	39.92

Slab Interface

Deck interface type:	Monolithic
Interface width:	*(in)*
Deck cohesion factor:	0.400 *(ksi)*
Deck friction factor:	1.400

Continuity Diaphragm

Span No.	Material Bar	Left Support Distance Bar	Bar Count	Bar Size	Right Support Material	 Distance Count	 Size

<u>Prestressing Force Information</u>

<u>Strand Layout</u>

Span	Pos.	Row No.	Col. No.	Config. Type	Harp Distance *(ft)*	Debond Distance *(in)*	Harp Curvature *(in)*
1		1	1	Straight/Debonded			
	Left						
	Right						
1		1	2	Straight/Debonded			
	Left						
	Right						
1		1	3	Straight/Debonded			

	Left			
	Right			
1		1	4	Straight/Debonded
	Left			
	Right			
1		1	5	Straight/Debonded
	Left			
	Right			
1		1	6	Straight/Debonded
	Left			
	Right			
1		1	7	Straight/Debonded
	Left			
	Right			
1		1	8	Straight/Debonded
	Left			
	Right			
1		1	9	Straight/Debonded
	Left			
	Right			
1		1	10	Straight/Debonded
	Left			
	Right			
1		1	11	Straight/Debonded
	Left			
	Right			
1		1	12	Straight/Debonded
	Left			
	Right			
1		1	13	Straight/Debonded
	Left			
	Right			
1		1	14	Straight/Debonded
	Left			
	Right			
1		1	15	Straight/Debonded
	Left			
	Right			
1		1	16	Straight/Debonded
	Left			
	Right			
1		2	1	Straight/Debonded
	Left			
	Right			
1		2	2	Straight/Debonded
	Left			
	Right			
1		2	3	Straight/Debonded
	Left			
	Right			

1		2	4	Straight/Debonded
	Left			
	Right			
1		2	5	Straight/Debonded
	Left			
	Right			
1		2	6	Straight/Debonded
	Left			
	Right			
1		3	1	Straight/Debonded
	Left			
	Right			
1		3	7	Straight/Debonded
	Left			
	Right			
1		3	10	Straight/Debonded
	Left			
	Right			
1		3	16	Straight/Debonded
	Left			
	Right			

Deck Profile

Interior Diaphragms

Span	Start Distance (ft)	Spacing (ft)	No of Spaces	Thickness (in)	Weight (kip)
1	0.00...	1.00	1	2.0000	0.3272
1	1.00...	8.96	1	1.0000	0.1636
1	9.96...	20.00	1	1.0000	0.1636
1	29.96...	8.96	1	1.0000	0.1636

Shear Reinforcement Ranges - Vertical

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Extends into Deck
#4 Bent Shear R...	1	0.21	4	6.0000	FALSE
#4 Bent Shear R...	1	2.21	1	10.5000	FALSE
#4 Bent Shear R...	1	3.08	27	15.0000	FALSE
#4 Bent Shear R...	1	36.83	1	10.5000	FALSE
#4 Bent Shear R...	1	37.71	4	6.0000	FALSE

Shear Reinforcement Ranges - Horizontal

Shear Reinforcement	Span No	Start Distance (ft)	Number Spaces	Spacing (in)	Composite Length (ft)

#3 - 2'-7" long	1	0.21	4	6.0000
#3 - 2'-7" long	1	2.21	1	10.5000
#3 - 2'-7" long	1	3.08	27	15.0000
#3 - 2'-7" long	1	36.83	1	10.5000
#3 - 2'-7" long	1	37.71	4	6.0000

1.4 SUMMARY OF LRFR LOAD RATING ANALYSIS RESULTS

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294
Bridge ID: 874294

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 15:41:57
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 15:42:26

Structure Definition Name: End Span 1 (or 3) - PS Conc PSU
Member Name: G3
Member Alternative Name: 17"x36" INT PSU - Existing Condition

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.70	-0.00	0.00	99.000	3564.00		
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**41.31**	**1.649**	**59.37**	**2.138**	**76.97**
1.69	6.0	Flexure	kip-ft	249.21	13.52	68.34	1.942	69.93	2.518	90.65
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**40.19**	**1.546**	**55.65**	**2.004**	**72.14**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.49	3.891	140.09		
2.83	10.0	Flexure	kip-ft	288.41	21.61	108.12	1.381	49.73	1.791	64.47
2.83	**10.0**	**Shear**	**kip**	**61.28**	**6.76**	**37.73**	**0.800**	**28.81**	**1.652**	**59.48**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.78	2.366	85.17		
5.66	20.0	Flexure	kip-ft	304.60	38.40	184.27	0.796	28.65	1.031	37.13
5.66	**20.0**	**Shear**	**kip**	**29.07**	**5.11**	**31.70**	**0.409**	**14.72**	**0.815**	**29.33**
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	1.33	1.274	45.88		
8.49	30.0	Flexure	kip-ft	304.60	50.23	228.45	0.605	21.77	0.784	28.23
8.49	**30.0**	**Shear**	**kip**	**23.83**	**3.30**	**25.78**	**0.437**	**15.73**	**0.795**	**28.61**
8.49	30.0	Concrete Stresses	ksi	1.63	0.36	1.65	0.963	34.67		
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**240.66**	**0.553**	**19.92**	**0.717**	**25.83**
11.32	40.0	Shear	kip	23.83	1.65	19.96	0.623	22.44	1.044	37.57
11.32	40.0	Concrete Stresses	ksi	1.63	0.41	1.73	0.878	31.61		
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**221.36**	**0.594**	**21.39**	**0.770**	**27.73**
14.15	50.0	Shear	kip	-24.61	-0.00	-14.26	0.986	35.50	1.780	64.09

14.15	50.0	Concrete Stresses	ksi	1.63	0.43	1.60	0.941	33.89		
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**240.66**	**0.553**	**19.93**	**0.717**	**25.83**
16.98	60.0	Shear	kip	-23.83	-1.65	-19.96	0.623	22.43	1.043	37.56
16.98	60.0	Concrete Stresses	ksi	1.63	0.41	1.73	0.878	31.61		
19.80	70.0	Flexure	kip-ft	304.60	50.19	228.45	0.605	21.78	0.784	28.23
19.80	**70.0**	**Shear**	**kip**	**-23.83**	**-3.30**	**-25.78**	**0.437**	**15.73**	**0.795**	**28.61**
19.80	70.0	Concrete Stresses	ksi	1.63	0.36	1.65	0.963	34.68		
22.63	80.0	Flexure	kip-ft	304.60	38.37	184.27	0.796	28.65	1.032	37.14
22.63	**80.0**	**Shear**	**kip**	**-29.07**	**-5.12**	**-31.70**	**0.409**	**14.72**	**0.815**	**29.32**
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	1.33	1.275	45.88		
25.46	90.0	Flexure	kip-ft	295.44	21.57	108.12	1.419	51.08	1.839	66.22
25.46	**90.0**	**Shear**	**kip**	**-58.31**	**-6.76**	**-37.73**	**0.755**	**27.19**	**1.596**	**57.45**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.78	2.367	85.19		
26.81	94.8	Flexure	kip-ft	262.19	11.90	60.52	2.335	84.07	3.027	108.97
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-40.64**	**1.529**	**55.03**	**1.981**	**71.33**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.44	4.428	159.40		
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-41.29**	**1.605**	**57.79**	**2.081**	**74.92**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Condition
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location							**Inventory Rating**	**Inventory Load Rating**	**Operating Rating**	**Operating Load Rating**
(ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj-LL***	**LL**	**Factor**	**(Ton)**	**Factor**	**(Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0		ksi	0.70	-0.00	0.00	99.000	3564.00		

		Concrete Stresses								
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**40.42**	**1.686**	**60.69**	**2.185**	**78.67**
1.69	6.0	Flexure	kip-ft	249.21	13.52	67.18	1.976	71.14	2.562	92.22
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**39.50**	**1.573**	**56.63**	**2.039**	**73.40**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.48	3.959	142.52		
2.83	10.0	Flexure	kip-ft	288.41	21.61	107.45	1.390	50.04	1.802	64.87
2.83	**10.0**	**Shear**	**kip**	**61.99**	**6.76**	**37.49**	**0.816**	**29.38**	**1.663**	**59.86**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.77	2.381	85.71		
5.66	20.0	Flexure	kip-ft	304.60	38.40	189.24	0.775	27.89	1.004	36.16
5.66	**20.0**	**Shear**	**kip**	**28.05**	**5.11**	**32.58**	**0.380**	**13.68**	**0.758**	**27.30**
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	1.36	1.241	44.67		
8.49	30.0	Flexure	kip-ft	304.60	50.23	245.39	0.563	20.27	0.730	26.28
8.49	**30.0**	**Shear**	**kip**	**23.83**	**3.30**	**27.77**	**0.406**	**14.60**	**0.663**	**23.86**
8.49	30.0	Concrete Stresses	ksi	1.63	0.36	1.77	0.897	32.28		
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**275.88**	**0.483**	**17.38**	**0.626**	**22.53**
11.32	40.0	Shear	kip	23.83	1.65	23.07	0.539	19.41	0.746	26.86
11.32	40.0	Concrete Stresses	ksi	1.63	0.41	1.99	0.766	27.57		
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**280.73**	**0.469**	**16.87**	**0.607**	**21.86**
14.15	50.0	Shear	kip	-23.83	-0.00	-18.49	0.737	26.51	1.013	36.46
14.15	50.0	Concrete Stresses	ksi	1.63	0.43	2.02	0.742	26.73		
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**275.88**	**0.483**	**17.38**	**0.626**	**22.53**
16.98	60.0	Shear	kip	-23.83	-1.65	-23.07	0.539	19.40	0.746	26.85
16.98	60.0	Concrete Stresses	ksi	1.63	0.41	1.99	0.766	27.58		
19.80	70.0	Flexure	kip-ft	304.60	50.19	245.39	0.563	20.28	0.730	26.28
19.80	**70.0**	**Shear**	**kip**	**-23.83**	**-3.30**	**-27.77**	**0.405**	**14.60**	**0.663**	**23.85**
19.80	70.0	Concrete Stresses	ksi	1.63	0.36	1.77	0.897	32.29		
22.63	80.0	Flexure	kip-ft	304.60	38.37	189.24	0.775	27.90	1.005	36.16
22.63	**80.0**	**Shear**	**kip**	**-28.05**	**-5.12**	**-32.58**	**0.380**	**13.67**	**0.758**	**27.30**
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	1.36	1.241	44.68		
25.46	90.0	Flexure	kip-ft	295.44	21.57	107.45	1.428	51.40	1.851	66.63
25.46	**90.0**	**Shear**	**kip**	**-59.02**	**-6.76**	**-37.49**	**0.771**	**27.74**	**1.606**	**57.81**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.77	2.381	85.73		

26.81	94.8	Flexure	kip-ft	262.19	11.90	59.38	2.380	85.68	3.085	111.07
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-39.87**	**1.558**	**56.09**	**2.020**	**72.71**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.43	4.513	162.46		
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-40.40**	**1.641**	**59.07**	**2.127**	**76.57**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Condition
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj -LL***	**LL**	**Legal Rating Factor**	**Legal Load Rating (Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**2772.00**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**22.62**	**4.054**	**113.52**
1.69	6.0	Flexure	kip-ft	249.21	13.52	37.34	4.785	133.99
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**22.13**	**3.780**	**105.84**
2.83	10.0	Flexure	kip-ft	288.41	21.61	59.51	3.379	94.61
2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**21.03**	**3.078**	**86.17**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.60**	**38.40**	**103.67**	**1.904**	**53.31**
5.66	20.0	Shear	kip	85.06	5.11	18.32	3.303	92.49
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**132.47**	**1.404**	**39.32**
8.49	30.0	Shear	kip	75.98	3.30	15.61	3.542	99.17
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**145.92**	**1.229**	**34.40**
11.32	40.0	Shear	kip	62.87	1.65	12.89	3.628	101.58
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**144.02**	**1.229**	**34.42**
14.15	50.0	Shear	kip	-66.05	-0.00	-10.18	4.990	139.73
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**145.92**	**1.229**	**34.41**
16.98	60.0	Shear	kip	-62.88	-1.65	-12.89	3.628	101.57
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**132.47**	**1.404**	**39.32**
19.80	70.0	Shear	kip	-76.01	-3.30	-15.61	3.543	99.20
22.63	**80.0**	**Flexure**	**kip-ft**	**304.60**	**38.37**	**103.67**	**1.904**	**53.32**
22.63	80.0	Shear	kip	-85.06	-5.12	-18.32	3.303	92.48
25.46	90.0	Flexure	kip-ft	295.44	21.57	59.51	3.470	97.17

25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-21.03**	**2.972**	**83.23**
26.81	94.8	Flexure	kip-ft	262.19	11.90	33.03	5.760	161.28
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-22.33**	**3.745**	**104.87**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-22.61**	**3.946**	**110.49**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3628.35**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**31.77**	**2.887**	**105.82**
1.69	6.0	Flexure	kip-ft	249.21	13.52	51.99	3.437	125.98
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**30.81**	**2.715**	**99.51**
2.83	10.0	Flexure	kip-ft	288.41	21.61	82.09	2.449	89.77
2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**29.02**	**2.231**	**81.77**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.60**	**38.40**	**144.31**	**1.368**	**50.13**
5.66	20.0	Shear	kip	64.21	5.11	25.50	1.744	63.92
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**186.66**	**0.996**	**36.52**
8.49	30.0	Shear	kip	43.23	3.30	21.99	1.368	50.13
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**209.15**	**0.857**	**31.42**
11.32	40.0	Shear	kip	37.55	1.65	18.48	1.477	54.14
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**211.77**	**0.836**	**30.64**
14.15	50.0	Shear	kip	-37.72	-0.00	-14.97	1.938	71.03
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**209.15**	**0.857**	**31.42**
16.98	60.0	Shear	kip	-37.55	-1.65	-18.48	1.477	54.13
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**186.66**	**0.997**	**36.53**
19.80	70.0	Shear	kip	-43.24	-3.30	-21.99	1.368	50.13
22.63	**80.0**	**Flexure**	**kip-ft**	**304.60**	**38.37**	**144.31**	**1.368**	**50.14**
22.63	80.0	Shear	kip	-64.23	-5.12	-25.50	1.744	63.93
25.46	90.0	Flexure	kip-ft	295.44	21.57	82.09	2.516	92.21
25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-29.02**	**2.155**	**78.97**
26.81	94.8	Flexure	kip-ft	262.19	11.90	46.14	4.123	151.10
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-31.19**	**2.681**	**98.26**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-31.75**	**2.811**	**103.01**

28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**31.90**	**2.875**	**115.01**
1.69	6.0	Flexure	kip-ft	249.21	13.52	52.61	3.397	135.88
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**31.17**	**2.683**	**107.33**
2.83	10.0	Flexure	kip-ft	288.41	21.61	83.64	2.404	96.16
2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**29.56**	**2.190**	**87.59**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.60**	**38.40**	**144.70**	**1.364**	**54.56**
5.66	20.0	Shear	kip	63.88	5.11	25.57	1.729	69.18
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**183.19**	**1.015**	**40.62**
8.49	30.0	Shear	kip	44.36	3.30	21.58	1.434	57.37
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**199.10**	**0.901**	**36.02**
11.32	40.0	Shear	kip	40.01	1.65	17.59	1.659	66.37
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**209.06**	**0.847**	**33.88**
14.15	50.0	Shear	kip	-38.63	-0.00	-13.61	2.183	87.33
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**199.10**	**0.901**	**36.02**
16.98	60.0	Shear	kip	-40.01	-1.65	-17.59	1.659	66.36
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**183.19**	**1.016**	**40.62**
19.80	70.0	Shear	kip	-44.37	-3.30	-21.58	1.434	57.37
22.63	**80.0**	**Flexure**	**kip-ft**	**304.60**	**38.37**	**144.70**	**1.364**	**54.57**
22.63	80.0	Shear	kip	-63.89	-5.12	-25.57	1.730	69.18
25.46	90.0	Flexure	kip-ft	295.44	21.57	83.64	2.469	98.77
25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-29.56**	**2.115**	**84.59**
26.81	94.8	Flexure	kip-ft	262.19	11.90	46.55	4.087	163.48
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-31.47**	**2.658**	**106.31**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-31.89**	**2.799**	**111.94**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results

17"x36" INT PSU - Existing Condition
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	89.52	0.00	0.00	99.000	5940.00
1.69	6.0	Flexure	kip-ft	249.21	13.52	82.89	2.335	140.13
2.83	10.0	Flexure	kip-ft	288.41	21.61	130.88	1.664	99.86
5.66	20.0	Flexure	kip-ft	304.60	38.40	221.65	0.965	57.89
8.49	30.0	Flexure	kip-ft	304.60	50.23	272.30	0.740	44.40
11.32	40.0	Flexure	kip-ft	304.60	57.22	282.85	0.687	41.20
14.15	50.0	Flexure	kip-ft	304.60	59.54	253.93	0.755	45.32
16.98	60.0	Flexure	kip-ft	304.60	57.20	282.85	0.687	41.21
19.80	70.0	Flexure	kip-ft	304.60	50.19	272.30	0.740	44.41
22.63	80.0	Flexure	kip-ft	304.60	38.37	221.65	0.965	57.89
25.46	90.0	Flexure	kip-ft	295.44	21.57	130.88	1.709	102.57
26.81	94.8	Flexure	kip-ft	262.19	11.90	73.43	2.807	168.40
28.29	100.0	Flexure	kip-ft	88.49	0.00	0.00	99.000	5940.00

Detailed Rating Results
17"x36" INT PSU - Existing Condition
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**31.15**	**2.944**	**117.77**
1.69	6.0	Flexure	kip-ft	249.21	13.52	51.25	3.487	139.49
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**30.37**	**2.754**	**110.18**
2.83	10.0	Flexure	kip-ft	288.41	21.61	81.00	2.482	99.30

2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**28.63**	**2.261**	**90.45**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.60**	**38.40**	**137.61**	**1.434**	**57.38**
5.66	20.0	Shear	kip	70.63	5.11	24.32	2.032	81.28
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**169.84**	**1.095**	**43.81**
8.49	30.0	Shear	kip	49.40	3.30	20.01	1.741	69.63
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**189.17**	**0.948**	**37.91**
11.32	40.0	Shear	kip	43.10	1.65	15.70	2.011	80.43
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**189.87**	**0.932**	**37.30**
14.15	50.0	Shear	kip	-43.83	-0.00	-12.33	2.734	109.34
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**189.17**	**0.948**	**37.91**
16.98	60.0	Shear	kip	-43.10	-1.65	-15.70	2.011	80.42
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**169.84**	**1.095**	**43.82**
19.80	70.0	Shear	kip	-49.41	-3.30	-20.01	1.741	69.63
22.63	**80.0**	**Flexure**	**kip-ft**	**304.60**	**38.37**	**137.61**	**1.435**	**57.38**
22.63	80.0	Shear	kip	-70.64	-5.12	-24.32	2.032	81.29
25.46	90.0	Flexure	kip-ft	295.44	21.57	81.00	2.550	101.99
25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-28.63**	**2.184**	**87.35**
26.81	94.8	Flexure	kip-ft	262.19	11.90	45.39	4.191	167.65
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-30.68**	**2.725**	**109.02**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-31.14**	**2.866**	**114.63**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj -LL***	**LL**	**Legal Rating Factor**	**Legal Load Rating (Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**1683.00**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**21.61**	**4.245**	**72.16**
1.69	6.0	Flexure	kip-ft	249.21	13.52	35.63	5.016	85.26
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**21.11**	**3.962**	**67.35**
2.83	10.0	Flexure	kip-ft	288.41	21.61	56.64	3.550	60.35
2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**20.02**	**3.234**	**54.97**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.60**	**38.40**	**97.92**	**2.016**	**34.27**
5.66	20.0	Shear	kip	85.06	5.11	17.31	3.497	59.45
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**123.85**	**1.502**	**25.53**

8.49	30.0	Shear	kip	85.06	3.30	14.59	4.267	72.54
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**134.43**	**1.334**	**22.67**
11.32	40.0	Shear	kip	73.13	1.65	11.88	4.602	78.24
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**129.66**	**1.366**	**23.21**
14.15	50.0	Shear	kip	-81.39	-0.00	-9.17	6.830	116.11
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**134.43**	**1.334**	**22.68**
16.98	60.0	Shear	kip	-73.14	-1.65	-11.88	4.602	78.24
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**123.85**	**1.502**	**25.54**
19.80	70.0	Shear	kip	-85.06	-3.30	-14.59	4.266	72.53
22.63	**80.0**	**Flexure**	**kip-ft**	**304.60**	**38.37**	**97.92**	**2.016**	**34.27**
22.63	80.0	Shear	kip	-85.06	-5.12	-17.31	3.497	59.44
25.46	90.0	Flexure	kip-ft	295.44	21.57	56.64	3.646	61.99
25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-20.02**	**3.123**	**53.09**
26.81	94.8	Flexure	kip-ft	262.19	11.90	31.53	6.034	102.58
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-21.31**	**3.924**	**66.71**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-21.60**	**4.132**	**70.24**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3267.00**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**38.49**	**2.383**	**78.64**
1.69	6.0	Flexure	kip-ft	249.21	13.52	63.33	2.822	93.12
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**37.53**	**2.229**	**73.55**
2.83	10.0	Flexure	kip-ft	288.41	21.61	100.16	2.007	66.24
2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**35.40**	**1.828**	**60.34**
5.66	20.0	Flexure	kip-ft	304.60	38.40	170.52	1.158	38.20
5.66	**20.0**	**Shear**	**kip**	**48.46**	**5.11**	**30.14**	**1.074**	**35.44**
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**211.09**	**0.881**	**29.08**
8.49	30.0	Shear	kip	36.71	3.30	24.87	1.008	33.26
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**236.48**	**0.758**	**25.02**
11.32	40.0	Shear	kip	32.36	1.65	19.60	1.189	39.24
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**239.38**	**0.740**	**24.41**

14.15	50.0	Shear	kip	-32.65	-0.00	-14.97	1.677	55.35
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**236.48**	**0.758**	**25.02**
16.98	60.0	Shear	kip	-32.37	-1.65	-19.60	1.189	39.23
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**211.09**	**0.881**	**29.09**
19.80	70.0	Shear	kip	-36.71	-3.30	-24.87	1.008	33.26
22.63	80.0	Flexure	kip-ft	304.60	38.37	170.52	1.158	38.20
22.63	**80.0**	**Shear**	**kip**	**-48.47**	**-5.12**	**-30.14**	**1.074**	**35.44**
25.46	90.0	Flexure	kip-ft	295.44	21.57	100.16	2.062	68.04
25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-35.40**	**1.766**	**58.28**
26.81	94.8	Flexure	kip-ft	262.19	11.90	56.09	3.392	111.93
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-37.92**	**2.206**	**72.79**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-38.47**	**2.320**	**76.55**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**89.52**	**0.00**	**0.00**	**99.000**	**3465.00**
1.17	**4.1**	**Shear**	**kip**	**128.89**	**7.72**	**40.09**	**2.288**	**80.08**
1.69	6.0	Flexure	kip-ft	249.21	13.52	65.94	2.710	94.86
1.69	**6.0**	**Shear**	**kip**	**118.02**	**7.42**	**39.07**	**2.141**	**74.92**
2.83	10.0	Flexure	kip-ft	288.41	21.61	104.17	1.930	67.56
2.83	**10.0**	**Shear**	**kip**	**92.60**	**6.76**	**36.82**	**1.758**	**61.54**
5.66	20.0	Flexure	kip-ft	304.60	38.40	176.73	1.117	39.09
5.66	**20.0**	**Shear**	**kip**	**45.94**	**5.11**	**31.23**	**0.974**	**34.10**
8.49	**30.0**	**Flexure**	**kip-ft**	**304.60**	**50.23**	**225.32**	**0.826**	**28.89**
8.49	30.0	Shear	kip	33.91	3.30	25.65	0.893	31.27
11.32	**40.0**	**Flexure**	**kip-ft**	**304.60**	**57.22**	**257.95**	**0.695**	**24.33**
11.32	40.0	Shear	kip	29.16	1.65	20.27	1.029	36.00
14.15	**50.0**	**Flexure**	**kip-ft**	**304.60**	**59.54**	**258.96**	**0.684**	**23.93**
14.15	50.0	Shear	kip	-29.63	-0.00	-15.79	1.443	50.51
16.98	**60.0**	**Flexure**	**kip-ft**	**304.60**	**57.20**	**257.95**	**0.695**	**24.33**
16.98	60.0	Shear	kip	-29.16	-1.65	-20.27	1.028	35.99
19.80	**70.0**	**Flexure**	**kip-ft**	**304.60**	**50.19**	**225.32**	**0.826**	**28.90**

19.80	70.0	Shear	kip	-33.91	-3.30	-25.65	0.893	31.27
22.63	80.0	Flexure	kip-ft	304.60	38.37	176.73	1.117	39.10
22.63	**80.0**	**Shear**	**kip**	**-45.95**	**-5.12**	**-31.23**	**0.974**	**34.10**
25.46	90.0	Flexure	kip-ft	295.44	21.57	104.17	1.983	69.39
25.46	**90.0**	**Shear**	**kip**	**-89.73**	**-6.76**	**-36.82**	**1.698**	**59.43**
26.81	94.8	Flexure	kip-ft	262.19	11.90	58.40	3.257	114.00
26.81	**94.8**	**Shear**	**kip**	**-118.16**	**-7.55**	**-39.48**	**2.118**	**74.13**
27.11	**95.8**	**Shear**	**kip**	**-125.66**	**-7.72**	**-40.07**	**2.227**	**77.94**
28.29	**100.0**	**Flexure**	**kip-ft**	**88.49**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294
Bridge ID: 874294

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 15:45:03
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 15:45:44

Structure Definition Name: End Span 1 (or 3) - PS Conc PSU
Member Name: G10
Member Alternative Name: 17"x36" INT PSU - (w/ Post Tensioning)

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.70	-0.00	0.00	99.000	3564.00		
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**20.37**	**3.351**	**120.64**	**4.344**	**156.39**
1.69	6.0	Flexure	kip-ft	243.32	13.52	33.69	3.841	138.27	4.979	179.24
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**19.81**	**3.141**	**113.07**	**4.072**	**146.57**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.25	7.736	278.50		
2.83	10.0	Flexure	kip-ft	284.36	21.61	53.30	2.759	99.33	3.577	128.76
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**18.60**	**2.590**	**93.25**	**3.358**	**120.88**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.700	169.19		
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**90.83**	**1.615**	**58.13**	**2.093**	**75.35**
5.66	20.0	Shear	kip	85.08	5.11	15.62	2.878	103.61	3.731	134.31
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	0.67	2.527	90.96		
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**112.61**	**1.227**	**44.18**	**1.591**	**57.27**
8.49	30.0	Shear	kip	59.51	3.30	12.71	2.491	89.69	4.720	169.93
8.49	30.0	Concrete Stresses	ksi	1.63	0.37	0.83	1.907	68.64		
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**118.63**	**1.123**	**40.43**	**1.456**	**52.41**
11.32	40.0	Shear	kip	54.86	1.65	9.84	3.066	110.39	6.250	225.00
11.32	40.0	Concrete Stresses	ksi	1.63	0.42	0.87	1.736	62.51		
14.15	**50.0**	**Flexure**		**304.65**	**59.54**	**109.11**	**1.206**	**43.40**	**1.563**	**56.26**

			kip-ft							
14.15	50.0	Shear	kip	-64.58	-0.00	-7.03	5.251	189.03	8.967	322.81
14.15	50.0	Concrete Stresses	ksi	1.63	0.44	0.80	1.861	67.00		
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**118.63**	**1.123**	**40.43**	**1.456**	**52.41**
16.98	60.0	Shear	kip	-54.87	-1.65	-9.84	3.066	110.38	6.249	224.98
16.98	60.0	Concrete Stresses	ksi	1.63	0.42	0.87	1.737	62.51		
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**112.61**	**1.228**	**44.19**	**1.591**	**57.29**
19.80	70.0	Shear	kip	-59.53	-3.30	-12.71	2.492	89.71	4.720	169.91
19.80	70.0	Concrete Stresses	ksi	1.63	0.37	0.83	1.907	68.66		
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**90.83**	**1.615**	**58.13**	**2.093**	**75.36**
22.63	80.0	Shear	kip	-85.08	-5.12	-15.62	2.878	103.60	3.730	134.30
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	0.67	2.527	90.97		
25.46	90.0	Flexure	kip-ft	291.74	21.57	53.30	2.839	102.20	3.680	132.49
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-18.60**	**2.502**	**90.07**	**3.243**	**116.75**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.701	169.23		
26.81	94.8	Flexure	kip-ft	256.36	11.90	29.83	4.626	166.53	5.996	215.87
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-20.03**	**3.106**	**111.81**	**4.026**	**144.94**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.22	8.804	316.93		
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-20.35**	**3.262**	**117.43**	**4.228**	**152.22**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Units	Capacity	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)

		Limit State			DL + Adj-LL*					
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.70	-0.00	0.00	99.000	3564.00		
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**19.93**	**3.425**	**123.31**	**4.440**	**159.85**
1.69	6.0	Flexure	kip-ft	243.32	13.52	33.11	3.907	140.67	5.065	182.34
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**19.47**	**3.196**	**115.05**	**4.143**	**149.13**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.24	7.870	283.33		
2.83	10.0	Flexure	kip-ft	284.36	21.61	52.96	2.777	99.96	3.599	129.57
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**18.48**	**2.607**	**93.85**	**3.379**	**121.65**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.729	170.26		
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**93.28**	**1.572**	**56.60**	**2.038**	**73.37**
5.66	20.0	Shear	kip	85.08	5.11	16.06	2.801	100.82	3.630	130.69
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	0.69	2.460	88.57		
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**120.96**	**1.143**	**41.13**	**1.481**	**53.32**
8.49	30.0	Shear	kip	53.03	3.30	13.69	2.042	73.50	4.381	157.72
8.49	30.0	Concrete Stresses	ksi	1.63	0.37	0.89	1.775	63.90		
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**135.99**	**0.980**	**35.27**	**1.270**	**45.71**
11.32	40.0	Shear	kip	45.04	1.65	11.37	2.159	77.74	4.245	152.83
11.32	40.0	Concrete Stresses	ksi	1.63	0.42	1.00	1.515	54.53		
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**138.38**	**0.951**	**34.23**	**1.232**	**44.37**
14.15	50.0	Shear	kip	-44.95	-0.00	-9.11	2.818	101.46	5.444	195.99
14.15	50.0	Concrete Stresses	ksi	1.63	0.44	1.02	1.467	52.83		
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**135.99**	**0.980**	**35.27**	**1.270**	**45.72**
16.98	60.0	Shear	kip	-45.04	-1.65	-11.37	2.159	77.73	4.245	152.83
16.98	60.0	Concrete Stresses	ksi	1.63	0.42	1.00	1.515	54.53		
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**120.96**	**1.143**	**41.14**	**1.481**	**53.33**
19.80	70.0	Shear	kip	-53.04	-3.30	-13.69	2.042	73.50	4.381	157.70
19.80	70.0	Concrete Stresses	ksi	1.63	0.37	0.89	1.775	63.92		
22.63	**80.0**	**Flexure**		**304.65**	**38.37**	**93.28**	**1.572**	**56.61**	**2.038**	**73.38**

			kip-ft							
22.63	80.0	Shear	kip	-85.08	-5.12	-16.06	2.800	100.81	3.630	130.68
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	0.69	2.461	88.58		
25.46	90.0	Flexure	kip-ft	291.74	21.57	52.96	2.857	102.85	3.703	133.32
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-18.48**	**2.518**	**90.64**	**3.264**	**117.50**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.730	170.30		
26.81	94.8	Flexure	kip-ft	256.36	11.90	29.27	4.715	169.73	6.112	220.02
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-19.65**	**3.166**	**113.97**	**4.104**	**147.74**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.22	8.973	323.03		
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-19.91**	**3.334**	**120.01**	**4.321**	**155.57**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**2772.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**11.15**	**8.238**	**230.67**
1.69	6.0	Flexure	kip-ft	243.32	13.52	18.41	9.462	264.94
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**10.91**	**7.679**	**215.03**
2.83	10.0	Flexure	kip-ft	284.36	21.61	29.33	6.749	188.96
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**10.37**	**6.254**	**175.13**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**51.10**	**3.864**	**108.18**
5.66	20.0	Shear	kip	85.08	5.11	9.03	6.703	187.69
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**65.30**	**2.849**	**79.78**
8.49	30.0	Shear	kip	85.08	3.30	7.69	8.095	226.66
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**71.93**	**2.493**	**69.81**
11.32	40.0	Shear	kip	85.08	1.65	6.36	10.048	281.34
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**70.99**	**2.495**	**69.85**

14.15	50.0	Shear	kip	-85.08	-0.00	-5.02	13.040	365.13
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**71.93**	**2.493**	**69.82**
16.98	60.0	Shear	kip	-85.08	-1.65	-6.36	10.047	281.31
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**65.30**	**2.850**	**79.80**
19.80	70.0	Shear	kip	-85.08	-3.30	-7.69	8.094	226.64
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**51.10**	**3.864**	**108.20**
22.63	80.0	Shear	kip	-85.08	-5.12	-9.03	6.702	187.67
25.46	90.0	Flexure	kip-ft	291.74	21.57	29.33	6.944	194.42
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-10.37**	**6.041**	**169.14**
26.81	94.8	Flexure	kip-ft	256.36	11.90	16.28	11.410	319.48
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-11.01**	**7.610**	**213.09**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-11.15**	**8.018**	**224.49**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3628.35**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**15.66**	**5.867**	**215.02**
1.69	6.0	Flexure	kip-ft	243.32	13.52	25.63	6.797	249.10
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**15.19**	**5.516**	**202.17**
2.83	10.0	Flexure	kip-ft	284.36	21.61	40.46	4.892	179.30
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**14.30**	**4.534**	**166.17**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**71.13**	**2.775**	**101.72**
5.66	20.0	Shear	kip	85.08	5.11	12.57	4.815	176.48
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**92.01**	**2.022**	**74.11**
8.49	30.0	Shear	kip	85.08	3.30	10.84	5.745	210.55
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**103.09**	**1.739**	**63.75**
11.32	40.0	Shear	kip	85.08	1.65	9.11	7.010	256.93
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**104.38**	**1.697**	**62.18**
14.15	50.0	Shear	kip	-85.08	-0.00	-7.38	8.869	325.04
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**103.09**	**1.740**	**63.76**
16.98	60.0	Shear	kip	-85.08	-1.65	-9.11	7.010	256.90
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**92.01**	**2.022**	**74.12**

19.80	70.0	Shear	kip	-85.08	-3.30	-10.84	5.744	210.53
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**71.13**	**2.776**	**101.73**
22.63	80.0	Shear	kip	-85.08	-5.12	-12.57	4.815	176.46
25.46	90.0	Flexure	kip-ft	291.74	21.57	40.46	5.034	184.49
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-14.30**	**4.379**	**160.50**
26.81	94.8	Flexure	kip-ft	256.36	11.90	22.74	8.167	299.32
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-15.38**	**5.447**	**199.65**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-15.65**	**5.711**	**209.30**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**15.73**	**5.842**	**233.70**
1.69	6.0	Flexure	kip-ft	243.32	13.52	25.93	6.717	268.67
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**15.37**	**5.451**	**218.06**
2.83	10.0	Flexure	kip-ft	284.36	21.61	41.23	4.802	192.06
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**14.57**	**4.450**	**178.00**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**71.33**	**2.768**	**110.72**
5.66	20.0	Shear	kip	85.08	5.11	12.61	4.802	192.09
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**90.30**	**2.060**	**82.42**
8.49	30.0	Shear	kip	85.08	3.30	10.64	5.854	234.15
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**98.14**	**1.827**	**73.09**
11.32	40.0	Shear	kip	85.08	1.65	8.67	7.364	294.57
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**103.05**	**1.719**	**68.74**
14.15	50.0	Shear	kip	-85.08	-0.00	-6.71	9.756	390.22
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**98.14**	**1.827**	**73.10**
16.98	60.0	Shear	kip	-85.08	-1.65	-8.67	7.364	294.54
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**90.30**	**2.061**	**82.43**
19.80	70.0	Shear	kip	-85.08	-3.30	-10.64	5.853	234.13
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**71.33**	**2.768**	**110.73**
22.63	80.0	Shear	kip	-85.08	-5.12	-12.61	4.802	192.07
25.46	90.0	Flexure	kip-ft	291.74	21.57	41.23	4.940	197.62

25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-14.57**	**4.298**	**171.92**
26.81	94.8	Flexure	kip-ft	256.36	11.90	22.94	8.096	323.85
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-15.51**	**5.400**	**216.01**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-15.72**	**5.686**	**227.44**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	88.32	0.00	0.00	99.000	5940.00
1.69	6.0	Flexure	kip-ft	243.32	13.52	40.86	4.618	277.07
2.83	10.0	Flexure	kip-ft	284.36	21.61	64.51	3.324	199.45
5.66	20.0	Flexure	kip-ft	304.65	38.40	109.25	1.958	117.46
8.49	30.0	Flexure	kip-ft	304.65	50.23	134.22	1.502	90.10
11.32	40.0	Flexure	kip-ft	304.65	57.22	139.42	1.393	83.60
14.15	50.0	Flexure	kip-ft	304.65	59.54	125.17	1.533	91.97
16.98	60.0	Flexure	kip-ft	304.65	57.20	139.42	1.394	83.61
19.80	70.0	Flexure	kip-ft	304.65	50.19	134.22	1.502	90.12
22.63	80.0	Flexure	kip-ft	304.65	38.37	109.25	1.958	117.47
25.46	90.0	Flexure	kip-ft	291.74	21.57	64.51	3.420	205.22
26.81	94.8	Flexure	kip-ft	256.36	11.90	36.20	5.560	333.58
28.29	100.0	Flexure	kip-ft	86.22	0.00	0.00	99.000	5940.00

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location							Legal Rating	Legal Load Rating

(ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**15.36**	**5.983**	**239.30**
1.69	6.0	Flexure	kip-ft	243.32	13.52	25.26	6.895	275.80
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**14.97**	**5.596**	**223.84**
2.83	10.0	Flexure	kip-ft	284.36	21.61	39.92	4.958	198.33
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**14.11**	**4.595**	**183.81**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**67.83**	**2.911**	**116.42**
5.66	20.0	Shear	kip	85.08	5.11	11.99	5.050	201.99
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**83.72**	**2.222**	**88.89**
8.49	30.0	Shear	kip	85.08	3.30	9.86	6.314	252.56
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**93.25**	**1.923**	**76.92**
11.32	40.0	Shear	kip	85.08	1.65	7.74	8.252	330.08
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**93.59**	**1.892**	**75.69**
14.15	50.0	Shear	kip	-85.08	-0.00	-6.08	10.765	430.60
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**93.25**	**1.923**	**76.93**
16.98	60.0	Shear	kip	-85.08	-1.65	-7.74	8.251	330.04
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**83.72**	**2.223**	**88.91**
19.80	70.0	Shear	kip	-85.08	-3.30	-9.86	6.313	252.53
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**67.83**	**2.911**	**116.44**
22.63	80.0	Shear	kip	-85.08	-5.12	-11.99	5.049	201.97
25.46	90.0	Flexure	kip-ft	291.74	21.57	39.92	5.102	204.07
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-14.11**	**4.438**	**177.53**
26.81	94.8	Flexure	kip-ft	256.36	11.90	22.37	8.303	332.11
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-15.13**	**5.538**	**221.51**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-15.35**	**5.823**	**232.91**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location							Legal Rating	Legal Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**1683.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**10.65**	**8.625**	**146.63**

1.69	6.0	Flexure	kip-ft	243.32	13.52	17.56	9.917	168.59
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**10.41**	**8.049**	**136.83**
2.83	10.0	Flexure	kip-ft	284.36	21.61	27.92	7.091	120.54
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**9.87**	**6.572**	**111.72**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**48.27**	**4.090**	**69.54**
5.66	20.0	Shear	kip	85.08	5.11	8.53	7.097	120.64
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**61.05**	**3.047**	**51.81**
8.49	30.0	Shear	kip	85.08	3.30	7.19	8.658	147.19
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**66.26**	**2.706**	**46.01**
11.32	40.0	Shear	kip	85.08	1.65	5.86	10.907	185.42
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**63.91**	**2.771**	**47.11**
14.15	50.0	Shear	kip	-85.08	-0.00	-4.52	14.485	246.24
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**66.26**	**2.707**	**46.01**
16.98	60.0	Shear	kip	-85.08	-1.65	-5.86	10.906	185.40
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**61.05**	**3.048**	**51.82**
19.80	70.0	Shear	kip	-85.08	-3.30	-7.19	8.657	147.18
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**48.27**	**4.091**	**69.54**
22.63	80.0	Shear	kip	-85.08	-5.12	-8.53	7.096	120.63
25.46	90.0	Flexure	kip-ft	291.74	21.57	27.92	7.296	124.03
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-9.87**	**6.347**	**107.90**
26.81	94.8	Flexure	kip-ft	256.36	11.90	15.54	11.954	203.21
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-10.51**	**7.973**	**135.54**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-10.65**	**8.394**	**142.71**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3267.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**18.97**	**4.842**	**159.80**
1.69	6.0	Flexure	kip-ft	243.32	13.52	31.22	5.579	184.12
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**18.50**	**4.528**	**149.43**
2.83	10.0	Flexure	kip-ft	284.36	21.61	49.37	4.009	132.31
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**17.45**	**3.716**	**122.62**

5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**84.06**	**2.349**	**77.51**
5.66	20.0	Shear	kip	85.08	5.11	14.86	4.075	134.48
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**104.05**	**1.788**	**59.01**
8.49	30.0	Shear	kip	85.08	3.30	12.26	5.080	167.65
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**116.56**	**1.538**	**50.77**
11.32	40.0	Shear	kip	85.08	1.65	9.66	6.609	218.10
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**118.00**	**1.501**	**49.53**
14.15	50.0	Shear	kip	-85.08	-0.00	-7.38	8.869	292.67
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**116.56**	**1.539**	**50.77**
16.98	60.0	Shear	kip	-85.08	-1.65	-9.66	6.609	218.08
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**104.05**	**1.788**	**59.02**
19.80	70.0	Shear	kip	-85.08	-3.30	-12.26	5.080	167.63
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**84.06**	**2.349**	**77.52**
22.63	80.0	Shear	kip	-85.08	-5.12	-14.86	4.075	134.46
25.46	90.0	Flexure	kip-ft	291.74	21.57	49.37	4.125	136.14
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-17.45**	**3.589**	**118.44**
26.81	94.8	Flexure	kip-ft	256.36	11.90	27.65	6.719	221.73
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-18.69**	**4.482**	**147.89**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-18.96**	**4.713**	**155.53**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - (w/ Post Tensioning)
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3465.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**19.76**	**4.649**	**162.71**
1.69	6.0	Flexure	kip-ft	243.32	13.52	32.50	5.359	187.56
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**19.26**	**4.349**	**152.22**
2.83	10.0	Flexure	kip-ft	284.36	21.61	51.35	3.855	134.94
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**18.15**	**3.573**	**125.06**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**87.11**	**2.266**	**79.32**
5.66	20.0	Shear	kip	85.08	5.11	15.40	3.932	137.62
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**111.07**	**1.675**	**58.63**
8.49	30.0	Shear	kip	85.08	3.30	12.64	4.926	172.42

11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**127.15**	**1.410**	**49.36**
11.32	40.0	Shear	kip	84.27	1.65	9.99	6.330	221.56
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**127.65**	**1.387**	**48.56**
14.15	50.0	Shear	kip	-85.08	-0.00	-7.78	8.408	294.29
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**127.15**	**1.411**	**49.37**
16.98	60.0	Shear	kip	-84.29	-1.65	-9.99	6.331	221.58
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**111.07**	**1.675**	**58.64**
19.80	70.0	Shear	kip	-85.08	-3.30	-12.64	4.926	172.40
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**87.11**	**2.267**	**79.33**
22.63	80.0	Shear	kip	-85.08	-5.12	-15.40	3.932	137.61
25.46	90.0	Flexure	kip-ft	291.74	21.57	51.35	3.967	138.84
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-18.15**	**3.451**	**120.79**
26.81	94.8	Flexure	kip-ft	256.36	11.90	28.79	6.452	225.84
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-19.46**	**4.304**	**150.63**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-19.75**	**4.525**	**158.36**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294
Bridge ID: 874294

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 15:31:36
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 15:32:03

Structure Definition Name: INT Span 2 - PS Conc PSU
Member Name: G3
Member Alternative Name: 17"x36" INT PSU - Existing Condition

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location							Inventory Rating	Inventory Load Rating	Operating Rating	Operating Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Factor	(Ton)	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	1.08	-0.00	0.00	99.000	3564.00		
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**48.83**	**1.162**	**41.84**	**1.507**	**54.24**
1.48	3.8	Flexure	kip-ft	408.30	16.29	71.63	3.095	111.40	4.011	144.41
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**48.15**	**1.110**	**39.96**	**1.439**	**51.80**
1.48	3.8	Concrete Stresses	ksi	2.45	0.12	0.53	5.535	199.26		
3.85	10.0	Flexure	kip-ft	462.73	39.60	171.07	1.380	49.69	1.789	64.41
3.85	**10.0**	**Shear**	**kip**	**76.71**	**9.14**	**43.77**	**0.852**	**30.69**	**1.159**	**41.74**
3.85	10.0	Concrete Stresses	ksi	2.45	0.29	1.26	2.147	77.31		
7.70	20.0	Flexure	kip-ft	462.73	70.46	292.21	0.733	26.37	0.950	34.19
7.70	**20.0**	**Shear**	**kip**	**32.51**	**6.89**	**36.77**	**0.371**	**13.37**	**0.771**	**27.74**
7.70	20.0	Concrete Stresses	ksi	2.45	0.52	2.15	1.125	40.50		
11.55	30.0	Flexure	kip-ft	462.73	92.31	365.43	0.543	19.55	0.704	25.35
11.55	**30.0**	**Shear**	**kip**	**24.35**	**4.49**	**30.09**	**0.356**	**12.81**	**0.698**	**25.14**
11.55	30.0	Concrete Stresses	ksi	2.45	0.68	2.69	0.825	29.70		
15.40	40.0	Flexure	kip-ft	462.73	105.27	402.57	0.470	16.92	0.609	21.94
15.40	**40.0**	**Shear**	**kip**	**22.39**	**2.24**	**24.02**	**0.466**	**16.78**	**0.839**	**30.20**
15.40	40.0	Concrete Stresses	ksi	2.45	0.77	2.96	0.709	25.51		
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**400.72**	**0.465**	**16.72**	**0.602**	**21.68**
19.25	50.0	Shear	kip	-22.39	0.00	-18.10	0.707	25.46	1.251	45.02
19.25	50.0		ksi	2.45	0.81	2.95	0.698	25.14		

		Concrete Stresses								
23.10	60.0	Flexure	kip-ft	462.73	105.27	402.57	0.470	16.92	0.609	21.94
23.10	**60.0**	**Shear**	**kip**	**-22.39**	**-2.24**	**-24.02**	**0.466**	**16.78**	**0.839**	**30.20**
23.10	60.0	Concrete Stresses	ksi	2.45	0.77	2.96	0.709	25.51		
26.95	70.0	Flexure	kip-ft	480.13	92.31	365.43	0.570	20.53	0.739	26.62
26.95	**70.0**	**Shear**	**kip**	**-27.52**	**-4.49**	**-30.09**	**0.416**	**14.98**	**0.781**	**28.10**
26.95	70.0	Concrete Stresses	ksi	2.45	0.68	2.69	0.825	29.70		
30.80	80.0	Flexure	kip-ft	462.73	70.46	292.21	0.733	26.37	0.950	34.19
30.80	**80.0**	**Shear**	**kip**	**-32.51**	**-6.89**	**-36.77**	**0.371**	**13.37**	**0.771**	**27.74**
30.80	80.0	Concrete Stresses	ksi	2.45	0.52	2.15	1.125	40.50		
34.65	90.0	Flexure	kip-ft	462.73	39.60	171.07	1.380	49.69	1.789	64.41
34.65	**90.0**	**Shear**	**kip**	**-76.71**	**-9.14**	**-43.77**	**0.852**	**30.69**	**1.159**	**41.74**
34.65	90.0	Concrete Stresses	ksi	2.45	0.29	1.26	2.147	77.31		
37.02	96.2	Flexure	kip-ft	408.30	16.29	71.63	3.095	111.41	4.012	144.41
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-48.15**	**1.110**	**39.96**	**1.439**	**51.80**
37.02	96.2	Concrete Stresses	ksi	2.45	0.12	0.53	5.535	199.26		
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-48.84**	**1.162**	**41.84**	**1.507**	**54.24**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	1.08	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Condition
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location							Inventory Rating	Inventory Load Rating	Operating Rating	Operating Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Factor	(Ton)	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	1.08	-0.00	0.00	99.000	3564.00		

1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**43.64**	**1.300**	**46.82**	**1.686**	**60.69**
1.48	3.8	Flexure	kip-ft	408.30	16.29	64.20	3.453	124.30	4.476	161.14
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**43.13**	**1.239**	**44.62**	**1.607**	**57.84**
1.48	3.8	Concrete Stresses	ksi	2.45	0.12	0.47	6.176	222.33		
3.85	10.0	Flexure	kip-ft	462.73	39.60	155.89	1.515	54.53	1.964	70.69
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**39.82**	**0.983**	**35.39**	**1.274**	**45.87**
3.85	10.0	Concrete Stresses	ksi	2.45	0.29	1.15	2.357	84.84		
7.70	20.0	Flexure	kip-ft	462.73	70.46	275.36	0.777	27.99	1.008	36.28
7.70	**20.0**	**Shear**	**kip**	**35.22**	**6.89**	**34.58**	**0.440**	**15.83**	**0.919**	**33.10**
7.70	20.0	Concrete Stresses	ksi	2.45	0.52	2.02	1.194	42.98		
11.55	30.0	Flexure	kip-ft	462.73	92.31	358.42	0.554	19.94	0.718	25.84
11.55	**30.0**	**Shear**	**kip**	**24.98**	**4.49**	**29.48**	**0.375**	**13.52**	**0.734**	**26.44**
11.55	30.0	Concrete Stresses	ksi	2.45	0.68	2.64	0.841	30.28		
15.40	40.0	Flexure	kip-ft	462.73	105.27	405.06	0.467	16.82	0.606	21.80
15.40	**40.0**	**Shear**	**kip**	**22.39**	**2.24**	**24.53**	**0.456**	**16.43**	**0.813**	**29.28**
15.40	40.0	Concrete Stresses	ksi	2.45	0.77	2.98	0.704	25.35		
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**415.29**	**0.448**	**16.14**	**0.581**	**20.92**
19.25	50.0	Shear	kip	-22.39	0.00	-19.73	0.649	23.36	1.095	39.40
19.25	50.0	Concrete Stresses	ksi	2.45	0.81	3.05	0.674	24.26		
23.10	60.0	Flexure	kip-ft	462.73	105.27	405.06	0.467	16.82	0.606	21.80
23.10	**60.0**	**Shear**	**kip**	**-22.39**	**-2.24**	**-24.53**	**0.456**	**16.43**	**0.813**	**29.28**
23.10	60.0	Concrete Stresses	ksi	2.45	0.77	2.98	0.704	25.35		
26.95	70.0	Flexure	kip-ft	480.13	92.31	358.42	0.582	20.93	0.754	27.14
26.95	**70.0**	**Shear**	**kip**	**-28.16**	**-4.49**	**-29.48**	**0.437**	**15.74**	**0.819**	**29.47**
26.95	70.0	Concrete Stresses	ksi	2.45	0.68	2.64	0.841	30.28		
30.80	80.0	Flexure	kip-ft	462.73	70.46	275.36	0.777	27.99	1.008	36.28
30.80	**80.0**	**Shear**	**kip**	**-35.22**	**-6.89**	**-34.58**	**0.440**	**15.83**	**0.919**	**33.10**
30.80	80.0	Concrete Stresses	ksi	2.45	0.52	2.02	1.194	42.98		
34.65	90.0	Flexure	kip-ft	462.73	39.60	155.89	1.515	54.53	1.964	70.69
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-39.82**	**0.983**	**35.39**	**1.274**	**45.87**
34.65	90.0	Concrete Stresses	ksi	2.45	0.29	1.15	2.357	84.84		
37.02	96.2	Flexure	kip-ft	408.30	16.29	64.20	3.453	124.30	4.476	161.14
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-43.13**	**1.239**	**44.62**	**1.607**	**57.84**
37.02	96.2	Concrete Stresses	ksi	2.45	0.12	0.47	6.176	222.33		

37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-43.64**	**1.301**	**46.82**	**1.686**	**60.69**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	1.08	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Condition
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**2772.00**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**26.81**	**2.850**	**79.79**
1.48	3.8	Flexure	kip-ft	408.30	16.29	39.03	7.645	214.05
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**26.39**	**2.727**	**76.35**
3.85	10.0	Flexure	kip-ft	462.73	39.60	91.00	3.493	97.80
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**23.64**	**2.229**	**62.42**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**147.98**	**1.947**	**54.53**
7.70	20.0	Shear	kip	79.93	6.89	19.22	2.854	79.92
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**190.63**	**1.402**	**39.24**
11.55	30.0	Shear	kip	79.93	4.49	16.51	3.464	96.98
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**215.01**	**1.185**	**33.17**
15.40	40.0	Shear	kip	79.93	2.24	13.79	4.301	120.44
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**213.27**	**1.175**	**32.90**
19.25	50.0	Shear	kip	79.93	0.00	11.08	5.550	155.39
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**215.01**	**1.185**	**33.17**
23.10	60.0	Shear	kip	-79.93	-2.24	-13.79	4.301	120.44
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**190.63**	**1.472**	**41.21**
26.95	70.0	Shear	kip	-80.21	-4.49	-16.51	3.477	97.35
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**147.98**	**1.947**	**54.53**
30.80	80.0	Shear	kip	-79.93	-6.89	-19.22	2.854	79.92
34.65	90.0	Flexure	kip-ft	462.73	39.60	91.00	3.493	97.80
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-23.64**	**2.229**	**62.42**
37.02	96.2	Flexure	kip-ft	408.30	16.29	39.03	7.645	214.05
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-26.39**	**2.727**	**76.35**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-26.81**	**2.850**	**79.79**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3628.35**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**37.60**	**2.032**	**74.48**
1.48	3.8	Flexure	kip-ft	408.30	16.29	54.79	5.446	199.60
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**37.04**	**1.943**	**71.19**
3.85	10.0	Flexure	kip-ft	462.73	39.60	129.53	2.454	89.94
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**33.65**	**1.566**	**57.40**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**218.51**	**1.319**	**48.34**
7.70	20.0	Shear	kip	79.93	6.89	28.38	1.933	70.84
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**266.94**	**1.001**	**36.68**
11.55	30.0	Shear	kip	55.52	4.49	23.11	1.661	60.88
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**295.17**	**0.863**	**31.63**
15.40	40.0	Shear	kip	46.74	2.24	19.17	1.763	64.63
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**301.38**	**0.831**	**30.47**
19.25	50.0	Shear	kip	-45.84	0.00	-15.66	2.252	82.55
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**295.17**	**0.863**	**31.63**
23.10	60.0	Shear	kip	-46.74	-2.24	-19.17	1.763	64.63
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**266.94**	**1.051**	**38.52**
26.95	70.0	Shear	kip	-58.64	-4.49	-23.11	1.765	64.69
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**218.51**	**1.319**	**48.34**
30.80	80.0	Shear	kip	-79.93	-6.89	-28.38	1.933	70.84
34.65	90.0	Flexure	kip-ft	462.73	39.60	129.53	2.454	89.94
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-33.65**	**1.566**	**57.40**
37.02	96.2	Flexure	kip-ft	408.30	16.29	54.79	5.446	199.60
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-37.04**	**1.943**	**71.19**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-37.60**	**2.032**	**74.48**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
C 5

Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**37.64**	**2.030**	**81.19**
1.48	3.8	Flexure	kip-ft	408.30	16.29	54.90	5.436	217.43
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**37.11**	**1.939**	**77.55**
3.85	10.0	Flexure	kip-ft	462.73	39.60	129.65	2.452	98.07
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**33.67**	**1.565**	**62.59**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**216.28**	**1.332**	**53.30**
7.70	20.0	Shear	kip	79.93	6.89	28.09	1.953	78.12
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**268.72**	**0.994**	**39.77**
11.55	30.0	Shear	kip	54.91	4.49	23.27	1.630	65.20
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**300.26**	**0.848**	**33.93**
15.40	40.0	Shear	kip	45.69	2.24	19.28	1.711	68.45
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**310.88**	**0.806**	**32.24**
19.25	50.0	Shear	kip	-44.19	0.00	-14.79	2.298	91.91
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**300.26**	**0.848**	**33.93**
23.10	60.0	Shear	kip	-45.69	-2.24	-19.28	1.711	68.45
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**268.72**	**1.044**	**41.76**
26.95	70.0	Shear	kip	-58.05	-4.49	-23.27	1.734	69.36
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**216.28**	**1.332**	**53.30**
30.80	80.0	Shear	kip	-79.93	-6.89	-28.09	1.953	78.12
34.65	90.0	Flexure	kip-ft	462.73	39.60	129.65	2.452	98.07
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-33.67**	**1.565**	**62.59**
37.02	96.2	Flexure	kip-ft	408.30	16.29	54.90	5.436	217.43
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-37.11**	**1.939**	**77.55**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-37.64**	**2.030**	**81.19**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	182.43	0.00	0.00	99.000	5940.00
1.48	3.8	Flexure	kip-ft	408.30	16.29	84.85	3.810	228.59
3.85	10.0	Flexure	kip-ft	462.73	39.60	201.93	1.705	102.32
7.70	20.0	Flexure	kip-ft	462.73	70.46	342.42	0.912	54.71
11.55	30.0	Flexure	kip-ft	462.73	92.31	424.27	0.682	40.93
15.40	40.0	Flexure	kip-ft	462.73	105.27	464.01	0.595	35.68
19.25	50.0	Flexure	kip-ft	462.73	109.59	457.59	0.593	35.59
23.10	60.0	Flexure	kip-ft	462.73	105.27	464.01	0.595	35.68
26.95	70.0	Flexure	kip-ft	480.13	92.31	424.27	0.716	42.98
30.80	80.0	Flexure	kip-ft	462.73	70.46	342.42	0.912	54.71
34.65	90.0	Flexure	kip-ft	462.73	39.60	201.93	1.705	102.32
37.02	96.2	Flexure	kip-ft	408.30	16.29	84.85	3.810	228.59
38.50	100.0	Flexure	kip-ft	157.45	0.00	0.00	99.000	5940.00

Detailed Rating Results
17"x36" INT PSU - Existing Condition
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**34.38**	**2.222**	**88.88**
1.48	3.8	Flexure	kip-ft	408.30	16.29	50.25	5.938	237.52
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**33.97**	**2.118**	**84.72**
3.85	10.0	Flexure	kip-ft	462.73	39.60	120.59	2.636	105.44
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**31.32**	**1.682**	**67.30**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**207.99**	**1.386**	**55.42**
7.70	20.0	Shear	kip	79.93	6.89	27.01	2.031	81.23
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**262.21**	**1.019**	**40.76**
11.55	30.0	Shear	kip	57.20	4.49	22.70	1.748	69.93
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**294.75**	**0.864**	**34.57**
15.40	40.0	Shear	kip	47.00	2.24	18.39	1.848	73.94

19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**299.85**	**0.836**	**33.43**
19.25	50.0	Shear	kip	-46.49	0.00	-14.08	2.539	101.56
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**294.75**	**0.864**	**34.57**
23.10	60.0	Shear	kip	-47.00	-2.24	-18.39	1.848	73.94
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**262.21**	**1.070**	**42.80**
26.95	70.0	Shear	kip	-60.25	-4.49	-22.70	1.851	74.05
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**207.99**	**1.386**	**55.42**
30.80	80.0	Shear	kip	-79.93	-6.89	-27.01	2.031	81.23
34.65	90.0	Flexure	kip-ft	462.73	39.60	120.59	2.636	105.44
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-31.32**	**1.682**	**67.30**
37.02	96.2	Flexure	kip-ft	408.30	16.29	50.25	5.938	237.52
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-33.97**	**2.118**	**84.72**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-34.38**	**2.222**	**88.89**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**1683.00**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**23.11**	**3.306**	**56.19**
1.48	3.8	Flexure	kip-ft	408.30	16.29	33.81	8.827	150.05
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**22.86**	**3.148**	**53.52**
3.85	10.0	Flexure	kip-ft	462.73	39.60	81.56	3.897	66.25
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**21.19**	**2.487**	**42.29**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**142.24**	**2.026**	**34.44**
7.70	20.0	Shear	kip	79.93	6.89	18.47	2.970	50.48
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**182.02**	**1.468**	**24.95**
11.55	30.0	Shear	kip	79.93	4.49	15.76	3.628	61.67
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**200.90**	**1.268**	**21.55**
15.40	40.0	Shear	kip	79.93	2.24	13.05	4.547	77.31
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**198.90**	**1.260**	**21.42**
19.25	50.0	Shear	kip	79.93	0.00	10.33	5.950	101.16
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**200.90**	**1.268**	**21.55**
23.10	60.0	Shear	kip	-79.93	-2.24	-13.05	4.547	77.31

26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**182.02**	**1.541**	**26.20**
26.95	70.0	Shear	kip	-80.21	-4.49	-15.76	3.641	61.90
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**142.24**	**2.026**	**34.44**
30.80	80.0	Shear	kip	-79.93	-6.89	-18.47	2.970	50.48
34.65	90.0	Flexure	kip-ft	462.73	39.60	81.56	3.897	66.25
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-21.19**	**2.487**	**42.29**
37.02	96.2	Flexure	kip-ft	408.30	16.29	33.81	8.827	150.05
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-22.86**	**3.148**	**53.52**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-23.11**	**3.306**	**56.20**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3267.00**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**42.33**	**1.805**	**59.57**
1.48	3.8	Flexure	kip-ft	408.30	16.29	61.87	4.823	159.16
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**41.83**	**1.720**	**56.77**
3.85	10.0	Flexure	kip-ft	462.73	39.60	148.55	2.140	70.61
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**38.58**	**1.366**	**45.07**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**256.55**	**1.123**	**37.07**
7.70	20.0	Shear	kip	62.13	6.89	33.32	1.236	40.77
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**323.99**	**0.825**	**27.21**
11.55	30.0	Shear	kip	41.63	4.49	28.05	0.988	32.59
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**365.51**	**0.697**	**23.00**
15.40	40.0	Shear	kip	35.37	2.24	22.78	1.099	36.28
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**373.79**	**0.670**	**22.12**
19.25	50.0	Shear	kip	-34.84	0.00	-17.52	1.530	50.49
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**365.51**	**0.697**	**23.00**
23.10	60.0	Shear	kip	-35.37	-2.24	-22.78	1.099	36.28
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**323.99**	**0.866**	**28.58**
26.95	70.0	Shear	kip	-45.02	-4.49	-28.05	1.081	35.66
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**256.55**	**1.123**	**37.07**
30.80	80.0	Shear	kip	-62.13	-6.89	-33.32	1.236	40.77

34.65	90.0	Flexure	kip-ft	462.73	39.60	148.55	2.140	70.61
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-38.58**	**1.366**	**45.07**
37.02	96.2	Flexure	kip-ft	408.30	16.29	61.87	4.823	159.16
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-41.83**	**1.720**	**56.77**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-42.33**	**1.805**	**59.57**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - Existing Condition
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.43**	**0.00**	**0.00**	**99.000**	**3465.00**
1.12	**2.9**	**Shear**	**kip**	**112.74**	**10.73**	**44.35**	**1.723**	**60.29**
1.48	3.8	Flexure	kip-ft	408.30	16.29	64.83	4.603	161.11
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**43.83**	**1.642**	**57.46**
3.85	10.0	Flexure	kip-ft	462.73	39.60	155.49	2.044	71.55
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**40.39**	**1.305**	**45.67**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**267.96**	**1.075**	**37.64**
7.70	20.0	Shear	kip	57.26	6.89	34.80	1.075	37.63
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**345.07**	**0.774**	**27.10**
11.55	30.0	Shear	kip	38.34	4.49	29.21	0.862	30.16
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**394.80**	**0.645**	**22.58**
15.40	40.0	Shear	kip	32.21	2.24	23.63	0.957	33.51
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**401.52**	**0.624**	**21.84**
19.25	50.0	Shear	kip	-31.95	0.00	-18.04	1.362	47.67
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**394.80**	**0.645**	**22.58**
23.10	60.0	Shear	kip	-32.21	-2.24	-23.63	0.957	33.51
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**345.07**	**0.813**	**28.46**
26.95	70.0	Shear	kip	-41.72	-4.49	-29.21	0.951	33.28
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**267.96**	**1.075**	**37.64**
30.80	80.0	Shear	kip	-57.26	-6.89	-34.80	1.075	37.63
34.65	90.0	Flexure	kip-ft	462.73	39.60	155.49	2.044	71.55
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-40.39**	**1.305**	**45.67**
37.02	96.2	Flexure	kip-ft	408.30	16.29	64.83	4.603	161.11
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-43.83**	**1.642**	**57.46**

37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-44.36**	**1.723**	**60.29**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294
Bridge ID: 874294

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 15:34:40
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 15:35:19

Structure Definition Name: INT Span 2 - PS Conc PSU
Member Name: G10
Member Alternative Name: 17"x36" INT PSU - w/ post Tensioning

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location							Inventory Rating	Inventory Load Rating	Operating Rating	Operating Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Factor	(Ton)	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	1.08	-0.00	0.00	99.000	3564.00		
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**20.86**	**2.720**	**97.92**	**3.526**	**126.94**
1.48	3.8	Flexure	kip-ft	408.30	16.29	30.61	7.243	260.75	9.389	338.01
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**20.57**	**2.598**	**93.53**	**3.368**	**121.24**
1.48	3.8	Concrete Stresses	ksi	2.45	0.12	0.23	12.955	466.37		
3.85	10.0	Flexure	kip-ft	462.73	39.60	73.09	3.231	116.30	4.188	150.76
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**18.70**	**2.093**	**75.36**	**2.714**	**97.69**
3.85	10.0	Concrete Stresses	ksi	2.45	0.29	0.54	5.026	180.94		
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**124.85**	**1.715**	**61.73**	**2.223**	**80.02**
7.70	20.0	Shear	kip	79.93	6.89	15.71	2.594	93.38	3.363	121.05
7.70	20.0	Concrete Stresses	ksi	2.45	0.52	0.92	2.633	94.80		
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**156.13**	**1.271**	**45.76**	**1.648**	**59.32**
11.55	30.0	Shear	kip	79.93	4.49	12.85	3.304	118.93	4.283	154.17
11.55	30.0	Concrete Stresses	ksi	2.45	0.68	1.15	1.931	69.51		
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**172.00**	**1.100**	**39.61**	**1.426**	**51.34**
15.40	40.0	Shear	kip	70.23	2.24	10.26	3.754	135.16	5.567	200.41
15.40	40.0	Concrete Stresses	ksi	2.45	0.77	1.26	1.659	59.71		
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**171.21**	**1.087**	**39.14**	**1.409**	**50.74**

19.25	50.0	Shear	kip	-71.82	0.00	-7.73	5.308	191.08	7.657	275.64
19.25	50.0	Concrete Stresses	ksi	2.45	0.81	1.26	1.635	58.85		
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**172.00**	**1.100**	**39.61**	**1.426**	**51.34**
23.10	60.0	Shear	kip	-70.23	-2.24	-10.26	3.754	135.16	5.567	200.41
23.10	60.0	Concrete Stresses	ksi	2.45	0.77	1.26	1.659	59.71		
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**156.13**	**1.335**	**48.06**	**1.730**	**62.30**
26.95	70.0	Shear	kip	-80.21	-4.49	-12.85	3.316	119.38	4.299	154.75
26.95	70.0	Concrete Stresses	ksi	2.45	0.68	1.15	1.931	69.51		
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**124.85**	**1.715**	**61.73**	**2.223**	**80.02**
30.80	80.0	Shear	kip	-79.93	-6.89	-15.71	2.594	93.38	3.363	121.05
30.80	80.0	Concrete Stresses	ksi	2.45	0.52	0.92	2.633	94.80		
34.65	90.0	Flexure	kip-ft	462.73	39.60	73.09	3.231	116.30	4.188	150.76
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-18.70**	**2.093**	**75.36**	**2.714**	**97.69**
34.65	90.0	Concrete Stresses	ksi	2.45	0.29	0.54	5.026	180.94		
37.02	96.2	Flexure	kip-ft	408.30	16.29	30.61	7.243	260.75	9.389	338.01
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-20.57**	**2.598**	**93.53**	**3.368**	**121.24**
37.02	96.2	Concrete Stresses	ksi	2.45	0.12	0.23	12.955	466.37		
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-20.87**	**2.720**	**97.93**	**3.526**	**126.95**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	1.08	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location							Inventory Rating	Inventory Load Rating	Operating Rating	Operating Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Factor	(Ton)	Factor	(Ton)

0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	1.08	-0.00	0.00	99.000	3564.00		
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**18.65**	**3.044**	**109.57**	**3.945**	**142.04**
1.48	3.8	Flexure	kip-ft	408.30	16.29	27.43	8.082	290.94	10.476	377.14
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**18.43**	**2.901**	**104.43**	**3.760**	**135.37**
1.48	3.8	Concrete Stresses	ksi	2.45	0.12	0.20	14.455	520.38		
3.85	10.0	Flexure	kip-ft	462.73	39.60	66.60	3.545	127.63	4.596	165.45
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**17.02**	**2.301**	**82.82**	**2.982**	**107.36**
3.85	10.0	Concrete Stresses	ksi	2.45	0.29	0.49	5.516	198.56		
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**117.65**	**1.820**	**65.51**	**2.359**	**84.92**
7.70	20.0	Shear	kip	79.93	6.89	14.77	2.758	99.29	3.575	128.71
7.70	20.0	Concrete Stresses	ksi	2.45	0.52	0.86	2.795	100.61		
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**153.13**	**1.296**	**46.66**	**1.680**	**60.48**
11.55	30.0	Shear	kip	79.93	4.49	12.60	3.372	121.38	4.371	157.35
11.55	30.0	Concrete Stresses	ksi	2.45	0.68	1.13	1.969	70.87		
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**173.06**	**1.093**	**39.36**	**1.417**	**51.02**
15.40	40.0	Shear	kip	69.26	2.24	10.48	3.623	130.44	5.451	196.25
15.40	40.0	Concrete Stresses	ksi	2.45	0.77	1.27	1.648	59.34		
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**177.43**	**1.049**	**37.77**	**1.360**	**48.96**
19.25	50.0	Shear	kip	-66.70	0.00	-8.43	4.523	162.82	7.025	252.91
19.25	50.0	Concrete Stresses	ksi	2.45	0.81	1.30	1.577	56.78		
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**173.06**	**1.093**	**39.36**	**1.417**	**51.02**
23.10	60.0	Shear	kip	-69.26	-2.24	-10.48	3.623	130.44	5.451	196.25
23.10	60.0	Concrete Stresses	ksi	2.45	0.77	1.27	1.648	59.34		
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**153.13**	**1.361**	**49.00**	**1.764**	**63.52**
26.95	70.0	Shear	kip	-80.21	-4.49	-12.60	3.384	121.84	4.387	157.94
26.95	70.0	Concrete Stresses	ksi	2.45	0.68	1.13	1.969	70.87		
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**117.65**	**1.820**	**65.51**	**2.359**	**84.92**
30.80	80.0	Shear	kip	-79.93	-6.89	-14.77	2.758	99.29	3.575	128.71
30.80	80.0		ksi	2.45	0.52	0.86	2.795	100.61		

		Concrete Stresses								
34.65	90.0	Flexure	kip-ft	462.73	39.60	66.60	3.545	127.63	4.596	165.45
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-17.02**	**2.301**	**82.82**	**2.982**	**107.36**
34.65	90.0	Concrete Stresses	ksi	2.45	0.29	0.49	5.516	198.56		
37.02	96.2	Flexure	kip-ft	408.30	16.29	27.43	8.082	290.94	10.476	377.14
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-18.43**	**2.901**	**104.43**	**3.760**	**135.37**
37.02	96.2	Concrete Stresses	ksi	2.45	0.12	0.20	14.455	520.38		
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-18.65**	**3.044**	**109.58**	**3.946**	**142.05**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	1.08	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**2772.00**
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**11.46**	**6.669**	**186.74**
1.48	3.8	Flexure	kip-ft	408.30	16.29	16.68	17.893	501.00
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**11.27**	**6.382**	**178.70**
3.85	10.0	Flexure	kip-ft	462.73	39.60	38.88	8.175	228.91
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**10.10**	**5.218**	**146.10**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**63.23**	**4.558**	**127.63**
7.70	20.0	Shear	kip	79.93	6.89	8.21	6.680	187.05
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**81.45**	**3.280**	**91.85**
11.55	30.0	Shear	kip	79.93	4.49	7.05	8.107	226.99
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**91.86**	**2.773**	**77.64**
15.40	40.0	Shear	kip	79.93	2.24	5.89	10.068	281.90
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**91.12**	**2.750**	**77.00**
19.25	50.0	Shear	kip	79.93	0.00	4.73	12.989	363.70
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**91.86**	**2.773**	**77.64**
23.10	60.0	Shear	kip	-79.93	-2.24	-5.89	10.068	281.90

26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**81.45**	**3.445**	**96.45**
26.95	70.0	Shear	kip	-80.21	-4.49	-7.05	8.137	227.84
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**63.23**	**4.558**	**127.63**
30.80	80.0	Shear	kip	-79.93	-6.89	-8.21	6.680	187.05
34.65	90.0	Flexure	kip-ft	462.73	39.60	38.88	8.175	228.91
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-10.10**	**5.218**	**146.10**
37.02	96.2	Flexure	kip-ft	408.30	16.29	16.68	17.893	501.00
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-11.27**	**6.382**	**178.70**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-11.46**	**6.670**	**186.75**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**3628.35**
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**16.06**	**4.756**	**174.32**
1.48	3.8	Flexure	kip-ft	408.30	16.29	23.41	12.747	467.17
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**15.83**	**4.547**	**166.63**
3.85	10.0	Flexure	kip-ft	462.73	39.60	55.34	5.744	210.50
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**14.37**	**3.666**	**134.35**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**93.36**	**3.087**	**113.13**
7.70	20.0	Shear	kip	79.93	6.89	12.12	4.524	165.81
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**114.05**	**2.343**	**85.86**
11.55	30.0	Shear	kip	79.93	4.49	9.87	5.790	212.19
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**126.11**	**2.020**	**74.03**
15.40	40.0	Shear	kip	79.93	2.24	8.19	7.244	265.51
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**128.76**	**1.946**	**71.32**
19.25	50.0	Shear	kip	79.93	0.00	6.69	9.192	336.87
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**126.11**	**2.020**	**74.03**
23.10	60.0	Shear	kip	-79.93	-2.24	-8.19	7.244	265.51
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**114.05**	**2.460**	**90.16**
26.95	70.0	Shear	kip	-80.21	-4.49	-9.87	5.811	212.98
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**93.36**	**3.087**	**113.13**
30.80	80.0	Shear	kip	-79.93	-6.89	-12.12	4.524	165.81

34.65	90.0	Flexure	kip-ft	462.73	39.60	55.34	5.744	210.50
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-14.37**	**3.666**	**134.35**
37.02	96.2	Flexure	kip-ft	408.30	16.29	23.41	12.747	467.17
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-15.83**	**4.547**	**166.63**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-16.06**	**4.757**	**174.33**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**16.08**	**4.750**	**190.02**
1.48	3.8	Flexure	kip-ft	408.30	16.29	23.46	12.722	508.90
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**15.86**	**4.538**	**181.51**
3.85	10.0	Flexure	kip-ft	462.73	39.60	55.39	5.739	229.54
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**14.39**	**3.663**	**146.51**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**92.41**	**3.119**	**124.75**
7.70	20.0	Shear	kip	79.93	6.89	12.00	4.571	182.83
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**114.81**	**2.327**	**93.08**
11.55	30.0	Shear	kip	79.93	4.49	9.94	5.751	230.04
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**128.28**	**1.986**	**79.42**
15.40	40.0	Shear	kip	79.93	2.24	8.24	7.203	288.14
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**132.83**	**1.886**	**75.46**
19.25	50.0	Shear	kip	79.93	0.00	6.32	9.727	389.09
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**128.28**	**1.986**	**79.42**
23.10	60.0	Shear	kip	-79.93	-2.24	-8.24	7.203	288.14
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**114.81**	**2.444**	**97.75**
26.95	70.0	Shear	kip	-80.21	-4.49	-9.94	5.773	230.90
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**92.41**	**3.119**	**124.75**
30.80	80.0	Shear	kip	-79.93	-6.89	-12.00	4.571	182.83
34.65	90.0	Flexure	kip-ft	462.73	39.60	55.39	5.739	229.54
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-14.39**	**3.663**	**146.51**
37.02	96.2	Flexure	kip-ft	408.30	16.29	23.46	12.722	508.90
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-15.86**	**4.538**	**181.51**

37.39	97.1	Shear	kip	-112.75	-10.73	-16.08	4.751	190.03
38.50	100.0	Flexure	kip-ft	157.45	0.00	0.00	99.000	3960.00

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	182.46	0.00	0.00	99.000	5940.00
1.48	3.8	Flexure	kip-ft	408.30	16.29	35.85	9.016	540.99
3.85	10.0	Flexure	kip-ft	462.73	39.60	85.33	4.036	242.14
7.70	20.0	Flexure	kip-ft	462.73	70.46	144.69	2.158	129.47
11.55	30.0	Flexure	kip-ft	462.73	92.31	179.27	1.615	96.87
15.40	40.0	Flexure	kip-ft	462.73	105.27	196.07	1.407	84.45
19.25	50.0	Flexure	kip-ft	462.73	109.59	193.35	1.404	84.24
23.10	60.0	Flexure	kip-ft	462.73	105.27	196.07	1.407	84.45
26.95	70.0	Flexure	kip-ft	480.13	92.31	179.27	1.695	101.73
30.80	80.0	Flexure	kip-ft	462.73	70.46	144.69	2.158	129.47
34.65	90.0	Flexure	kip-ft	462.73	39.60	85.33	4.036	242.14
37.02	96.2	Flexure	kip-ft	408.30	16.29	35.85	9.016	540.99
38.50	100.0	Flexure	kip-ft	157.45	0.00	0.00	99.000	5940.00

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	182.46	0.00	0.00	99.000	3960.00

1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**14.69**	**5.201**	**208.03**
1.48	3.8	Flexure	kip-ft	408.30	16.29	21.47	13.898	555.92
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**14.52**	**4.957**	**198.29**
3.85	10.0	Flexure	kip-ft	462.73	39.60	51.52	6.170	246.79
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**13.38**	**3.938**	**157.51**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**88.86**	**3.243**	**129.72**
7.70	20.0	Shear	kip	79.93	6.89	11.54	4.753	190.12
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**112.03**	**2.385**	**95.39**
11.55	30.0	Shear	kip	79.93	4.49	9.70	5.894	235.75
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**125.93**	**2.023**	**80.91**
15.40	40.0	Shear	kip	79.93	2.24	7.86	7.549	301.96
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**128.11**	**1.956**	**78.24**
19.25	50.0	Shear	kip	79.93	0.00	6.02	10.217	408.69
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**125.93**	**2.023**	**80.91**
23.10	60.0	Shear	kip	-79.93	-2.24	-7.86	7.549	301.96
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**112.03**	**2.504**	**100.17**
26.95	70.0	Shear	kip	-80.21	-4.49	-9.70	5.916	236.64
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**88.86**	**3.243**	**129.72**
30.80	80.0	Shear	kip	-79.93	-6.89	-11.54	4.753	190.12
34.65	90.0	Flexure	kip-ft	462.73	39.60	51.52	6.170	246.79
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-13.38**	**3.938**	**157.51**
37.02	96.2	Flexure	kip-ft	408.30	16.29	21.47	13.898	555.92
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-14.52**	**4.957**	**198.28**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-14.69**	**5.201**	**208.05**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj-LL***	**LL**	**Legal Rating Factor**	**Legal Load Rating (Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**1683.00**
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**9.87**	**7.737**	**131.52**
1.48	3.8	Flexure	kip-ft	408.30	16.29	14.44	20.659	351.20
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**9.77**	**7.369**	**125.27**
3.85	10.0	Flexure	kip-ft	462.73	39.60	34.85	9.121	155.07

3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**9.05**	**5.822**	**98.97**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**60.77**	**4.742**	**80.62**
7.70	20.0	Shear	kip	79.93	6.89	7.89	6.950	118.15
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**77.77**	**3.436**	**58.41**
11.55	30.0	Shear	kip	79.93	4.49	6.73	8.491	144.34
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**85.84**	**2.968**	**50.45**
15.40	40.0	Shear	kip	79.93	2.24	5.57	10.644	180.94
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**84.98**	**2.949**	**50.13**
19.25	50.0	Shear	kip	79.93	0.00	4.41	13.927	236.76
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**85.84**	**2.968**	**50.45**
23.10	60.0	Shear	kip	-79.93	-2.24	-5.57	10.644	180.94
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**77.77**	**3.608**	**61.33**
26.95	70.0	Shear	kip	-80.21	-4.49	-6.73	8.523	144.88
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**60.77**	**4.742**	**80.62**
30.80	80.0	Shear	kip	-79.93	-6.89	-7.89	6.950	118.15
34.65	90.0	Flexure	kip-ft	462.73	39.60	34.85	9.122	155.07
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-9.05**	**5.822**	**98.97**
37.02	96.2	Flexure	kip-ft	408.30	16.29	14.44	20.659	351.20
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-9.77**	**7.369**	**125.27**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-9.88**	**7.737**	**131.54**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**3267.00**
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**18.08**	**4.225**	**139.42**
1.48	3.8	Flexure	kip-ft	408.30	16.29	26.43	11.289	372.52
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**17.87**	**4.026**	**132.87**
3.85	10.0	Flexure	kip-ft	462.73	39.60	63.47	5.008	165.27
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**16.49**	**3.197**	**105.48**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**109.61**	**2.629**	**86.76**
7.70	20.0	Shear	kip	79.93	6.89	14.24	3.853	127.16
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**138.43**	**1.930**	**63.69**

11.55	30.0	Shear	kip	79.93	4.49	11.98	4.770	157.41
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**156.17**	**1.631**	**53.83**
15.40	40.0	Shear	kip	79.93	2.24	9.73	6.094	201.11
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**159.70**	**1.569**	**51.78**
19.25	50.0	Shear	kip	79.93	0.00	7.48	8.215	271.09
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**156.17**	**1.631**	**53.83**
23.10	60.0	Shear	kip	-79.93	-2.24	-9.73	6.094	201.11
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**138.43**	**2.027**	**66.89**
26.95	70.0	Shear	kip	-80.21	-4.49	-11.98	4.788	158.00
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**109.61**	**2.629**	**86.76**
30.80	80.0	Shear	kip	-79.93	-6.89	-14.24	3.853	127.16
34.65	90.0	Flexure	kip-ft	462.73	39.60	63.47	5.008	165.27
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-16.49**	**3.196**	**105.48**
37.02	96.2	Flexure	kip-ft	408.30	16.29	26.43	11.289	372.52
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-17.87**	**4.026**	**132.87**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-18.08**	**4.225**	**139.43**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - w/ post Tensioning
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**182.46**	**0.00**	**0.00**	**99.000**	**3465.00**
1.12	**2.9**	**Shear**	**kip**	**112.73**	**10.73**	**18.95**	**4.032**	**141.10**
1.48	3.8	Flexure	kip-ft	408.30	16.29	27.70	10.774	377.09
1.48	**3.8**	**Shear**	**kip**	**106.69**	**10.52**	**18.72**	**3.843**	**134.50**
3.85	10.0	Flexure	kip-ft	462.73	39.60	66.43	4.785	167.47
3.85	**10.0**	**Shear**	**kip**	**79.93**	**9.14**	**17.26**	**3.054**	**106.89**
7.70	**20.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**114.49**	**2.517**	**88.10**
7.70	20.0	Shear	kip	79.93	6.89	14.87	3.689	129.12
11.55	**30.0**	**Flexure**	**kip-ft**	**462.73**	**92.31**	**147.43**	**1.812**	**63.43**
11.55	30.0	Shear	kip	79.93	4.49	12.48	4.580	160.30
15.40	**40.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**168.68**	**1.510**	**52.85**
15.40	40.0	Shear	kip	79.93	2.24	10.10	5.877	205.68
19.25	**50.0**	**Flexure**	**kip-ft**	**462.73**	**109.59**	**171.55**	**1.461**	**51.12**

19.25	50.0	Shear	kip	79.93	0.00	7.71	7.976	279.15
23.10	**60.0**	**Flexure**	**kip-ft**	**462.73**	**105.27**	**168.68**	**1.510**	**52.85**
23.10	60.0	Shear	kip	-79.93	-2.24	-10.10	5.877	205.68
26.95	**70.0**	**Flexure**	**kip-ft**	**480.13**	**92.31**	**147.43**	**1.903**	**66.61**
26.95	70.0	Shear	kip	-80.21	-4.49	-12.48	4.597	160.90
30.80	**80.0**	**Flexure**	**kip-ft**	**462.73**	**70.46**	**114.49**	**2.517**	**88.10**
30.80	80.0	Shear	kip	-79.93	-6.89	-14.87	3.689	129.12
34.65	90.0	Flexure	kip-ft	462.73	39.60	66.43	4.785	167.47
34.65	**90.0**	**Shear**	**kip**	**-79.93**	**-9.14**	**-17.26**	**3.054**	**106.89**
37.02	96.2	Flexure	kip-ft	408.30	16.29	27.70	10.774	377.09
37.02	**96.2**	**Shear**	**kip**	**-106.69**	**-10.52**	**-18.72**	**3.843**	**134.50**
37.39	**97.1**	**Shear**	**kip**	**-112.75**	**-10.73**	**-18.95**	**4.032**	**141.12**
38.50	**100.0**	**Flexure**	**kip-ft**	**157.45**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294D
Bridge ID: 874294D

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 20:30:58
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 20:33:15

Structure Definition Name: End Span 1 (or 3) - PS Conc PSU
Member Name: G8
Member Alternative Name: 17"x36" INT PSU - Existing Deteriorated

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.70	-0.00	0.00	99.000	3564.00		
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**41.31**	**1.651**	**59.44**	**2.140**	**77.05**
1.69	6.0	Flexure	kip-ft	229.80	13.52	68.34	1.780	64.09	2.308	83.08
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**40.19**	**1.548**	**55.74**	**2.007**	**72.25**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.50	3.813	137.28		
2.83	10.0	Flexure	kip-ft	268.56	21.61	108.12	1.277	45.96	1.655	59.57
2.83	**10.0**	**Shear**	**kip**	**61.52**	**6.76**	**37.73**	**0.804**	**28.94**	**1.655**	**59.58**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.79	2.317	83.40		
5.66	20.0	Flexure	kip-ft	287.73	38.40	184.27	0.743	26.76	0.964	34.69
5.66	**20.0**	**Shear**	**kip**	**29.08**	**5.11**	**31.70**	**0.409**	**14.73**	**0.815**	**29.35**
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	1.35	1.245	44.84		
8.49	30.0	Flexure	kip-ft	287.73	50.23	228.45	0.563	20.25	0.729	26.26
8.49	**30.0**	**Shear**	**kip**	**23.84**	**3.30**	**25.78**	**0.437**	**15.74**	**0.795**	**28.63**
8.49	30.0	Concrete Stresses	ksi	1.63	0.37	1.68	0.940	33.83		
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**240.66**	**0.513**	**18.48**	**0.665**	**23.96**
11.32	40.0	Shear	kip	23.84	1.65	19.96	0.623	22.45	1.044	37.59
11.32	40.0	Concrete Stresses	ksi	1.63	0.42	1.77	0.856	30.81		
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**221.36**	**0.551**	**19.82**	**0.714**	**25.69**
14.15	50.0	Shear	kip	-24.63	-0.00	-14.26	0.987	35.52	1.781	64.13

14.15	50.0	Concrete Stresses	ksi	1.63	0.44	1.63	0.917	33.02		
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**240.66**	**0.513**	**18.48**	**0.666**	**23.96**
16.98	60.0	Shear	kip	-23.84	-1.65	-19.96	0.623	22.44	1.044	37.58
16.98	60.0	Concrete Stresses	ksi	1.63	0.42	1.77	0.856	30.81		
19.80	70.0	Flexure	kip-ft	287.73	50.19	228.45	0.563	20.26	0.730	26.26
19.80	**70.0**	**Shear**	**kip**	**-23.84**	**-3.30**	**-25.78**	**0.437**	**15.73**	**0.795**	**28.63**
19.80	70.0	Concrete Stresses	ksi	1.63	0.37	1.68	0.940	33.84		
22.63	80.0	Flexure	kip-ft	287.73	38.37	184.27	0.743	26.77	0.964	34.70
22.63	**80.0**	**Shear**	**kip**	**-29.09**	**-5.12**	**-31.70**	**0.409**	**14.73**	**0.815**	**29.34**
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	1.35	1.246	44.84		
25.46	90.0	Flexure	kip-ft	275.54	21.57	108.12	1.314	47.29	1.703	61.31
25.46	**90.0**	**Shear**	**kip**	**-58.55**	**-6.76**	**-37.73**	**0.759**	**27.31**	**1.599**	**57.55**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.79	2.317	83.42		
26.81	94.8	Flexure	kip-ft	242.12	11.90	60.52	2.146	77.24	2.781	100.13
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-40.64**	**1.531**	**55.11**	**1.985**	**71.44**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.44	4.340	156.22		
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-41.29**	**1.608**	**57.88**	**2.084**	**75.03**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location							Inventory Rating	Inventory Load Rating	Operating Rating	Operating Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Factor	(Ton)	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0		ksi	0.70	-0.00	0.00	99.000	3564.00		

		Concrete Stresses								
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**40.42**	**1.688**	**60.75**	**2.188**	**78.75**
1.69	6.0	Flexure	kip-ft	229.80	13.52	67.18	1.811	65.20	2.348	84.52
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**39.50**	**1.575**	**56.71**	**2.042**	**73.51**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.49	3.879	139.66		
2.83	10.0	Flexure	kip-ft	268.56	21.61	107.45	1.285	46.25	1.665	59.95
2.83	**10.0**	**Shear**	**kip**	**62.22**	**6.76**	**37.49**	**0.820**	**29.51**	**1.666**	**59.96**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.79	2.331	83.92		
5.66	20.0	Flexure	kip-ft	287.73	38.40	189.24	0.724	26.06	0.938	33.78
5.66	**20.0**	**Shear**	**kip**	**28.06**	**5.11**	**32.58**	**0.380**	**13.69**	**0.759**	**27.32**
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	1.39	1.213	43.66		
8.49	30.0	Flexure	kip-ft	287.73	50.23	245.39	0.524	18.86	0.679	24.44
8.49	**30.0**	**Shear**	**kip**	**23.84**	**3.30**	**27.77**	**0.406**	**14.61**	**0.663**	**23.87**
8.49	30.0	Concrete Stresses	ksi	1.63	0.37	1.80	0.875	31.50		
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**275.88**	**0.448**	**16.12**	**0.580**	**20.90**
11.32	40.0	Shear	kip	23.84	1.65	23.07	0.539	19.42	0.747	26.88
11.32	40.0	Concrete Stresses	ksi	1.63	0.42	2.03	0.747	26.88		
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**280.73**	**0.434**	**15.63**	**0.563**	**20.26**
14.15	50.0	Shear	kip	-23.84	-0.00	-18.49	0.737	26.52	1.013	36.48
14.15	50.0	Concrete Stresses	ksi	1.63	0.44	2.06	0.723	26.04		
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**275.88**	**0.448**	**16.12**	**0.581**	**20.90**
16.98	60.0	Shear	kip	-23.84	-1.65	-23.07	0.539	19.41	0.746	26.87
16.98	60.0	Concrete Stresses	ksi	1.63	0.42	2.03	0.747	26.88		
19.80	70.0	Flexure	kip-ft	287.73	50.19	245.39	0.524	18.86	0.679	24.45
19.80	**70.0**	**Shear**	**kip**	**-23.84**	**-3.30**	**-27.77**	**0.406**	**14.60**	**0.663**	**23.87**
19.80	70.0	Concrete Stresses	ksi	1.63	0.37	1.80	0.875	31.51		
22.63	80.0	Flexure	kip-ft	287.73	38.37	189.24	0.724	26.06	0.938	33.79
22.63	**80.0**	**Shear**	**kip**	**-28.06**	**-5.12**	**-32.58**	**0.380**	**13.68**	**0.759**	**27.32**
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	1.39	1.213	43.66		
25.46	90.0	Flexure	kip-ft	275.54	21.57	107.45	1.322	47.59	1.714	61.69
25.46	**90.0**	**Shear**	**kip**	**-59.25**	**-6.76**	**-37.49**	**0.774**	**27.87**	**1.609**	**57.92**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.79	2.332	83.94		

26.81	94.8	Flexure	kip-ft	242.12	11.90	59.38	2.187	78.73	2.835	102.06
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-39.87**	**1.561**	**56.18**	**2.023**	**72.83**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.44	4.423	159.23		
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-40.40**	**1.643**	**59.16**	**2.130**	**76.68**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj -LL***	**LL**	**Legal Rating Factor**	**Legal Load Rating (Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**2772.00**
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**22.62**	**4.059**	**113.64**
1.69	6.0	Flexure	kip-ft	229.80	13.52	37.34	4.386	122.80
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**22.13**	**3.785**	**105.99**
2.83	10.0	Flexure	kip-ft	268.56	21.61	59.51	3.122	87.42
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**21.03**	**3.083**	**86.32**
5.66	**20.0**	**Flexure**	**kip-ft**	**287.73**	**38.40**	**103.67**	**1.779**	**49.81**
5.66	20.0	Shear	kip	85.08	5.11	18.32	3.304	92.52
8.49	**30.0**	**Flexure**	**kip-ft**	**287.73**	**50.23**	**132.47**	**1.306**	**36.57**
8.49	30.0	Shear	kip	76.05	3.30	15.61	3.545	99.26
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**145.92**	**1.140**	**31.91**
11.32	40.0	Shear	kip	62.92	1.65	12.89	3.631	101.66
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**144.02**	**1.139**	**31.90**
14.15	50.0	Shear	kip	-66.11	-0.00	-10.18	4.994	139.84
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**145.92**	**1.140**	**31.92**
16.98	60.0	Shear	kip	-62.92	-1.65	-12.89	3.631	101.66
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**132.47**	**1.306**	**36.58**
19.80	70.0	Shear	kip	-76.08	-3.30	-15.61	3.546	99.29
22.63	**80.0**	**Flexure**	**kip-ft**	**287.73**	**38.37**	**103.67**	**1.779**	**49.82**
22.63	80.0	Shear	kip	-85.08	-5.12	-18.32	3.304	92.51
25.46	90.0	Flexure	kip-ft	275.54	21.57	59.51	3.213	89.97

25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-21.03**	**2.978**	**83.37**
26.81	94.8	Flexure	kip-ft	242.12	11.90	33.03	5.292	148.19
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-22.33**	**3.751**	**105.04**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-22.61**	**3.952**	**110.66**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3628.35**
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**31.76**	**2.891**	**105.94**
1.69	6.0	Flexure	kip-ft	229.80	13.52	51.99	3.150	115.46
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**30.81**	**2.719**	**99.65**
2.83	10.0	Flexure	kip-ft	268.56	21.61	82.09	2.263	82.96
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**29.02**	**2.235**	**81.91**
5.66	**20.0**	**Flexure**	**kip-ft**	**287.73**	**38.40**	**144.31**	**1.278**	**46.83**
5.66	20.0	Shear	kip	64.26	5.11	25.50	1.746	63.98
8.49	**30.0**	**Flexure**	**kip-ft**	**287.73**	**50.23**	**186.66**	**0.927**	**33.97**
8.49	30.0	Shear	kip	43.25	3.30	21.99	1.369	50.17
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**209.15**	**0.795**	**29.14**
11.32	40.0	Shear	kip	37.57	1.65	18.48	1.478	54.17
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**211.77**	**0.775**	**28.40**
14.15	50.0	Shear	kip	-37.74	-0.00	-14.97	1.939	71.07
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**209.15**	**0.795**	**29.15**
16.98	60.0	Shear	kip	-37.57	-1.65	-18.48	1.478	54.16
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**186.66**	**0.927**	**33.98**
19.80	70.0	Shear	kip	-43.26	-3.30	-21.99	1.369	50.17
22.63	**80.0**	**Flexure**	**kip-ft**	**287.73**	**38.37**	**144.31**	**1.278**	**46.84**
22.63	80.0	Shear	kip	-64.27	-5.12	-25.50	1.746	63.98
25.46	90.0	Flexure	kip-ft	275.54	21.57	82.09	2.329	85.37
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-29.02**	**2.159**	**79.11**
26.81	94.8	Flexure	kip-ft	242.12	11.90	46.14	3.788	138.84
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-31.19**	**2.685**	**98.41**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-31.75**	**2.815**	**103.17**

28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**31.90**	**2.878**	**115.13**
1.69	6.0	Flexure	kip-ft	229.80	13.52	52.61	3.113	124.53
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**31.17**	**2.687**	**107.48**
2.83	10.0	Flexure	kip-ft	268.56	21.61	83.64	2.221	88.86
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**29.56**	**2.193**	**87.74**
5.66	**20.0**	**Flexure**	**kip-ft**	**287.73**	**38.40**	**144.70**	**1.274**	**50.98**
5.66	20.0	Shear	kip	63.93	5.11	25.57	1.731	69.24
8.49	**30.0**	**Flexure**	**kip-ft**	**287.73**	**50.23**	**183.19**	**0.945**	**37.78**
8.49	30.0	Shear	kip	44.39	3.30	21.58	1.435	57.41
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**199.10**	**0.835**	**33.41**
11.32	40.0	Shear	kip	40.03	1.65	17.59	1.660	66.42
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**209.06**	**0.785**	**31.39**
14.15	50.0	Shear	kip	-38.66	-0.00	-13.61	2.185	87.39
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**199.10**	**0.835**	**33.42**
16.98	60.0	Shear	kip	-40.04	-1.65	-17.59	1.660	66.40
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**183.19**	**0.945**	**37.79**
19.80	70.0	Shear	kip	-44.40	-3.30	-21.58	1.435	57.41
22.63	**80.0**	**Flexure**	**kip-ft**	**287.73**	**38.37**	**144.70**	**1.275**	**50.98**
22.63	80.0	Shear	kip	-63.94	-5.12	-25.57	1.731	69.24
25.46	90.0	Flexure	kip-ft	275.54	21.57	83.64	2.286	91.45
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-29.56**	**2.119**	**84.74**
26.81	94.8	Flexure	kip-ft	242.12	11.90	46.55	3.755	150.22
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-31.47**	**2.662**	**106.47**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-31.89**	**2.803**	**112.11**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results

17"x36" INT PSU - Existing Deteriorated
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**5940.00**
1.69	**6.0**	**Flexure**	**kip-ft**	**229.80**	**13.52**	**82.89**	**2.140**	**128.42**
2.83	**10.0**	**Flexure**	**kip-ft**	**268.56**	**21.61**	**130.88**	**1.538**	**92.28**
5.66	**20.0**	**Flexure**	**kip-ft**	**287.73**	**38.40**	**221.65**	**0.901**	**54.08**
8.49	**30.0**	**Flexure**	**kip-ft**	**287.73**	**50.23**	**272.30**	**0.688**	**41.30**
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**282.85**	**0.637**	**38.22**
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**253.93**	**0.700**	**42.00**
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**282.85**	**0.637**	**38.22**
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**272.30**	**0.689**	**41.31**
22.63	**80.0**	**Flexure**	**kip-ft**	**287.73**	**38.37**	**221.65**	**0.901**	**54.09**
25.46	**90.0**	**Flexure**	**kip-ft**	**275.54**	**21.57**	**130.88**	**1.583**	**94.96**
26.81	**94.8**	**Flexure**	**kip-ft**	**242.12**	**11.90**	**73.43**	**2.579**	**154.73**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**5940.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**31.15**	**2.947**	**117.90**
1.69	6.0	Flexure	kip-ft	229.80	13.52	51.25	3.196	127.83
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**30.37**	**2.758**	**110.34**
2.83	10.0	Flexure	kip-ft	268.56	21.61	81.00	2.294	91.76

2.83	10.0	Shear	kip	92.75	6.76	28.63	2.265	90.60
5.66	20.0	Flexure	kip-ft	287.73	38.40	137.61	1.340	53.60
5.66	20.0	Shear	kip	70.68	5.11	24.32	2.034	81.35
8.49	30.0	Flexure	kip-ft	287.73	50.23	169.84	1.019	40.75
8.49	30.0	Shear	kip	49.43	3.30	20.01	1.742	69.68
11.32	40.0	Flexure	kip-ft	287.73	57.22	189.17	0.879	35.16
11.32	40.0	Shear	kip	43.13	1.65	15.70	2.012	80.49
14.15	50.0	Flexure	kip-ft	287.73	59.54	189.87	0.864	34.56
14.15	50.0	Shear	kip	-43.86	-0.00	-12.33	2.735	109.41
16.98	60.0	Flexure	kip-ft	287.73	57.20	189.17	0.879	35.17
16.98	60.0	Shear	kip	-43.13	-1.65	-15.70	2.012	80.48
19.80	70.0	Flexure	kip-ft	287.73	50.19	169.84	1.019	40.76
19.80	70.0	Shear	kip	-49.44	-3.30	-20.01	1.742	69.68
22.63	80.0	Flexure	kip-ft	287.73	38.37	137.61	1.340	53.61
22.63	80.0	Shear	kip	-70.70	-5.12	-24.32	2.034	81.36
25.46	90.0	Flexure	kip-ft	275.54	21.57	81.00	2.361	94.43
25.46	90.0	Shear	kip	-89.88	-6.76	-28.63	2.188	87.51
26.81	94.8	Flexure	kip-ft	242.12	11.90	45.39	3.851	154.05
26.81	94.8	Shear	kip	-118.33	-7.55	-30.68	2.730	109.19
27.11	95.8	Shear	kip	-125.83	-7.72	-31.14	2.870	114.81
28.29	100.0	Flexure	kip-ft	81.43	0.00	0.00	99.000	3960.00

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	83.08	0.00	0.00	99.000	1683.00
1.17	4.1	Shear	kip	129.02	7.72	21.61	4.249	72.24
1.69	6.0	Flexure	kip-ft	229.80	13.52	35.63	4.596	78.14
1.69	6.0	Shear	kip	118.17	7.42	21.11	3.967	67.45
2.83	10.0	Flexure	kip-ft	268.56	21.61	56.64	3.281	55.77
2.83	10.0	Shear	kip	92.75	6.76	20.02	3.239	55.07
5.66	20.0	Flexure	kip-ft	287.73	38.40	97.92	1.883	32.01
5.66	20.0	Shear	kip	85.08	5.11	17.31	3.498	59.47
8.49	30.0	Flexure	kip-ft	287.73	50.23	123.85	1.397	23.75

8.49	30.0	Shear	kip	85.08	3.30	14.59	4.268	72.55
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**134.43**	**1.237**	**21.03**
11.32	40.0	Shear	kip	73.19	1.65	11.88	4.606	78.31
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**129.66**	**1.265**	**21.51**
14.15	50.0	Shear	kip	-81.47	-0.00	-9.17	6.837	116.23
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**134.43**	**1.237**	**21.03**
16.98	60.0	Shear	kip	-73.20	-1.65	-11.88	4.606	78.31
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**123.85**	**1.397**	**23.76**
19.80	70.0	Shear	kip	-85.08	-3.30	-14.59	4.267	72.55
22.63	**80.0**	**Flexure**	**kip-ft**	**287.73**	**38.37**	**97.92**	**1.884**	**32.02**
22.63	80.0	Shear	kip	-85.08	-5.12	-17.31	3.498	59.46
25.46	90.0	Flexure	kip-ft	275.54	21.57	56.64	3.376	57.40
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-20.02**	**3.129**	**53.19**
26.81	94.8	Flexure	kip-ft	242.12	11.90	31.53	5.545	94.26
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-21.31**	**3.930**	**66.81**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-21.60**	**4.138**	**70.34**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3267.00**
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**38.49**	**2.386**	**78.73**
1.69	6.0	Flexure	kip-ft	229.80	13.52	63.33	2.586	85.34
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**37.53**	**2.232**	**73.66**
2.83	10.0	Flexure	kip-ft	268.56	21.61	100.16	1.855	61.22
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**35.40**	**1.832**	**60.44**
5.66	20.0	Flexure	kip-ft	287.73	38.40	170.52	1.081	35.69
5.66	**20.0**	**Shear**	**kip**	**48.49**	**5.11**	**30.14**	**1.075**	**35.47**
8.49	**30.0**	**Flexure**	**kip-ft**	**287.73**	**50.23**	**211.09**	**0.820**	**27.05**
8.49	30.0	Shear	kip	36.73	3.30	24.87	1.009	33.28
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**236.48**	**0.703**	**23.21**
11.32	40.0	Shear	kip	32.38	1.65	19.60	1.190	39.27
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**239.38**	**0.685**	**22.62**

14.15	50.0	Shear	kip	-32.67	-0.00	-14.97	1.678	55.39
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**236.48**	**0.703**	**23.21**
16.98	60.0	Shear	kip	-32.38	-1.65	-19.60	1.190	39.26
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**211.09**	**0.820**	**27.06**
19.80	70.0	Shear	kip	-36.74	-3.30	-24.87	1.009	33.28
22.63	80.0	Flexure	kip-ft	287.73	38.37	170.52	1.082	35.69
22.63	**80.0**	**Shear**	**kip**	**-48.50**	**-5.12**	**-30.14**	**1.075**	**35.47**
25.46	90.0	Flexure	kip-ft	275.54	21.57	100.16	1.909	63.00
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-35.40**	**1.769**	**58.38**
26.81	94.8	Flexure	kip-ft	242.12	11.90	56.09	3.117	102.85
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-37.92**	**2.209**	**72.90**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-38.47**	**2.323**	**76.66**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**83.08**	**0.00**	**0.00**	**99.000**	**3465.00**
1.17	**4.1**	**Shear**	**kip**	**129.02**	**7.72**	**40.09**	**2.290**	**80.16**
1.69	6.0	Flexure	kip-ft	229.80	13.52	65.94	2.484	86.93
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**39.07**	**2.144**	**75.03**
2.83	10.0	Flexure	kip-ft	268.56	21.61	104.17	1.784	62.43
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**36.82**	**1.761**	**61.64**
5.66	20.0	Flexure	kip-ft	287.73	38.40	176.73	1.043	36.52
5.66	**20.0**	**Shear**	**kip**	**45.97**	**5.11**	**31.23**	**0.975**	**34.12**
8.49	**30.0**	**Flexure**	**kip-ft**	**287.73**	**50.23**	**225.32**	**0.768**	**26.88**
8.49	30.0	Shear	kip	33.93	3.30	25.65	0.894	31.29
11.32	**40.0**	**Flexure**	**kip-ft**	**287.73**	**57.22**	**257.95**	**0.645**	**22.57**
11.32	40.0	Shear	kip	29.18	1.65	20.27	1.029	36.03
14.15	**50.0**	**Flexure**	**kip-ft**	**287.73**	**59.54**	**258.96**	**0.634**	**22.18**
14.15	50.0	Shear	kip	-29.65	-0.00	-15.79	1.444	50.54
16.98	**60.0**	**Flexure**	**kip-ft**	**287.73**	**57.20**	**257.95**	**0.645**	**22.57**
16.98	60.0	Shear	kip	-29.18	-1.65	-20.27	1.029	36.02
19.80	**70.0**	**Flexure**	**kip-ft**	**287.73**	**50.19**	**225.32**	**0.768**	**26.88**

19.80	70.0	Shear	kip	-33.93	-3.30	-25.65	0.894	31.29
22.63	80.0	Flexure	kip-ft	287.73	38.37	176.73	1.044	36.53
22.63	**80.0**	**Shear**	**kip**	**-45.98**	**-5.12**	**-31.23**	**0.975**	**34.12**
25.46	90.0	Flexure	kip-ft	275.54	21.57	104.17	1.836	64.25
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-36.82**	**1.701**	**59.54**
26.81	94.8	Flexure	kip-ft	242.12	11.90	58.40	2.993	104.75
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-39.48**	**2.121**	**74.25**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-40.07**	**2.230**	**78.06**
28.29	**100.0**	**Flexure**	**kip-ft**	**81.43**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294D
Bridge ID: 874294D

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 11:44:40
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 11:45:40

Structure Definition Name: End Span 1 (or 3) - PS Conc PSU
Member Name: G9
Member Alternative Name: 17"x36" INT PSU - w/ Conc Repair + Post Tensioning

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.70	-0.00	0.00	99.000	3564.00		
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**20.37**	**3.351**	**120.64**	**4.344**	**156.39**
1.69	6.0	Flexure	kip-ft	243.32	13.52	33.69	3.841	138.27	4.979	179.24
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**19.81**	**3.141**	**113.07**	**4.072**	**146.57**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.25	7.736	278.50		
2.83	10.0	Flexure	kip-ft	284.36	21.61	53.30	2.759	99.33	3.577	128.76
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**18.60**	**2.590**	**93.25**	**3.358**	**120.88**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.700	169.19		
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**90.83**	**1.615**	**58.13**	**2.093**	**75.35**
5.66	20.0	Shear	kip	85.08	5.11	15.62	2.878	103.61	3.731	134.31
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	0.67	2.527	90.96		
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**112.61**	**1.227**	**44.18**	**1.591**	**57.27**
8.49	30.0	Shear	kip	59.51	3.30	12.71	2.491	89.69	4.720	169.93
8.49	30.0	Concrete Stresses	ksi	1.63	0.37	0.83	1.907	68.64		
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**118.63**	**1.123**	**40.43**	**1.456**	**52.41**
11.32	40.0	Shear	kip	54.86	1.65	9.84	3.066	110.39	6.250	225.00
11.32	40.0	Concrete Stresses	ksi	1.63	0.42	0.87	1.736	62.51		
14.15	**50.0**	**Flexure**		**304.65**	**59.54**	**109.11**	**1.206**	**43.40**	**1.563**	**56.26**

			kip-ft							
14.15	50.0	Shear	kip	-64.58	-0.00	-7.03	5.251	189.03	8.967	322.81
14.15	50.0	Concrete Stresses	ksi	1.63	0.44	0.80	1.861	67.00		
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**118.63**	**1.123**	**40.43**	**1.456**	**52.41**
16.98	60.0	Shear	kip	-54.87	-1.65	-9.84	3.066	110.38	6.249	224.98
16.98	60.0	Concrete Stresses	ksi	1.63	0.42	0.87	1.737	62.51		
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**112.61**	**1.228**	**44.19**	**1.591**	**57.29**
19.80	70.0	Shear	kip	-59.53	-3.30	-12.71	2.492	89.71	4.720	169.91
19.80	70.0	Concrete Stresses	ksi	1.63	0.37	0.83	1.907	68.66		
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**90.83**	**1.615**	**58.13**	**2.093**	**75.36**
22.63	80.0	Shear	kip	-85.08	-5.12	-15.62	2.878	103.60	3.730	134.30
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	0.67	2.527	90.97		
25.46	90.0	Flexure	kip-ft	291.74	21.57	53.30	2.839	102.20	3.680	132.49
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-18.60**	**2.502**	**90.07**	**3.243**	**116.75**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.701	169.23		
26.81	94.8	Flexure	kip-ft	256.36	11.90	29.83	4.626	166.53	5.996	215.87
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-20.03**	**3.106**	**111.81**	**4.026**	**144.94**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.22	8.804	316.93		
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-20.35**	**3.262**	**117.43**	**4.228**	**152.22**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Units Capacity	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)

		Limit State			DL + Adj-LL*					
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.70	-0.00	0.00	99.000	3564.00		
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**19.93**	**3.425**	**123.31**	**4.440**	**159.85**
1.69	6.0	Flexure	kip-ft	243.32	13.52	33.11	3.907	140.67	5.065	182.34
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**19.47**	**3.196**	**115.05**	**4.143**	**149.13**
1.69	6.0	Concrete Stresses	ksi	1.63	0.10	0.24	7.870	283.33		
2.83	10.0	Flexure	kip-ft	284.36	21.61	52.96	2.777	99.96	3.599	129.57
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**18.48**	**2.607**	**93.85**	**3.379**	**121.65**
2.83	10.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.729	170.26		
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**93.28**	**1.572**	**56.60**	**2.038**	**73.37**
5.66	20.0	Shear	kip	85.08	5.11	16.06	2.801	100.82	3.630	130.69
5.66	20.0	Concrete Stresses	ksi	1.63	0.28	0.69	2.460	88.57		
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**120.96**	**1.143**	**41.13**	**1.481**	**53.32**
8.49	30.0	Shear	kip	53.03	3.30	13.69	2.042	73.50	4.381	157.72
8.49	30.0	Concrete Stresses	ksi	1.63	0.37	0.89	1.775	63.90		
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**135.99**	**0.980**	**35.27**	**1.270**	**45.71**
11.32	40.0	Shear	kip	45.04	1.65	11.37	2.159	77.74	4.245	152.83
11.32	40.0	Concrete Stresses	ksi	1.63	0.42	1.00	1.515	54.53		
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**138.38**	**0.951**	**34.23**	**1.232**	**44.37**
14.15	50.0	Shear	kip	-44.95	-0.00	-9.11	2.818	101.46	5.444	195.99
14.15	50.0	Concrete Stresses	ksi	1.63	0.44	1.02	1.467	52.83		
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**135.99**	**0.980**	**35.27**	**1.270**	**45.72**
16.98	60.0	Shear	kip	-45.04	-1.65	-11.37	2.159	77.73	4.245	152.83
16.98	60.0	Concrete Stresses	ksi	1.63	0.42	1.00	1.515	54.53		
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**120.96**	**1.143**	**41.14**	**1.481**	**53.33**
19.80	70.0	Shear	kip	-53.04	-3.30	-13.69	2.042	73.50	4.381	157.70
19.80	70.0	Concrete Stresses	ksi	1.63	0.37	0.89	1.775	63.92		
22.63	**80.0**	**Flexure**		**304.65**	**38.37**	**93.28**	**1.572**	**56.61**	**2.038**	**73.38**

			kip-ft							
22.63	80.0	Shear	kip	-85.08	-5.12	-16.06	2.800	100.81	3.630	130.68
22.63	80.0	Concrete Stresses	ksi	1.63	0.28	0.69	2.461	88.58		
25.46	90.0	Flexure	kip-ft	291.74	21.57	52.96	2.857	102.85	3.703	133.32
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-18.48**	**2.518**	**90.64**	**3.264**	**117.50**
25.46	90.0	Concrete Stresses	ksi	1.63	0.16	0.39	4.730	170.30		
26.81	94.8	Flexure	kip-ft	256.36	11.90	29.27	4.715	169.73	6.112	220.02
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-19.65**	**3.166**	**113.97**	**4.104**	**147.74**
26.81	94.8	Concrete Stresses	ksi	1.63	0.09	0.22	8.973	323.03		
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-19.91**	**3.334**	**120.01**	**4.321**	**155.57**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
28.29	100.0	Concrete Stresses	ksi	0.82	-0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**2772.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**11.15**	**8.238**	**230.67**
1.69	6.0	Flexure	kip-ft	243.32	13.52	18.41	9.462	264.94
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**10.91**	**7.679**	**215.03**
2.83	10.0	Flexure	kip-ft	284.36	21.61	29.33	6.749	188.96
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**10.37**	**6.254**	**175.13**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**51.10**	**3.864**	**108.18**
5.66	20.0	Shear	kip	85.08	5.11	9.03	6.703	187.69
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**65.30**	**2.849**	**79.78**
8.49	30.0	Shear	kip	85.08	3.30	7.69	8.095	226.66
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**71.93**	**2.493**	**69.81**
11.32	40.0	Shear	kip	85.08	1.65	6.36	10.048	281.34
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**70.99**	**2.495**	**69.85**

14.15	50.0	Shear	kip	-85.08	-0.00	-5.02	13.040	365.13
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**71.93**	**2.493**	**69.82**
16.98	60.0	Shear	kip	-85.08	-1.65	-6.36	10.047	281.31
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**65.30**	**2.850**	**79.80**
19.80	70.0	Shear	kip	-85.08	-3.30	-7.69	8.094	226.64
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**51.10**	**3.864**	**108.20**
22.63	80.0	Shear	kip	-85.08	-5.12	-9.03	6.702	187.67
25.46	90.0	Flexure	kip-ft	291.74	21.57	29.33	6.944	194.42
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-10.37**	**6.041**	**169.14**
26.81	94.8	Flexure	kip-ft	256.36	11.90	16.28	11.410	319.48
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-11.01**	**7.610**	**213.09**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-11.15**	**8.018**	**224.49**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3628.35**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**15.66**	**5.867**	**215.02**
1.69	6.0	Flexure	kip-ft	243.32	13.52	25.63	6.797	249.10
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**15.19**	**5.516**	**202.17**
2.83	10.0	Flexure	kip-ft	284.36	21.61	40.46	4.892	179.30
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**14.30**	**4.534**	**166.17**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**71.13**	**2.775**	**101.72**
5.66	20.0	Shear	kip	85.08	5.11	12.57	4.815	176.48
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**92.01**	**2.022**	**74.11**
8.49	30.0	Shear	kip	85.08	3.30	10.84	5.745	210.55
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**103.09**	**1.739**	**63.75**
11.32	40.0	Shear	kip	85.08	1.65	9.11	7.010	256.93
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**104.38**	**1.697**	**62.18**
14.15	50.0	Shear	kip	-85.08	-0.00	-7.38	8.869	325.04
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**103.09**	**1.740**	**63.76**
16.98	60.0	Shear	kip	-85.08	-1.65	-9.11	7.010	256.90
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**92.01**	**2.022**	**74.12**

19.80	70.0	Shear	kip	-85.08	-3.30	-10.84	5.744	210.53
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**71.13**	**2.776**	**101.73**
22.63	80.0	Shear	kip	-85.08	-5.12	-12.57	4.815	176.46
25.46	90.0	Flexure	kip-ft	291.74	21.57	40.46	5.034	184.49
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-14.30**	**4.379**	**160.50**
26.81	94.8	Flexure	kip-ft	256.36	11.90	22.74	8.167	299.32
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-15.38**	**5.447**	**199.65**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-15.65**	**5.711**	**209.30**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**15.73**	**5.842**	**233.70**
1.69	6.0	Flexure	kip-ft	243.32	13.52	25.93	6.717	268.67
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**15.37**	**5.451**	**218.06**
2.83	10.0	Flexure	kip-ft	284.36	21.61	41.23	4.802	192.06
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**14.57**	**4.450**	**178.00**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**71.33**	**2.768**	**110.72**
5.66	20.0	Shear	kip	85.08	5.11	12.61	4.802	192.09
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**90.30**	**2.060**	**82.42**
8.49	30.0	Shear	kip	85.08	3.30	10.64	5.854	234.15
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**98.14**	**1.827**	**73.09**
11.32	40.0	Shear	kip	85.08	1.65	8.67	7.364	294.57
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**103.05**	**1.719**	**68.74**
14.15	50.0	Shear	kip	-85.08	-0.00	-6.71	9.756	390.22
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**98.14**	**1.827**	**73.10**
16.98	60.0	Shear	kip	-85.08	-1.65	-8.67	7.364	294.54
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**90.30**	**2.061**	**82.43**
19.80	70.0	Shear	kip	-85.08	-3.30	-10.64	5.853	234.13
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**71.33**	**2.768**	**110.73**
22.63	80.0	Shear	kip	-85.08	-5.12	-12.61	4.802	192.07
25.46	90.0	Flexure	kip-ft	291.74	21.57	41.23	4.940	197.62

25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-14.57**	**4.298**	**171.92**
26.81	94.8	Flexure	kip-ft	256.36	11.90	22.94	8.096	323.85
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-15.51**	**5.400**	**216.01**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-15.72**	**5.686**	**227.44**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**5940.00**
1.69	**6.0**	**Flexure**	**kip-ft**	**243.32**	**13.52**	**40.86**	**4.618**	**277.07**
2.83	**10.0**	**Flexure**	**kip-ft**	**284.36**	**21.61**	**64.51**	**3.324**	**199.45**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**109.25**	**1.958**	**117.46**
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**134.22**	**1.502**	**90.10**
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**139.42**	**1.393**	**83.60**
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**125.17**	**1.533**	**91.97**
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**139.42**	**1.394**	**83.61**
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**134.22**	**1.502**	**90.12**
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**109.25**	**1.958**	**117.47**
25.46	**90.0**	**Flexure**	**kip-ft**	**291.74**	**21.57**	**64.51**	**3.420**	**205.22**
26.81	**94.8**	**Flexure**	**kip-ft**	**256.36**	**11.90**	**36.20**	**5.560**	**333.58**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**5940.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location							Legal Rating	Legal Load Rating

(ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3960.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**15.36**	**5.983**	**239.30**
1.69	6.0	Flexure	kip-ft	243.32	13.52	25.26	6.895	275.80
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**14.97**	**5.596**	**223.84**
2.83	10.0	Flexure	kip-ft	284.36	21.61	39.92	4.958	198.33
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**14.11**	**4.595**	**183.81**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**67.83**	**2.911**	**116.42**
5.66	20.0	Shear	kip	85.08	5.11	11.99	5.050	201.99
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**83.72**	**2.222**	**88.89**
8.49	30.0	Shear	kip	85.08	3.30	9.86	6.314	252.56
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**93.25**	**1.923**	**76.92**
11.32	40.0	Shear	kip	85.08	1.65	7.74	8.252	330.08
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**93.59**	**1.892**	**75.69**
14.15	50.0	Shear	kip	-85.08	-0.00	-6.08	10.765	430.60
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**93.25**	**1.923**	**76.93**
16.98	60.0	Shear	kip	-85.08	-1.65	-7.74	8.251	330.04
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**83.72**	**2.223**	**88.91**
19.80	70.0	Shear	kip	-85.08	-3.30	-9.86	6.313	252.53
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**67.83**	**2.911**	**116.44**
22.63	80.0	Shear	kip	-85.08	-5.12	-11.99	5.049	201.97
25.46	90.0	Flexure	kip-ft	291.74	21.57	39.92	5.102	204.07
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-14.11**	**4.438**	**177.53**
26.81	94.8	Flexure	kip-ft	256.36	11.90	22.37	8.303	332.11
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-15.13**	**5.538**	**221.51**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-15.35**	**5.823**	**232.91**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location							Legal Rating	Legal Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**1683.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**10.65**	**8.625**	**146.63**

1.69	6.0	Flexure	kip-ft	243.32	13.52	17.56	9.917	168.59
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**10.41**	**8.049**	**136.83**
2.83	10.0	Flexure	kip-ft	284.36	21.61	27.92	7.091	120.54
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**9.87**	**6.572**	**111.72**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**48.27**	**4.090**	**69.54**
5.66	20.0	Shear	kip	85.08	5.11	8.53	7.097	120.64
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**61.05**	**3.047**	**51.81**
8.49	30.0	Shear	kip	85.08	3.30	7.19	8.658	147.19
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**66.26**	**2.706**	**46.01**
11.32	40.0	Shear	kip	85.08	1.65	5.86	10.907	185.42
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**63.91**	**2.771**	**47.11**
14.15	50.0	Shear	kip	-85.08	-0.00	-4.52	14.485	246.24
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**66.26**	**2.707**	**46.01**
16.98	60.0	Shear	kip	-85.08	-1.65	-5.86	10.906	185.40
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**61.05**	**3.048**	**51.82**
19.80	70.0	Shear	kip	-85.08	-3.30	-7.19	8.657	147.18
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**48.27**	**4.091**	**69.54**
22.63	80.0	Shear	kip	-85.08	-5.12	-8.53	7.096	120.63
25.46	90.0	Flexure	kip-ft	291.74	21.57	27.92	7.296	124.03
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-9.87**	**6.347**	**107.90**
26.81	94.8	Flexure	kip-ft	256.36	11.90	15.54	11.954	203.21
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-10.51**	**7.973**	**135.54**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-10.65**	**8.394**	**142.71**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj -LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3267.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**18.97**	**4.842**	**159.80**
1.69	6.0	Flexure	kip-ft	243.32	13.52	31.22	5.579	184.12
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**18.50**	**4.528**	**149.43**
2.83	10.0	Flexure	kip-ft	284.36	21.61	49.37	4.009	132.31
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**17.45**	**3.716**	**122.62**

5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**84.06**	**2.349**	**77.51**
5.66	20.0	Shear	kip	85.08	5.11	14.86	4.075	134.48
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**104.05**	**1.788**	**59.01**
8.49	30.0	Shear	kip	85.08	3.30	12.26	5.080	167.65
11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**116.56**	**1.538**	**50.77**
11.32	40.0	Shear	kip	85.08	1.65	9.66	6.609	218.10
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**118.00**	**1.501**	**49.53**
14.15	50.0	Shear	kip	-85.08	-0.00	-7.38	8.869	292.67
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**116.56**	**1.539**	**50.77**
16.98	60.0	Shear	kip	-85.08	-1.65	-9.66	6.609	218.08
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**104.05**	**1.788**	**59.02**
19.80	70.0	Shear	kip	-85.08	-3.30	-12.26	5.080	167.63
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**84.06**	**2.349**	**77.52**
22.63	80.0	Shear	kip	-85.08	-5.12	-14.86	4.075	134.46
25.46	90.0	Flexure	kip-ft	291.74	21.57	49.37	4.125	136.14
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-17.45**	**3.589**	**118.44**
26.81	94.8	Flexure	kip-ft	256.36	11.90	27.65	6.719	221.73
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-18.69**	**4.482**	**147.89**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-18.96**	**4.713**	**155.53**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc Repair + Post Tensioning
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 1

Location (ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj -LL***	**LL**	**Legal Rating Factor**	**Legal Load Rating (Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**88.32**	**0.00**	**0.00**	**99.000**	**3465.00**
1.17	**4.1**	**Shear**	**kip**	**129.09**	**7.72**	**19.76**	**4.649**	**162.71**
1.69	6.0	Flexure	kip-ft	243.32	13.52	32.50	5.359	187.56
1.69	**6.0**	**Shear**	**kip**	**118.17**	**7.42**	**19.26**	**4.349**	**152.22**
2.83	10.0	Flexure	kip-ft	284.36	21.61	51.35	3.855	134.94
2.83	**10.0**	**Shear**	**kip**	**92.75**	**6.76**	**18.15**	**3.573**	**125.06**
5.66	**20.0**	**Flexure**	**kip-ft**	**304.65**	**38.40**	**87.11**	**2.266**	**79.32**
5.66	20.0	Shear	kip	85.08	5.11	15.40	3.932	137.62
8.49	**30.0**	**Flexure**	**kip-ft**	**304.65**	**50.23**	**111.07**	**1.675**	**58.63**
8.49	30.0	Shear	kip	85.08	3.30	12.64	4.926	172.42

11.32	**40.0**	**Flexure**	**kip-ft**	**304.65**	**57.22**	**127.15**	**1.410**	**49.36**
11.32	40.0	Shear	kip	84.27	1.65	9.99	6.330	221.56
14.15	**50.0**	**Flexure**	**kip-ft**	**304.65**	**59.54**	**127.65**	**1.387**	**48.56**
14.15	50.0	Shear	kip	-85.08	-0.00	-7.78	8.408	294.29
16.98	**60.0**	**Flexure**	**kip-ft**	**304.65**	**57.20**	**127.15**	**1.411**	**49.37**
16.98	60.0	Shear	kip	-84.29	-1.65	-9.99	6.331	221.58
19.80	**70.0**	**Flexure**	**kip-ft**	**304.65**	**50.19**	**111.07**	**1.675**	**58.64**
19.80	70.0	Shear	kip	-85.08	-3.30	-12.64	4.926	172.40
22.63	**80.0**	**Flexure**	**kip-ft**	**304.65**	**38.37**	**87.11**	**2.267**	**79.33**
22.63	80.0	Shear	kip	-85.08	-5.12	-15.40	3.932	137.61
25.46	90.0	Flexure	kip-ft	291.74	21.57	51.35	3.967	138.84
25.46	**90.0**	**Shear**	**kip**	**-89.88**	**-6.76**	**-18.15**	**3.451**	**120.79**
26.81	94.8	Flexure	kip-ft	256.36	11.90	28.79	6.452	225.84
26.81	**94.8**	**Shear**	**kip**	**-118.33**	**-7.55**	**-19.46**	**4.304**	**150.63**
27.11	**95.8**	**Shear**	**kip**	**-125.83**	**-7.72**	**-19.75**	**4.525**	**158.36**
28.29	**100.0**	**Flexure**	**kip-ft**	**86.22**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294D
Bridge ID: 874294D

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 20:33:28
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 20:35:00

Structure Definition Name: INT Span 2 - PS Conc PSU
Member Name: G8
Member Alternative Name: 17"x36" INT PSU - Existing Deteriorated

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.86	-0.00	0.00	99.000	3564.00		
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**48.82**	**0.945**	**34.03**	**1.225**	**44.11**
1.48	3.8	Flexure	kip-ft	277.16	16.30	71.63	2.048	73.74	2.655	95.59
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**48.15**	**0.900**	**32.40**	**1.167**	**42.01**
1.48	3.8	Concrete Stresses	ksi	1.77	0.12	0.53	3.928	141.41		
3.85	10.0	Flexure	kip-ft	325.50	39.61	171.07	0.922	33.19	1.195	43.02
3.85	**10.0**	**Shear**	**kip**	**28.01**	**9.14**	**43.77**	**0.216**	**7.79**	**0.522**	**18.79**
3.85	10.0	Concrete Stresses	ksi	1.77	0.29	1.26	1.474	53.08		
7.70	20.0	Flexure	kip-ft	325.50	70.48	292.21	0.464	16.71	0.602	21.66
7.70	**20.0**	**Shear**	**kip**	**17.93**	**6.90**	**36.77**	**0.145**	**5.21**	**0.229**	**8.25**
7.70	20.0	Concrete Stresses	ksi	1.77	0.52	2.15	0.731	26.32		
11.55	30.0	Flexure	kip-ft	325.50	92.34	365.43	0.328	11.83	0.426	15.33
11.55	**30.0**	**Shear**	**kip**	**17.93**	**4.49**	**30.09**	**0.234**	**8.42**	**0.303**	**10.92**
11.55	30.0	Concrete Stresses	ksi	1.77	0.68	2.69	0.510	18.35		
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**402.57**	**0.275**	**9.91**	**0.357**	**12.84**
15.40	40.0	Shear	kip	17.93	2.24	24.02	0.360	12.96	0.466	16.79
15.40	40.0	Concrete Stresses	ksi	1.77	0.77	2.96	0.423	15.21		
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**400.72**	**0.269**	**9.68**	**0.348**	**12.54**
19.25	50.0	Shear	kip	-17.93	0.00	-18.10	0.566	20.38	0.734	26.42

19.25	50.0	Concrete Stresses	ksi	1.77	0.81	2.95	0.411	14.80		
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**402.57**	**0.275**	**9.91**	**0.357**	**12.84**
23.10	60.0	Shear	kip	-17.93	-2.24	-24.02	0.360	12.96	0.466	16.79
23.10	60.0	Concrete Stresses	ksi	1.77	0.77	2.96	0.423	15.21		
26.95	70.0	Flexure	kip-ft	341.96	92.34	365.43	0.354	12.75	0.459	16.53
26.95	**70.0**	**Shear**	**kip**	**-18.03**	**-4.49**	**-30.09**	**0.236**	**8.49**	**0.311**	**11.19**
26.95	70.0	Concrete Stresses	ksi	1.77	0.68	2.69	0.510	18.35		
30.80	80.0	Flexure	kip-ft	325.50	70.48	292.21	0.464	16.71	0.602	21.66
30.80	**80.0**	**Shear**	**kip**	**-17.93**	**-6.90**	**-36.77**	**0.145**	**5.21**	**0.229**	**8.25**
30.80	80.0	Concrete Stresses	ksi	1.77	0.52	2.15	0.731	26.32		
34.65	90.0	Flexure	kip-ft	325.50	39.61	171.07	0.922	33.19	1.195	43.02
34.65	**90.0**	**Shear**	**kip**	**-28.01**	**-9.14**	**-43.77**	**0.216**	**7.79**	**0.522**	**18.79**
34.65	90.0	Concrete Stresses	ksi	1.77	0.29	1.26	1.474	53.08		
37.02	96.2	Flexure	kip-ft	277.16	16.30	71.63	2.048	73.74	2.655	95.59
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-48.15**	**0.900**	**32.40**	**1.167**	**42.01**
37.02	96.2	Concrete Stresses	ksi	1.77	0.12	0.53	3.928	141.41		
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-48.83**	**0.946**	**34.07**	**1.227**	**44.16**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	0.86	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location							**Inventory Rating**	**Inventory Load Rating**	**Operating Rating**	**Operating Load Rating**
(ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj-LL***	**LL**	**Factor**	**(Ton)**	**Factor**	**(Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0		ksi	0.86	-0.00	0.00	99.000	3564.00		

		Concrete Stresses								
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**43.63**	**1.058**	**38.07**	**1.371**	**49.35**
1.48	3.8	Flexure	kip-ft	277.16	16.30	64.20	2.286	82.28	2.963	106.66
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**43.13**	**1.005**	**36.18**	**1.303**	**46.90**
1.48	3.8	Concrete Stresses	ksi	1.77	0.12	0.47	4.383	157.78		
3.85	10.0	Flexure	kip-ft	325.50	39.61	155.89	1.012	36.42	1.311	47.21
3.85	**10.0**	**Shear**	**kip**	**32.15**	**9.14**	**39.82**	**0.297**	**10.71**	**0.729**	**26.24**
3.85	10.0	Concrete Stresses	ksi	1.77	0.29	1.15	1.618	58.25		
7.70	20.0	Flexure	kip-ft	325.50	70.48	275.36	0.493	17.74	0.639	22.99
7.70	**20.0**	**Shear**	**kip**	**17.93**	**6.90**	**34.58**	**0.154**	**5.54**	**0.278**	**10.00**
7.70	20.0	Concrete Stresses	ksi	1.77	0.52	2.02	0.776	27.93		
11.55	30.0	Flexure	kip-ft	325.50	92.34	358.42	0.335	12.06	0.434	15.63
11.55	**30.0**	**Shear**	**kip**	**17.93**	**4.49**	**29.48**	**0.239**	**8.60**	**0.310**	**11.14**
11.55	30.0	Concrete Stresses	ksi	1.77	0.68	2.64	0.520	18.71		
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**405.06**	**0.273**	**9.85**	**0.355**	**12.76**
15.40	40.0	Shear	kip	17.93	2.24	24.53	0.352	12.69	0.457	16.44
15.40	40.0	Concrete Stresses	ksi	1.77	0.77	2.98	0.420	15.12		
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**415.29**	**0.259**	**9.34**	**0.336**	**12.10**
19.25	50.0	Shear	kip	-17.93	0.00	-19.73	0.519	18.70	0.673	24.24
19.25	50.0	Concrete Stresses	ksi	1.77	0.81	3.05	0.397	14.28		
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**405.06**	**0.273**	**9.85**	**0.355**	**12.76**
23.10	60.0	Shear	kip	-17.93	-2.24	-24.53	0.352	12.69	0.457	16.44
23.10	60.0	Concrete Stresses	ksi	1.77	0.77	2.98	0.420	15.12		
26.95	70.0	Flexure	kip-ft	341.96	92.34	358.42	0.361	13.00	0.468	16.85
26.95	**70.0**	**Shear**	**kip**	**-18.03**	**-4.49**	**-29.48**	**0.241**	**8.66**	**0.328**	**11.79**
26.95	70.0	Concrete Stresses	ksi	1.77	0.68	2.64	0.520	18.71		
30.80	80.0	Flexure	kip-ft	325.50	70.48	275.36	0.493	17.74	0.639	22.99
30.80	**80.0**	**Shear**	**kip**	**-17.93**	**-6.90**	**-34.58**	**0.154**	**5.54**	**0.278**	**10.00**
30.80	80.0	Concrete Stresses	ksi	1.77	0.52	2.02	0.776	27.93		
34.65	90.0	Flexure	kip-ft	325.50	39.61	155.89	1.012	36.42	1.311	47.21
34.65	**90.0**	**Shear**	**kip**	**-32.15**	**-9.14**	**-39.82**	**0.297**	**10.71**	**0.729**	**26.24**
34.65	90.0	Concrete Stresses	ksi	1.77	0.29	1.15	1.618	58.25		

37.02	96.2	Flexure	kip-ft	277.16	16.30	64.20	2.286	82.28	2.963	106.66
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-43.13**	**1.005**	**36.18**	**1.303**	**46.90**
37.02	96.2	Concrete Stresses	ksi	1.77	0.12	0.47	4.383	157.78		
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-43.64**	**1.059**	**38.12**	**1.373**	**49.41**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	0.86	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**2772.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**26.80**	**2.317**	**64.89**
1.48	3.8	Flexure	kip-ft	277.16	16.30	39.03	5.060	141.69
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**26.39**	**2.211**	**61.91**
3.85	10.0	Flexure	kip-ft	325.50	39.61	91.00	2.333	65.32
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**23.64**	**1.908**	**53.42**
7.70	**20.0**	**Flexure**	**kip-ft**	**325.50**	**70.48**	**147.98**	**1.234**	**34.55**
7.70	20.0	Shear	kip	56.12	6.90	19.22	1.901	53.23
11.55	**30.0**	**Flexure**	**kip-ft**	**325.50**	**92.34**	**190.63**	**0.848**	**23.73**
11.55	30.0	Shear	kip	34.48	4.49	16.51	1.345	37.67
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**215.01**	**0.694**	**19.42**
15.40	40.0	Shear	kip	28.84	2.24	13.79	1.452	40.66
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**213.27**	**0.680**	**19.03**
19.25	50.0	Shear	kip	-29.24	0.00	-11.08	2.030	56.84
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**215.01**	**0.694**	**19.42**
23.10	60.0	Shear	kip	-28.84	-2.24	-13.79	1.452	40.66
26.95	**70.0**	**Flexure**	**kip-ft**	**341.96**	**92.34**	**190.63**	**0.914**	**25.59**
26.95	70.0	Shear	kip	-38.79	-4.49	-16.51	1.546	43.29
30.80	**80.0**	**Flexure**	**kip-ft**	**325.50**	**70.48**	**147.98**	**1.234**	**34.55**
30.80	80.0	Shear	kip	-56.12	-6.90	-19.22	1.901	53.23
34.65	90.0	Flexure	kip-ft	325.50	39.61	91.00	2.333	65.32
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-23.64**	**1.908**	**53.42**

37.02	96.2	Flexure	kip-ft	277.16	16.30	39.03	5.060	141.69
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-26.39**	**2.211**	**61.91**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-26.81**	**2.320**	**64.96**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location							**Legal Rating**	**Legal Load Rating**
(ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj-LL***	**LL**	**Factor**	**(Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3628.35**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**37.58**	**1.653**	**60.57**
1.48	3.8	Flexure	kip-ft	277.16	16.30	54.79	3.605	132.12
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**37.04**	**1.575**	**57.73**
3.85	10.0	Flexure	kip-ft	325.50	39.61	129.53	1.639	60.07
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**33.65**	**1.340**	**49.12**
7.70	20.0	Flexure	kip-ft	325.50	70.48	218.51	0.836	30.63
7.70	**20.0**	**Shear**	**kip**	**30.43**	**6.90**	**28.38**	**0.591**	**21.66**
11.55	30.0	Flexure	kip-ft	325.50	92.34	266.94	0.605	22.19
11.55	**30.0**	**Shear**	**kip**	**22.81**	**4.49**	**23.11**	**0.573**	**20.98**
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**295.17**	**0.505**	**18.52**
15.40	40.0	Shear	kip	19.93	2.24	19.17	0.687	25.19
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**301.38**	**0.481**	**17.63**
19.25	50.0	Shear	kip	-19.60	0.00	-15.66	0.963	35.29
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**295.17**	**0.505**	**18.52**
23.10	60.0	Shear	kip	-19.93	-2.24	-19.17	0.687	25.19
26.95	**70.0**	**Flexure**	**kip-ft**	**341.96**	**92.34**	**266.94**	**0.653**	**23.92**
26.95	70.0	Shear	kip	-26.73	-4.49	-23.11	0.703	25.77
30.80	80.0	Flexure	kip-ft	325.50	70.48	218.51	0.836	30.63
30.80	**80.0**	**Shear**	**kip**	**-30.43**	**-6.90**	**-28.38**	**0.591**	**21.66**
34.65	90.0	Flexure	kip-ft	325.50	39.61	129.53	1.639	60.07
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-33.65**	**1.340**	**49.12**
37.02	96.2	Flexure	kip-ft	277.16	16.30	54.79	3.605	132.12
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-37.04**	**1.575**	**57.73**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-37.59**	**1.655**	**60.64**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**37.63**	**1.651**	**66.02**
1.48	3.8	Flexure	kip-ft	277.16	16.30	54.90	3.598	143.92
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**37.11**	**1.572**	**62.89**
3.85	10.0	Flexure	kip-ft	325.50	39.61	129.65	1.638	65.50
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**33.67**	**1.339**	**53.57**
7.70	20.0	Flexure	kip-ft	325.50	70.48	216.28	0.844	33.77
7.70	**20.0**	**Shear**	**kip**	**30.85**	**6.90**	**28.09**	**0.609**	**24.35**
11.55	30.0	Flexure	kip-ft	325.50	92.34	268.72	0.601	24.05
11.55	**30.0**	**Shear**	**kip**	**22.63**	**4.49**	**23.27**	**0.563**	**22.51**
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**300.26**	**0.497**	**19.87**
15.40	40.0	Shear	kip	19.55	2.24	19.28	0.668	26.72
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**310.88**	**0.466**	**18.65**
19.25	50.0	Shear	kip	-18.99	0.00	-14.79	0.987	39.49
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**300.26**	**0.497**	**19.87**
23.10	60.0	Shear	kip	-19.55	-2.24	-19.28	0.668	26.72
26.95	**70.0**	**Flexure**	**kip-ft**	**341.96**	**92.34**	**268.72**	**0.648**	**25.94**
26.95	70.0	Shear	kip	-26.54	-4.49	-23.27	0.692	27.68
30.80	80.0	Flexure	kip-ft	325.50	70.48	216.28	0.844	33.77
30.80	**80.0**	**Shear**	**kip**	**-30.85**	**-6.90**	**-28.09**	**0.609**	**24.35**
34.65	90.0	Flexure	kip-ft	325.50	39.61	129.65	1.638	65.50
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-33.67**	**1.339**	**53.57**
37.02	96.2	Flexure	kip-ft	277.16	16.30	54.90	3.598	143.92
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-37.11**	**1.572**	**62.89**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-37.64**	**1.653**	**66.10**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
FL120 Span < 200ft

Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	0.0	Flexure	kip-ft	127.58	0.00	0.00	99.000	5940.00
1.48	3.8	Flexure	kip-ft	277.16	16.30	84.85	2.522	151.31
3.85	10.0	Flexure	kip-ft	325.50	39.61	201.93	1.139	68.34
7.70	20.0	Flexure	kip-ft	325.50	70.48	342.42	0.578	34.66
11.55	30.0	Flexure	kip-ft	325.50	92.34	424.27	0.413	24.76
15.40	40.0	Flexure	kip-ft	325.50	105.30	464.01	0.348	20.89
19.25	50.0	Flexure	kip-ft	325.50	109.62	457.59	0.343	20.59
23.10	60.0	Flexure	kip-ft	325.50	105.30	464.01	0.348	20.89
26.95	70.0	Flexure	kip-ft	341.96	92.34	424.27	0.445	26.70
30.80	80.0	Flexure	kip-ft	325.50	70.48	342.42	0.578	34.66
34.65	90.0	Flexure	kip-ft	325.50	39.61	201.93	1.139	68.34
37.02	96.2	Flexure	kip-ft	277.16	16.30	84.85	2.522	151.31
38.50	100.0	Flexure	kip-ft	102.41	0.00	0.00	99.000	5940.00

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**34.37**	**1.807**	**72.28**
1.48	3.8	Flexure	kip-ft	277.16	16.30	50.25	3.931	157.22
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**33.97**	**1.717**	**68.70**
3.85	10.0	Flexure	kip-ft	325.50	39.61	120.59	1.761	70.42
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**31.32**	**1.440**	**57.59**
7.70	20.0	Flexure	kip-ft	325.50	70.48	207.99	0.878	35.12

7.70	**20.0**	**Shear**	**kip**	**32.53**	**6.90**	**27.01**	**0.681**	**27.24**
11.55	30.0	Flexure	kip-ft	325.50	92.34	262.21	0.616	24.65
11.55	**30.0**	**Shear**	**kip**	**23.31**	**4.49**	**22.70**	**0.600**	**23.99**
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**294.75**	**0.506**	**20.24**
15.40	40.0	Shear	kip	20.02	2.24	18.39	0.720	28.80
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**299.85**	**0.483**	**19.34**
19.25	50.0	Shear	kip	-19.83	0.00	-14.08	1.083	43.33
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**294.75**	**0.506**	**20.24**
23.10	60.0	Shear	kip	-20.02	-2.24	-18.39	0.720	28.80
26.95	**70.0**	**Flexure**	**kip-ft**	**341.96**	**92.34**	**262.21**	**0.665**	**26.58**
26.95	70.0	Shear	kip	-27.25	-4.49	-22.70	0.733	29.33
30.80	80.0	Flexure	kip-ft	325.50	70.48	207.99	0.878	35.12
30.80	**80.0**	**Shear**	**kip**	**-32.53**	**-6.90**	**-27.01**	**0.681**	**27.24**
34.65	90.0	Flexure	kip-ft	325.50	39.61	120.59	1.761	70.42
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-31.32**	**1.440**	**57.59**
37.02	96.2	Flexure	kip-ft	277.16	16.30	50.25	3.931	157.22
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-33.97**	**1.717**	**68.70**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-34.38**	**1.809**	**72.37**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**1683.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**23.11**	**2.688**	**45.70**
1.48	3.8	Flexure	kip-ft	277.16	16.30	33.81	5.843	99.32
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**22.86**	**2.553**	**43.40**
3.85	10.0	Flexure	kip-ft	325.50	39.61	81.56	2.603	44.25
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**21.19**	**2.129**	**36.19**
7.70	**20.0**	**Flexure**	**kip-ft**	**325.50**	**70.48**	**142.24**	**1.284**	**21.83**
7.70	20.0	Shear	kip	60.86	6.90	18.47	2.175	36.98
11.55	**30.0**	**Flexure**	**kip-ft**	**325.50**	**92.34**	**182.02**	**0.888**	**15.09**
11.55	30.0	Shear	kip	36.63	4.49	15.76	1.514	25.74
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**200.90**	**0.742**	**12.62**

15.40	40.0	Shear	kip	31.22	2.24	13.05	1.675	28.48
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**198.90**	**0.729**	**12.39**
19.25	50.0	Shear	kip	-31.73	0.00	-10.33	2.362	40.16
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**200.90**	**0.742**	**12.62**
23.10	60.0	Shear	kip	-31.22	-2.24	-13.05	1.675	28.48
26.95	**70.0**	**Flexure**	**kip-ft**	**341.96**	**92.34**	**182.02**	**0.957**	**16.28**
26.95	70.0	Shear	kip	-40.95	-4.49	-15.76	1.725	29.33
30.80	**80.0**	**Flexure**	**kip-ft**	**325.50**	**70.48**	**142.24**	**1.284**	**21.83**
30.80	80.0	Shear	kip	-60.86	-6.90	-18.47	2.175	36.98
34.65	90.0	Flexure	kip-ft	325.50	39.61	81.56	2.603	44.25
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-21.19**	**2.129**	**36.19**
37.02	96.2	Flexure	kip-ft	277.16	16.30	33.81	5.843	99.32
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-22.86**	**2.553**	**43.40**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-23.11**	**2.691**	**45.75**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
SU 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3267.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**42.31**	**1.468**	**48.44**
1.48	3.8	Flexure	kip-ft	277.16	16.30	61.87	3.193	105.35
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**41.83**	**1.395**	**46.03**
3.85	10.0	Flexure	kip-ft	325.50	39.61	148.55	1.429	47.16
3.85	**10.0**	**Shear**	**kip**	**61.06**	**9.14**	**38.58**	**0.990**	**32.65**
7.70	20.0	Flexure	kip-ft	325.50	70.48	256.55	0.712	23.49
7.70	**20.0**	**Shear**	**kip**	**24.68**	**6.90**	**33.32**	**0.371**	**12.23**
11.55	30.0	Flexure	kip-ft	325.50	92.34	323.99	0.499	16.46
11.55	**30.0**	**Shear**	**kip**	**18.01**	**4.49**	**28.05**	**0.340**	**11.22**
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**365.51**	**0.408**	**13.46**
15.40	40.0	Shear	kip	17.93	2.24	22.78	0.511	16.85
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**373.79**	**0.388**	**12.80**
19.25	50.0	Shear	kip	-17.93	0.00	-17.52	0.787	25.98
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**365.51**	**0.408**	**13.46**

23.10	60.0	Shear	kip	-17.93	-2.24	-22.78	0.511	16.85
26.95	70.0	Flexure	kip-ft	341.96	92.34	323.99	0.538	17.75
26.95	**70.0**	**Shear**	**kip**	**-21.67**	**-4.49**	**-28.05**	**0.440**	**14.54**
30.80	80.0	Flexure	kip-ft	325.50	70.48	256.55	0.712	23.49
30.80	**80.0**	**Shear**	**kip**	**-24.68**	**-6.90**	**-33.32**	**0.371**	**12.23**
34.65	90.0	Flexure	kip-ft	325.50	39.61	148.55	1.429	47.16
34.65	**90.0**	**Shear**	**kip**	**-61.06**	**-9.14**	**-38.58**	**0.990**	**32.65**
37.02	96.2	Flexure	kip-ft	277.16	16.30	61.87	3.193	105.35
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-41.83**	**1.395**	**46.03**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-42.32**	**1.470**	**48.50**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - Existing Deteriorated
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**127.58**	**0.00**	**0.00**	**99.000**	**3465.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**44.34**	**1.401**	**49.03**
1.48	3.8	Flexure	kip-ft	277.16	16.30	64.83	3.047	106.64
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**43.83**	**1.331**	**46.60**
3.85	10.0	Flexure	kip-ft	325.50	39.61	155.49	1.365	47.79
3.85	**10.0**	**Shear**	**kip**	**54.81**	**9.14**	**40.39**	**0.826**	**28.92**
7.70	20.0	Flexure	kip-ft	325.50	70.48	267.96	0.681	23.85
7.70	**20.0**	**Shear**	**kip**	**23.34**	**6.90**	**34.80**	**0.325**	**11.39**
11.55	30.0	Flexure	kip-ft	325.50	92.34	345.07	0.468	16.39
11.55	**30.0**	**Shear**	**kip**	**17.93**	**4.49**	**29.21**	**0.324**	**11.35**
15.40	**40.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**394.80**	**0.378**	**13.22**
15.40	40.0	Shear	kip	17.93	2.24	23.63	0.492	17.24
19.25	**50.0**	**Flexure**	**kip-ft**	**325.50**	**109.62**	**401.52**	**0.361**	**12.64**
19.25	50.0	Shear	kip	-17.93	0.00	-18.04	0.765	26.76
23.10	**60.0**	**Flexure**	**kip-ft**	**325.50**	**105.30**	**394.80**	**0.378**	**13.22**
23.10	60.0	Shear	kip	-17.93	-2.24	-23.63	0.492	17.23
26.95	70.0	Flexure	kip-ft	341.96	92.34	345.07	0.505	17.67
26.95	**70.0**	**Shear**	**kip**	**-20.25**	**-4.49**	**-29.21**	**0.386**	**13.50**
30.80	80.0	Flexure	kip-ft	325.50	70.48	267.96	0.681	23.85

30.80	**80.0**	**Shear**	**kip**	**-23.34**	**-6.90**	**-34.80**	**0.325**	**11.39**
34.65	90.0	Flexure	kip-ft	325.50	39.61	155.49	1.365	47.79
34.65	**90.0**	**Shear**	**kip**	**-54.81**	**-9.14**	**-40.39**	**0.826**	**28.92**
37.02	96.2	Flexure	kip-ft	277.16	16.30	64.83	3.047	106.64
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-43.83**	**1.331**	**46.60**
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-44.35**	**1.402**	**49.09**
38.50	**100.0**	**Flexure**	**kip-ft**	**102.41**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

Bridge Name: Matheson Hmck Bridge over Matheson Hammock Canal
NBI Structure ID: 874294D
Bridge ID: 874294D

Analyzed By: BrR
Analyze Date: Wednesday, October 06, 2021 10:33:34
Analysis Engine: AASHTO LRFR Engine Version 6.8.4.3002
Analysis Preference Setting: None

Report By: BrR
Report Date: Wednesday, October 06, 2021 10:41:31

Structure Definition Name: INT Span 2 - PS Conc PSU
Member Name: G10
Member Alternative Name: 17"x36" INT PSU - w/ Conc. Repair + Post Tensioning

Report by Action: ☑ **Flexure** ☑ **Concrete Stresses** ☑ **Shear** ☑ **Critical**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
HL-93 (US)
Truck + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location							Inventory Rating	Inventory Load Rating	Operating Rating	Operating Load Rating
(ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Factor	(Ton)	Factor	(Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.86	-0.00	0.00	99.000	3564.00		
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**20.86**	**2.212**	**79.64**	**2.868**	**103.23**
1.12	2.9	Shear	kip	445.93	-5.24	67.36	6.698	241.12	9.343	336.35
1.48	3.8	Flexure	kip-ft	293.46	16.30	30.61	5.099	183.55	6.609	237.94
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**20.57**	**2.107**	**75.84**	**2.731**	**98.32**
1.48	3.8	Shear	kip	436.13	4.78	85.59	5.040	181.43	7.371	265.36
1.48	3.8	Concrete Stresses	ksi	1.77	0.12	0.23	9.193	330.96		
3.85	10.0	Flexure	kip-ft	344.64	39.61	73.09	2.307	83.06	2.991	107.68
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**18.70**	**1.791**	**64.49**	**2.322**	**83.60**
3.85	10.0	Shear	kip	424.83	54.28	180.89	2.049	73.75	2.753	99.11
3.85	10.0	Concrete Stresses	ksi	1.77	0.29	0.54	3.451	124.23		
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**124.85**	**1.174**	**42.27**	**1.522**	**54.79**
7.70	20.0	Shear	kip	44.94	6.90	15.71	1.321	47.56	2.897	104.28
7.70	20.0	Shear	kip	424.83	93.06	265.36	1.250	45.01	1.664	59.89
7.70	20.0	Concrete Stresses	ksi	1.77	0.52	0.92	1.711	61.60		
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**156.13**	**0.839**	**30.20**	**1.087**	**39.15**
11.55	30.0	Shear	kip	30.63	4.49	12.85	1.112	40.04	2.168	78.03
11.55	30.0	Shear	kip	424.83	120.65	313.56	0.970	34.92	1.283	46.19
11.55	30.0	Concrete Stresses	ksi	1.77	0.68	1.15	1.193	42.96		
15.40	**40.0**	**Flexure**		**344.64**	**105.30**	**172.00**	**0.708**	**25.48**	**0.917**	**33.03**

			kip-ft							
15.40	40.0	Shear	kip	26.59	2.24	10.26	1.325	47.69	2.415	86.93
15.40	40.0	Shear	kip	424.83	135.52	336.40	0.860	30.96	1.138	40.96
15.40	40.0	Concrete Stresses	ksi	1.77	0.77	1.26	0.989	35.61		
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**171.21**	**0.693**	**24.95**	**0.898**	**32.34**
19.25	50.0	Shear	kip	-26.93	0.00	-7.73	1.990	71.66	3.511	126.41
19.25	50.0	Shear	kip	424.83	137.84	329.53	0.871	31.35	1.120	40.33
19.25	50.0	Concrete Stresses	ksi	1.77	0.81	1.26	0.962	34.63		
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**172.00**	**0.708**	**25.48**	**0.917**	**33.03**
23.10	60.0	Shear	kip	-26.59	-2.24	-10.26	1.325	47.69	2.415	86.93
23.10	60.0	Shear	kip	424.83	135.52	336.40	0.860	30.96	1.138	40.96
23.10	60.0	Concrete Stresses	ksi	1.77	0.77	1.26	0.989	35.61		
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**156.13**	**0.903**	**32.50**	**1.170**	**42.13**
26.95	70.0	Shear	kip	-34.86	-4.49	-12.85	1.300	46.81	2.412	86.83
26.95	70.0	Shear	kip	441.60	118.83	312.68	1.032	37.16	1.367	49.23
26.95	70.0	Concrete Stresses	ksi	1.77	0.68	1.15	1.193	42.96		
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**124.85**	**1.174**	**42.27**	**1.522**	**54.79**
30.80	80.0	Shear	kip	-44.94	-6.90	-15.71	1.321	47.56	2.897	104.28
30.80	80.0	Shear	kip	424.83	93.06	265.36	1.250	45.01	1.664	59.89
30.80	80.0	Concrete Stresses	ksi	1.77	0.52	0.92	1.711	61.60		
34.65	90.0	Flexure	kip-ft	344.64	39.61	73.09	2.307	83.06	2.991	107.68
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-18.70**	**1.791**	**64.49**	**2.322**	**83.60**
34.65	90.0	Shear	kip	424.83	54.28	180.89	2.049	73.75	2.753	99.11
34.65	90.0	Concrete Stresses	ksi	1.77	0.29	0.54	3.451	124.23		
37.02	96.2	Flexure	kip-ft	293.46	16.30	30.61	5.099	183.56	6.610	237.94
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-20.57**	**2.107**	**75.84**	**2.731**	**98.32**
37.02	96.2	Shear	kip	436.13	4.78	85.59	5.040	181.43	7.371	265.36
37.02	96.2	Concrete Stresses	ksi	1.77	0.12	0.23	9.193	330.97		
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-20.86**	**2.215**	**79.73**	**2.871**	**103.36**
37.38	97.1	Shear	kip	446.33	-5.46	66.97	6.747	242.88	9.399	338.38
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	0.86	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
HL-93 (US)
Tandem + Lane
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Inventory Rating Factor	Inventory Load Rating (Ton)	Operating Rating Factor	Operating Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
0.00	0.0	Concrete Stresses	ksi	0.86	-0.00	0.00	99.000	3564.00		
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**18.64**	**2.475**	**89.11**	**3.209**	**115.51**
1.12	2.9	Shear	kip	445.93	-3.06	57.34	7.831	281.92	10.728	386.19
1.48	3.8	Flexure	kip-ft	293.46	16.30	27.43	5.689	204.81	7.375	265.49
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**18.43**	**2.352**	**84.68**	**3.049**	**109.77**
1.48	3.8	Shear	kip	436.13	4.78	72.19	5.975	215.10	8.391	302.09
1.48	3.8	Concrete Stresses	ksi	1.77	0.12	0.20	10.258	369.29		
3.85	10.0	Flexure	kip-ft	344.64	39.61	66.60	2.532	91.16	3.282	118.17
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**17.02**	**1.969**	**70.88**	**2.552**	**91.88**
3.85	10.0	Shear	kip	424.83	54.28	162.82	2.276	81.93	3.071	110.55
3.85	10.0	Concrete Stresses	ksi	1.77	0.29	0.49	3.787	136.33		
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**117.65**	**1.246**	**44.86**	**1.615**	**58.15**
7.70	20.0	Shear	kip	49.78	6.90	14.77	1.592	57.31	3.080	110.88
7.70	20.0	Shear	kip	424.83	92.32	249.52	1.333	47.98	1.778	64.00
7.70	20.0	Concrete Stresses	ksi	1.77	0.52	0.86	1.816	65.37		
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**153.13**	**0.855**	**30.79**	**1.109**	**39.92**
11.55	30.0	Shear	kip	31.38	4.49	12.60	1.169	42.09	2.286	82.29
11.55	30.0	Shear	kip	424.83	120.44	307.44	0.990	35.64	1.311	47.21
11.55	30.0	Concrete Stresses	ksi	1.77	0.68	1.13	1.217	43.80		
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**173.06**	**0.703**	**25.32**	**0.912**	**32.82**
15.40	40.0	Shear	kip	26.38	2.24	10.48	1.285	46.27	2.342	84.31

15.40	40.0	Shear	kip	424.83	135.61	338.85	0.854	30.73	1.130	40.67
15.40	40.0	Concrete Stresses	ksi	1.77	0.77	1.27	0.983	35.39		
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**177.43**	**0.669**	**24.07**	**0.867**	**31.20**
19.25	50.0	Shear	kip	-25.78	0.00	-8.43	1.748	62.93	3.074	110.67
19.25	50.0	Shear	kip	424.83	138.07	342.40	0.838	30.15	1.082	38.96
19.25	50.0	Concrete Stresses	ksi	1.77	0.81	1.30	0.928	33.42		
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**173.06**	**0.703**	**25.32**	**0.912**	**32.82**
23.10	60.0	Shear	kip	-26.38	-2.24	-10.48	1.285	46.27	2.342	84.31
23.10	60.0	Shear	kip	424.83	135.61	338.85	0.854	30.73	1.130	40.67
23.10	60.0	Concrete Stresses	ksi	1.77	0.77	1.27	0.983	35.39		
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**153.13**	**0.920**	**33.13**	**1.193**	**42.95**
26.95	70.0	Shear	kip	-35.63	-4.49	-12.60	1.362	49.04	2.533	91.17
26.95	70.0	Shear	kip	441.60	118.62	306.50	1.054	37.94	1.398	50.31
26.95	70.0	Concrete Stresses	ksi	1.77	0.68	1.13	1.217	43.80		
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**117.65**	**1.246**	**44.86**	**1.615**	**58.15**
30.80	80.0	Shear	kip	-49.78	-6.90	-14.77	1.592	57.31	3.080	110.88
30.80	80.0	Shear	kip	424.83	92.32	249.52	1.333	47.98	1.778	64.00
30.80	80.0	Concrete Stresses	ksi	1.77	0.52	0.86	1.816	65.37		
34.65	90.0	Flexure	kip-ft	344.64	39.61	66.60	2.532	91.16	3.282	118.17
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-17.02**	**1.969**	**70.88**	**2.552**	**91.88**
34.65	90.0	Shear	kip	424.83	54.28	162.82	2.276	81.93	3.071	110.55
34.65	90.0	Concrete Stresses	ksi	1.77	0.29	0.49	3.787	136.33		
37.02	96.2	Flexure	kip-ft	293.46	16.30	27.43	5.689	204.81	7.375	265.49
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-18.43**	**2.352**	**84.68**	**3.049**	**109.77**
37.02	96.2	Shear	kip	436.13	4.78	72.19	5.975	215.10	8.391	302.09
37.02	96.2	Concrete Stresses	ksi	1.77	0.12	0.20	10.258	369.29		
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-18.65**	**2.478**	**89.22**	**3.212**	**115.65**
37.38	97.1	Shear	kip	446.33	-3.18	57.07	7.877	283.57	10.795	388.61
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3564.00**	**99.000**	**3564.00**
38.50	100.0	Concrete Stresses	ksi	0.86	0.00	0.00	99.000	3564.00		

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning

C 3
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**2772.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**11.45**	**5.424**	**151.88**
1.12	2.9	Shear	kip	445.93	14.71	18.70	23.057	645.59
1.48	3.8	Flexure	kip-ft	293.46	16.30	16.68	12.596	352.68
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**11.27**	**5.175**	**144.91**
1.48	3.8	Shear	kip	436.13	19.99	24.38	17.070	477.97
3.85	10.0	Flexure	kip-ft	344.64	39.61	38.88	5.839	163.49
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**10.10**	**4.465**	**125.03**
3.85	10.0	Shear	kip	424.83	54.28	58.80	6.302	176.46
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**63.23**	**3.121**	**87.39**
7.70	20.0	Shear	kip	70.05	6.90	8.21	5.755	161.13
7.70	20.0	Shear	kip	424.83	92.25	90.04	3.694	103.43
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**81.45**	**2.165**	**60.61**
11.55	30.0	Shear	kip	70.05	4.49	7.05	7.029	196.82
11.55	30.0	Shear	kip	424.83	119.98	116.90	2.608	73.02
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**91.86**	**1.784**	**49.94**
15.40	40.0	Shear	kip	70.05	2.24	5.89	8.778	245.79
15.40	40.0	Shear	kip	424.83	136.02	132.69	2.176	60.94
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**91.12**	**1.753**	**49.08**
19.25	50.0	Shear	kip	70.05	0.00	4.73	11.384	318.75
19.25	50.0	Shear	kip	424.83	140.50	132.96	2.139	59.88
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**91.86**	**1.784**	**49.94**
23.10	60.0	Shear	kip	-70.05	-2.24	-5.89	8.778	245.79
23.10	60.0	Shear	kip	424.83	136.02	132.69	2.177	60.94
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**81.45**	**2.329**	**65.22**
26.95	70.0	Shear	kip	-70.42	-4.49	-7.05	7.069	197.94
26.95	70.0	Shear	kip	441.60	119.34	116.31	2.771	77.58
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**63.23**	**3.121**	**87.39**
30.80	80.0	Shear	kip	-70.05	-6.90	-8.21	5.755	161.13
30.80	80.0	Shear	kip	424.83	92.25	90.04	3.694	103.43
34.65	90.0	Flexure	kip-ft	344.64	39.61	38.88	5.839	163.49
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-10.10**	**4.465**	**125.03**
34.65	90.0	Shear	kip	424.83	54.28	58.80	6.302	176.46

37.02	96.2	Flexure	kip-ft	293.46	16.30	16.68	12.596	352.68
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-11.27**	**5.175**	**144.91**
37.02	96.2	Shear	kip	436.13	19.99	24.38	17.071	477.98
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-11.45**	**5.430**	**152.05**
37.38	97.1	Shear	kip	446.33	14.60	18.58	23.237	650.64
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**2772.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
C 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3628.35**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**16.06**	**3.868**	**141.77**
1.12	2.9	Shear	kip	445.93	8.71	31.65	13.814	506.27
1.48	3.8	Flexure	kip-ft	293.46	16.30	23.41	8.973	328.87
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**15.83**	**3.687**	**135.12**
1.48	3.8	Shear	kip	436.13	14.06	39.54	10.674	391.20
3.85	10.0	Flexure	kip-ft	344.64	39.61	55.34	4.102	150.34
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**14.37**	**3.137**	**114.97**
3.85	10.0	Shear	kip	424.83	54.28	92.85	3.991	146.27
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**93.36**	**2.114**	**77.47**
7.70	20.0	Shear	kip	70.05	6.90	12.12	3.897	142.84
7.70	20.0	Shear	kip	424.83	89.96	139.88	2.394	87.74
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**114.05**	**1.546**	**56.66**
11.55	30.0	Shear	kip	70.05	4.49	9.87	5.020	183.98
11.55	30.0	Shear	kip	424.83	116.31	165.94	1.859	68.14
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**126.11**	**1.299**	**47.62**
15.40	40.0	Shear	kip	59.28	2.24	8.19	5.304	194.41
15.40	40.0	Shear	kip	424.83	133.38	182.99	1.593	58.37
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**128.76**	**1.240**	**45.46**
19.25	50.0	Shear	kip	-57.11	0.00	-6.69	6.568	240.71
19.25	50.0	Shear	kip	424.83	138.44	187.41	1.528	56.01
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**126.11**	**1.299**	**47.62**
23.10	60.0	Shear	kip	-59.28	-2.24	-8.19	5.304	194.41
23.10	60.0	Shear	kip	424.83	133.38	182.99	1.593	58.37

26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**114.05**	**1.664**	**60.97**
26.95	70.0	Shear	kip	-70.42	-4.49	-9.87	5.049	185.03
26.95	70.0	Shear	kip	441.60	115.66	165.11	1.974	72.35
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**93.36**	**2.114**	**77.47**
30.80	80.0	Shear	kip	-70.05	-6.90	-12.12	3.897	142.84
30.80	80.0	Shear	kip	424.83	89.96	139.88	2.394	87.74
34.65	90.0	Flexure	kip-ft	344.64	39.61	55.34	4.102	150.34
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-14.37**	**3.137**	**114.97**
34.65	90.0	Shear	kip	424.83	54.28	92.85	3.991	146.27
37.02	96.2	Flexure	kip-ft	293.46	16.30	23.41	8.973	328.87
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-15.83**	**3.687**	**135.12**
37.02	96.2	Shear	kip	436.13	14.06	39.54	10.674	391.21
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-16.06**	**3.873**	**141.93**
37.38	97.1	Shear	kip	446.33	8.60	31.48	13.905	509.61
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3628.35**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
C 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**16.08**	**3.863**	**154.53**
1.12	2.9	Shear	kip	445.93	8.69	31.72	13.785	551.38
1.48	3.8	Flexure	kip-ft	293.46	16.30	23.46	8.956	358.24
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**15.86**	**3.680**	**147.19**
1.48	3.8	Shear	kip	436.13	14.02	39.64	10.648	425.91
3.85	10.0	Flexure	kip-ft	344.64	39.61	55.39	4.099	163.94
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**14.39**	**3.134**	**125.37**
3.85	10.0	Shear	kip	424.83	54.28	92.95	3.987	159.47
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**92.41**	**2.136**	**85.42**
7.70	20.0	Shear	kip	70.05	6.90	12.00	3.938	157.50
7.70	20.0	Shear	kip	424.83	89.96	138.23	2.423	96.90
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**114.81**	**1.536**	**61.43**
11.55	30.0	Shear	kip	70.05	4.49	9.94	4.987	199.46
11.55	30.0	Shear	kip	424.83	116.22	167.09	1.847	73.88

15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**128.28**	**1.277**	**51.09**
15.40	40.0	Shear	kip	57.66	2.24	8.24	5.123	204.94
15.40	40.0	Shear	kip	424.83	133.39	186.01	1.567	62.67
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**132.83**	**1.202**	**48.09**
19.25	50.0	Shear	kip	-54.70	0.00	-6.32	6.658	266.30
19.25	50.0	Shear	kip	424.83	139.00	192.50	1.485	59.39
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**128.28**	**1.277**	**51.09**
23.10	60.0	Shear	kip	-57.66	-2.24	-8.24	5.123	204.94
23.10	60.0	Shear	kip	424.83	133.39	186.01	1.567	62.67
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**114.81**	**1.652**	**66.10**
26.95	70.0	Shear	kip	-70.42	-4.49	-9.94	5.015	200.60
26.95	70.0	Shear	kip	441.60	115.57	166.25	1.961	78.44
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**92.41**	**2.136**	**85.42**
30.80	80.0	Shear	kip	-70.05	-6.90	-12.00	3.938	157.50
30.80	80.0	Shear	kip	424.83	89.96	138.23	2.423	96.90
34.65	90.0	Flexure	kip-ft	344.64	39.61	55.39	4.099	163.94
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-14.39**	**3.134**	**125.37**
34.65	90.0	Shear	kip	424.83	54.28	92.95	3.987	159.47
37.02	96.2	Flexure	kip-ft	293.46	16.30	23.46	8.956	358.24
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-15.86**	**3.680**	**147.19**
37.02	96.2	Shear	kip	436.13	14.02	39.64	10.648	425.91
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-16.08**	**3.868**	**154.72**
37.38	97.1	Shear	kip	446.33	8.57	31.55	13.876	555.03
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
FL120 Span < 200ft
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Permit Rating Factor	Permit Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**5940.00**
1.12	**2.9**	**Shear**	**kip**	**445.93**	**0.11**	**50.24**	**8.873**	**532.40**
1.48	**3.8**	**Flexure**	**kip-ft**	**293.46**	**16.30**	**35.85**	**6.347**	**380.83**
1.48	3.8	Shear	kip	436.13	5.52	61.36	7.018	421.08
3.85	10.0	Flexure	kip-ft	344.64	39.61	85.33	2.882	172.94
3.85	**10.0**	**Shear**	**kip**	**424.83**	**54.28**	**141.29**	**2.623**	**157.36**

7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**144.69**	**1.478**	**88.65**
7.70	20.0	Shear	kip	424.83	89.96	209.42	1.599	95.94
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**179.27**	**1.065**	**63.93**
11.55	30.0	Shear	kip	424.83	117.79	246.37	1.246	74.78
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**196.07**	**0.905**	**54.32**
15.40	40.0	Shear	kip	424.83	132.33	262.21	1.116	66.93
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**193.35**	**0.895**	**53.69**
19.25	50.0	Shear	kip	424.83	137.71	257.32	1.116	66.95
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**196.07**	**0.905**	**54.32**
23.10	60.0	Shear	kip	424.83	132.33	262.21	1.116	66.93
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**179.27**	**1.146**	**68.79**
26.95	70.0	Shear	kip	441.60	116.18	245.09	1.328	79.67
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**144.69**	**1.478**	**88.65**
30.80	80.0	Shear	kip	424.83	89.96	209.42	1.599	95.94
34.65	90.0	Flexure	kip-ft	344.64	39.61	85.33	2.882	172.94
34.65	**90.0**	**Shear**	**kip**	**424.83**	**54.28**	**141.29**	**2.623**	**157.36**
37.02	**96.2**	**Flexure**	**kip-ft**	**293.46**	**16.30**	**35.85**	**6.347**	**380.83**
37.02	96.2	Shear	kip	436.13	5.52	61.36	7.018	421.09
37.38	**97.1**	**Shear**	**kip**	**446.33**	**-0.01**	**50.00**	**8.926**	**535.58**
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**5940.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
ST 5
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	**Percent**	**Limit State**	**Units**	**Capacity**	**DL + Adj-LL***	**LL**	**Legal Rating Factor**	**Legal Load Rating (Ton)**
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3960.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**14.69**	**4.229**	**169.18**
1.12	2.9	Shear	kip	445.93	10.50	27.85	15.637	625.49
1.48	3.8	Flexure	kip-ft	293.46	16.30	21.47	9.784	391.34
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**14.52**	**4.020**	**160.79**
1.48	3.8	Shear	kip	436.13	15.76	35.17	11.951	478.03
3.85	10.0	Flexure	kip-ft	344.64	39.61	51.52	4.406	176.26
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**13.38**	**3.370**	**134.79**
3.85	10.0	Shear	kip	424.83	54.28	84.94	4.363	174.50
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**88.86**	**2.221**	**88.83**

7.70	20.0	Shear	kip	70.05	6.90	11.54	4.094	163.78
7.70	20.0	Shear	kip	424.83	89.96	132.11	2.535	101.39
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**112.03**	**1.574**	**62.95**
11.55	30.0	Shear	kip	70.05	4.49	9.70	5.110	204.41
11.55	30.0	Shear	kip	424.83	116.53	162.91	1.893	75.70
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**125.93**	**1.301**	**52.05**
15.40	40.0	Shear	kip	59.67	2.24	7.86	5.566	222.66
15.40	40.0	Shear	kip	424.83	133.78	182.35	1.596	63.85
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**128.11**	**1.247**	**49.86**
19.25	50.0	Shear	kip	-58.06	0.00	-6.02	7.422	296.87
19.25	50.0	Shear	kip	424.83	139.22	185.71	1.538	61.52
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**125.93**	**1.301**	**52.05**
23.10	60.0	Shear	kip	-59.67	-2.24	-7.86	5.566	222.66
23.10	60.0	Shear	kip	424.83	133.78	182.35	1.596	63.85
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**112.03**	**1.694**	**67.74**
26.95	70.0	Shear	kip	-70.42	-4.49	-9.70	5.140	205.58
26.95	70.0	Shear	kip	441.60	115.89	162.09	2.009	80.38
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**88.86**	**2.221**	**88.83**
30.80	80.0	Shear	kip	-70.05	-6.90	-11.54	4.094	163.78
30.80	80.0	Shear	kip	424.83	89.96	132.11	2.535	101.39
34.65	90.0	Flexure	kip-ft	344.64	39.61	51.52	4.406	176.26
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-13.38**	**3.370**	**134.79**
34.65	90.0	Shear	kip	424.83	54.28	84.94	4.363	174.50
37.02	96.2	Flexure	kip-ft	293.46	16.30	21.47	9.784	391.35
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-14.52**	**4.020**	**160.79**
37.02	96.2	Shear	kip	436.13	15.76	35.17	11.951	478.03
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-14.69**	**4.235**	**169.38**
37.38	97.1	Shear	kip	446.33	10.39	27.69	15.745	629.81
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3960.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
SU 2
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**1683.00**

1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**9.87**	**6.291**	**106.96**
1.12	2.9	Shear	kip	445.93	16.77	14.32	29.967	509.43
1.48	3.8	Flexure	kip-ft	293.46	16.30	14.44	14.543	247.23
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**9.77**	**5.975**	**101.58**
1.48	3.8	Shear	kip	436.13	21.95	19.35	21.406	363.90
3.85	10.0	Flexure	kip-ft	344.64	39.61	34.85	6.515	110.75
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**9.05**	**4.982**	**84.70**
3.85	10.0	Shear	kip	424.83	54.28	50.46	7.344	124.85
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**60.77**	**3.247**	**55.20**
7.70	20.0	Shear	kip	70.05	6.90	7.89	5.987	101.78
7.70	20.0	Shear	kip	424.83	92.66	86.20	3.853	65.51
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**77.77**	**2.267**	**38.54**
11.55	30.0	Shear	kip	70.05	4.49	6.73	7.362	125.15
11.55	30.0	Shear	kip	424.83	120.40	111.36	2.734	46.47
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**85.84**	**1.909**	**32.45**
15.40	40.0	Shear	kip	70.05	2.24	5.57	9.280	157.76
15.40	40.0	Shear	kip	424.83	136.44	123.89	2.328	39.57
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**84.98**	**1.879**	**31.95**
19.25	50.0	Shear	kip	70.05	0.00	4.41	12.206	207.50
19.25	50.0	Shear	kip	424.83	140.92	124.00	2.290	38.92
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**85.84**	**1.909**	**32.45**
23.10	60.0	Shear	kip	-70.05	-2.24	-5.57	9.280	157.76
23.10	60.0	Shear	kip	424.83	136.44	123.89	2.328	39.57
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**77.77**	**2.440**	**41.47**
26.95	70.0	Shear	kip	-70.42	-4.49	-6.73	7.404	125.87
26.95	70.0	Shear	kip	441.60	119.75	110.79	2.905	49.38
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**60.77**	**3.247**	**55.20**
30.80	80.0	Shear	kip	-70.05	-6.90	-7.89	5.987	101.78
30.80	80.0	Shear	kip	424.83	92.66	86.20	3.853	65.51
34.65	90.0	Flexure	kip-ft	344.64	39.61	34.85	6.515	110.75
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-9.05**	**4.982**	**84.69**
34.65	90.0	Shear	kip	424.83	54.28	50.46	7.344	124.85
37.02	96.2	Flexure	kip-ft	293.46	16.30	14.44	14.543	247.23
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-9.77**	**5.975**	**101.58**
37.02	96.2	Shear	kip	436.13	21.95	19.35	21.406	363.90
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-9.87**	**6.299**	**107.09**
37.38	97.1	Shear	kip	446.33	16.66	14.21	30.232	513.94
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**1683.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
SU 3
Axle Load
Impact: With Impact

Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3267.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**18.08**	**3.436**	**113.37**
1.12	2.9	Shear	kip	445.93	6.08	37.39	11.765	388.24
1.48	3.8	Flexure	kip-ft	293.46	16.30	26.43	7.947	262.24
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**17.87**	**3.265**	**107.75**
1.48	3.8	Shear	kip	436.13	11.39	46.35	9.163	302.38
3.85	10.0	Flexure	kip-ft	344.64	39.61	63.47	3.577	118.04
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**16.49**	**2.735**	**90.27**
3.85	10.0	Shear	kip	424.83	54.28	109.65	3.379	111.52
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**109.61**	**1.800**	**59.41**
7.70	20.0	Shear	kip	70.05	6.90	14.24	3.319	109.54
7.70	20.0	Shear	kip	424.83	89.96	168.00	1.993	65.78
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**138.43**	**1.274**	**42.03**
11.55	30.0	Shear	kip	55.12	4.49	11.98	3.177	104.85
11.55	30.0	Shear	kip	424.83	115.19	202.93	1.526	50.35
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**156.17**	**1.049**	**34.63**
15.40	40.0	Shear	kip	43.05	2.24	9.73	3.180	104.94
15.40	40.0	Shear	kip	424.83	132.50	225.69	1.295	42.74
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**159.70**	**1.000**	**33.00**
19.25	50.0	Shear	kip	-41.98	0.00	-7.48	4.315	142.38
19.25	50.0	Shear	kip	424.83	138.48	230.42	1.243	41.01
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**156.17**	**1.049**	**34.63**
23.10	60.0	Shear	kip	-43.05	-2.24	-9.73	3.180	104.94
23.10	60.0	Shear	kip	424.83	132.50	225.69	1.295	42.74
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**138.43**	**1.371**	**45.23**
26.95	70.0	Shear	kip	-58.59	-4.49	-11.98	3.401	112.22
26.95	70.0	Shear	kip	441.60	113.94	201.66	1.625	53.62
30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**109.61**	**1.800**	**59.41**
30.80	80.0	Shear	kip	-70.05	-6.90	-14.24	3.319	109.54
30.80	80.0	Shear	kip	424.83	89.96	168.00	1.993	65.78
34.65	90.0	Flexure	kip-ft	344.64	39.61	63.47	3.577	118.04
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-16.49**	**2.735**	**90.27**
34.65	90.0	Shear	kip	424.83	54.28	109.65	3.379	111.52
37.02	96.2	Flexure	kip-ft	293.46	16.30	26.43	7.947	262.24
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-17.87**	**3.265**	**107.75**
37.02	96.2	Shear	kip	436.13	11.39	46.35	9.163	302.38

37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-18.08**	**3.440**	**113.51**
37.38	97.1	Shear	kip	446.33	5.96	37.19	11.840	390.72
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3267.00**

Detailed Rating Results
17"x36" INT PSU - w/ Conc. Repair + Post Tensioning
SU 4
Axle Load
Impact: With Impact
Lane: Single Lane

Span 2

Location (ft)	Percent	Limit State	Units	Capacity	DL + Adj-LL*	LL	Legal Rating Factor	Legal Load Rating (Ton)
0.00	**0.0**	**Flexure**	**kip-ft**	**135.08**	**0.00**	**0.00**	**99.000**	**3465.00**
1.12	**2.9**	**Shear**	**kip**	**94.16**	**10.73**	**18.94**	**3.279**	**114.75**
1.12	2.9	Shear	kip	445.93	4.95	39.82	11.074	387.60
1.48	3.8	Flexure	kip-ft	293.46	16.30	27.70	7.584	265.45
1.48	**3.8**	**Shear**	**kip**	**89.01**	**10.52**	**18.72**	**3.116**	**109.07**
1.48	3.8	Shear	kip	436.13	10.28	49.20	8.656	302.96
3.85	10.0	Flexure	kip-ft	344.64	39.61	66.43	3.417	119.61
3.85	**10.0**	**Shear**	**kip**	**70.05**	**9.14**	**17.26**	**2.613**	**91.47**
3.85	10.0	Shear	kip	424.83	54.28	115.78	3.200	112.02
7.70	**20.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**114.49**	**1.724**	**60.33**
7.70	20.0	Shear	kip	70.05	6.90	14.87	3.178	111.23
7.70	20.0	Shear	kip	424.83	89.96	176.43	1.898	66.43
11.55	**30.0**	**Flexure**	**kip-ft**	**344.64**	**92.34**	**147.43**	**1.196**	**41.86**
11.55	30.0	Shear	kip	49.78	4.49	12.48	2.722	95.28
11.55	30.0	Shear	kip	424.83	116.12	216.90	1.423	49.81
15.40	**40.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**168.68**	**0.971**	**34.00**
15.40	40.0	Shear	kip	38.99	2.24	10.10	2.757	96.49
15.40	40.0	Shear	kip	424.83	132.50	243.11	1.202	42.09
19.25	**50.0**	**Flexure**	**kip-ft**	**344.64**	**109.62**	**171.55**	**0.931**	**32.58**
19.25	50.0	Shear	kip	-38.35	0.00	-7.71	3.827	133.94
19.25	50.0	Shear	kip	424.83	138.59	246.79	1.160	40.60
23.10	**60.0**	**Flexure**	**kip-ft**	**344.64**	**105.30**	**168.68**	**0.971**	**34.00**
23.10	60.0	Shear	kip	-38.99	-2.24	-10.10	2.757	96.49
23.10	60.0	Shear	kip	424.83	132.50	243.11	1.202	42.09
26.95	**70.0**	**Flexure**	**kip-ft**	**362.07**	**92.34**	**147.43**	**1.287**	**45.04**
26.95	70.0	Shear	kip	-53.70	-4.49	-12.48	2.964	103.73
26.95	70.0	Shear	kip	441.60	114.73	215.57	1.516	53.07

30.80	**80.0**	**Flexure**	**kip-ft**	**344.64**	**70.48**	**114.49**	**1.724**	**60.33**
30.80	80.0	Shear	kip	-70.05	-6.90	-14.87	3.178	111.23
30.80	80.0	Shear	kip	424.83	89.96	176.43	1.898	66.43
34.65	90.0	Flexure	kip-ft	344.64	39.61	66.43	3.417	119.61
34.65	**90.0**	**Shear**	**kip**	**-70.05**	**-9.14**	**-17.26**	**2.613**	**91.47**
34.65	90.0	Shear	kip	424.83	54.28	115.78	3.200	112.02
37.02	96.2	Flexure	kip-ft	293.46	16.30	27.70	7.584	265.45
37.02	**96.2**	**Shear**	**kip**	**-89.01**	**-10.52**	**-18.72**	**3.116**	**109.07**
37.02	96.2	Shear	kip	436.13	10.28	49.20	8.656	302.96
37.38	**97.1**	**Shear**	**kip**	**-94.28**	**-10.73**	**-18.95**	**3.283**	**114.89**
37.38	97.1	Shear	kip	446.33	4.83	39.62	11.144	390.04
38.50	**100.0**	**Flexure**	**kip-ft**	**108.44**	**0.00**	**0.00**	**99.000**	**3465.00**

Note:
*Adj-LL is only applicable for Permit load rating.

CONSOR

Project #:	D210107FL00.00
Designed By:	YRA
Design Date:	Nov-21
Checked By:	MP
Check Date:	Nov-21

Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD MOMENT & SHEAR REACTIONS (SPAN 2)

DEAD LOAD MOMENT REACTIONS FROM AASHTOWARE BrR (SPAN 2)								
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	**Total DC Selfweight of Slab Unit alone (per Slab Unit)** (KIP-FT)	**Total DC (Railing + Sidewalk) per Slab Unit** (KIP-FT)	**Total DC per Slab Unit** (KIP-FT)
0	0	0	0	0	0	0	0	0.00
1.48	12.5	0.1	0.3	0.7	2.6	12.9	3.3	16.20
3.85	30.5	0.3	0.7	1.8	6.3	31.5	8.1	39.60
7.7	54.2	0.5	1.4	3.2	11.2	56.1	14.4	70.50
11.55	71.1	0.7	1.6	4.2	14.7	73.4	18.9	92.30
15.4	81.3	0.8	1.6	4.8	16.8	83.7	21.6	105.30
19.25	84.7	0.8	1.6	5	17.5	87.1	22.5	109.60
23.1	81.3	0.8	1.6	4.8	16.8	83.7	21.6	105.30
26.95	71.1	0.7	1.6	4.2	14.7	73.4	18.9	92.30
30.8	54.2	0.5	1.4	3.2	11.2	56.1	14.4	70.50
34.65	30.5	0.3	0.7	1.8	6.3	31.5	8.1	39.60
37.02	12.5	0.1	0.3	0.7	2.6	12.9	3.3	16.20
38.5	0	0	0	0	0	0	0	0.00

** Existing condition assumes the removal of 7 strands, and 1 exterior stirrup leg to account for the controlling deterioration along the bottom face of the slab units.

CONSOR

Project #: D210107FL00.00
Designed By: YRA
Design Date: Nov-21
Checked By: MP
Check Date: Nov-21

Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD MOMENT & SHEAR REACTIONS (SPAN 2)

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR (SPAN 2)									
Location	Self Weight (Slab Unit) (KIP)	% of DC Slab Unitx (KIP)	Self Weight (Interior diagrams) (KIP)	DC - Railing (KIP)	DC - Curb/ Sidewalk (KIP)		**Total DC Selfweight of Slab Unit alone (per Slab Unit)** (KIP)	**Total DC (Railing + Sidewalk) per Slab Unit** (KIP)	**Total DC per Slab Unit** (KIP)
0	8.8	0.09	0.49	0.52	1.82		9.38	2.34	11.72
1.48	8.12	0.08	0.16	0.48	1.68		8.36	2.16	10.52
3.85	7.04	0.07	0.16	0.41	1.45		7.27	1.86	9.13
7.7	5.28	0.05	0.16	0.31	1.09		5.49	1.4	6.89
11.55	3.52	0.04	0	0.21	0.73		3.56	0.94	4.50
15.4	1.76	0.02	0	0.1	0.36		1.78	0.46	2.24
19.25	0	0	0	0	0		0	0	0.00
23.1	-1.76	-0.02	0	-0.1	-0.36		-1.78	-0.46	-2.24
26.95	-3.52	-0.04	0	-0.21	-0.73		-3.56	-0.94	-4.50
30.8	-5.28	-0.05	-0.16	-0.31	-1.09		-5.49	-1.4	-6.89
34.65	-7.04	-0.07	-0.16	-0.41	-1.45		-7.27	-1.86	-9.13
37.02	-8.12	-0.08	-0.16	-0.48	-1.68		-8.36	-2.16	-10.52
38.5	-8.8	-0.09	-0.49	-0.52	-1.82		-9.38	-2.34	-11.72

** Existing condition assumes the removal of 7 strands, and 1 exterior stirrup leg to account for the controlling deterioration along the bottom face of the slab units.

CONSOR

Project #:	D210107FL00.00
Designed By:	YRA
Design Date:	Jan-22
Checked By:	MP
Check Date:	Jan-22

Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DESIGN CAPACITY

LOAD RATING SUMMARY - CONTROLLING LEGAL LOAD
(Assuming Post Tensioning)
Span 2 - INTERIOR PSU-8 (LRFR) - SU4

Location	Condition Factor	Unfactored DL Moment (kip-ft)	Unfactored SU4 Truck LL Moment (kip-ft)	Flexural Operating Rating Factor	Existing Flexural Capacity (kip-ft) **	Existing Shear Capacity (kip) **	Required Flexural Capacity (kip-ft) *	Required Shear Capacity (kip) *
0.00	0.90	0	0	99	135.08	-	-	-
1.12		-	-	-	-	94.16	-	-
1.48		16.30	27.70	7.58	293.46	89.01	-	-
3.85		39.61	66.43	3.42	344.64	70.05	-	-
7.7		70.48	114.49	1.72	344.64	70.05	-	-
11.55		92.34	147.43	1.20	344.64	49.78	-	-
15.4		105.30	168.68	0.97	344.64	38.99	359.34	-
19.25		109.62	171.55	0.93	344.64	-38.35	368.62	-
23.1		105.30	168.68	0.97	344.64	-38.99	359.34	-
26.95		92.34	147.43	1.29	362.07	-53.70	-	-
30.8		70.48	114.49	1.72	344.64	-70.05	-	-
34.65		39.61	66.43	3.42	344.64	-70.05	-	-
37.02		16.30	27.70	7.58	293.46	-89.01	-	-
37.39		-	-	-	-	-94.28	-	-
38.5		0.00	0.00	99.00	108.44	-	-	-

* Minimum Required capacity to meet a minimin Inventory Rating Factor of 1.1, conservatively.

** Existing condition assumes the removal of 7 strands, and 1 exterior stirrup leg to account for the controlling deterioration along the bottom face of the slab units.

Notes:

1) Gross Section Properties from AASHTOWare Bridge Rating Software:

PS Box Beam - Circular Void

Name:	17"x36" PSU	
Description:	17"x36" Prestressed Slab Unit (Typ.)	
Si Or Us Type:	US Customary	
Box Beam Type:	Circular Void	
Top Width:	35.0000	in
Number Circular Voids:	2	
Three Void Box Shape Indicator:	FALSE	
Ctc Distance Voids:	16.0000	in
Void Diameter:	10.0000	in
Interior Void Diameter:		in
Exterior Void Diameter:		in
Depth:	17.0000	in
Distance To Cg Void Bot:	9.0000	in
Bot Width:	36.0000	in
Shear Key Vertical Loc:	2.0000	in
Shear Key Height:	6.0000	in
Shear Key Depth:	1.5000	in
Area:	438.822	in^2
Nominal Weight Or Mass:	457.107	lb/ft
Ixx:	13330.101	in^4
Distance Y To Cg:	8.1667	in
Sxx Top:	1509.078	in^3
Sxx Bot:	1632.246	in^3
Nominal Depth:	17.0000	in
Volume Surface Ratio:	3.175	in
Half Depth Area Pos Flex:		in^2
Half Depth Area Neg Flex:		in^2
St Venant Torsional Constant:	14593.772	in^4

Concrete Material

Name:	Class P (5000)	
Description:	Class 5000 cement concrete	
Si Or Us Type:	US Customary	
28 Day Compressive Strength:	5.000	ksi
Initial Compressive Strength:	4.000	ksi
Density For DL:	0.150	kcf
Density For Modulus Of Elasticity:	0.145	kcf
Std Modulus Of Elasticity:	4074.28	ksi
Std Initial Modulus Of Elasticity:	3644.15	ksi
Coefficient Of Thermal Expansion:	0.0000060000	1/F
Poissons Ratio:	0.200	
Composition Type:	Normal	
Modulus Of Rupture:	0.537	ksi
Shear Factor:	1.000	

Reinforcing Steel Material

Name:	Grade 40	
Description:	40 ksi reinforcing steel	
Si Or Us Type:	US Customary	
Yield Strength:	40.000	ksi
Modulus Of Elasticity:	29000.00	ksi
Ultimate Strength:	70.000	ksi
Reinforcing Bar Type:	Plain	

Prestress Strand Material

Name:	7/16" (7W-250) SR	
Description:	Stress relieved 7/16"/Seven Wire/fpu = 250	
Si Or Us Type:	US Customary	
Strand Diameter:	0.4375	in
Strand Area:	0.108	in^2
Strand Type:	Stress Relieved	
Ultimate Tensile Strength:	250.000	ksi
Yield Strength:	212.500	ksi
Modulus Of Elasticity:	28500.00	ksi
Transfer Length Std:	21.8750	in
Transfer Length LRFD:	26.2500	in
Unit Load Per Length:	0.367	lb/ft
Epoxy Coated Indicator:	FALSE	

2.0 SONOVOID SLAB UNIT STRENGTHENING - CFRP WRAPS EVALUATION

OBJECTIVE

Design of externally bonded Carbon FRP reinforcement in order to increase the Flexural Capacity of Sonovoid Slab Units 2-8 and 2-9, Bridge No.874294. Load rate CFRP strengthened slab units using LRFR Strength II for controlling FL-Legal Truck (SU4).

CODES AND SPECIFICATIONS

- "FDOT Bridge Load Rating Manual, "Florida Department of Transportation (FDOT) ", January 2021, FDOT BLRM , 2021 edition used for project consistency
- "FDOT Structures Design Guidelines (SDG). Structures Manual Vol.1", January 2021, FDOT
- "AASHTO LRFD Bridge Design Specifications, "American Association of State Highway and Transportation Officials (AASHTO), 9th Edition 2020
- "Fiber Reinforced Polymer Guidelines (FRPG). Structures Design Manual Vol.4", January 2021, FDOT
- "Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures ", ACI 440.2R-08, ACI, 2008

Assumptions/Notes:

1. Assume all prestressing strands are bonded for flexural analysis
2. Calculations are an addendum to the AASHTOWare BrR Analysis
3. CFRP Strengthening will use the U-Wrap Method described in (ACI 440.2R-08, Chapter 11) and Flexural Strengthing analysis techniques in (ACI 440.2R-08, Chapter 10)

Procedure:

1. Input Original Beam Geometry, Material Properties, Strength and Load Effects
2. AASHTOWARE BrR Refined Analysis Results Input
    a. Moment
3. FRP Reinforcement Properties
4. Design of Externally Bonded FRP Reinforcement
    a. Development Length of FRP
    b. Flexural Capacity
    c. Service Check
    d. FRP Fatigue Check
5. Calculate Operating Ratings
6. Summary

Legend:

INPUT <------Data Input

OUTPUT <------Reference Checks and Design Results Output

INPUT DATA

Resistance factor for FRP (ACI 440.2R-08, Table 11.1) $\psi_f := 0.85$

System Factor (FDOT BLRM Table 6A.4.2.4-1) $\phi_S := 1.0$

Condition Factor for Shear (AASHTO MBE 6A.4.2.3) $\phi_C := 0.90$

Load Factors per Table 6A.4.2.2-1 FDOT Load Rating Manual, January 2021

Load factor for Dead Load $\gamma_{DC} := 1.25$

Load factor for Live Load - Inventory (1.75) and FL-120 (1.35) $\gamma_{INV} := 1.75$

Load factor for Live Load - Operating $\gamma_{OPT} := 1.35$

Load factor for Live Load - FL-120 $\gamma_{FL120} := 1.35$

Load factor for Live Load - Legal - Operating $\gamma_{FLSU\_OPT} := 1.35$

Material Properties

Concrete Information:

Correction factor for source of aggregate. (AASHTO 5.4.2.4-1. & FDOT SDG. 1.4.1-A) $K_1 := 1.0$

Nominal compressive strength of concrete Slab Unit (non-composite). $f'_{c\_bm} := 5.0 \cdot ksi$

Slab Unit concrete strength at final (FDOT BLRM Table 6A.5.2.1-1) $fc := 5.0ksi$

Deck Slab concrete strength at final (FDOT BLRM Table 6A.5.2.1-1) $fcslab := 0ksi$

Weight of concrete and humidity (AASHTO Table 3.5.1-1 & FDOT SDG 1.4.1-A & 4.6.6) $w_c := 0.145 \frac{kip}{ft^3}$ $Humidity := 75$

Modulus of elasticity for normalweight concrete Deck Slab. (AASHTO 5.4.2.4-2).

$$E_c := 120000 \cdot K_1 \cdot \left(w_c \cdot \frac{ft^3}{kip}\right)^{2.0} \cdot \left(fcslab \cdot \frac{1}{ksi}\right)^{0.33} \cdot ksi = 0 \cdot ksi$$

Modulus of elasticity for normalweight concrete Slab Unit. (AASHTO 5.4.2.4-2).

$$E_{c\_bm} := 120000 \cdot K_1 \cdot \left(w_c \cdot \frac{ft^3}{kip}\right)^{2.0} \cdot \left(f'_{c\_bm} \cdot \frac{1}{ksi}\right)^{0.33} \cdot ksi = 4.291 \times 10^3 \cdot ksi$$

Modular Ratio $n_{trans} := \frac{E_c}{E_{c\_bm}} = 0$

Concrete cracking stress (AASHTO 5.4.2.6) $f_r := 0.24 \cdot \sqrt{\frac{f'_{c\_bm}}{ksi}} \cdot ksi = 0.537 \cdot ksi$

Geometry Information:

Span length (CL bearing to CL bearing, Span 2) $L_{Span} := 38.50ft$ *(See Asbuilt Plans, PG. 8 of 13 of pdf)*

Slab Section Properties - **[Not Applicable to this Design]**

Deck thickness (Assumed for Asphalt W.S.) $t_{slab} := 0in$

Effective Deck Width $b_s := 0.0ft$

Transformed Width $b_{transf} := n_{trans} \cdot b_s = 0 \cdot in$

Height of the section (Slab Unit + Deck Slab) $h_c := 17in + t_{slab} = 17 \cdot in$

Tranformed Area $A_{ts} := t_{slab} \cdot b_{transf} = 0 \cdot in^2$

Slab Unit Properties

	Non-composite	(Tranformed) Composite
Slab Unit height	$h_{nc} := 17in$	$h_c = 17 \cdot in$
Size of Void	$d_{void} := 10in$	
Bottom flange width	$b_{f\_bot} := 36in$	
Top flange width	$b_{f\_top} := 35in$	
Web width (assume effective web width)	$b_w := b_{f\_top} - 2 \cdot 1in - 2 \cdot \left(\frac{\pi \cdot d_{void}}{4}\right)$	$b_w = 17.292 \cdot in$
Cross sectional area (From AASHTOWARE BrR)	$A_{nc} := 438.822in^2$	$A := A_{nc} + b_{transf} \cdot t_{slab}$ $A = 438.822 \cdot in^2$
Moment of inertia	$I_{nc} := 13330.101in^4$	$I := 13330.101in^4$
C.G (from bottom)	$y_{b\_nc} := 8.1667in$	$y_b := 8.1667in$
Top fiber to C.G.	$y_{t\_nc} := h_{nc} - y_{b\_nc} = 8.833 \cdot in$	$y_t := h_c - y_b = 8.833 \cdot in$
Section modulus at top fiber	$S_{t\_nc} := \frac{I_{nc}}{y_{t\_nc}} = 1.509 \times 10^3 \cdot in^3$	$S_t := \frac{I}{y_t} = 1.509 \times 10^3 \cdot in^3$

Section modulus at top of slab unit once section becomes composite $S_{top\_girder\_c} := \frac{I}{y_t - t_{slab}} = 1.509 \times 10^3 \cdot in^3$

Section modulus at bottom fiber $S_{b\_nc} := \frac{I_{nc}}{y_{b\_nc}} = 1.632 \times 10^3 \cdot in^3$ $S_b := \frac{I}{y_b} = 1.632 \times 10^3 \cdot in^3$

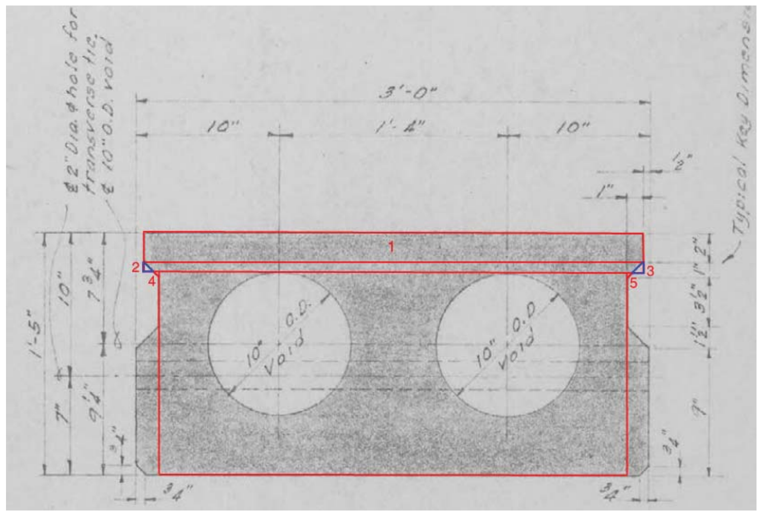
Radius of gyration $r := \sqrt{\frac{I_{nc}}{A_{nc}}} = 5.512 \cdot in$

Slab Unit/Girder Dimensions (For Nominal Bending Strength)

Slab Unit Dimensions (Used for Flexural Design):

17"x36" Slab Unit:

Base	*Height*
$b_1 := 35in$	$h_1 := 2.0in$
$b_2 := 0.75in$	$h_2 := 0.75in$
$b_3 := 0.75in$	$h_3 := 0.75in$
$b_4 := 0.25in$	$h_4 := 0.25in$
$b_5 := 0.25in$	$h_5 := 0.25in$



Slab Unit/Girder Dimensions (For Nominal Bending Strength)

Steel Information:

Strand Info: (7/16" seven-wire strand, Grade 250)

Strand diameter. (7/16") $d_s := 0.4375in$

Strand area. $A_s := 0.108in^2$

Specified tensile strength of prestressing steel (ksi). (MBE Table 6A.5.2.3-1) $f_{pu} := 250ksi$

Yield strength of prestressing steel (ksi). $f_{py} := 0.9 \cdot f_{pu} = 225 \cdot ksi$

Modulus of elasticity for prestressing strands (ksi). (MBE Table 6A.5.2.3-1) $E_p := 28500ksi$

Total number of strands at critical section $N_{Total\_str} := 15$

Area of existing prestressing steel. $A_{ps} := N_{Total\_str} \cdot A_s = 1.62 \cdot in^2$

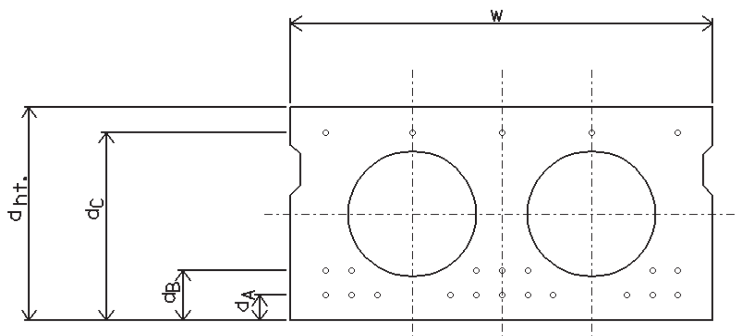
Total Losses to prestresing steel (Assumed). $\Delta f_{pT} := 0.75 \cdot f_{pu} \cdot 13.43\% = 25.181 \cdot ksi$

Effective stress in prestressing steel after losses. $f_{pe} := 0.75f_{pu} - \Delta f_{pT} = 162.319 \cdot ksi$

Effective force in prestressing steel after losses. $P_{pe} := A_{ps} \cdot f_{pe} = 262.956 \cdot kip$

Effective prestress strain. $\varepsilon_{pe} := \dfrac{f_{pe}}{E_p} = 0.0057$

Strand Layout - Interior Units 2-8 & 2-9:
(Note: Assumed strand layout for Design, accounting for removal of severed/deteriorated strands per damages reported in the most current Inspection Reports, plus 50% of the adjacent strands)



Strand Locations (Measured inches From the Bottom)

"Location"	"From Bottom"	"No. Strands""
"Top Row"	14.5	4
"3rd Row"	6.5	0
"2nd Row"	4.5	5
"Bottom Row"	2.5	10

C.G. of PS to bottom fiber of slab unit at mid-span

$$y_{ps} := \frac{A_s \cdot \left(d_{strand_{3,2}} \cdot d_{strand_{3,1}} in + d_{strand_{4,2}} \cdot d_{strand_{4,1}} in\right)}{\left(d_{strand_{3,2}} + d_{strand_{4,2}}\right) \cdot A_s} = 3.17 \cdot in$$

Prestressing strand eccentricity. $e_{nc} := y_{b\_nc} - y_{ps} = 5.00 \cdot in$ $\quad e := y_b - y_{ps} = 5.00 \cdot in$

Distance from the extreme compression fiber to the centoid of prestressing tendons. $d_{p\_nc} := h_{nc} - y_{ps} = 13.83 \cdot in$ $\quad d_p := h_c - y_{ps} = 13.83 \cdot in$

Area of transverse reinforcement #4 stirrups (Assume 3-legs of Transverse reinforcement) $A_v := 3(0.2)\, in^2 = 0.6 \cdot in^2$

Yield strength of stirrups (FDOT BLRM Table 6A.5.2.2-1) $f_y := 40ksi$

AASHTOWARE BrR-Inputs (Moment)

B. Moments (AASHTOWARE BrR Analysis Results):
(Note: HL93 Truck LL Not Applicable to this Design)

$g := 0$

$M_g := (87.1 kip \cdot ft)$ — Moment due to self weight of the slab unit (Midspan). (Total DC Self weight moment from AASHTOWare BrR)

$M_{pre\_DC} := (0 kip \cdot ft)$ — Moment due to additional precast components

$M_{pc} := (0 kip \cdot ft)$ — Moment due dead load of deck slab [Not Applicable]

$M_c := (22.5 kip \cdot ft)$ — Moment due to additional structural components (Total DC Railing & Sidewalk/Curb moment from AASHTOWare BrR)

$M_{DC} := M_g + M_{pre\_DC} + M_{pc} + M_c = (109.6) \cdot kip \cdot ft$ — Dead load moment from structural components and non-structural attachments.

$M_{DW} := (0 kip \cdot ft)$ — Moment due to future wearing surface DL.

$LLDF_{M\_HL93} := (0.0)$ — [Not Applicable]

$LLDF_{M\_FL.Legal} := (0.256)$ — Live load distribution factor for moment from AASHTOWare BrR Refined Analysis (Note: Distribution Factor assuming post-tensioning is repaired/restored)

$M_{LL\_HL93} := (0.0 kip \cdot ft)$ — Live load moment from controlling HL-93 truck. [Not Applicable]

$M_{LL\_FL.Legal} := (171.55 kip \cdot ft)$ — Live load moment from controlling FL-Legal truck: SU4.

Design Load Combinations:
(Note: HL93 Truck LL Not Applicable to this Design)

$M_{Ser\_FL.Legal} := 1.0 \cdot M_{DC} + 1.0 \cdot M_{DW} + 1.0 \cdot M_{LL\_FL.Legal} = (281.1) \cdot kip \cdot ft$ — Service moment (Service I). AASHTO LRFD Table 3.4.1-1.

$M_{Str\_FL.Legal} := 1.25 \cdot M_{DC} + 1.5 \cdot M_{DW} + 1.35 \cdot M_{LL\_FL.Legal} = (368.6) \cdot kip \cdot ft$ — Strength moment (Strength II). AASHTO LRFD Table 3.4.1-1.

$\phi M_{n\_no\_wrap} := (344.64 kip \cdot ft)$ — Capacity of member before FRP wrap is applied

AASHTOWARE BrR-Inputs (Moment)

3. CFRP Reinforcement Properties

The amount of the CFRP reinforcement and its material properties are given as per net-fiber.

Thickness of the CFRP strip *(V-Wrap[TM] - C200HM)* $t_f := 0.04in$

Ultimate tensile strength of the CFRP $f_{fu\_pre} := 155ksi$

Rupture strain $\varepsilon_{fu\_pre} := 0.011$

Modulus of elasticity of CFRP $E_f := 14 \cdot 10^6 psi = 14000 \cdot ksi$

Number of plies of CFRP sheets (Per preliminary recommendations) $n := 2$

Width of the CFRP sheet (36" per preliminary recommendation from Structural Technologies) $w_f := 36in$

CFRP orientation $\alpha_f := 90deg$

Spacing of CFRP [Not Applicable] $s_{FRP} := 0in$

Area of FRP for shear . (ACI 440.2R Eq. 11-4) [Not Applicable] $A_{fv} := 0in^2$

Area of FRP for flexure (U-wrap) $A_{ff} := n \cdot t_f \cdot b_{f\_bot} = 2.88 \cdot in^2$

Environmental reduction factor for CFRP. (ACI 440.2R Table 9.1) $C_E := 0.85$

Design ultimate tensile strength of CFRP. (ACI 440.2R Eq. 9-3) $f_{fu} := C_E \cdot f_{fu\_pre} = 131.75 \cdot ksi$

Ultimate rupture strain of CFRP reinforcement. (ACI 440.2R Eq. 9-4) $\varepsilon_{fu} := C_E \cdot \varepsilon_{fu\_pre} = 0.0093 \cdot \frac{in}{in}$

4. DESIGN OF EXTERNALLY BONDED FRP REINFORCEMENT

(ACI 440.2R-08, Chapter 11)

The CFRP sheets will be applied along the bottom face of the deteriorated slab units, along the full length and across the entire width of the slab units.

FRP Strength Criteria (Moment)

$$Check\_FRP\_Stength\_Criteria\_Moment_g := \begin{cases} \text{"OK"} & \text{if } \left(\left(\phi M_{n\_no\_wrap_g} \geq 1.1\, M_{DC_g} + 1.0\, M_{LL\_HL93_g}\right)\right) \wedge \left(\left(\phi M_{n\_no\_wrap_g} \geq 1.1 \cdot M_{DC_g} + 1.0\, M_{LL\_FL.Legal_g}\right)\right) \\ \text{"Not Good"} & \text{otherwise} \end{cases}$$

[NOT APPLICABLE]

FDOT FRPG Section 4.2.C
(For multiple girder Strengthening)

$Check\_FRP\_Stength\_Criteria\_Moment = (\text{"OK"})$

FRP Strength Criteria (Moment)

CFRP Development Length

FRP Reinforcement - Development Length

Determine length of CFRP needed to develop full bond capacity. Overlap length of CFRP sheets must be provided by manufactor ACI 440.2R-08 13.2

$$l_{df} := 0.057 \cdot \sqrt{\frac{n \cdot E_f \cdot t_f}{\sqrt{\frac{f'_{c\_bm}}{psi}} \cdot psi \cdot in}} \cdot in = 7.174 \cdot in$$

Development length needed to develop full bond strength of CFRP ACI 440.2R-08 (13-2)

CFRP Development Length

Ultimate Flexural Strength Pt.1

FRP Reinforcement - Flexural Capacity

Design material properties:

$$f_{fu} = 131.75 \cdot ksi$$

$$\varepsilon_{fu} = 9.35 \times 10^{-3}$$

Area of the CFRP reinforcement

$$A_{fv} = 5.76 \cdot in^2$$

Effective depth of CFRP (ACI 440.2R-08 Fig 11.2)

$$d_{vFRP} := \left(d_p - t_{slab} - 2in\right) = 11.833 \cdot in$$

Active bond length (ACI 440.2R-08 11.4.1.2)

$$L_e := \frac{2500in}{\left(n \cdot \frac{t_f}{in} \cdot \frac{E_f}{psi}\right)^{0.58}} = 0.775 \cdot in$$

Bond reduction coefficients (ACI 440.2R-08 11.4.1.2)

$$k_1 := \left(\frac{fc}{psi \cdot 4000}\right)^{\frac{2}{3}} = 1.16 \qquad k_2 := \frac{d_{vFRP} - L_e}{d_{vFRP}} = 0.934 \quad \text{for U-Wrap}$$

$$\kappa_v := \frac{k_1 \cdot k_2 \cdot \frac{L_e}{in}}{468 \cdot \varepsilon_{fu}} = 0.192$$

$$\kappa_v := \min\left(0.75, \kappa_v\right) = 0.192$$

Effective strain of the CFRP reinforcement (ACI 440.2R-08 11.4.1.2)

$$\varepsilon_{fe} := \min\left(\kappa_v \cdot \varepsilon_{fu}, 0.004\right) = 0.0018$$

Effective strength of the CFRP reinforcement $\quad f_{fe} := \varepsilon_{fe} \cdot E_f = 25.145 \cdot \text{ksi}$

(ACI 440.2R Eq. 11-5)

Determine the existing state of strain

Determine strain at soffit during installation of CFRP. Tension is positive and compression is negative.

$$\varepsilon_{bi} := \frac{-P_{pe}}{E_{c\_bm} \cdot A_{nc}} + \frac{-P_{pe} \cdot e_{nc} + M_g + M_{pc}}{E_{c\_bm} \cdot S_{b\_nc}} + \frac{M_c}{E_{c\_bm} \cdot S_b} = \left(-1.396 \times 10^{-4}\right)$$

Determine the design strain of the FRP system

Determine strain at which debonding of CFRP may occur

$$\varepsilon_{fd} := \min\left(0.083 \cdot \sqrt{\frac{f'_{c\_bm} \cdot psi \cdot in}{n \cdot E_f \cdot t_f \cdot psi}}, 0.9 \cdot \varepsilon_{fu}\right) = 5.546 \times 10^{-3}$$

ACI 440.2R-08 (10-2)

Determine flexure capacity of section

The determination of flexural capacity for prestressed slab units repaired with CFRP wraps makes use of strain compatability which is an iterative process. Each iteration involves the assumption of a neutral axis depth. Once an assumption is made, the strains in the compressive concrete face, CFRP wrap, and strands are determined based on a linear strain relationship. The calculated strains are then converted into compressive and tensile forces that are used to check if equilibrium within the cross section is obtained, iterations continue until equilibrium is reached. **It is assumed all strands are bonded at the section of interest**.

Guess neutral axis depth (reasonable guess is 0.1*depth of section):

$c := (6.475\text{in})$

Assumed depth from top of section to neutral axis

Determine the effective level of strain in the CFRP reinforcement:

$d_f := h_c = 17 \cdot \text{in}$

Depth from top of section to CFRP reinforcement

$$\varepsilon_{fe} := \text{for } i \in g \quad \varepsilon_{fe_i} \leftarrow \min\left[0.003 \cdot \left(\frac{d_f - c_i}{c_i}\right) - \varepsilon_{bi_i}, \varepsilon_{fd}\right]$$

Strain in CFRP reinforcement
ACI 440.2R-08 (10-16)

$\varepsilon_{fe} = \left(5.016 \times 10^{-3}\right)$

$$\text{Controlling\_Failure} := \text{for } i \in g$$
$$\left| \begin{array}{l} \text{Controlling\_Failure}_i \leftarrow \text{"CFRP debonding/rupture controls"} \quad \text{if } \left|\varepsilon_{fe_i}\right| = \varepsilon_{fd} \\ \text{Controlling\_Failure}_i \leftarrow \text{"Concrete crushing controls"} \quad \text{otherwise} \end{array} \right.$$

$$\text{Controlling\_Failure} = (\text{"Concrete crushing controls"})$$

Determine strain at extreme compression fiber based on controlling failure type:

$$\varepsilon_c := \text{for } i \in g$$
$$\left| \begin{array}{l} \varepsilon_{c_i} \leftarrow \left(\varepsilon_{fe_i} + \varepsilon_{bi_i}\right) \cdot \dfrac{c_i}{d_f - c_i} \quad \text{if } \varepsilon_{fe_i} = \varepsilon_{fd} \\ \varepsilon_{c_i} \leftarrow 0.003 \quad \text{otherwise} \end{array} \right.$$

CFRP debonding/rupture

Concrete crushing

$$\varepsilon_c = \left(3 \times 10^{-3}\right)$$

Strain at extreme compression fiber

Calculate the strain in the exisitng prestressing steel:

Net tensile strain in prestressing steel beyond decompression, at nominal strength

$$\varepsilon_{pnet} := \text{for } i \in g$$
$$\left| \begin{array}{l} \varepsilon_{pnet_i} \leftarrow \left(\varepsilon_{fe_i} + \varepsilon_{bi_i}\right) \cdot \left(\dfrac{d_p - c_i}{d_f - c_i}\right) \quad \text{if } \varepsilon_{fe_i} = \varepsilon_{fd} \\ \varepsilon_{pnet_i} \leftarrow 0.003 \cdot \dfrac{d_p - c_g}{c_g} \quad \text{otherwise} \end{array} \right.$$

CFRP debonding/rupture
ACI 440.2R-08 (10-23b)

Concrete crushing
ACI 440.2R-08 (10-23a)

$$\varepsilon_{pnet} = \left(3.409 \times 10^{-3}\right)$$

$$\varepsilon_{ps} := \text{for } i \in g$$
$$\left| \; \varepsilon_{ps_i} \leftarrow \min\left[\varepsilon_{pe} + \frac{P_{pe}}{A_{nc} \cdot E_{c\_bm}} \cdot \left(1 + \frac{e_{nc}^2}{r^2}\right) + \varepsilon_{pnet_i}, 0.035\right] \right. = \left(9.359 \times 10^{-3}\right)$$

Strain in prestressing steel
ACI 440.2R-08 (10-22)

$$\text{Check\_steel\_rupture}_g := \begin{cases} \text{"Need to consider steel rupture"} & \text{if } \varepsilon_{ps_g} \geq 0.035 \\ \text{"Steel rupture does not control OK"} & \text{otherwise} \end{cases}$$

Check if steel rupture controls
ACI 440.2R-08 (10-22)

$\text{Check\_steel\_rupture} = (\text{"Steel rupture does not control OK"})$

Calculate the stress level in prestressing steel and CFRP:

$$f_{ps_g} := \left(\begin{cases} 28500 \cdot \varepsilon_{ps} & \text{if } \varepsilon_{ps_g} \leq 0.0076 \\ 250 - \dfrac{0.04}{\varepsilon_{ps_g} - 0.0064} & \text{otherwise} \end{cases} \right) \cdot \text{ksi}$$

Stress in prestressing steel (applicable for Grade 250 ksi steel)
ACI 440.2R-08 (10-24b)

$f_{ps_g} = 236.483 \cdot \text{ksi}$

$f_{fe} := E_f \cdot \varepsilon_{fe} = (70.224) \cdot \text{ksi}$

Stress in CFRP Reinforcement
ACI 440.2R-08 (10-21)

Calculate the internal force resultants and check equilibrium:

Use Whitney Stress Block to model stress if concrete crushing controls. If CFRP debonding/rupture controls use approximate stress block factors based on parabolic stress-strain relationship for concrete (see ACI 440.2R-08 15.5 Step 9)

$$\beta_{1_g} := \begin{array}{l} \text{if } \varepsilon_{fe_g} = \varepsilon_{fd} \\ \quad \left| \begin{array}{l} \varepsilon'_c \leftarrow \dfrac{1.7 \cdot f'_{c\_bm}}{E_{c\_bm}} \\ \beta_1 \leftarrow \dfrac{4 \cdot \varepsilon'_c - \varepsilon_{c_g}}{6 \cdot \varepsilon'_c - 2 \cdot \varepsilon_{c_g}} \end{array} \right. \\ \text{if } \varepsilon_{c_g} = 0.003 \\ \quad \left| \begin{array}{l} \beta_1 \leftarrow \max\left(0.85 - \dfrac{f'_{c\_bm} - 4000\text{psi}}{1000 \cdot \text{psi}} \cdot 0.05, 0.65\right) \quad \text{if } f'_{c\_bm} > 4000\text{psi} \\ \beta_1 \leftarrow 0.85 \quad \text{if } f'_{c\_bm} \leq 4000\text{psi} \end{array} \right. \end{array}$$

Approximate stress block β factor based on parabolic stress-strain relationship ACI 440.2R-08 15.5 Step 9

Stress block β factor based on Whitney Stress Block

$\beta_1 = (0.8)$

$\beta_{1_g} = 0.8$

$$\alpha_{1_g} := \begin{cases} \alpha_1 \leftarrow 0.85 \quad \text{if } \varepsilon_{c_g} = 0.003 \\ \text{otherwise} \\ \quad \varepsilon'_c \leftarrow \dfrac{1.7 \cdot f'_{c\_bm}}{E_{c\_bm}} \\ \quad \alpha_1 \leftarrow \dfrac{3 \cdot \varepsilon'_c \cdot \varepsilon_{c_g} - \left(\varepsilon_{c_g}\right)^2}{3 \cdot \beta_{1_g} \cdot \varepsilon'^2_c} \end{cases}$$

Stress block α factor based on Whitney Stress Block

Approximate stress block α factor based on parabolic stress-strain relationship ACI 440.2R-08 15.5 Step 9

$$\alpha_1 = (0.85)$$

$$\alpha_{1_g} = 0.85$$

Ultimate Flexural Strength Pt.1

Strain Compatability Calcs

$$fw_{transf} := \frac{b_1 \cdot (h_1 + h_2) - \left(2 \cdot \frac{1}{2} \cdot b_2 \cdot h_2\right)}{b_1 \cdot (h_1 + h_2)} \cdot b_1 = 34.795 \cdot in$$

Use transformed girder flange width if stress block lies on or beyond first tapered section of girder flange

$$
\begin{aligned}
\text{Ten\_Com} := \; & \text{for } i \in g \\
& \quad \text{if } \beta_{1_i} \cdot c_i \le t_{slab} \qquad \text{Stress block in deck} \\
& \qquad Com_i \leftarrow \alpha_{1_i} \cdot f'_{c\_bm} \cdot b_{transf} \cdot \beta_{1_i} \cdot c_i \\
& \qquad Ten_i \leftarrow A_{ps} \cdot f_{ps_i} + A_{ff} \cdot f_{fe_i} \\
& \quad \text{if } \beta_{1_i} \cdot c_i > t_{slab} \wedge \beta_{1_i} \cdot c_i \le h_1 + t_{slab} \qquad \text{Stress block in top of flange} \\
& \qquad Com_i \leftarrow \alpha_{1_i} \cdot f'_{c\_bm} \cdot b_{transf} \cdot t_{slab} + \alpha_{1_i} \cdot f'_{c\_bm} \cdot b_1 \cdot \left(\beta_{1_i} \cdot c_i - t_{slab}\right) \\
& \qquad Ten_i \leftarrow A_{ps} \cdot f_{ps_i} + A_{ff} \cdot f_{fe_i} \\
& \quad \text{if } \beta_{1_i} \cdot c_i > h_1 + t_{slab} \wedge \beta_{1_i} \cdot c_i \le h_1 + h_2 + t_{slab} \qquad \text{Stress block in first tapered section of flange} \\
& \qquad Com_i \leftarrow \alpha_{1_i} \cdot f'_{c\_bm} \cdot b_{transf} \cdot t_{slab} + \alpha_{1_i} \cdot f'_{c\_bm} \cdot fw_{transf} \cdot \left(\beta_{1_i} \cdot c_i - t_{slab}\right) \\
& \qquad Ten_i \leftarrow A_{ps} \cdot f_{ps_i} + A_{ff} \cdot f_{fe_i} \\
& \quad \text{if } \beta_{1_i} \cdot c_i > h_1 + h_2 + t_{slab} \wedge \beta_{1_i} \cdot c_i \le h_1 + h_2 + h_4 + t_{slab} \qquad \text{Stress block in second tapered section of flange} \\
& \qquad Com_i \leftarrow \alpha_{1_i} \cdot f'_{c\_bm} \cdot b_{transf} \cdot t_{slab} + \alpha_{1_i} \cdot f'_{c\_bm} \cdot \left(h_1 + h_2\right) \cdot fw_{transf} + \alpha_{1_i} \cdot f'_{c\_bm} \cdot \left(\beta_{1_i} \cdot c_i - t_{slab} - h_1 - h_2\right) \cdot \left(b_w + b_4\right) \\
& \qquad Ten_i \leftarrow A_{ps} \cdot f_{ps_i} + A_{ff} \cdot f_{fe_i} \\
& \quad \text{if } \beta_{1_i} \cdot c_i > h_1 + h_2 + h_4 + t_{slab} \qquad \text{Stress block in web} \\
& \qquad Com_i \leftarrow \alpha_{1_i} \cdot f'_{c\_bm} \cdot b_{transf} \cdot t_{slab} + \alpha_{1_i} \cdot f'_{c\_bm} \cdot \left(h_1 + h_2\right) \cdot fw_{transf} + \alpha_{1_i} \cdot f'_{c\_bm} \cdot \left(h_4 \cdot b_w + h_4 \cdot b_4\right) \cdots \\
& \qquad \quad + \alpha_{1_i} \cdot f'_{c\_bm} \cdot \left[\beta_{1_i} \cdot c_i - t_{slab} - \left(h_1 + h_2 + h_4\right)\right] \cdot b_w \\
& \qquad Ten_i \leftarrow A_{ps} \cdot f_{ps_i} + A_{ff} \cdot f_{fe_i} \\
& \text{return augment}(Ten, Com)
\end{aligned}
$$

Strain Compatability Calcs

Ultimate Flexural Capacity Pt.2

$Ten\_Com = (585.349 \quad 585.521)\cdot kip$

Check if section is in equilibrium

Tension Compression

$$Equilibrium := \left| \begin{array}{l} \text{for } i \in g \\ \quad \left| \begin{array}{l} Equilibrium_i \leftarrow \text{"Equilibrium achieved"} \quad \text{if } \left| \dfrac{Ten\_Com_{i,0} - Ten\_Com_{i,1}}{Ten\_Com_{i,0}} \right| \le 1\% \\ Equilibrium_i \leftarrow \text{"Equilibrium not achieved, adjust c value"} \quad \text{if } \left| \dfrac{Ten\_Com_{i,0} - Ten\_Com_{i,1}}{Ten\_Com_{i,0}} \right| > 1\% \end{array} \right. \\ \text{return } Equilibrium \end{array} \right.$$

$Equilibrium = (\text{"Equilibrium achieved"})$

Nominal flexural strength:

$$M_{np} := \overrightarrow{\left[A_{ps}\cdot f_{ps}\cdot\left(d_p - \frac{\beta_1\cdot c}{2}\right)\right]} = (358.946)\cdot kip\cdot ft$$

Prestressing steel contribution to flexural strength

Percent difference of calculated nominal strength of section without CFRP vs Conspan flexural capacity.
Use nominal section strength for check since AASHTO uses ϕ = 1.0 and ACI use ϕ = 0.9

$$\overrightarrow{\left|\frac{M_{np_g} - \phi M_{n\_no\_wrap_g}}{\phi M_{n\_no\_wrap_g}}\right|} = 4.151\cdot\%$$

$$M_{nf} := \overrightarrow{\left[A_{ff}\cdot f_{fe}\cdot\left(d_f - \frac{\beta_1\cdot c}{2}\right)\right]} = (242.864)\cdot kip\cdot ft$$

CFRP contribution to flexural strength

Design flexural strength:

$$\phi_g := \left| \begin{array}{l} \phi \leftarrow 0.9 \quad \text{if } \varepsilon_{ps_g} \ge 0.013 \\ \phi \leftarrow 0.65 + \dfrac{0.25\cdot\left(\varepsilon_{ps_g} - 0.010\right)}{0.013 - 0.010} \quad \text{if } \varepsilon_{ps_g} > 0.010 \wedge \varepsilon_{ps_g} < 0.013 \\ \phi \leftarrow 0.65 \quad \text{if } \varepsilon_{ps_g} \le 0.01 \end{array} \right.$$

Strength reduction factor
ACI 440.2R-08 (10-19)

$\phi = (0.65)$

$$\phi M_n := \overrightarrow{\left[\phi\cdot\left(M_{np} + \psi_f\cdot M_{nf}\right)\right]} = (367.497)\cdot kip\cdot ft$$

Design strength of composite section with CFRP wrap
ACI 440.2R-08 (10-26)

Ultimate Flexural Capacity Pt.2

Service I

FRP Reinforcement - Service Check

Check service stresses using Service I load combinations: SDG Vol 4. 4.2

Check if section will crack under service loads

$$f_D := \frac{-P_{pe}}{A_{nc}} + \frac{-P_{pe} \cdot e_{nc} + M_g + M_{pc}}{S_{b\_nc}} + \frac{M_c}{S_b} = (-0.599) \cdot ksi$$

Stress at soffit due to dead load. Tension is positive and compression is negative

Check if section is cracked due to live load moment:

$$\begin{aligned} Is\_section\_cracked := \ & \text{for } i \in g \\ & \quad Is\_section\_cracked_i \leftarrow \text{"Section is cracked; CFRP Strengthening Required"} \quad \text{if } f_{D_i} + \frac{M_{LL\_FL.Legal_i}}{S_b} \geq f_r \\ & \quad Is\_section\_cracked_i \leftarrow \text{"Section is not cracked OK"} \quad \text{otherwise} \end{aligned}$$

$$Is\_section\_cracked = (\text{"Section is cracked; CFRP Strengthening Required"})$$

Check stress in prestressing steel

Strain in prestressing steel. Tension is positive and compression is negative.

$$\varepsilon_{ps\_s} := \varepsilon_{pe} - \frac{P_{pe}}{A_{nc} \cdot E_{c\_bm}} \cdot \left(1 + \frac{e_{nc}^{\ 2}}{r^2}\right) + \frac{(M_g + M_{pc}) \cdot e_{nc}}{I_{nc} \cdot E_{c\_bm}} + \frac{(M_c + M_{LL\_FL.Legal}) \cdot e}{I \cdot E_{c\_bm}} = \left(5.736 \times 10^{-3}\right)$$

$$\begin{aligned} f_{ps\_s} := \ & \text{for } i \in g \\ & \quad f_{ps\_s_i} \leftarrow 28500 \cdot \varepsilon_{ps\_s_i} \cdot ksi \quad \text{if } \varepsilon_{ps\_s_i} \leq 0.0076 \\ & \quad f_{ps\_s_i} \leftarrow \left(250 - \frac{0.04}{\left|\varepsilon_{ps\_s_i}\right| - 0.0064}\right) \cdot ksi \quad \text{if } \varepsilon_{ps\_s_i} > 0.0076 \end{aligned}$$

Stress in prestressing steel (applicable for 250 grade steel) ACI 440.2R-08 (10-24b)

$f_{ps\_s} = (163.468)\cdot ksi$

$$Check\_steel\_stress := \text{for } i \in g \; \begin{cases} Check\_steel\_stress_i \leftarrow \text{"OK"} & \text{if } \left|f_{ps\_s_i}\right| \le 0.82\cdot f_{py} \wedge \left|f_{ps\_s_i}\right| \le 0.74\cdot f_{pu} \\ Check\_steel\_stress_i \leftarrow \text{"NOT OK"} & \text{otherwise} \end{cases}$$

Check if stress in prestressing steel satisfies ACI 440.2R-08 (10-20a) & (10-20b)

$Check\_steel\_stress = (\text{"OK"})$

Check compressive stress in concrete

Tension is positive and compression is negative

Check top of precast slab unit:

$$f_{c\_top\_gir} := \frac{-P_{pe}}{A_{nc}} + \frac{P_{pe}\cdot e_{nc} - M_g - M_{pc}}{S_{t\_nc}} - \frac{M_c}{S_{top\_girder\_c}} - \frac{M_{LL\_FL.Legal}}{S_{top\_girder\_c}} = (-1.964)\cdot ksi$$

Stress at top of precast girder

$$Check\_top\_girder\_stress := \text{for } i \in g \; \begin{cases} Check\_top\_girder\_stress_i \leftarrow \text{"OK"} & \text{if } \left|f_{c\_top\_gir_i}\right| \le 0.45\cdot f'_{c\_bm} \\ Check\_top\_girder\_stress_i \leftarrow \text{"NOT OK"} & \text{otherwise} \end{cases}$$

$Check\_top\_girder\_stress = (\text{"OK"})$

Check top of deck: - **[NO DECK PRESENT; CHECK NOT APPLICABLE]**

$$f_{c\_top\_deck} := \text{if}\left(t_{slab} = 0in, 0ksi, \frac{M_c}{S_t}\cdot n - \frac{M_{LL\_FL.Legal}}{S_t}\cdot n\right) = 0\cdot ksi$$

Stress at top of deck

$$Check\_top\_deck\_stress := \text{if}\left(t_{slab} = 0in, \text{"NOT APPLICABLE"}, \text{for } i \in g \; \begin{cases} Check\_top\_deck\_stress_i \leftarrow \text{"OK"} & \text{if } \left|f_{c\_top\_deck_i}\right| \le 0.45\cdot fcslab \\ Check\_top\_deck\_stress_i \leftarrow \text{"NOT OK"} & \text{otherwise} \end{cases}\right)$$

$Check\_top\_deck\_stress = \text{"NOT APPLICABLE"}$

Check stress in CFRP

Tension is positive and compression is negative

$$f_{f\_s} := \frac{E_f}{E_{c\_bm}} \cdot \left(f_D + \frac{M_{LL\_FL.Legal}}{S_b} \right) - \varepsilon_{bi} \cdot E_f = (4.115) \cdot ksi$$

Stress in CFRP

$$\begin{aligned} Check\_FRP\_stress := \ & \text{for } i \in g \\ & \quad Check\_FRP\_stress_i \leftarrow \text{"OK"} \ \text{ if } \left| f_{f\_s_i} \right| \le 0.55 \cdot f_{fu} \\ & \quad Check\_FRP\_stress_i \leftarrow \text{"Not OK"} \ \text{ otherwise} \end{aligned}$$

Check that stress in CFRP satisfies ACI 440.2R-08 Table 10.1

$Check\_FRP\_stress = (\text{"OK"})$

Service I

FRP Fatigue Check

FRP Reinforcement - Fatigue

SDG Vol4. 4.2 states that the standard fatigue truck from LRFD should be used to check fatigue stresses in CFRP composite. By inspection, the standard fatigue truck will produce lower stresses within the section when compared to the truck used for the Service I stress check. If Service I is satisfied, no further analysis is required. (Refer to ACI 440.2R-08 10.2.9)

FRP Fatigue Check

Summary:

The Flexural Loading Rating (LR) controlled by SU4 Legal Strength loading which produced a LR of 0.931 was increased by CFRP strengthening along the bottom face of the slab unit length. The CFRP strengthening design consisted of U-wrap method plies which are 36" wide (C200HM) along the controlling sections. The strengthened section resulted in a flexural load rating shown below:

Number of Plies for U-Wrap Shear

$n = 2$

Width of Plies

$w_f = 36 \cdot in$

FRP Development Length

$l_{df} = 7.174 \cdot in$

FRP Stress Check

$Check\_FRP\_stress = (\text{"OK"})$

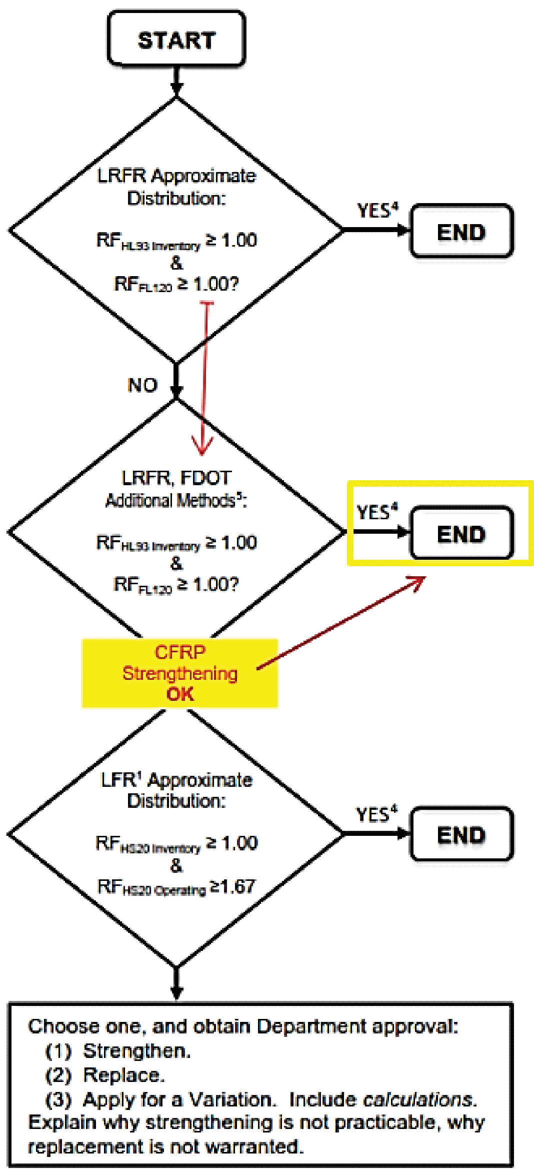
Rating Factor (Moment)

RATING FACTOR FOR CONTROLLING LEGAL LOAD (SU4) OPERATING LOADING MOMENT

$$RF_{OPT.moment\_rehab} := \frac{\phi M_n - \gamma_{DC} \cdot M_{DC}}{\gamma_{OPT} \cdot M_{LL\_FL.Legal}} = 1$$

Rating Factor (Moment)

FDOT Fig.2-2—Widening & Rehab.



3.0 POST-TENSIONING ALTERNATIVES FOR REPLACEMENT OF EXISTING POST-TENSIONING WIRE

Specifications: AASHTO LRFD Specifications for Highway Bridges, 9th edition 2020;
AASHTO ASD Specifications for Highway Bridges, 11th edition 1973
FDOT Load Rating Manual 2021

References 1) "Transverse post tensioning design and detailing of precast, prestressed adjacent box girder bridges", Kromel E. Hanna, George Morcous, and Maher K. Tadros, PCI Journal, 2009.

Units: U.S customary units

Existing Sonovoid Slab Post-Tensioning:

INPUT DATA

Bridge Data:

$Depth_{sonovoid} := 17in$ — Depth of Sonovoid Slab Unit (in.)

$Width_{sonovoid} := 36in$ — Width of Sonovoid Slab Unit (in.)

$y_{c\_bot} := 8.1667in$ — Distance Y from bottom face to Cg of section (in.)

$y_{c\_top} := Depth_{sonovoid} - y_{c\_bot} = 0.736\,ft$ — Distance Y from top face to Cg of section (in.)

$L_{Span\_1} := 29.042ft$ — Length of Span 1 or 3 (Brg-to-Brg.) (ft.)

$L_{Span\_2} := 38.50ft$ — Length of Span 2 (Brg-to-Brg.) (ft.)

$Skew := 0deg$ — Bridge Skew Angle (degrees)

$Width_{bridge} := 34ft$ — Widht of Bridge (ft.) - (Assumed width of bridge ignoring the 6" sidewalk overhang for analysis).

$Width_{diaphragm} := 12in$ — Diaphragm Width of Sonovoid Slab Unit (in.)

Post-Tensioning Strand Data:

$n := 2$ — Specified Number of Post-Tensioning Bar per duct

$d_{strand} := 0.50in$ — Specified Diameter of Post-Tentioning Strand (in) (See Appendix E)

$Area_{PT\_strand} := 0.153in^2$ — Minimum net Area of 0.50" diameter Strand (in^2) (See Appendix E)

$f_{pu} := 270ksi$ — Ultimate Strength of Post-Tensioning Strand (ksi) (See Appendix E)

$f_y := 245ksi$ — Yield Strength of Post-Tensioning Strand (ksi) (See Appendix E)

$P_{ult} := f_{pu} \cdot Area_{PT\_strand} = 41.31 \cdot kip$ — Minimum Ultimate Strength of Post-Tensioning Strand (kip) (See Appendix E)

Calculate Minimum Required Transverse Post-Tensioning Force per Diaphragm after Anchorage Setting:
(AASHTO LRFD 5.12.2.3.3c)

$F_{min\_trans\_PT} := 0.25ksi \cdot \left(Width_{diaphragm} \cdot Depth_{sonovoid}\right) = 51 \cdot kip$

Estimated Minimum Required Transverse Post-Tensioning Force per Diaphragm (AASHTO LRFD 5.12.2.3.3c)

Check Minimum Required Prestressing Strands:

$Area_{Min.\_PT\_strand} := \dfrac{F_{min\_trans\_PT}}{0.70 \cdot f_{pu}} = 0.27 \cdot in^2$

Minimum Area of Post-Tensioning Bar required to satisfy the minimum Transverse Post-Tensioning Force (in^2) (AASHTO LRFD Table 5.9.2.2-1)

$Area_{PT\_strand\_provided} := n \cdot Area_{PT\_strand} = 0.306 \cdot in^2$

Area of Post-Tensioning Strands provided (in^2)

Check Minimum Area of Post-Tensioning Strand to satisfy minimum transverse Post-Tensioning Force per AASHTO:

$Check_{min\_Area\_PT} := if\left(Area_{PT\_strand\_provided} < Area_{Min.\_PT\_strand}, \text{"N.G., Increase Bar Size"}, \text{"OK, Min. Req. Area Satisfied"}\right)$

$Check_{min\_Area\_PT} = \text{"OK, Min. Req. Area Satisfied"}$

$Check_{min\_Area\_PT\_ratio} := \dfrac{Area_{PT\_strand\_provided}}{Area_{Min.\_PT\_strand}} = 1.134$

Specifications: AASHTO LRFD Specifications for Highway Bridges, 9th edition 2020;
AASHTO ASD Specifications for Highway Bridges, 11th edition 1973
FDOT Load Rating Manual 2021

References 1) "Analysis of Bolt Torquing", PDHonline Course S149
2) "Transverse post tensioning design and detailing of precast, prestressed adjacent box girder bridges", Kromel E. Hanna, George Morcous, and Maher K. Tadros, PCI Journal, 2009.
3) Williams Form Engineering Corp., "Post-Tensioning System and Prestressing Steel Bars".

Units: U.S customary units

Determine Force in Transverse Post-Tensioning:

INPUT DATA

Bridge Data:

$Depth_{sonovoid} := 17in$ — Depth of Sonovoid Slab Unit (in.)

$Width_{sonovoid} := 36in$ — Width of Sonovoid Slab Unit (in.)

$L_{Span\_1} := 29.042ft$ — Length of Span 1 or 3 (Brg-to-Brg.) (ft.)

$L_{Span\_2} := 38.50ft$ — Length of Span 2 (Brg-to-Brg.) (ft.)

$Skew := 0deg$ — Bridge Skew Angle (degrees)

$Width_{bridge} := 34ft$ — Widht of Bridge (ft.) - (Assumed width of bridge ignoring the 6" sidewalk overhang for analysis).

$Width_{diaphragm} := 12in$ — Diaphragm Width of Solenoid Slab Unit (in.) -

Post-Tensioning Bar Data:

$n := 1$ — Specified Number of Post-Tensioning Bar per duct

$d_{bar} := 1.0in$ — Specified Diameter of All-Threated Post-Tentioning Bar (in) (See Appendix E)

$pitch_{bar} := 4.0in$ — Specified Pitch of All Threated Post-Tensioning Bar (in) (See Appendix E)

$Area_{PT\_bar} := 0.85in^2$ — Minimum net Area of 1" diameter All-threated bar (in^2) (See Appendix E)

$f_{pu} := 150ksi$ — Ultimate Strength of Post-Tensioning Bar (ksi) (See Appendix E)

$f_y := 120ksi$ — Yield Strength of Post-Tensioning Bar (ksi) (See Appendix E)

$P_{ult} := 128kip$ — Minimum Ultimate Strength of Post-Tensioning Bar (kip) (See Appendix E)

$P_{0.6Pu\_PT\_Force} := 76.5kip$ — Ultimate Prestressing Force at release, 0.60Pu (kip) (See Appendix E)

$major\_diameter := 1.125in$ — Major Bar/Bolt Diameter (in.) (See Appendix E)

$minor\_diameter := n \cdot d_{bar} = 1 \cdot in$ — Minor Bar/Bolt Diameter (in)

Compute the Minimum Required Transverse Post-Tensioning Force per Diaphragm after Anchorage Setting:
(AASHTO LRFD 5.12.2.3.3c)

$F_{min\_trans\_PT} := 0.25ksi \cdot \left(Width_{diaphragm} \cdot Depth_{sonovoid}\right) = 51 \cdot kip$ — Estimated Minimum Required Transverse Post-Tensioning Force per Diaphragm (AASHTO LRFD 5.12.2.3.3c)

Check Minimum Required Prestressing Bar:

$Area_{Min.\_Req\_PT\_Bar} := \frac{F_{min\_trans\_PT}}{0.70 \cdot f_{pu}} = 0.486 \cdot in^2$ — Minimum Area of Post-Tensioning Bar required to satisfy the minimum Transverse Post-Tensioning Force (in^2) (AASHTO LRFD Table 5.9.2.2-1)

$Area_{PT\_Bar\_provided} := n \cdot Area_{PT\_bar} = 0.85 \cdot in^2$ — Area of Post-Tensioning Bar provided (in^2)

$Check_{min\_Area\_PT} := if\left(Area_{PT\_Bar\_provided} < Area_{Min.\_Req\_PT\_Bar}, \text{"N.G., Increase Bar Size"}, \text{"OK, Min. Req. Area Satisfied"}\right)$

$Check_{min\_Area\_PT} = \text{"OK, Min. Req. Area Satisfied"}$

$Check_{min\_Area\_PT\_ratio} := \frac{Area_{PT\_Bar\_provided}}{Area_{Min.\_Req\_PT\_Bar}} = 1.75$

Determine Preload Force in Post-Tensioning Bar From Applied Torque:

Determine force in 1" bar due to 1000 lb-ft torque

Loads and Load Factors:

$Torque := 1000 \cdot lbf \cdot ft$ — Assumed Torque applied to Post-Tensioning bars to achieve the minimum required Post-Tensioning force (See Appendix E)

$d_m := \frac{major\_diameter + minor\_diameter}{2} = 1.063 \cdot in$ — Effective contact diameter for the threads

$TPI := \frac{8}{in}$ — Threads per inch

$Nut\_OD := 1.625in$ — Distance between nut flats for hex nuts (See Appendix E)

$l := \frac{1}{TPI}$ — Lead

$d_c := \dfrac{major\_diameter + Nut\_OD}{2} = 1.375 \cdot in$

$\alpha := 30deg$ — Angle of thread

$\mu := 0.15$ — Coefficient of friction assuming non-lubricated steel bolt

$Factor := \dfrac{1}{2 \cdot \pi} + \dfrac{\mu \cdot d_m}{2 \cdot \cos(\alpha)} + \dfrac{\mu \cdot d_c}{2} = 0.018\,ft$ — Factor used to convert force to Torque

$P_{Torque} := \dfrac{Torque}{Factor} = 55.805 \cdot kip$ — Prestressing force in Post-Tensioning Bar

Check Minimum Required Transverse Post-Tensioning Force per Diaphragm after Anchorage Setting:
(AASHTO LRFD 5.12.2.3.3c)

$F_{min\_trans\_PT} = 51 \cdot kip$ — Estimated Minimum Required Transverse Post-Tensioning Force per Diaphragm (AASHTO LRFD 5.12.2.3.3c)

$F_{PT\_perBar} := \dfrac{P_{Torque}}{n} = 55.805 \cdot kip$ — Estimated Force in each Transverse Post-Tensioning Bar (kip)

$Check_{min\_trans\_PT\_Force} := if\left(F_{PT\_perBar} < F_{min\_trans\_PT}, \text{"N.G., Increase Force"}, \text{"OK, Min. Required Force Satisfied"}\right)$

$Check_{min\_trans\_PT\_Force} = \text{"OK, Min. Required Force Satisfied"}$

$Check_{min\_trans\_PT\_Force\_ratio} := \dfrac{F_{PT\_perBar}}{F_{min\_trans\_PT}} = 1.094$

4.0 COLUMN LOADS FOR TEMPORARY SHORING

Pier 2 Column Loads & LBC (RCPier) Input - Matheson Hmk Park Bridge

A. General Criteria

(Note: On Project Tab in RCPier use Structure Type as "Pier". Use "US_LRFD" and State Specifications "None" with "U.S. Units".)

A1. General Variables

Depth of Interior Pier Cap: $h_{cap} := 3.0ft$

Width of Interior Bent Cap: $b_{cap} := 3.0ft$

Length of Interior Bent Cap: $L_{cap} := 34ft$

Pile Embedment Depth: $Pile_{embed} := 1.0ft$

Pile Size: $Pile_{size} := 14in$

Unit Weight of Concrete: $w_c := 150pcf$

Length of Span 1 or 3: $L_{span1} := 30ft$

Length of Span 1 or 3: $L_{span2} := 40ft$

Width of Bridge: $W_{br} := 34 \cdot ft$

Bridge Deck Depth: $d_{slab} := 1.292 \cdot in$ *(Average Depth of Asphalt overlay used since no deck slab is present)*

Bridge Skew Angle: $\theta_{skew} := 0deg$

Length of Bridge: $L_{br} := 100ft$

Height of Bearing Pad: $h_{bp} := \left(\frac{1}{4}\right) \cdot in$ (See Appendix A, sheetno. 7 of 12 of Asbuilt Plans)

Width of Bearing Pad $w_{bp} := 2 \cdot ft + 0 \cdot in$ *(Assumed per Asbuilt plans details)*

Length of Bearing Pad: $L_{bp} := 6 \cdot in$

B. Geometry Tab (RCPier)

B1. Pier Config.

Pier Type: PierType := "Multi Columns" (Use "Multi Columns" from the Pier Configuration)

Cap Shape: CapShape := "Straight" (Use Cap as straight since height of pedestal will determine cross slope of bridge)

Column Shape: ColumnShape := "Round" (Use "Round" Column Shape)

Pier View: $PierView := \text{"Upstation"}$

(Use "Upstation" to coincide with load directions calculated herein. Either "Upstation" or "Downstation" can be used, but load directions will need to coincide with Pier View chosen.)

Strut and Tie Model Not Used for Bent Cap Design - box not checked in RCPier

Expand for Upstation, Downstation and Skew Explanation

B2. Superstr.

Bridge Type: $BridgeType := \text{"Pretensioned Girders"}$ (Use "Pretensioned Girders" from "Pretensioned Girders" or "CIP PT Bridges".)

Number of Lanes: $N_{lanes} := 1$

Beam Height: $H_{beam} := 17in$ *[Appendix A, sheet no. 8 of 12]*

Beam Width: $b_{slab.unit} := 36in$ *[Appendix A, sheet no. 8 of 12]*

Beam Section Area: $A_{beam} := 438.82in^2$ *[From AASHTOWare BrR Model]*

Beam Inertia (I_{xx}): $I_{bm\_xx} := 13330.10in^4$ *[From AASHTOWare BrR Model]*

Beam C.G (Y_{cg}): $Y_{bm\_cg} := 8.17in$ *[From AASHTOWare BrR Model]*

Barrier/Railing Height: $H_{barr} := 3ft + 0in = 36 \cdot in$ *[Appendix A, sheet no. 8 of 12. (Includes Railing)]*

Depth of Deck: $d_{slab} = 1.292 \cdot in$

Span Number Rear to Current Pier: $Span_{NumRear} := 1$

(Use Span 1 & Bent 2 to design the interior bent since the bridge is symmetric about the midway point of Span 2 and Bent 2 & 3 have the same EL from the bulkhead cap.)

Curb to Curb Distance: $Dist_{BtoB} := 14ft$

(Use Clear Roadway width per Phase 1 of the Construction Sequence. See sheet 7 of 12 of Repair Plans)

Deck Offset: $Offset_{deck} := -8.0ft$

(Offset between center of the deck and center of the Pier cap; (+) if on the right of center of Pier cap, (-) otherwise)

Span:

Span 1	$L_{span1} = 30\,ft$	$W_{br} = 34\,ft$
Span 2	$L_{span2} = 40\,ft$	$W_{br} = 34\,ft$
Span 3	$L_{span1} = 30\,ft$	$W_{br} = 34\,ft$
End Bridge		$W_{br} = 34\,ft$

B3. Cap

Straight Cap Parameters

Cap Length (X):	$L_{cap} = 34\,ft$	
Cap Height (Y):	$h_{cap} = 36 \cdot in$	
Cap Depth (Z):	$b_{cap} = 36 \cdot in$	
Skew Angle (deg.):	$\theta_{skew} = 0 \cdot deg$	
Factor for Reduced Moment of Inertia:	$I_{reduce} := \mathbf{1}$	(No reduction in moment of inertia)
Start Elevation:	$Elev_{top\_cap\_start} := \mathbf{15.93} \cdot ft$	(Use Pier 2 top of cap elevation from Asbuilt Plans, sheet no. 6 of 12. Refer to Appendix A)
End Elevation:	$Elev_{top\_cap\_end} := \mathbf{15.86} \cdot ft$	(Use Pier 2 top of cap elevation from Asbuilt Plans, sheet no. 6 of 12. Refer to Appendix A)

Square ends of the Bent Cap are used so "Top Offset", "Fillet Radius" and "Chamfer" are not used.

B4. Brng/Grdr

Configuration:	$Num_{Bearings}$:= "Double"	(Select double for simply supported intermediate bent.)
Bearing Line 1 Eccentricity from CL Cap:	$BearingLine := 0.75ft$	(See Asbuilt Plans, sheet no. 7 of 12; Appendix A)

<u>Bearing Line 1</u>

Choose the "Dimension" button and input the following bearing dimensions

Length of Bearing:	$L_{bearing} := w_{bp} = 2\,ft$
Width of Bearing:	$W_{bearing} := L_{bp} = 0.5\,ft$
Thickness of Bearing:	$t_{bearing} := h_{bp} = 0.021\,ft$
Distance Between Edge of Cap and Centerline of Slab Unit:	$Dist_{cap\_beam} := \mathbf{1.50} \cdot ft$
Spacing of Beams:	$Beam_{spacing} := \mathbf{3.0} \cdot ft$

Cross Slope of Bridge: $CS := \mathbf{0.016}$

Distance From: DistanceFrom := "Cap Left End"

Bearing Point Input for Bearing Line 1:

Bearing Points			
Line	Point	From	Dist.
1	1	Left	1.50
	2	Left	4.50
	3	Left	7.50
	4	Left	10.50
	5	Left	13.50
	6	Left	16.50
	7	Left	19.50
	8	Left	22.50
	9	Left	25.50
	10	Left	28.50
	11	Left	32.50

Bearing Line 2

Bearing Line 2 Eccentricity from CL Cap: $BearingLine := -0.75ft$ (See Asbuilt Plans, sheet no. 7 of 12; Appendix A)

Choose the "Dimension" button and input the following bearing dimensions

Distance Between Edge of Cap and Centerline of Beam: $Dist_{cap\_beam} := \mathbf{1.50} \cdot ft$

Spacing of Beams: $Beam_{spacing} := \mathbf{3.0} \cdot ft$

Distance From: DistanceFrom := "Cap Left End"

Bearing Point Input:

Bearing Points			
Line	Point	From	Dist.
2	1	Left	1.50
	2	Left	4.50
	3	Left	7.50
	4	Left	10.50
	5	Left	13.50
	6	Left	16.50
	7	Left	19.50
	8	Left	22.50
	9	Left	25.50
	10	Left	28.50
	11	Left	32.50

B5. Material

Concrete Strength

[From As-Built Plans, sheet no. 5 of 12]

Cap: $f'_{c\_cap} := 5000psi$

Pile: $f'_{c\_pile} := 5000 \cdot psi$

Footing: $f'_{c\_footing} := 5000 \cdot psi$

Concrete Density

Cap:
Pile:
Footing:

(Use for All)

$w_c = 150 \cdot pcf$

[SDG Table 2.2-1]

Concrete Modulus of Elasticity

[AASHTO LRFD 5.4.2.4 & & SDG 1.4.1.A]

Cap: $E_{c\_cap} := 120000 \cdot 1.0 \cdot 0.145^2 \cdot \left(\frac{f'_{c\_cap}}{ksi}\right)^{0.33} \cdot ksi = 4291 \cdot ksi$

Pile: $E_{c\_pile} := 120000 \cdot 1.0 \cdot 0.145^2 \cdot \left(\frac{f'_{c\_pile}}{ksi}\right)^{0.33} \cdot ksi = 4291 \cdot ksi$

Footing: $E_{c\_footing} := 120000 \cdot 1.0 \cdot 0.145^2 \cdot \left(\frac{f'_{c\_footing}}{ksi}\right)^{0.33} \cdot ksi = 4291 \cdot ksi$

Steel Yield Strength

[SDG 1.4.1.B]

Cap (flex):
Cap (shear):
Pile:
Footing:

$f_y := 60ksi$

(Use for all elements)

Concrete Type

Cap:
Pile:
Footing:

ConcreteType := "Normal"

(Use for all elements from "Normal", "Sand-lightweight", "All-lightweight".)

B6. Str. Model

Additional Check Points

Add any additional points needed for checking moment and shear.

Hinge

No hinges will be added to the cap to. Design as a continuous beam.

C. Loads Tab (RCPier)

C1. DC Loads

Since bridge is simply supported, intermediate Piers 2 & 3 will experience identical dead loads.

Dead Loads for all slab units were determined from the AASHTOWare Load Rating Analysis model, and reactions along each bearing line were inputed at each bearing point for Spans 1 and 2, respectively (similar for Pier 3). Refer to "*Summary of Dead Load Shear Reactions*" from AASHTOWare BrR software for the reaction values inputted at the bearing points.

Dead Load from Temporary Type K barrier is assumed to be transferred to the bent through the bearing point at slab units 1-6 adn 2-6 and the support reactions computed below will be added to the Assume Weight

DC of a single Temporary Type K Barrier unit: $W_{typeK} := \mathbf{2.7}\,ton = 5.952 \cdot kip$ *[FDOT Standard Plans Index no. 102-110]*

Length of a single Temporary Type K Barrier unit: $L_{typeK} := \mathbf{12.5}\,ft$ *[FDOT Standard Plans Index no. 102-110]*

Distributed DL from Type K Barrier: $w_{typeK} := \dfrac{W_{typeK}}{L_{typeK}} = 0.476 \cdot \dfrac{kip}{ft}$ *[FDOT Standard Plans Index no. 102-110]*

Estimated DC reaction of Type K Barrier from Span 1: $P_{typeK\_sp1} := \dfrac{-w_{typeK} \cdot L_{span1}}{2} = -7.143 \cdot kip$

Estimated DC reaction of Type K Barrier from Span 2: $P_{typeK\_sp2} := \dfrac{-w_{typeK} \cdot L_{span2}}{2} = -9.524 \cdot kip$

DC Reactions Input at Bearing Points for Bearing Line 1:

DL Reactions at Bearing Points

Line	Bearing Point #	Dir	Load (kips)
1	1	Y	-13.89
	2	Y	-7.21
	3	Y	-7.21
	4	Y	-7.21
	5	Y	-7.21
	6	Y	-14.35
	7	Y	-7.21
	8	Y	-7.21
	9	Y	-7.21
	10	Y	-11.25
	11	Y	-15.36

* Dead Load from Superstructure components and attachments (including temporary Type K Barrier)

DC Reactions Input at Bearing Points for Bearing Line 2:

DL Reactions at Bearing Points

Line	Bearing Point #	Dir	Load (kips)
2	1	Y	-18.71
	2	Y	-9.62
	3	Y	-9.62
	4	Y	-9.62
	5	Y	-9.62
	6	Y	-19.14
	7	Y	-9.62
	8	Y	-9.62
	9	Y	-9.62
	10	Y	-15.12
	11	Y	-20.72

* Dead Load from Superstructure components and attachments (including temporary Type K Barrier)

C2. DW Loads

Per LBC reference content, "The Load from the slab, barriers and wearing surface is distributed among bearings based on each bearing/girder tributary width."

Dead Load from wearing surface is assuming an equivalent tributary load per foot of based on the average thickness of the asphalt overlay corresponding to each span as per sheet no. 7 of 12 of Asbuilt Plans (see Appendix A).

Density of Asphalt: $w_{aws} := 145pcf$ *[FDOT Standard Plans Index no. 102-110]*

Average Thickness of Wearing Surface along Span 1 or 3:	$t_{avg\_span1} := \mathbf{1.167}in$
Average Thickness of Wearing Surface along Span 2:	$t_{avg\_span2} := \mathbf{1.292}in$
Tributary width for interior Slab Units:	$b_{trib\_int} := b_{slab.unit} = 3\,ft$
Tributary width for interior Slab Unit 10:	$b_{trib\_int.10} := \mathbf{1}ft$
Tributary width for exterior Slab Unit 1:	$b_{trib\_int.1} := \mathbf{1}ft$
Distributed DW on typical interior Slab Units along Span 1 or 3:	$w_{DW\_span1\_int} := t_{avg\_span1} \cdot w_{aws} \cdot b_{trib\_int} = 0.0423 \cdot klf$
Distributed DW on typical interior Slab Units along Span 2:	$w_{DW\_span2\_int} := t_{avg\_span2} \cdot w_{aws} \cdot b_{trib\_int} = 0.0468 \cdot klf$
Distributed DW on interior Slab Unit 10 along Span 1 or 3:	$w_{DW\_span1\_int.10} := t_{avg\_span1} \cdot w_{aws} \cdot b_{trib\_int.10} = 0.0141 \cdot klf$
Distributed DW on interior Slab Unit 10 along Span 2:	$w_{DW\_span2\_int.10} := t_{avg\_span2} \cdot w_{aws} \cdot b_{trib\_int.10} = 0.0156 \cdot klf$
Distributed DW on exterior Slab Unit 1 along Span 1 or 3:	$w_{DW\_span1\_ext.1} := t_{avg\_span1} \cdot w_{aws} \cdot b_{trib\_int.1} = 0.0141 \cdot klf$
Distributed DW on exterior Slab Unit 1 along Span 2:	$w_{DW\_span2\_ext.1} := t_{avg\_span2} \cdot w_{aws} \cdot b_{trib\_int.1} = 0.0156 \cdot klf$

DW Bearing Reactions

DW Reactions Input at Bearing Points for Bearing Line 1:

DL Reactions at Bearing Points			
Line	Bearing Point #	Dir	Load (kips)
1	1	Y	-0.21
	2	Y	-0.63
	3	Y	-0.63
	4	Y	-0.63
	5	Y	-0.63
	6	Y	-0.63
	7	Y	-0.63
	8	Y	-0.63
	9	Y	-0.63
	10	Y	-0.21
	11	Y	0.00

* Dead Load from Superstructure components and attachments (including temporary Type K Barrier)

DW Reactions Input at Bearing Points for Bearing Line 2:

DL Reactions at Bearing Points			
Line	Bearing Point #	Dir	Load (kips)
2	1	Y	-0.31
	2	Y	-0.94
	3	Y	-0.94
	4	Y	-0.94
	5	Y	-0.94
	6	Y	-0.94
	7	Y	-0.94
	8	Y	-0.94
	9	Y	-0.94
	10	Y	-0.31
	11	Y	0.00

* Dead Load from Superstructure components and attachments (including temporary Type K Barrier)

C3. EH Loads (End Bent Only)

No EH loads on Interior Bent.

C4. LL & BR Loads

Longitudinal Reaction

Use "Compute Simply Supported Beam Reaction" since the superstructure is simply supported.

Per AASHTO LRFD 3.6.1.3 (Use the following load truck combinations):
- Use "Design Truck"
- Use "Design Truck + Lane Load"
- Use "Design Tandem + Lane Load"
- Do not use "Two Design Trucks + Lane Load". These truck loads could control for longer continuous spans. This live load case is used for negative moment between points of contraflexure and reactions at interior piers only.
- Do not use "Two Design Tandem + Lane Load" per AASHTO C3.6.1.3.1 this case will only be investigated if multiple lanes of heavier versions of "low boy" type vehicles are considered probable.

Transverse Positioning

Loaded Lanes: Use "All combinations" to check all the different combinations of loaded lanes.

Live Load Positions: Use "Variable Spacing" with a 1ft minimum spacing between positions. This live load positioning places a wheel over each bearing point then adds additional trucks from that position. It will then repeat a similar process for each bearing.

Longitudinal Force or BR Loads *[AASHTO LRFD 3.6.4]*

No Breaking (BR) Loads will be considered with the live loads.

C5. Centrifugal Force or CE Loads *[AASHTO LRFD 3.6.3]*

Since the bridge is a straight structure, the centrifugal force effects are not necessary. Do not check "Generate Centrifugal Load Cases also".

C6. Water Loads or WA Loads *[AASHTO LRFD 3.7]*

Since the Column axial loads are considered in this model, No Water Loads will be applied.

D. Analysis Tab - A/D Parameters Button - Analysis/Design Parameters LRFD

D1. Resistance Factors

- Use "Phi as per 2006 classification" per *AASHTO LRFD 5.5.4.2*.
- Use the program defaults for "Modulus of Rupture" see *AASHTO LRFD 5.4.2.6*.
- Use the program defaults for Strain T: 60ksi - Comp 0.002 and Tension 0.005. These ratios come from *AASTHO LRFD 5.7.2.1* and *AASHTO LRFD Figure C5.7.2.1-1*. They use a compression controlled strain limits of 0.002 and tension controlled strain limit of .005 and similar triangles as shown in the figure.

D2. Impact and Reduction

- Use the program defaults for Dynamic Load Allowance (IM) since the cap, columns, and footing will have Truck + IM for an intermediate bent. **(Note: Even though there is no footing, there must be impact on the footing to get impact on the piles for a bent.)** The lane will not have IM. *[AASHTO LRFD 3.6.2.1]*
- Use program defaults for Multiple Presence Factors [*AASHTO LRFD Table 3.6.1.1.2-1]*.

D3. Crack Control

- Use the the Crack Control Criteria "Current LRFD" per *AASHTO LRFD 5.7.3.4* with the following exposure factors:
    1. Cap - 0.75
    2. Column - 0.75
    3. Footing - 1.0

  Use a Class 2 exposure condition since the column (pile) and cap are exposed to water *[See AASHTO LRFD 5.7.3.4 commentary and SDG 3.10.E]*.
- Use the program default for Fatigue "ff term" = 24 per *AASHTO LRFD 5.5.3.2-1*.

Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 1

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 1-1									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	6.47	0.25	0.49	2.09	4.59	0	7.21	6.68	**13.89**
0.5	6.24	0.24	0.49	2.02	4.42	0	6.97	6.44	13.41
0.5	6.24	0.24	0.16	2.02	4.42	0	6.64	6.44	13.08
1.69	5.69	0.22	0.16	1.84	4.04	0	6.07	5.88	11.95
2.83	5.17	0.2	0.16	1.67	3.67	0	5.53	5.34	10.87
5.66	3.88	0.15	0.16	1.26	2.75	0	4.19	4.01	8.20
6.75	3.38	0.13	0.16	1.09	2.4	0	3.67	3.49	7.16
6.75	3.38	0.13	0	1.09	2.4	0	3.51	3.49	7.00
8.49	2.59	0.1	0	0.84	1.83	0	2.69	2.67	5.36
11.32	1.29	0.05	0	0.42	0.92	0	1.34	1.34	2.68
14.15	0	0	0	0	0	0	0	0	0.00
16.98	-1.29	-0.05	0	-0.42	-0.92	0	-1.34	-1.34	-2.68
19.8	-2.59	-0.1	0	-0.84	-1.83	0	-2.69	-2.67	-5.36
21.75	-3.48	-0.13	0	-1.13	-2.47	0	-3.61	-3.6	-7.21
21.75	-3.48	-0.13	-0.17	-1.13	-2.47	0	-3.78	-3.6	-7.38
22.63	-3.88	-0.15	-0.17	-1.26	-2.75	0	-4.2	-4.01	-8.21
25.46	-5.17	-0.2	-0.17	-1.67	-3.67	0	-5.54	-5.34	-10.88
26.81	-5.79	-0.22	-0.17	-1.87	-4.11	0	-6.18	-5.98	-12.16
28	-6.33	-0.24	-0.17	-2.05	-4.49	0	-6.74	-6.54	-13.28
28	-6.33	-0.24	-0.49	-2.05	-4.49	0	-7.06	-6.54	-13.60
28.29	-6.47	-0.25	-0.49	-2.09	-4.59	0	-7.21	-6.68	**-13.89**

* Dead Load (Support) Bearing Reactions

CONSOR

Project #: D210107FL00.00
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Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 1

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 1-8 **									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	6.47	0.25	0.49	0	0	0	7.21	0	**7.21**
0.5	6.24	0.24	0.49	0	0	0	6.97	0	6.97
0.5	6.24	0.24	0.16	0	0	0	6.64	0	6.64
1.69	5.69	0.22	0.16	0	0	0	6.07	0	6.07
2.83	5.17	0.2	0.16	0	0	0	5.53	0	5.53
5.66	3.88	0.15	0.16	0	0	0	4.19	0	4.19
6.75	3.38	0.13	0.16	0	0	0	3.67	0	3.67
6.75	3.38	0.13	0	0	0	0	3.51	0	3.51
8.49	2.59	0.1	0	0	0	0	2.69	0	2.69
11.32	1.29	0.05	0	0	0	0	1.34	0	1.34
14.15	0	0	0	0	0	0	0	0	0.00
16.98	-1.29	-0.05	0	0	0	0	-1.34	0	-1.34
19.8	-2.59	-0.1	0	0	0	0	-2.69	0	-2.69
21.75	-3.48	-0.13	0	0	0	0	-3.61	0	-3.61
21.75	-3.48	-0.13	-0.17	0	0	0	-3.78	0	-3.78
22.63	-3.88	-0.15	-0.17	0	0	0	-4.2	0	-4.20
25.46	-5.17	-0.2	-0.17	0	0	0	-5.54	0	-5.54
26.81	-5.79	-0.22	-0.17	0	0	0	-6.18	0	-6.18
28	-6.33	-0.24	-0.17	0	0	0	-6.74	0	-6.74
28	-6.33	-0.24	-0.49	0	0	0	-7.06	0	-7.06
28.29	-6.47	-0.25	-0.49	0	0	0	-7.21	0	**-7.21**

* Dead Load (Support) Bearing Reactions

** Slab Units 1-2 to 1-7 and 1-9 are similar.

Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 1

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 1-10									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	6.47	0.25	0.49	0	4.04	0	7.21	4.04	**11.25**
0.5	6.24	0.24	0.49	0	3.9	0	6.97	3.9	10.87
0.5	6.24	0.24	0.16	0	3.9	0	6.64	3.9	10.54
1.69	5.69	0.22	0.16	0	3.56	0	6.07	3.56	9.63
2.83	5.17	0.2	0.16	0	3.23	0	5.53	3.23	8.76
5.66	3.88	0.15	0.16	0	2.42	0	4.19	2.42	6.61
6.75	3.38	0.13	0.16	0	2.11	0	3.67	2.11	5.78
6.75	3.38	0.13	0	0	2.11	0	3.51	2.11	5.62
8.49	2.59	0.1	0	0	1.62	0	2.69	1.62	4.31
11.32	1.29	0.05	0	0	0.81	0	1.34	0.81	2.15
14.15	0	0	0	0	0	0	0	0	0.00
16.98	-1.29	-0.05	0	0	-0.81	0	-1.34	-0.81	-2.15
19.8	-2.59	-0.1	0	0	-1.62	0	-2.69	-1.62	-4.31
21.75	-3.48	-0.13	0	0	-2.17	0	-3.61	-2.17	-5.78
21.75	-3.48	-0.13	-0.17	0	-2.17	0	-3.78	-2.17	-5.95
22.63	-3.88	-0.15	-0.17	0	-2.42	0	-4.2	-2.42	-6.62
25.46	-5.17	-0.2	-0.17	0	-3.23	0	-5.54	-3.23	-8.77
26.81	-5.79	-0.22	-0.17	0	-3.62	0	-6.18	-3.62	-9.80
28	-6.33	-0.24	-0.17	0	-3.96	0	-6.74	-3.96	-10.70
28	-6.33	-0.24	-0.49	0	-3.96	0	-7.06	-3.96	-11.02
28.29	-6.47	-0.25	-0.49	0	-4.04	0	-7.21	-4.04	**-11.25**

* Dead Load (Support) Bearing Reactions

CONSOR

Project #: D210107FL00.00
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Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 1

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 1-11									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	6.47	0.25	0.49	2.09	6.06	0	7.21	8.15	**15.36**
0.5	6.24	0.24	0.49	2.02	5.85	0	6.97	7.87	14.84
0.5	6.24	0.24	0.16	2.02	5.85	0	6.64	7.87	14.51
1.69	5.69	0.22	0.16	1.84	5.34	0	6.07	7.18	13.25
2.83	5.17	0.2	0.16	1.67	4.85	0	5.53	6.52	12.05
5.66	3.88	0.15	0.16	1.26	3.64	0	4.19	4.9	9.09
6.75	3.38	0.13	0.16	1.09	3.17	0	3.67	4.26	7.93
6.75	3.38	0.13	0	1.09	3.17	0	3.51	4.26	7.77
8.49	2.59	0.1	0	0.84	2.42	0	2.69	3.26	5.95
11.32	1.29	0.05	0	0.42	1.21	0	1.34	1.63	2.97
14.15	0	0	0	0	0	0	0	0	0.00
16.98	-1.29	-0.05	0	-0.42	-1.21	0	-1.34	-1.63	-2.97
19.8	-2.59	-0.1	0	-0.84	-2.42	0	-2.69	-3.26	-5.95
21.75	-3.48	-0.13	0	-1.13	-3.26	0	-3.61	-4.39	-8.00
21.75	-3.48	-0.13	-0.17	-1.13	-3.26	0	-3.78	-4.39	-8.17
22.63	-3.88	-0.15	-0.17	-1.26	-3.64	0	-4.2	-4.9	-9.10
25.46	-5.17	-0.2	-0.17	-1.67	-4.85	0	-5.54	-6.52	-12.06
26.81	-5.79	-0.22	-0.17	-1.87	-5.43	0	-6.18	-7.3	-13.48
28	-6.33	-0.24	-0.17	-2.05	-5.94	0	-6.74	-7.99	-14.73
28	-6.33	-0.24	-0.49	-2.05	-5.94	0	-7.06	-7.99	-15.05
28.29	-6.47	-0.25	-0.49	-2.09	-6.06	0	-7.21	-8.15	**-15.36**

* Dead Load (Support) Bearing Reactions

CONSOR

Project #:	D210107FL00.00
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Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 2

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 2-1									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	8.8	0.33	0.49	2.85	6.24	0	9.62	9.09	**18.71**
0.29	8.67	0.33	0.49	2.81	6.15	0	9.49	8.96	18.45
0.29	8.67	0.33	0.16	2.81	6.15	0	9.16	8.96	18.12
1.48	8.12	0.31	0.16	2.63	5.76	0	8.59	8.39	16.98
3.85	7.04	0.27	0.16	2.28	4.99	0	7.47	7.27	14.74
7.7	5.28	0.2	0.16	1.71	3.74	0	5.64	5.45	11.09
9.25	4.57	0.17	0.16	1.48	3.24	0	4.9	4.72	9.62
9.25	4.57	0.17	0	1.48	3.24	0	4.74	4.72	9.46
11.55	3.52	0.13	0	1.14	2.5	0	3.65	3.64	7.29
15.4	1.76	0.07	0	0.57	1.25	0	1.83	1.82	3.65
19.25	0	0	0	0	0	0	0	0	0.00
23.1	-1.76	-0.07	0	-0.57	-1.25	0	-1.83	-1.82	-3.65
26.95	-3.52	-0.13	0	-1.14	-2.5	0	-3.65	-3.64	-7.29
29.25	-4.57	-0.17	0	-1.48	-3.24	0	-4.74	-4.72	-9.46
29.25	-4.57	-0.17	-0.16	-1.48	-3.24	0	-4.9	-4.72	-9.62
30.8	-5.28	-0.2	-0.16	-1.71	-3.74	0	-5.64	-5.45	-11.09
34.65	-7.04	-0.27	-0.16	-2.28	-4.99	0	-7.47	-7.27	-14.74
37.02	-8.12	-0.31	-0.16	-2.63	-5.76	0	-8.59	-8.39	-16.98
38.21	-8.67	-0.33	-0.16	-2.81	-6.15	0	-9.16	-8.96	-18.12
38.21	-8.67	-0.33	-0.49	-2.81	-6.15	0	-9.49	-8.96	-18.45
38.5	-8.8	-0.33	-0.49	-2.85	-6.24	0	-9.62	-9.09	**-18.71**

* Dead Load (Support) Bearing Reactions

Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 2

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 2-8 ***									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	8.8	0.33	0.49	0	0	0	9.62	0	**9.62**
0.29	8.67	0.33	0.49	0	0	0	9.49	0	9.49
0.29	8.67	0.33	0.16	0	0	0	9.16	0	9.16
1.48	8.12	0.31	0.16	0	0	0	8.59	0	8.59
3.85	7.04	0.27	0.16	0	0	0	7.47	0	7.47
7.7	5.28	0.2	0.16	0	0	0	5.64	0	5.64
9.25	4.57	0.17	0.16	0	0	0	4.9	0	4.90
9.25	4.57	0.17	0	0	0	0	4.74	0	4.74
11.55	3.52	0.13	0	0	0	0	3.65	0	3.65
15.4	1.76	0.07	0	0	0	0	1.83	0	1.83
19.25	0	0	0	0	0	0	0	0	0.00
23.1	-1.76	-0.07	0	0	0	0	-1.83	0	-1.83
26.95	-3.52	-0.13	0	0	0	0	-3.65	0	-3.65
29.25	-4.57	-0.17	0	0	0	0	-4.74	0	-4.74
29.25	-4.57	-0.17	-0.16	0	0	0	-4.9	0	-4.90
30.8	-5.28	-0.2	-0.16	0	0	0	-5.64	0	-5.64
34.65	-7.04	-0.27	-0.16	0	0	0	-7.47	0	-7.47
37.02	-8.12	-0.31	-0.16	0	0	0	-8.59	0	-8.59
38.21	-8.67	-0.33	-0.16	0	0	0	-9.16	0	-9.16
38.21	-8.67	-0.33	-0.49	0	0	0	-9.49	0	-9.49
38.5	-8.8	-0.33	-0.49	0	0	0	-9.62	0	**-9.62**

* Dead Load (Support) Bearing Reactions

*** Slab Units 2-2 to 2-7 and 2-9 are similar.

CONSOR

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Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 2

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 2-10									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	8.8	0.33	0.49	0	5.5	0	9.62	5.5	**15.12**
0.29	8.67	0.33	0.49	0	5.41	0	9.49	5.41	14.90
0.29	8.67	0.33	0.16	0	5.41	0	9.16	5.41	14.57
1.48	8.12	0.31	0.16	0	5.08	0	8.59	5.08	13.67
3.85	7.04	0.27	0.16	0	4.4	0	7.47	4.4	11.87
7.7	5.28	0.2	0.16	0	3.3	0	5.64	3.3	8.94
9.25	4.57	0.17	0.16	0	2.86	0	4.9	2.86	7.76
9.25	4.57	0.17	0	0	2.86	0	4.74	2.86	7.60
11.55	3.52	0.13	0	0	2.2	0	3.65	2.2	5.85
15.4	1.76	0.07	0	0	1.1	0	1.83	1.1	2.93
19.25	0	0	0	0	0	0	0	0	0.00
23.1	-1.76	-0.07	0	0	-1.1	0	-1.83	-1.1	-2.93
26.95	-3.52	-0.13	0	0	-2.2	0	-3.65	-2.2	-5.85
29.25	-4.57	-0.17	0	0	-2.86	0	-4.74	-2.86	-7.60
29.25	-4.57	-0.17	-0.16	0	-2.86	0	-4.9	-2.86	-7.76
30.8	-5.28	-0.2	-0.16	0	-3.3	0	-5.64	-3.3	-8.94
34.65	-7.04	-0.27	-0.16	0	-4.4	0	-7.47	-4.4	-11.87
37.02	-8.12	-0.31	-0.16	0	-5.08	0	-8.59	-5.08	-13.67
38.21	-8.67	-0.33	-0.16	0	-5.41	0	-9.16	-5.41	-14.57
38.21	-8.67	-0.33	-0.49	0	-5.41	0	-9.49	-5.41	-14.90
38.5	-8.8	-0.33	-0.49	0	-5.5	0	-9.62	-5.5	**-15.12**

* Dead Load (Support) Bearing Reactions

CONSOR

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Matheson Hmk Road over Matheson Hammock Canal
SUMMARY OF DEAD LOAD SHEAR REACTIONS

Note: The following Dead Load Shear reactions were extracted from the AASHTOWare BrR Rating model. The Slab unit superstructure system is assumed to be simply supported, and the reactions at the begin and end locations along the span represent the support reactions at the bearing points for each slab unit.

SPAN 2

DEAD LOAD SHEAR REACTIONS FROM AASHTOWARE BrR - INT SLAB UNIT 2-11									
Location	Self Weight (Slab Unit) (KIP-FT)	% of DC Slab Unit (KIP-FT)	Self Weight (Interior diagrams) (KIP-FT)	DC - Railing (KIP-FT)	DC - Curb/ Sidewalk (KIP-FT)	PS Transfer Forces (KIP-FT)	Total DC Selfweight of Slab Unit alone (per Slab Unit) (KIP-FT)	Total DC (Railing + Sidewalk) per Slab Unit (KIP-FT)	Total DC per Slab Unit * (KIP-FT)
0	8.8	0.33	0.49	2.85	8.25	0	9.62	11.1	**20.72**
0.29	8.67	0.33	0.49	2.81	8.12	0	9.49	10.93	20.42
0.29	8.67	0.33	0.16	2.81	8.12	0	9.16	10.93	20.09
1.48	8.12	0.31	0.16	2.63	7.61	0	8.59	10.24	18.83
3.85	7.04	0.27	0.16	2.28	6.6	0	7.47	8.88	16.35
7.7	5.28	0.2	0.16	1.71	4.95	0	5.64	6.66	12.30
9.25	4.57	0.17	0.16	1.48	4.28	0	4.9	5.76	10.66
9.25	4.57	0.17	0	1.48	4.28	0	4.74	5.76	10.50
11.55	3.52	0.13	0	1.14	3.3	0	3.65	4.44	8.09
15.4	1.76	0.07	0	0.57	1.65	0	1.83	2.22	4.05
19.25	0	0	0	0	0	0	0	0	0.00
23.1	-1.76	-0.07	0	-0.57	-1.65	0	-1.83	-2.22	-4.05
26.95	-3.52	-0.13	0	-1.14	-3.3	0	-3.65	-4.44	-8.09
29.25	-4.57	-0.17	0	-1.48	-4.28	0	-4.74	-5.76	-10.50
29.25	-4.57	-0.17	-0.16	-1.48	-4.28	0	-4.9	-5.76	-10.66
30.8	-5.28	-0.2	-0.16	-1.71	-4.95	0	-5.64	-6.66	-12.30
34.65	-7.04	-0.27	-0.16	-2.28	-6.6	0	-7.47	-8.88	-16.35
37.02	-8.12	-0.31	-0.16	-2.63	-7.61	0	-8.59	-10.24	-18.83
38.21	-8.67	-0.33	-0.16	-2.81	-8.12	0	-9.16	-10.93	-20.09
38.21	-8.67	-0.33	-0.49	-2.81	-8.12	0	-9.49	-10.93	-20.42
38.5	-8.8	-0.33	-0.49	-2.85	-8.25	0	-9.62	-11.1	**-20.72**

* Dead Load (Support) Bearing Reactions

Dead Load Reactions from LBC (RCPIER) Model

LBC (RCPIER) COLUMN TOP LOADS - DC1 Superstructure & Attachments (UNFACTORED)*

Memb	Node	Fx	Fy	Fz	Mx	My	Mz
1	2	-2.8	-119.4	-0.004246	-13.26	0.04451	-24.5
2	4	2.8	-126.9	0.004246	-13.52	0.04467	23.15

* Includes DL from Temporary Type K barrier.

LBC (RCPIER) COLUMN TOP LOADS - DW1 (UNFACTORED)

Memb	Node	Fx	Fy	Fz	Mx	My	Mz
1	2	-0.9183	-8.072	0.001265	-1.044	-0.01326	-7.59
2	4	0.9183	-5.528	-0.001265	-0.966	-0.01331	8.041

LBC (RCPIER) COLUMN TOP LOADS - Self (Substructure) (UNFACTORED)

Memb	Node	Fx	Fy	Fz	Mx	My	Mz
1	2	-1.193	-22.95	0	0	0	-10.16
2	4	1.193	-22.95	0	0	0	10.15

LBC (RCPIER) COLUMN TOP LOADS - TOTAL FACTORED DL

Memb	Node	Fx	Fy	Fz	Mx	My	Mz
1	2	-6.3687	-190.0455	-0.00341	-18.141	0.035748	-54.71
2	4	4.9113	-195.6045	0.002981	-14.486	0.03136	41.341

X is along the pier (transverse direction)
Z along direction opposite to stationing (longitudinal direction)
Y is vertical

CONSOR

Project #:	D210107FL.00
Designed By:	YRA
Design Date:	Nov-21
Checked By:	MAP
Check Date:	Dec-21

Matheson Hmk Road over Matheson Hammock Canal

LBC (RCPIER) COLUMN TOP LOADS - FACTORED LOADS WITH IMPACT *

Memb	Node	Fx	**Fy(Max/Min)**	Fz	Mx	My	Mz
1	2	-4.191	-133.4	-0.00300	-12.62	0.0314	-36.13
		-7.455	-394.3	-0.09098	-3.037	0.9534	-58.06
2	4	4.191	-138.5	0.00300	-12.8	0.0316	35.20
		24.49	-239.9	0.06353	-7.769	0.6684	200.70

* Includes DL from Temporary Type K barrier.

LBC (RCPIER) COLUMN TOP LOADS - SERVICE LOADS WITH IMPACT *

Memb	Node	Fx	**Fy(Max/Min)**	Fz	Mx	My	Mz
1	2	-4.911	-150.5	-0.00298	-14.31	0.0312	-42.26
		-5.532	-267.2	-0.05302	-5.674	0.5556	-44.17
2	4	4.911	-155.4	0.00298	-14.49	0.0314	41.34
		15.27	-180.7	0.03734	-8.44	0.3928	125.4

* Includes DL from Temporary Type K barrier.

X is along the pier (transverse direction)
Z along direction opposite to stationing (longitudinal direction)
Y is vertical

COLUMN LOADS FOR TEMPORARY SHORING

NOTE: Below is a summary of the maximum reactions computed at the top of the columns at Pier no. 2. Temporary Shoring will be installed at Column no. 2 to accommodate the column repairs. Highlighted in green are the estimated factored and service loads that will be supported by the temporary shoring.

Maximum DL Reactions - Pier Column Loads from RCPier (kips)
COLUMN TOP DEAD LOADS

Column No.	Node	Fx (kips)	Fy (kips)	Fz (kips)	Mx (kip-ft)	My (kip-ft)	Mz (kip-ft)	
1	2	-7.960875	**-191.0**	-0.0043	-22.67625	0.044684375	-68.3875	[Max Fy]
2	4	6.139125	**-196.0**	0.00373	-18.1075	0.0392	51.67625	[Max Fy]

Maximum LL Reactions - Pier Column Loads from RCPier (kips)
COLUMN TOP LL LOADS WITH IMPACT

Column No.	Node	Fx (kips)	Fy (kips)	Fz (kips)	Mx (kip-ft)	My (kip-ft)	Mz (kip-ft)	
1	2	-0.871575	**-204.0**	-0.0848	18.07325	0.888825625	-1.0575	[Max Fy]
2	4	19.728325	**-44.0**	0.05791	8.8895	0.609235	161.08525	[Max Fy]

Maximum Strength Envelope - Pier Column Loads from RCPier (kips)
COLUMN TOP LOADS WITH IMPACT

Memb	Node	Fx (kips)	Fy (kips)	Fz (kips)	Mx (kip-ft)	My (kip-ft)	Mz (kip-ft)	
1	2	-8.83245	**-394.3**	-0.0891	-4.603	0.93351	-69.445	[Max Fy]
2	4	25.86745	**-239.9**	0.06163	-9.218	0.648435	212.7615	

Maximum Service Envelope - Pier Column Loads from RCPier (kips)
COLUMN TOP LOADS WITH IMPACT

Memb	Node	Fx (kips)	Fy (kips)	Fz (kips)	Mx (kip-ft)	My (kip-ft)	Mz (kip-ft)	
1	2	-6.4503	**-267.2**	-0.0518	-6.718	0.54234	-51.76	[Max Fy]
2	4	16.1883	**-180.7**	0.03608	-9.406	0.37949	133.441	

Pier 2 RC-Pier Model, looking upstation:

APPENDICES

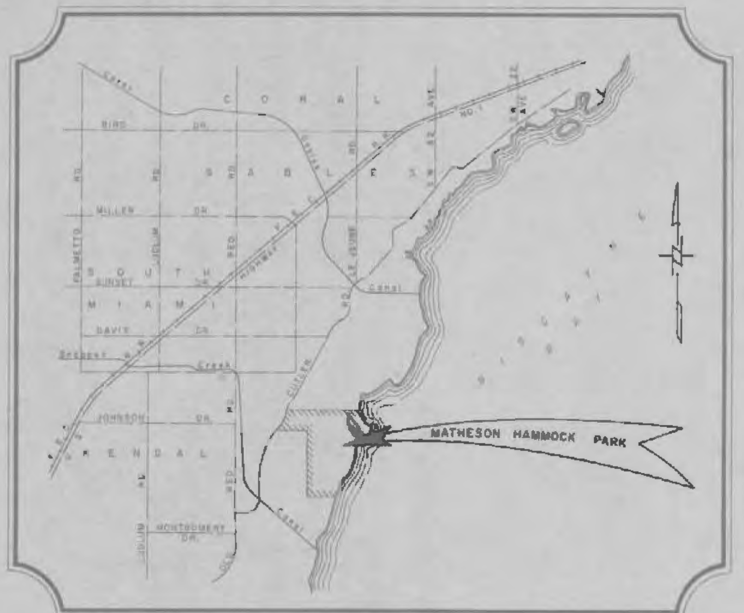
APPENDIX A – AS-BUILT BRIDGE PLANS

MATHESON HAMMOCK PARK

DADE COUNTY, FLORIDA

BRIDGE AND APPROACH ROAD

As Built
Plans



INDEX TO DRAWINGS

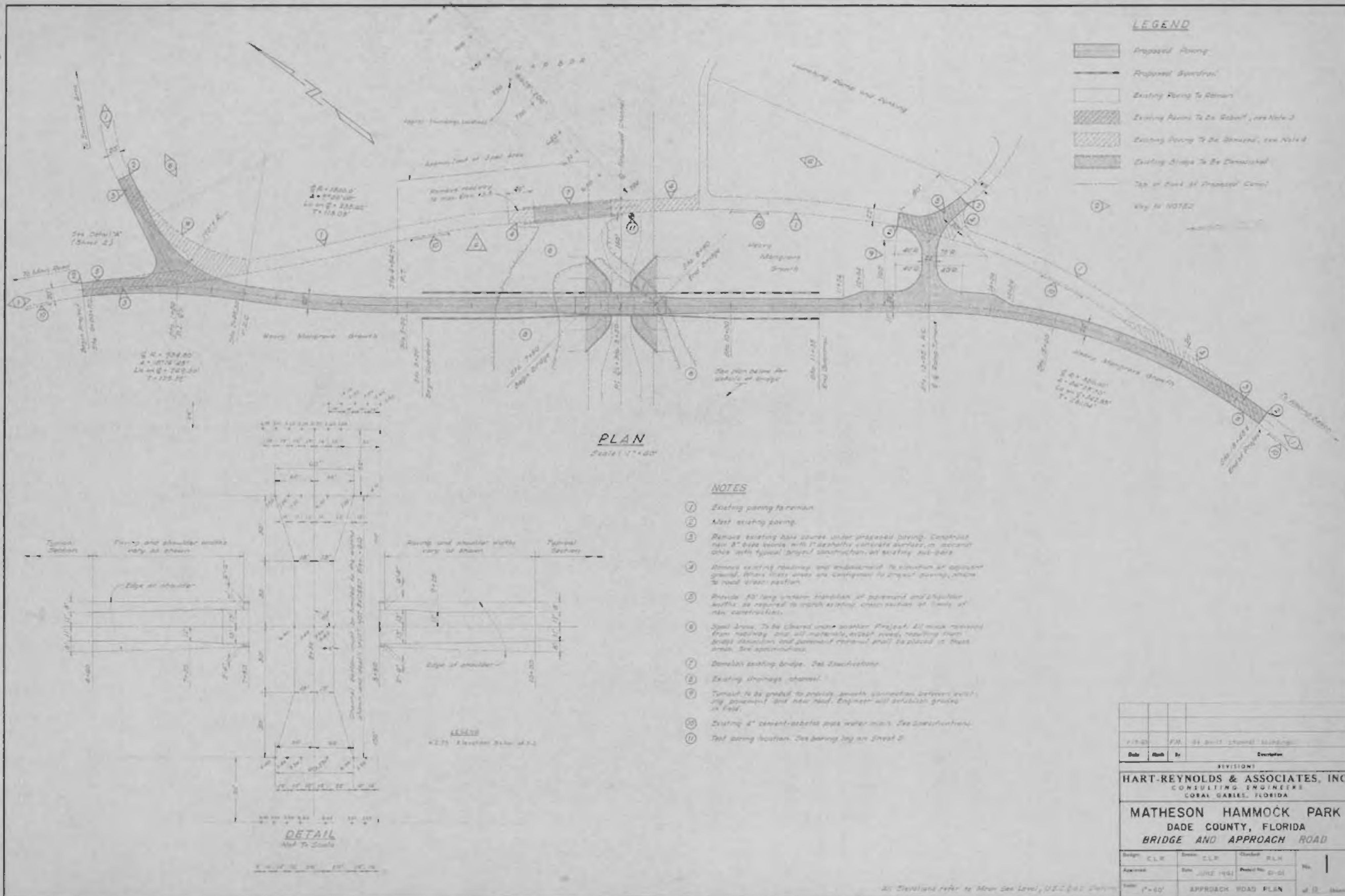
Sheet No.	Description
1.	APPROACH ROAD PLAN
2.	PROFILE
3.	CROSS SECTIONS
4.	" "
5.	BRIDGE PLAN & ELEVATION
6.	END & INTERMEDIATE BENTS
7.	SUPERSTRUCTURE
8.	PRESTRESSED SLAB UNITS
9.	APPROACH SLAB - PILING
10.	MISCELLANEOUS DETAILS
11.	BULKHEAD PLAN
12.	" DETAILS

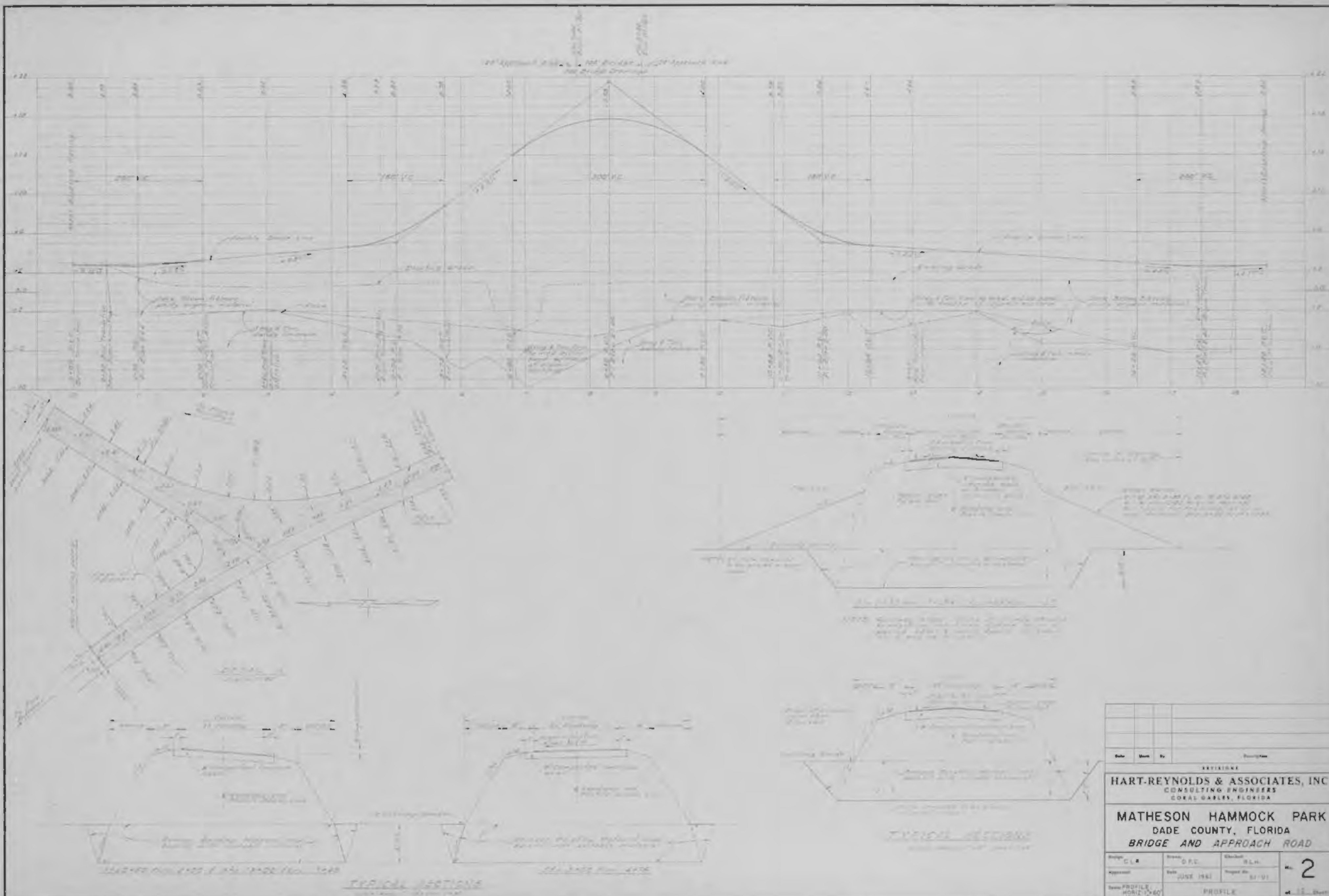
SITE NUMBER 294

H A R T - R E Y N O L D S & A S S O C I A T E S, I N C.

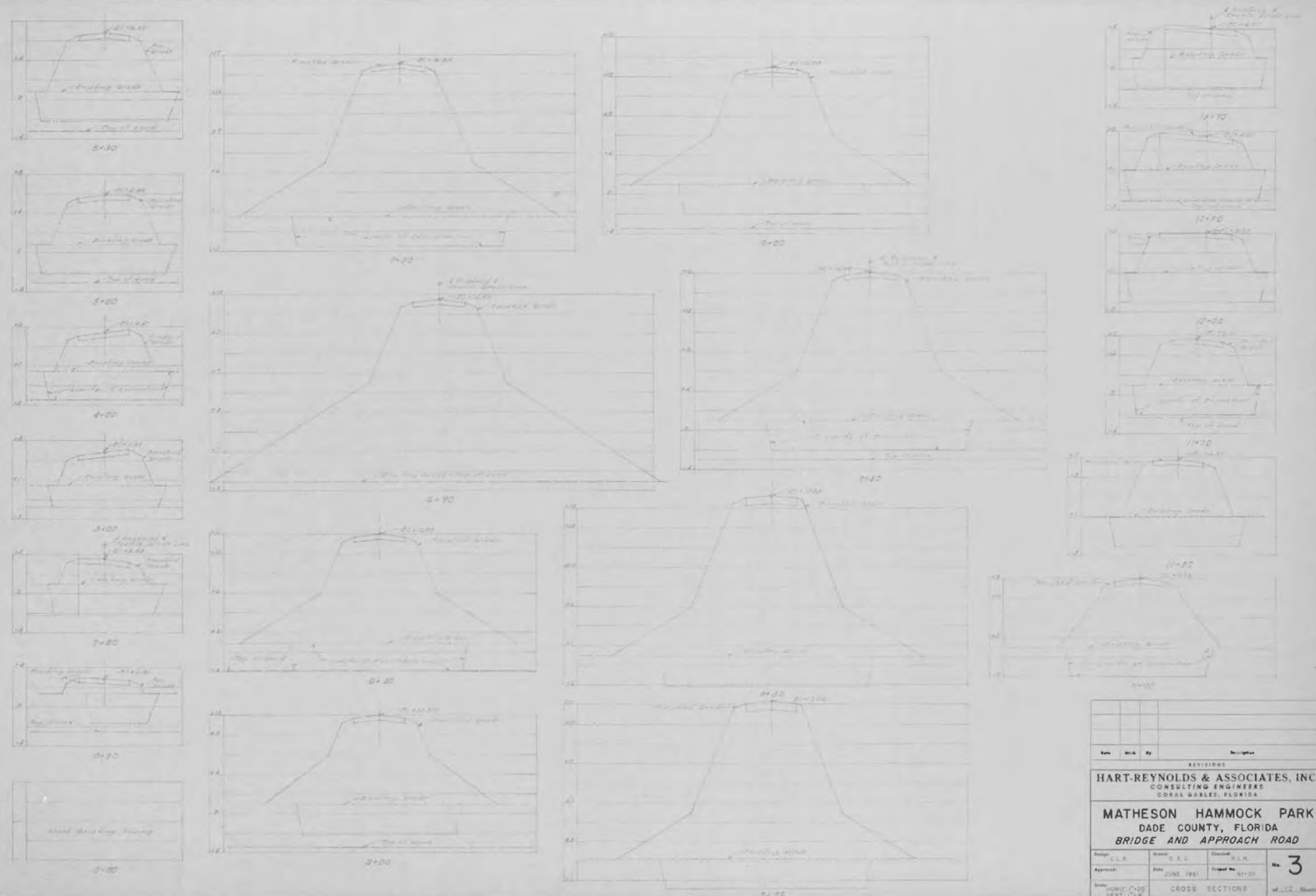
C O N S U L T I N G E N G I N E E R S

C O R A L G A B L E S, F L O R I D A


LEGEND
Proposed Paving
Proposed Guardrail
Existing Paving To Remain
Existing Paving To Be Rebuilt, see Note 3
Existing Paving To Be Removed, see Note 4
Existing Bridge To Be Demolished
Top of Bank of Proposed Canal
Key to NOTES
PLAN
DETAIL
Not To Scale
NOTES
(1) Existing paving to remain.
(2) Meet existing paving.
(3) Remove existing base course under proposed paving. Construct new 8" base course with 1" asphaltic concrete surface, in accordance with typical project construction, on existing sub-base.
(4) Remove existing roadway and embankment to elevation of adjacent ground. Where these areas are contiguous to project paving, shape to road cross section.
(5) Provide 50' long uniform transition of pavement and shoulder widths as required to match existing cross-section at limits of new construction.
(6) Spoil Areas. To be cleared under another Project. All muck removed from roadway and all materials, except wood, resulting from bridge demolition and pavement removal shall be placed in these areas. See specifications.
(7) Demolish existing bridge. See Specifications.
(8) Existing drainage channel.
(9) Turnout to be graded to provide smooth connection between existing pavement and new road. Engineer will establish grades in field.
(10) Existing 4" cement-asbestos pipe water main. See Specifications.
(11) Test boring location. See boring log on Sheet 5.
Date
Mark
By
Description
REVISIONS
HART-REYNOLDS & ASSOCIATES, INC.
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
Design C.L.R.
Drawn C.L.R.
Checked R.L.H.
Approved
Date JUNE 1961
Scale 1" = 60'
APPROACH ROAD PLAN
No. 1



Date
Mark
By
Description
REVISIONS
HART-REYNOLDS & ASSOCIATES, INC.
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
PROFILE
No. 2



Date	Work	By	Description

REVISIONS

HART-REYNOLDS & ASSOCIATES, INC.
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA

MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD

Design: G.L.R.	Drawn: D.R.C.	Checked: R.L.R.	No. 3
Approved:	Date: JUNE 1961	Project No. 61-01	
Scale: HORIZ. 1"=20' VERT. 1"=8'	CROSS SECTIONS		of 12 Sheets

Date	Mark	By	Description

REVISIONS

HART-REYNOLDS & ASSOCIATES, INC.
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA

MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD

Design: C.L.R.	Drawn: D.F.C.	Checked: R.L.H.	No. 4
Approved:	Date: JUNE 1961	Project No. 61-03	
Scale: HORIZ. 1"=20' VERT. 1"=4'	CROSS SECTIONS		of 12 Sheets

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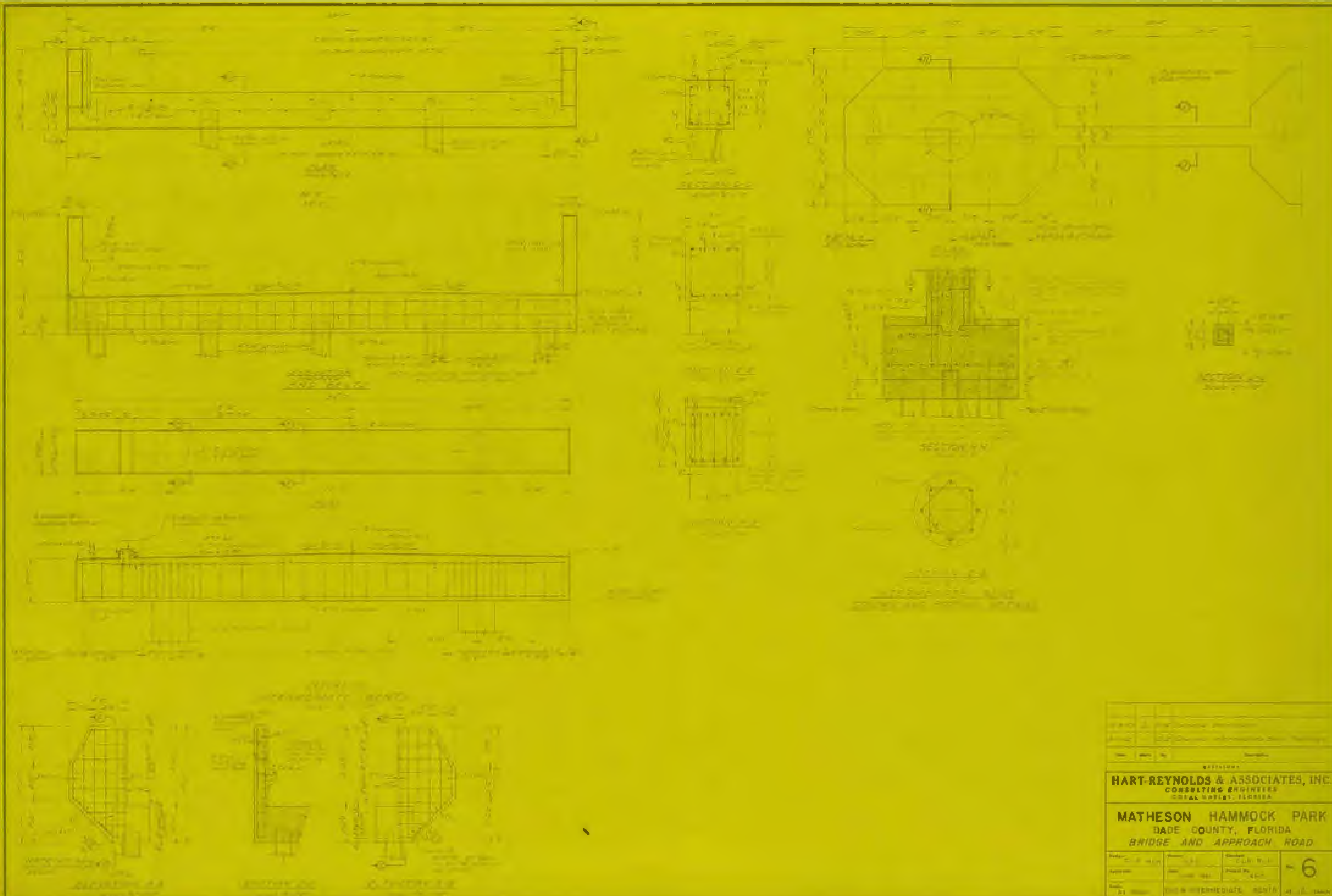
CORAL GABLES, FLORIDA

MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD

5



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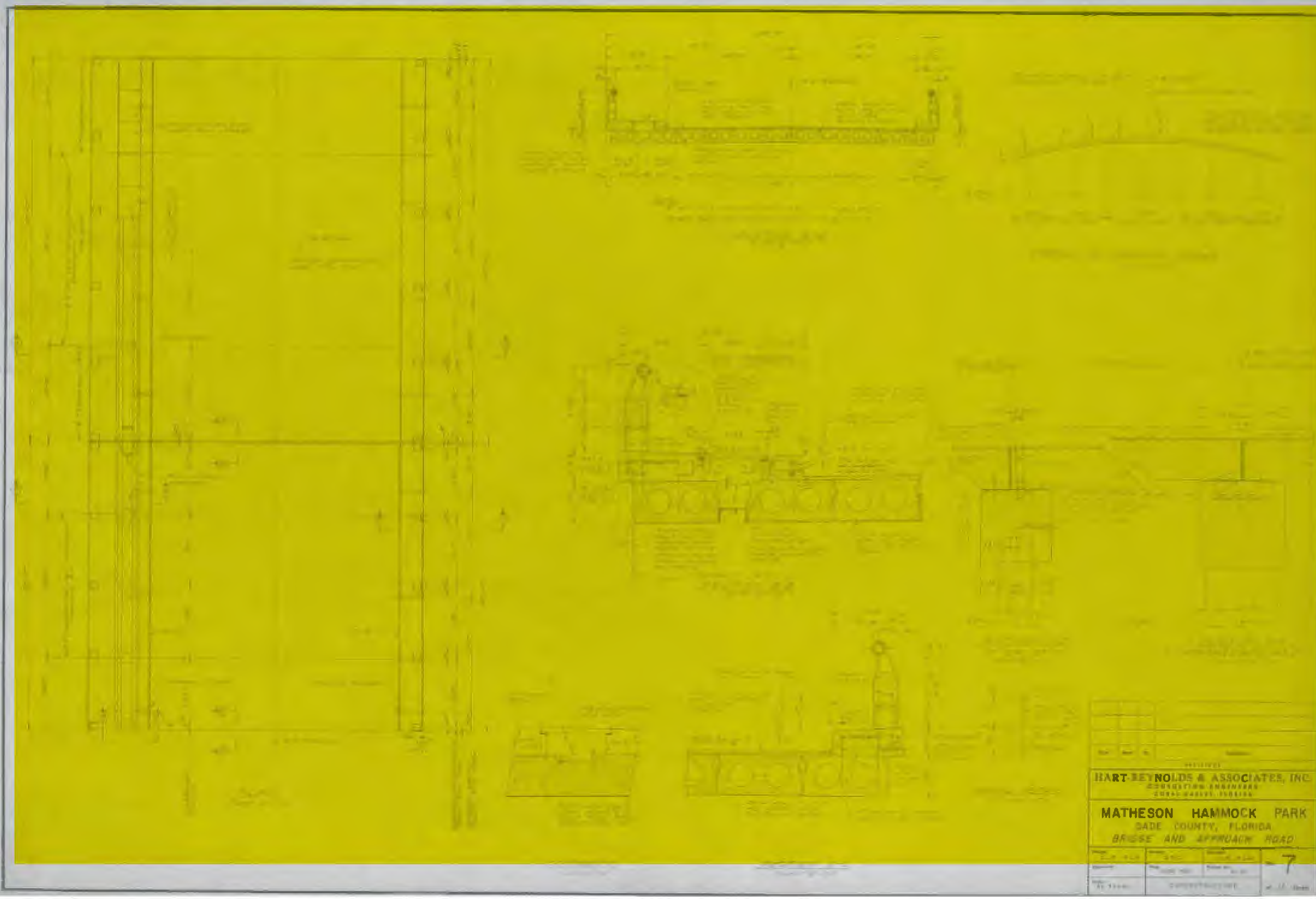
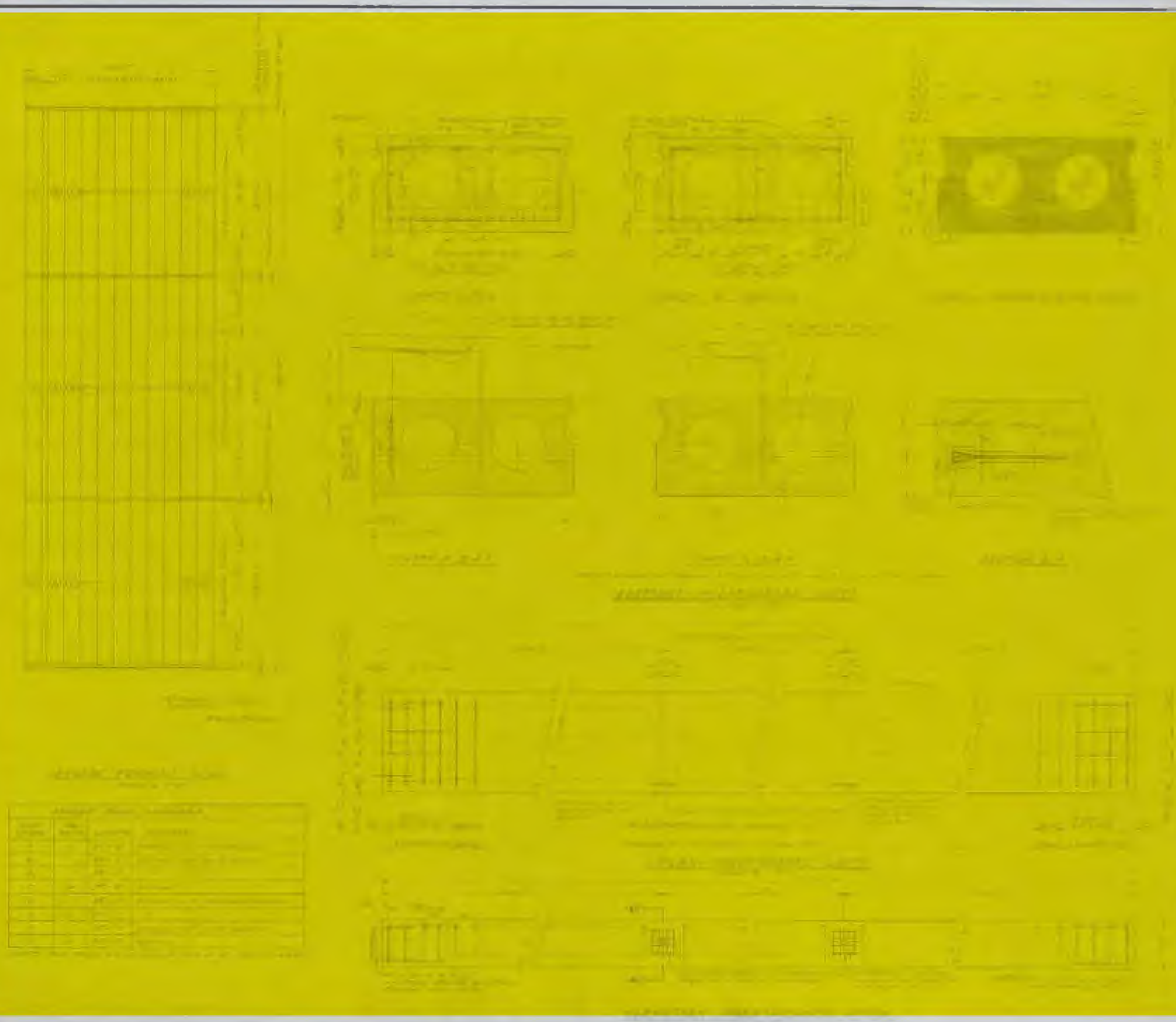
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
6


HART-REYNOLDS & ASSOCIATES, INC.
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
7



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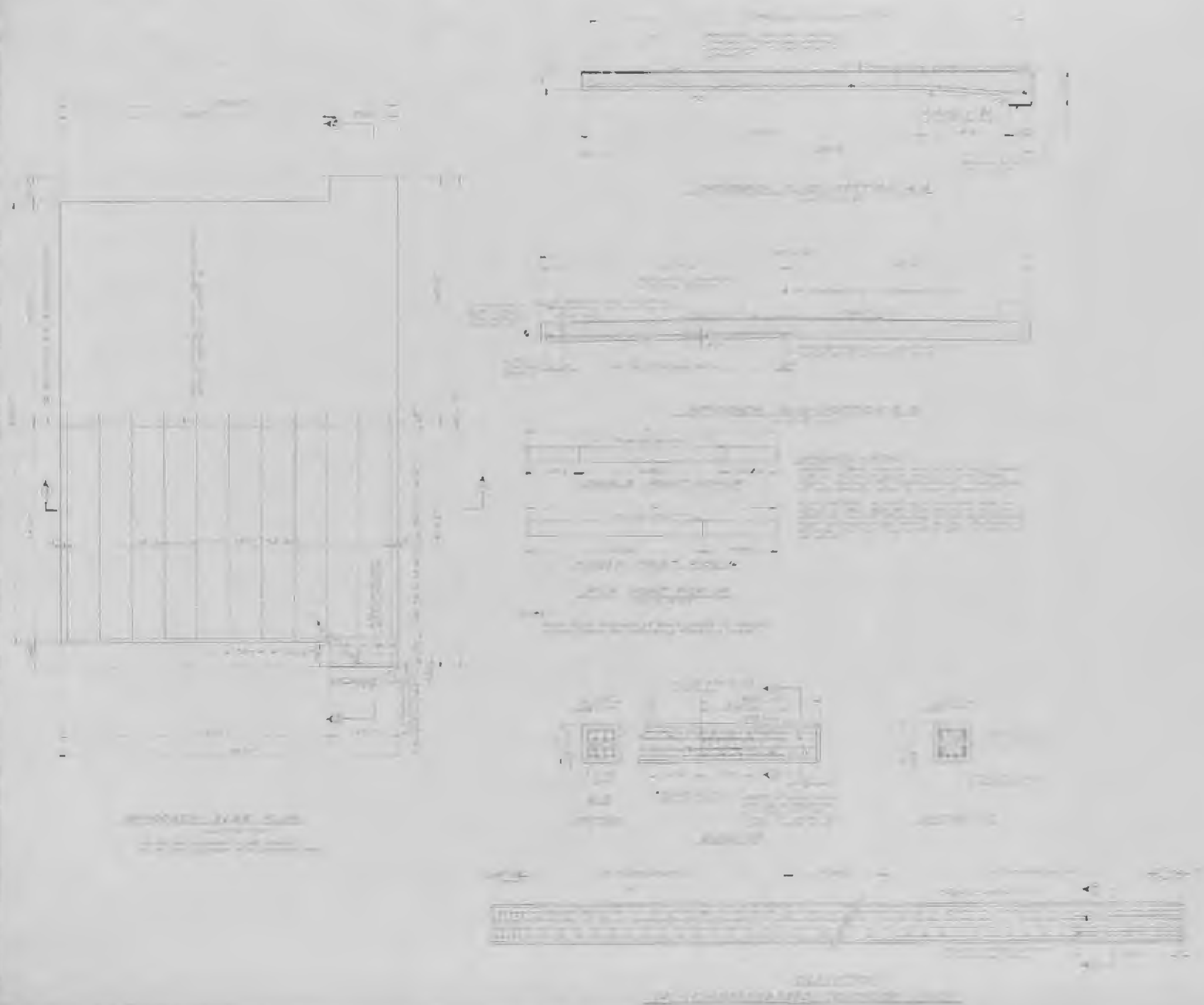
MATHESON HAMMOCK PARK

DADE COUNTY, FLORIDA

BRIDGE AND APPROACH ROAD

8



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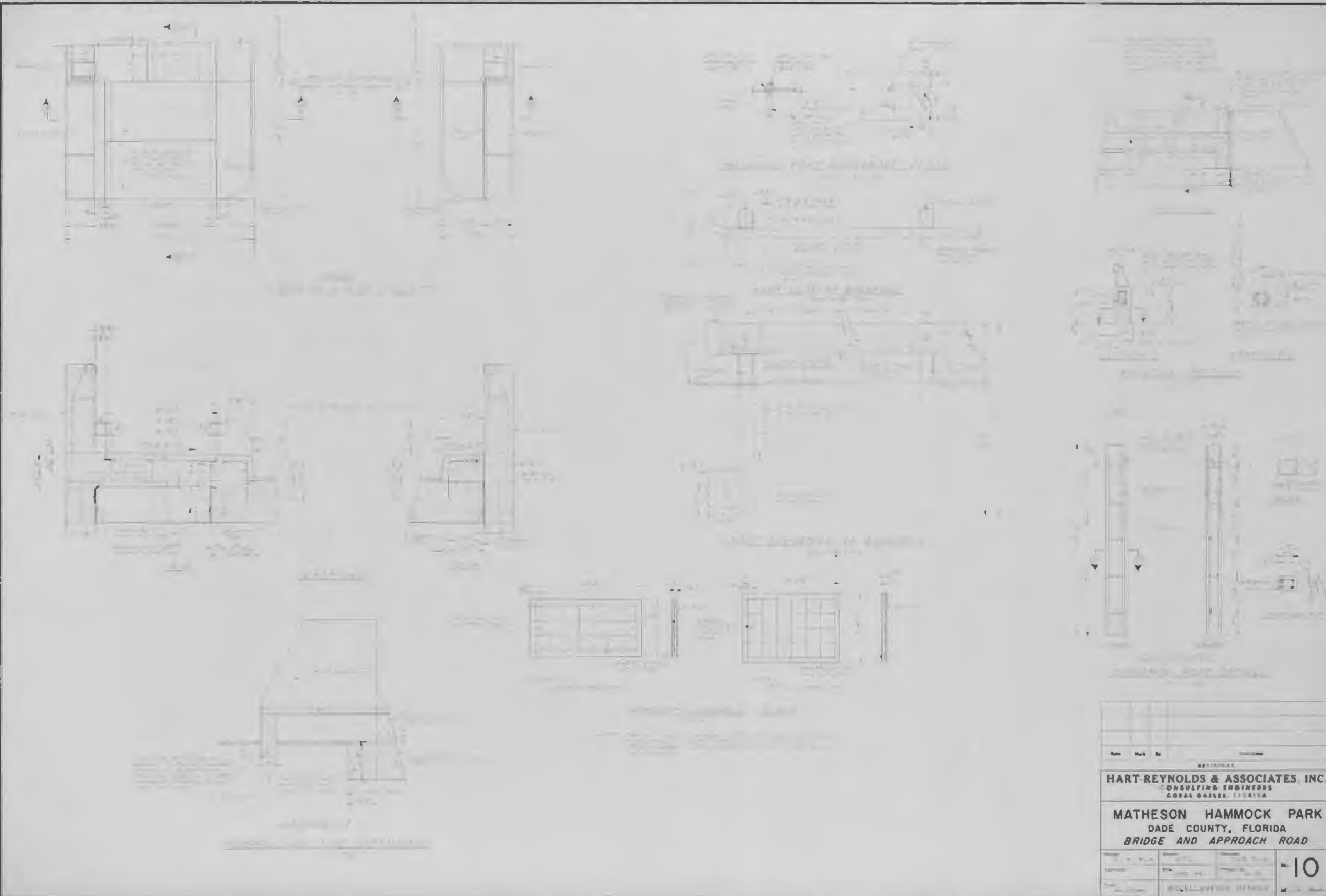
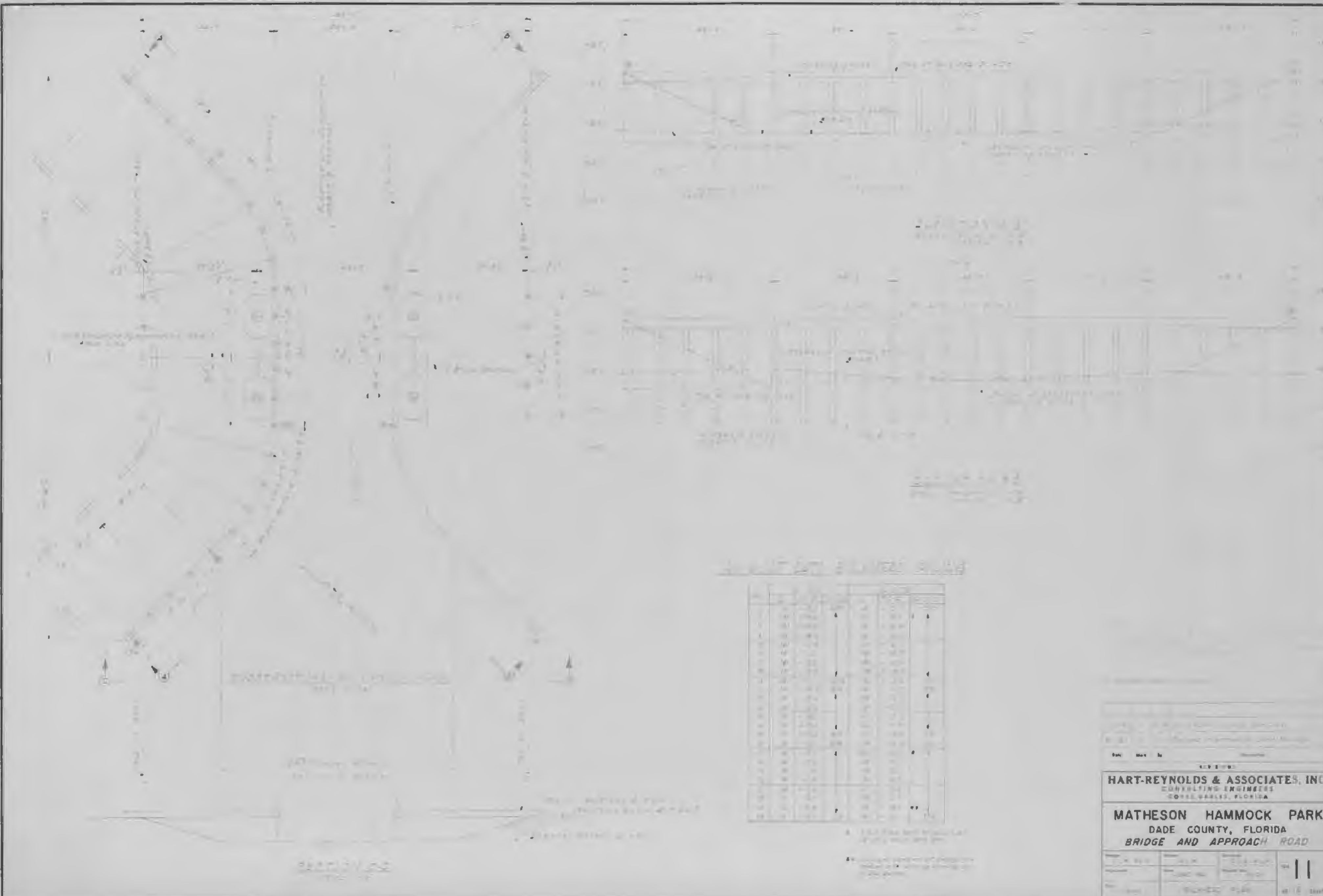
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA

MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD

No. 9


HART-REYNOLDS & ASSOCIATES, INC.
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
MISCELLANEOUS DETAILS
-10



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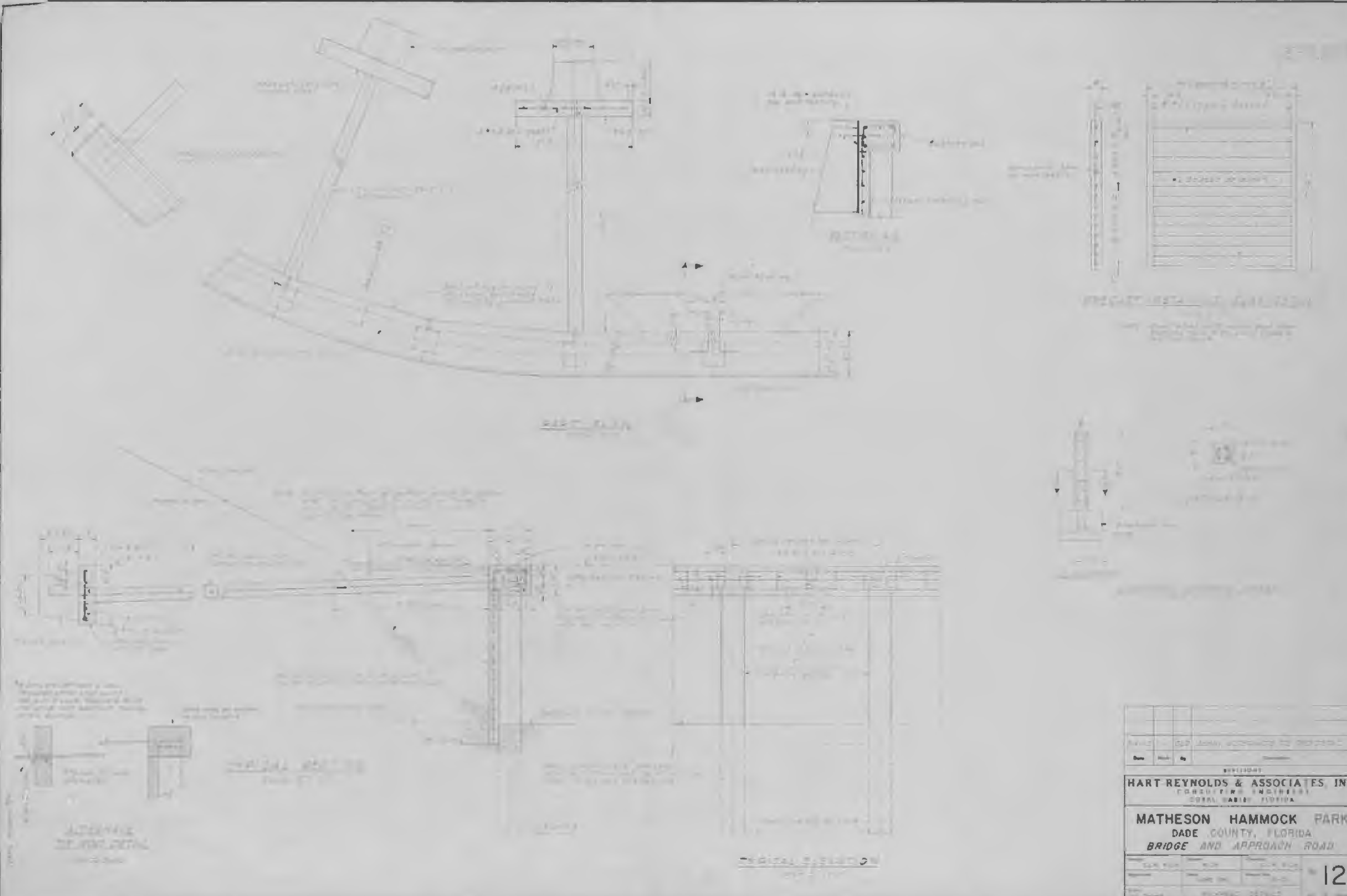
CORAL GABLES, FLORIDA
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
11



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CORAL GABLES, FLORIDA

MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD

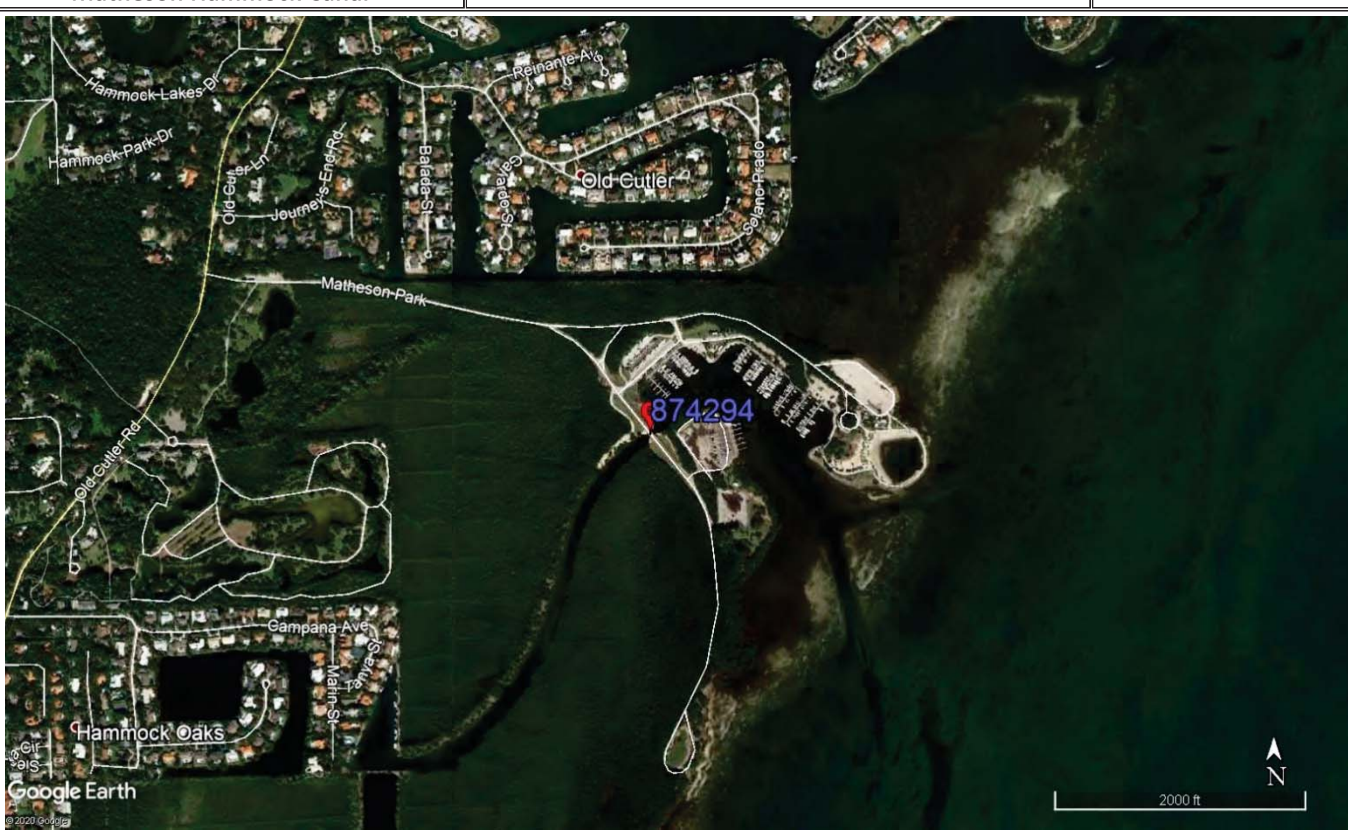
12

APPENDIX B – FDOT BRIDGE INSPECTION REPORT AND SUBSEQUENT INTERIM REPORTS

	BRIDGE INSPECTION REPORT PREPARED FOR: FDOT District 6 BRIDGE OWNER: MIAMI-DADE COUNTY INSPECTION TYPE: Regular NBI CONTRACT No. CA611	Inspected by: **Marlin Engineering, Inc.**
Bridge No. 874294	**REPORT CONTAINS**	**Inspection Date: 4-06-2020**

☒ BrM Inspection Report
☒ CIDR Information
☒ Bridge Profile
☒ UW Inspection Report
☐ Fracture Critical Data
☒ Load Rating Summary Sheet
☐ Addendum
☐ Mechanical and Electrical Data

Matheson Hammock Road over Matheson Hammock Canal	**Facility Carried & Location**	**Matheson Hammock Park**



Location Map		**Detour Length = N/A**

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

BY:	Marlin Engineering, Inc.	STRUCTURE NAME:	Not recorded
OWNER:	2 County Hwy Agency	YEAR BUILT:	1967
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	87 000 757
STRUCTURE TYPE:	5 Prestressed Concrete - 01 Slab	MP:	0.080
LOCATION:	Matheson Hammock Park	ROUTE:	00000
SERV. TYPE ON:	5 Highway-pedestrian	FACILITY CARRIED:	Matheson Hmk Road
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Matheson Hammock Canal

☐ FUNCTIONALLY OBSOLETE ☒ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 4/6/2020 UNDERWATER: 4/6/2020

SUFFICIENCY RATING: 15.5
HEALTH INDEX: 86.68

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

BY:	Marlin Engineering, Inc.	STRUCTURE NAME:	Not recorded
OWNER:	2 County Hwy Agency	YEAR BUILT:	1967
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	87 000 757
STRUCTURE TYPE:	5 Prestressed Concrete - 01 Slab	MP:	0.080
LOCATION:	Matheson Hammock Park	ROUTE:	00000
SERV. TYPE ON:	5 Highway-pedestrian	FACILITY CARRIED:	Matheson Hmk Road
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Matheson Hammock Canal

- [ ] THIS BRIDGE CONTAINS FRACTURE CRITICAL COMPONENTS
- [ ] THIS BRIDGE IS SCOUR CRITICAL
- [X] THIS REPORT IDENTIFIES DEFICIENCIES WHICH REQUIRE PROMPT CORRECTIVE ACTION
- [ ] FUNCTIONALLY OBSOLETE
- [X] STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Regular NBI

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 4/6/2020 UNDERWATER: 4/6/2020

OVERALL NBI RATINGS:

DECK:	3 Serious	CHANNEL:	6 Bank Slumping
SUPERSTRUCTURE:	3 Serious	CULVERT:	N N/A (NBI)
SUBSTRUCTURE:	4 Poor	SUFF. RATING:	15.5
PERF. RATING:	Poor	HEALTH INDEX:	86.68

FIELD PERSONNEL / TITLE / NUMBER:	INITIALS
Porras, Omar - Senior Diver Bridge Inspector (CBI#0368) (lead)	
Gomez, Hiram - Bridge Inspector Assistance	
Jacob Popp - Bridge Inspector Assistance, Diver	
Burgos, Daniel - Bridge Inspector Assistance, Diver	
Campo, Luis - Bridge Inspector Assistant	

REVIEWING BRIDGE INSPECTION SUPERVISOR:

Rego, Alexis - Bridge Inspector (CBI#00409)

CONFIRMING REGISTERED PROFESSIONAL ENGINEER:

Vers, Julie - Structural Design Manager (P.E. # 77896) Marlin Engineering
1700 NW 66 Avenue
Suite 106
Plantation Florida 33313

JULIE ANN VERS
LICENSE
No. 77896
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

SIGNATURE:

DATE:

The official record of this package has been electronically signed and sealed by Julie A. Vers, P.E. on the date adjacent to the seal as required by Rule 61G15-23.004, F.A.C.. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

All Elements

DECKS : Decks/Slabs

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8099 / 3	PS Conc Slab (Sonovoid)	3178	89.88	114	3.22	244	6.9	0	.	3536 (SF)
0	1080 / 3	Delamination/Spall/Patched Area	0	.	114	59.07	79	40.93	0	.	193 (SF)
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 (SF)
0	1100 / 3	Exposed Prestressing	0	.	0	.	20	100	0	.	20 (SF)
0	1110 / 3	Cracking (PSC)	0	.	0	.	144	100	0	.	144 (SF)
0	510 / 3	Wearing Surfaces	1929	73.23	0	.	705	26.77	0	.	2634 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	705	100	0	.	705 sq.ft

Element Inspection Notes:

8099/3 Notes: The top of the slab units is not visible due to an asphalt overlay. The width of the sonovoid slab units was field verified to be 3ft. wide.

SECONDARY:
_Object markers and centerline raised pavement markers are missing on the structure. Refer to Photo 01. NO CHANGE.
_Sidewalk panels are loose and moves under pedestrian load. Refer to Photo 02. NO CHANGE.
_The slab unit joints show evidence of water seepage. NO CHANGE. NCAR.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Replace the southern utility access panel of Span 1.
_Shim all sidewalk panels throughout the structure.
_Rehab/replace slab units 1-7, 1-8, 2-7, 2-8, 3-7 and 3-8.
_Clean efflorescence on slab units 1-6 and 1-7 to monitor the cracks.
_Repair cracks on slab units 1-6, 1-9, 2-6, 2-9, 3-6.
_Repair spalled/delaminated areas on slab units 1-6, 1-9, 2-6, 2-9, and 3-6 as needed.

CORRECTIVE ACTION EVALUATION:
_The recommendation noted above was completed.
_The recommendation noted above was not completed. Recommendation will be repeated.
_The recommendation noted above was not completed. Recommendation will be repeated
_The recommendation noted above was not completed. Recommendation will be repeated.
_The recommendation noted above was not completed. Recommendation will be repeated

Refer to Defects 1080, 1090, 1100, and 1110 for additional deficiencies.

1080/3 CS-3:
_Slab Unit 1-8 east edge has a spall/delamination 4ft. L x 15in. W x 2in. D and associated cracks with corrosion bleed-out near mid-span. Previously noted a delamination with associated cracks. (Total 8 SF) Refer to Photo 03. INCREASE.
_Slab Unit 1-9, center line has a spall/delamination up to 36in. L x 24in. W x 2in. D over Abutment 1. (Total 6 SF) Refer to Photo 04. NO CHANGE.
_Slab Unit 3-7 has an unsound repaired area 11ft. L x 2ft. W starting from Abutment 4 with hollow sounding throughout and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out. (Total 22 SF) Refer to Photo 05. NO CHANGE.
_Slab Unit 3-8 has a spall/delamination up to 7ft. L x 3ft. W x 1in. D and associated cracks with corrosion bleed-out starting at Pier 3. (Total 21 SF) Refer to Photo 06. NO CHANGE.
_Slab Unit 3-8 west edge has an unsound repaired area 11ft. L x 18in. W starting from Abutment 4 with hollow sounding throughout and associated cracks up to 1/16in. W with efflorescence. (Total 22 SF) NO CHANGE.

CS-2:

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

_Slab Unit 1-6, east edge has a delamination up to full length x 12in. W starting at Pier 2 cap. Previously noted as 3in. W. (Total 30 SF) INCREASE.
_Slab Unit 1-7, east edge has a delamination 7ft. L x 4in. W, starting at Pier 2 cap. (Total 7 SF) NEW.
_Slab Unit 1-9, west edge has a delamination up to 10ft. L x 14in. W, starting at Pier 2 cap. (Total 10 SF) NO CHANGE.
_Slab Unit 2-6, east edge has a delamination 30in. L x 4in. W starting at Pier 2 cap. (Total 3 SF). Refer to Photo 07. NO CHANGE.
_Slab Unit 2-7, west edge has a delamination up to 24in. L x 4in. W starting at Pier 2 cap. (Total 2 SF) Refer to Photo 07. NO CHANGE.
_Slab Unit 2-8 west half has two delaminated areas up to 15ft. L x 18in. W (average width) at south and north ends. (Total 60 SF). Refer to Photo 08. NO CHANGE.
_Slab Unit 3-6 has a delamination up to 24in. L x 6in. W on the east edge over Pier 3. (Total 2 SF) NO CHANGE.

1090/3 CS-3:
_Slab Unit 1-6 exhibits a spall with exposed rebar up to 15in. L x 6in. W x 1/2in. D with evidence of previous failed repair, at 9ft. from Abutment 1. (Total 1 SF) Refer to Photo 09. NO CHANGE.

1100/3 CS-3:
_Slab Unit 2-8 has a spall 10ft. L x 24in. W x up to 4in. D at mid-span with 6 exposed and corroded transverse rebars with up to 60% section remaining and 5 exposed and corroded prestressing strands with up to 0% section remaining (2 broken threads). (Total 20 SF) Refer to Photos 08 and 10. NO CHANGE.

1110/3 CS-3:
_Slab Unit 1-6 east edge has a delamination area full length x 12in. W with associated cracks up to 1/16in. W with efflorescence throughout. Previously noted as a delamination full length x 3in. W. (Total 30 SF) INCREASE.
_Slab Unit 1-7 east edge has a spall/delamination 24in. L x 12in. W with associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out over Abutment 1. No corrosion bleed out was previously noted. (Total 2 SF) Refer to Photo 11. INCREASE.
_Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W with associated cracks up to 1/8in. W with efflorescence and corrosion bleed-out, starting at Abutment 1. (Total 15 SF) Refer to Photo 11. NO CHANGE.
_Slab Unit 1-8 has a delaminated area up to 7ft. L x 3ft. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out. (Total 21 SF) NO CHANGE.
_Slab Unit 1-9 west edge has a delaminated area 8ft. L x 10in. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out, starting near the 3/4 point and extending to Pier 2 cap. (Total 8 SF) NO CHANGE.
_Slab Unit 2-7 east edge is intermittently cracked/delaminated up to span length x 16in. W (average width). (Total 38 SF) NO CHANGE.
_Slab Unit 2-9 west edge has a delaminated area up to 5ft. L x 5in. W with associated cracking up to 1/4in. wide, starting at the Pier 2 cap. (Total 5 SF). NO CHANGE.
_Slabs Unit 3-7 has two delaminated areas, one starting at Pier 3 up to 8ft. L x 15in. W (average width) with associated cracks, and the second, near mid-span up to 3ft. L x 30in. W. (Total 25 SF) NO CHANGE.

510/3 PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Repair the asphalt overlay over the expansion joints and slab unit joints as needed.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defect 3220 for deficiencies.

3220/3 CS-3:

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_The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated rutting over the slab unit joints with upheaving up to 1in. H at the shoulders, possibly indicating independent slab units movement. (Total 600 SF) Refer to Photo 12. NO CHANGE.

_The asphalt overlay has transverse cracks up to roadway width x 1/4in. W with rutting and upheaving up to 3in. H and vegetation growth over the expansion joints. (Total 105 SF) Refer to Photo 13. NO CHANGE.

DECKS : Joints

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	301 / 3	Pourable Joint Seal	0	.	0	.	104	74.29	36	25.71	140 ft
0	2310 / 3	Leakage	0	.	0	.	104	100	0	.	104 ft
0	2330 / 3	Seal Damage	0	.	0	.	0	.	36	100	36 ft

Element Inspection Notes:

301/3 Note: The roadway joints are not visible due to an asphalt overlay.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Clean and seal the expansion joints.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defects 2310 and 2330 for deficiencies.

2310/3 CS-3:
_There is evidence of moderate to heavy water seepage through the expansion joints on bents and abutment caps. (Total 104 LF) Refer to Photo 14. NO CHANGE. NCAR.

2330/3 CS-4:
_The sealant along the sidewalk expansion joints has deteriorated. (Total 36 LF) Refer to Photo 15. NO CHANGE.

MISCELLANEOUS : Channel

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8290 / 3	Channel	0	.	0	.	1	100	0	.	1 (EA)
0	9150 / 3	Bank Erosion	0	.	0	.	1	100	0	.	1 (EA)

Element Inspection Notes:

8290/3 FROM THE 2020 UNDERWATER INSPECTION:

Divers conducting the Underwater Inspection. Refer to Photo 16.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Repair undermining areas at the north seawall.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defect 9150 for deficiencies.

9150/3 CS-3:
_There are two areas of undermining up to 22ft. L x 3in. H x 21in. of penetration with backfill migration under the north seawall, below Slab Units 2-2 and 2-5. Previously noted

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undermining up to 22ft. L x 9in. H x 21in. of penetration. (Total 1 ea.) Refer to Photo 17. NO CHANGE.

MISCELLANEOUS : Other Elements

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	321 / 3	Re Conc Approach Slab	1410	100	0	.	0	.	0	.	1410 sq.ft
0	510 / 3	Wearing Surfaces	957	91.14	0	.	93	8.86	0	.	1050 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	93	100	0	.	93 sq.ft

Element Inspection Notes:

321/3 Note: The approach slabs are not visible due to an asphalt overlay.

SECONDARY:
_There are several approach roadway guardrails posts spalled/delaminated up to 14in. H x 3.5in. W x 1-1/4in D with exposed and corroded rebars at the following locations: NW guardrail, Posts 1, 2, 3, and 4, SW guardrail, Posts 2 and 4 from the bridge, SE guardrail, Post 1 from the bridge. Post 4 in NW guardrail was not previously noted. Refer to Photo 18. INCREASE.
_The approach guardrail panels exhibit moderate to heavy corrosion with numerous corrosion holes throughout. Refer to Photo 19. NO CHANGE.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Replace the approach guardrail panels and posts.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.

510/3 Refer to Defect 3220 for deficiencies.

3220/3 CS-3:
_The asphalt over the north approach slab has two longitudinal ravel cracks up to slab length x 1/8in. W in Lanes 1 and Lane 2. Previously noted cracks up to 1/16in. W (Total 40 SF) INCREASE. NCAR.
_The asphalt in both approach slab to approach roadway transitions has a transverse crack up to roadway width x 1/4in. W. (Total 53 SF) NO CHANGE. NCAR.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	205 / 3	Re Conc Column	0	.	0	.	4	100	0	.	4 each
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 each
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	3	100	0	.	3 each

Element Inspection Notes:

205/3 Note: At high tide, the seawater reaches the lower section of the columns.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Repair delaminated areas in columns.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defects 1090 and 1130 for deficiencies.

1090/3 CS-3:
_Column 2-2, south face has a spall/delamination up to 7ft. H x 3ft. W x 3in. D with one

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exposed rebar and one stirrup, having areas of up to 80% section remaining. Additionally, there are areas of delamination around the column circumference covering the entire column height with associated cracks up to 1/4in. W. No exposed rebar was previously noted. (Total 1 ea.) Refer to Photo 20. INCREASE.

1130/3 CS-3:
_Columns 2-1, 3-1, and 3-2 have delaminated areas along their entire length with associated cracks up to full height x 1/16in. W, as a result of corrosion of the steel reinforcement. (Total 3 ea.) Refer to Photo 21. NO CHANGE.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	215 / 3	Re Conc Abutment	65	92.86	0	.	5	7.14	0	.	70 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	0	.	5	100	0	.	5 ft

Element Inspection Notes:

215/3 Refer to Defect 1080 for deficiencies.

1080/3 CS-3:
_Abutment 4 cap has a spall/delamination up to 5ft. L x full height x 2in. D with associated cracks up to 1/16in. W under Slab Units 3-10 and 3-11. (Total 5 LF) Refer to Photo 22. NEW.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	234 / 3	Re Conc Pier Cap	49	72.06	12	17.65	7	10.29	0	.	68 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	12	63.16	7	36.84	0	.	19 ft

Element Inspection Notes:

234/3 SECONDARY:
_Bents 2 and 3 caps have vegetation growth along the west end. Refer to Photo 23. NO CHANGE.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Remove vegetation from west end of caps.
_Repair delaminations in Pier 2 and 3 caps.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defect 1080 for additional deficiencies.

1080/3 CS-3:
_Bent 2 cap has a spall/delamination up to 3ft. L x 16in. H x 1 in. D on the south face over Column 2-2, and on the same location, north face a delamination 20in. L x 12in. H. Previously noted only a delamination 3ft. L x 16in. H. (Total 3 LF) Refer to Photo 24. INCREASE.
_Bent 3 cap, bottom and north faces has two unsound repaired areas with multidirectional cracks up to 1/64in. W. No unsound concrete with cracks was previously noted. (Total 4 LF) INCREASE.

CS-2:
_Pier 3 cap has intermittent delaminated areas up to 3ft. L x 16in. H between Columns 3-1 and 3-2, along the top and bottom north edges. Previously noted delaminations up to 3ft. L

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x 16in. H totaling 5 LF. (Total 12 LF) INCREASE.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8393 / 3	Bulkhead Seawall Any Materia	0	.	0	.	354	100	0	.	354 ft
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	314	100	0	.	314 ft
0	6000 / 3	Scour	0	.	0	.	40	100	0	.	40 ft

Element Inspection Notes:

8393/3 Note: This element represents the concrete seawall that lines both sides of the channel. The seawall is underwater during high tide. The seawalls have a total of 44 piles; 22 piles at each seawall.

SECONDARY:
_The brackets and fasteners attaching the clearance gauges to the seawalls exhibit heavy to severe corrosion. Refer to Photo 25.

FROM THE 2020 UNDERWATER INSPECTION:

SECONDARY:
_SE and NW clearance gauges have moderate decay at bottom 3ft. Refer to Photo 26. NO CHANGE.
_The south seawall has two open joints up to 4in. W with backfill leakage behind Piles 15 and 18 from west. Refer to Photo 27. NO CHANGE.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Clean & seal cracks & repair delaminations/spalls in seawall caps.
_Seal open joints at the south seawall behind Piles 15 and 18.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defects 1130 and 6000 for additional deficiencies.

1130/3 CS-3:
_The seawall caps on the north and south walls have up to 1/4in W cracks, with associated delaminations/spalls throughout their entire lengths. (Total 314 LF) Refer to Photo 28. NO CHANGE.
_The south seawall at Pile 13, SE corner has a spall 14in. H x 3-1/2in. W x 1in. D, 3ft. 9in. below cap. NO CHANGE. NCAR.
_South seawall piles have vertical cracks up to 31in. L x 1/8in. W, some with corrosion bleed out as follows: NO CHANGE. NCAR.
-Pile 3, NE corner has a crack, and west, north and east faces have cracks with corrosion bleed out.
-Pile 4, north face has a crack with corrosion bleed out.
-Pile 16, east face has a crack with corrosion bleed out.
-Pile 17, west, north and east faces have cracks with corrosion bleed out.
-Piles 19, 20 and 21, SW and SE corners have cracks.

_North seawall piles have vertical cracks intermittently throughout, up to 34in. L x 1/16in. W, some with corrosion bleed out as follows: NO CHANGE. NCAR.
-Piles 5 and 6, SW and SE corners have cracks with corrosion bleed out.
-Pile 3, SW corner has a crack.
-Pile 4, NW corner has a crack.
-Piles 7, 8, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 23 have cracks in the SW and SE corners.

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-Pile 11, SE corner has a crack.

6000/3 From the 2020 Underwater Inspection:

CS-3:
_There are two areas of undermining up to 22ft. L x 9in. H x 21in. of penetration with backfill migration under the north seawall, below Slab Units 2 and 5. Refer to Element 8290 for related comments and recommended corrective actions. (Total 40 LF) NO CHANGE.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8394 / 3	R/Conc Abut Slope Protection	3968	73.81	0	.	1408	26.19	0	.	5376 (SF)
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	320	100	0	.	320 (SF)
0	4000 / 3	Settlement	0	.	0	.	1088	100	0	.	1088 (SF)

Element Inspection Notes:

8394/3 Note: At high tide, the seawater reaches the lower section of the concrete slope pavement.

SECONDARY:
_There is vegetation growth in the joints between the panels of slope protection in several locations. NO CHANGE. NCAR.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Repair settled & fractured sections of slope pavement.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defects 1130 and 4000 for additional deficiencies.

1130/3 CS-3:
_The slope pavement has multidirectional cracks up to 5ft. L x 1/8in. W along the NE corner near the toe. (Total 320 SF) NO CHANGE. NCAR.

4000/3 CS-3:
_The top slope pavement section along the SW and NW corners has settled up to 4in. H. (Total 933 SF) NO CHANGE.
_The slope protection toe has a fractured and settled area of 15ft. x 7ft. x 2ft deep at the NW corner behind the seawall cap. Possibly due to water reaching this area at high tide, no undermining or backfill migration are noted in the channel adjacent area. (Total 105 SF) Refer to Photo 29. NO CHANGE.
_The SW slope protection toe has 5 fractured panels that have settled up to 3in. H. Possibly due to water reaching this area at high tide, no undermining or backfill migration are noted in the channel adjacent area. (Total 50 SF) Refer to Photo 30. NO CHANGE.

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	333 / 3	Other Bridge Railing	167	83.5	33	16.5	0	.	0	.	200 ft
0	1000 / 3	Corrosion	0	.	30	100	0	.	0	.	30 ft
0	1020 / 3	Connection	0	.	3	100	0	.	0	.	3 ft

Element Inspection Notes:

333/3 Note: This element represents the concrete post and beam bridge rail with

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aluminum handrail on top across both sides of the structure.

CS-1:
_The concrete bridge rail beams have 1/64in W cracks at the junctures with the posts in several locations. NO CHANGE. NCAR.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Replace the approach guardrail panels and posts.
_Replace the missing railing nuts on left side of Bent 3.
_Clean & coat the corroded nuts of railing.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.

Refer to Defects 1000 and 1020 for additional deficiencies.

1000/3 CS-2:
_The rail anchor bolt nuts and washers have moderate corrosion at random locations: 25 nuts at west railing, and 5 nuts at east railing. (Total 30 LF) Refer to Photo 31. NO CHANGE.

1020/3 CS-2:
_There are several missing anchor bolt nuts at the aluminium rail posts at the following locations: (Total 3 ea.) Refer to Photo 32. INCREASE.

_West rail, Post 1-1 is missing 1 of 4 nuts. NEW.
_West rail, Post 2-6 is missing 2 of 4 nuts. NO CHANGE.
_East rail, Post 1-5 is missing 1 of 4 nuts. NEW.

Total Number of Elements*: 10
*excluding defects/protective systems

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UNIT: 0 **DECKS**

ELEMENT/ENV: 301:2330 / 3 Seal Damage **ELEM CATEGORY: Joints**

CONDITION STATE		PRIORITY
4	MMS Quantity: 36 lf Element Estimated Quantity: 36 ft	3

WORK ORDER RECOMMENDATION:

Install new sealant along the sidewalk expansion joints. Photo 15

ELEMENT/ENV: 8099 / 3 PS Conc Slab (Sonovoid) **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
1 , 2 , 3	MMS Quantity: 4 sf Element Estimated Quantity: 4 (SF)	3

WORK ORDER RECOMMENDATION:

Replace missing object markers at the four corners of the bridge. Photo 01

1 , 2 , 3	MMS Quantity: 300 sf Element Estimated Quantity: 300 (SF)	3

WORK ORDER RECOMMENDATION:

Properly secure the sidewalk panels. Photo 02

ELEMENT/ENV: 8099:510:3220 / 3 Crack (Wearing Surface) **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
3	MMS Quantity: 600 sf Element Estimated Quantity: 600 sq.ft	0

WORK ORDER RECOMMENDATION:

Monitor the slab units for independent movement. Photo 12

3	MMS Quantity: 600 sf Element Estimated Quantity: 600 sq.ft	3

WORK ORDER RECOMMENDATION:

Repair cracks on the asphalt along the slab unit joints. Photo 12

3	MMS Quantity: 105 sf Element Estimated Quantity: 105 sq.ft	3

WORK ORDER RECOMMENDATION:

Clean and repair cracks and rutting along the expansion joints. Photo 13

ELEMENT/ENV: 8099:1080 / 3 Delamination/Spall/Patched Area **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
2 , 3	MMS Quantity: 338 sf Element Estimated Quantity: 338 (SF)	3

WORK ORDER RECOMMENDATION:

Repair spalls delaminations and cracks along the underside of the slabs units. Photos 03 to 11

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UNIT: 0 **DECKS**

ELEMENT/ENV: 8099:1100 / 3 Exposed Prestressing **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
3	MMS Quantity: 20 sf Element Estimated Quantity: 20 (SF)	3

WORK ORDER RECOMMENDATION:

Clean and coat exposed prestressing and reinforce Slab Unit 2-8. Photos 08 and 10

UNIT: 0 **MISCELLANEOUS**

ELEMENT/ENV: 321 / 3 Re Conc Approach Slab **ELEM CATEGORY: Other Elements**

CONDITION STATE		PRIORITY
1	MMS Quantity: 80 sf Element Estimated Quantity: 80 sq.ft	3

WORK ORDER RECOMMENDATION:

Replace all the approach guardrail panels. Photo 19

1	MMS Quantity: 7 sf Element Estimated Quantity: 7 sq.ft	3

WORK ORDER RECOMMENDATION:

Replace spalled and delaminated posts along the roadway approach guardrails. Photo 18

ELEMENT/ENV: 8290:9150 / 3 Bank Erosion **ELEM CATEGORY: Channel**

CONDITION STATE		PRIORITY
3	MMS Quantity: 8 mh Element Estimated Quantity: 1 (EA)	3

WORK ORDER RECOMMENDATION:

Repair undermining areas at the north seawall. Photo 17

UNIT: 0 **SUBSTRUCTURE**

ELEMENT/ENV: 205:1090 / 3 Exposed Rebar **ELEM CATEGORY: Substructure**

CONDITION STATE		PRIORITY
3	MMS Quantity: 16 mh Element Estimated Quantity: 1 each	3

WORK ORDER RECOMMENDATION:

Remove any loose concrete and repair delaminations and spalls along the Column 2-2. Photo 20

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UNIT: 0 **SUBSTRUCTURE**

ELEMENT/ENV: 205:1130 / 3 Cracking (RC and Other) **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
3	MMS Quantity: 8 mh	Element Estimated Quantity: 4 each	3

WORK ORDER RECOMMENDATION:

Install cathodic protection to Bents 2 and 3 columns. Photos 20 and 21

CONDITION STATE			PRIORITY
3	MMS Quantity: 80 mh	Element Estimated Quantity: 4 each	3

WORK ORDER RECOMMENDATION:

Repair delaminations and seal cracks along Bents 2 and 3 columns. Photo 21

ELEMENT/ENV: 215:1080 / 3 Delamination/Spall/Patched Area **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
3	MMS Quantity: 8 mh	Element Estimated Quantity: 5 ft	3

WORK ORDER RECOMMENDATION:

Repair spall/delamination on Abutment 4 cap under Slab Units 3-10 and 3-11. Photo 22

ELEMENT/ENV: 234 / 3 Re Conc Pier Cap **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
1 , 2 , 3	MMS Quantity: 2 mh	Element Estimated Quantity: 2 ft	3

WORK ORDER RECOMMENDATION:

Remove vegetation growing on west end of Bents 2 and 3 caps. Photo 23

ELEMENT/ENV: 234:1080 / 3 Delamination/Spall/Patched Area **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
2 , 3	MMS Quantity: 16 mh	Element Estimated Quantity: 19 ft	3

WORK ORDER RECOMMENDATION:

Repair spalls and delaminations along Bents 2 and 3 caps. Photo 24

ELEMENT/ENV: 8393 / 3 Bulkhead Seawall Any Material **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
3	MMS Quantity: 8 mh	Element Estimated Quantity: 4 ft	3

WORK ORDER RECOMMENDATION:

Replace the clearance gauges and hardware on the seawall at both sides of the channel. Photos 25 and 26

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UNIT: 0 **SUBSTRUCTURE**

ELEMENT/ENV: 8393 / 3 Bulkhead Seawall Any Material **ELEM CATEGORY: Substructure**

CONDITION STATE		PRIORITY
3	MMS Quantity: 8 mh Element Estimated Quantity: 2 ft	3

WORK ORDER RECOMMENDATION:

Seal open joints at the south seawall behind Piles 15 and 18. Photo 27

ELEMENT/ENV: 8393:1130 / 3 Cracking (RC and Other) **ELEM CATEGORY: Substructure**

CONDITION STATE		PRIORITY
3	MMS Quantity: 40 mh Element Estimated Quantity: 314 ft	3

WORK ORDER RECOMMENDATION:

Repair delaminations and spalls along the seawall caps. Photo 28

ELEMENT/ENV: 8394:4000 / 3 Settlement **ELEM CATEGORY: Substructure**

CONDITION STATE		PRIORITY
3	MMS Quantity: 160 mh Element Estimated Quantity: 1088 (SF)	3

WORK ORDER RECOMMENDATION:

Repair settled and fractured areas along the slope protections. Photos 29 and 30

UNIT: 0 **SUPERSTRUCTURE**

ELEMENT/ENV: 333:1000 / 3 Corrosion **ELEM CATEGORY: Superstructure**

CONDITION STATE		PRIORITY
2	MMS Quantity: 30 lf Element Estimated Quantity: 30 ft	3

WORK ORDER RECOMMENDATION:

Clean and paint or replace corroded hardware along the bridge aluminium rail. Photo 31

ELEMENT/ENV: 333:1020 / 3 Connection **ELEM CATEGORY: Superstructure**

CONDITION STATE		PRIORITY
2	MMS Quantity: 3 lf Element Estimated Quantity: 3 ft	3

WORK ORDER RECOMMENDATION:

Replace missing nuts at the aluminium rail post connections. Photo 32

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Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Structure Notes

BRIDGE OWNER: MIAMI-DADE COUNTY

Bridge inventoried from south to north.

P/S Slab Units on R/Conc Caps and Abutments over P/Conc Columns. (3 spans)

Element 227/3 Re Conc Pile notes have been replaced by Element 205/3 Re Conc Column on 10/29/2019.

TRAFFIC RESTRICTIONS:
Based on the current load rating analysis dated 1/13/2020, it is recommended that this bridge be posted for the SU, C and ST5 type vehicles as follows: SU = 11 tons, C = 16 tons, ST5 = 18 tons. The bridge is currently posted for SU = 11 tons, C = 16 tons, ST5 = 18 tons. Refer to posting signs Photos 33 and 34.

REVIEWED BY:

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

INSPECTION NOTES: **GZJW** **4/6/2020**

Sufficiency Rating Calculation Accepted by knmeira at 5/13/2020 9:36:35 AM

The Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (04/06/2020)

The Substructure NBI Rating is coded 4 (Poor) due to the significant deterioration of Column 2-2. (04/06/2020)

The Channel NBI Rating was lowered from 7 to 6 due to areas of undermining on the channel below the North seawall. (04/06/2020)

LOAD CAPACITY EVALUATION:
Since the current load rating dated 1/13/2020, there is no indication that deterioration, geometric changes or additional dead load have occurred that would warrant a new load rating analysis. This only applies to this inspection dated 04/06/2020 per Julie A.Vers, P.E.

The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure.

Element 8475 R/Conc Walls was replaced by 8393 Bulkhead Seawall Any Material during this inspection cycle. All previous notes were transferred accordingly. (04/06/2020)

The following elements were inspected underwater by the divers:
8290 Channel
8393 Bulkhead Seawall Any Material

LEGEND:
NCAR: NO CORRECTIVE ACTION RECOMMENDED.
RT: Right
LT: Left
NC: No Change
INC: Increase
CAT: Corrective Action Taken
L: Long
W: Wide
H: High
D: Deep
UW: Underwater
S.L.: Section Loss
in.: Inches
ft.: Feet

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Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 01 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Object markers and centerline raised pavement markers are missing on the structure.

WORK ORDER RECOMMENDATION:
Replace missing object markers at the four corners of the bridge.

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Photo 02 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Sidewalk panels are loose and moves under pedestrian load.

WORK ORDER RECOMMENDATION:
Properly secure the sidewalk panels.

FLORIDA DEPARTMENT OF TRANSPORTATION
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Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 03 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-8 east edge has a spall/delamination 4ft. L x 15in. W x 2in. D and associated cracks with corrosion bleed-out near mid-span.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 04 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-9, center line has a spall/delamination up to 36in. L x 24in. W x 2in. D over Abutment 1.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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Photo 05 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 3-7 has an unsound repaired area 11ft. L x 2ft. W starting from Abutment 4 with hollow sounding throughout and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 06 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 3-8 has a spall/delamination up to 7ft. L x 3ft. W x 1in. D and associated cracks with corrosion bleed-out starting at Pier 3.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 07 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Units 2-6 and 2-7, east and west edges have delaminations up to 30in. L x 4in. W, starting at Pier 2 cap.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 08 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 2-8 west half has two delaminated areas up to 15ft. L x 18in. W (average width) at south and north ends, and at midspan has a spall 10ft. L x 24in. W x up to 4in. D with exposed strands. Refer to Photo 10 for additional information.

WORK ORDER RECOMMENDATION:
Clean and coat exposed prestressing and reinforce Slab Unit 2-8.
Repair spalls delaminations and cracks along the underside of the slabs units.

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Photo 09 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-6 exhibits a spall with exposed rebar up to 15in. L x 6in. W x 1/2in. D with evidence of previous failed repair, at 9ft. from Abutment 1.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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Photo 10 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 2-8 has a spall 10ft. L x 24in. W x up to 4in. D at mid-span with 6 exposed and corroded transverse rebars with up to 60% section remaining and 5 exposed and corroded prestressing strands with up to 0% section remaining (2 broken threads).

WORK ORDER RECOMMENDATION:
Clean and coat exposed prestressing and reinforce Slab Unit 2-8.
Repair spalls delaminations and cracks along the underside of the slabs units.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 11 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-7 east edge has a spall/delamination 24in. L x 12in. W with associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out over Abutment 1. Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W with associated cracks up to 1/8in. W with efflorescence and corrosion bleed-out, starting at Abutment 1.

WORK ORDER RECOMMENDATION:
Repair spalls delaminations and cracks along the underside of the slabs units.

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Photo 12 Element/Env 8099/ 510/3: PS Conc Slab (Sonovoid)/ Wearing Surfaces

The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated rutting over the slab unit joints with upheaving up to 1in. H at the shoulders, possibly indicating independent slab units movement.

WORK ORDER RECOMMENDATION:
Repair cracks on the asphalt along the slab unit joints.
Monitor the slab units for independent movement.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 13 Element/Env 8099/ 510/3: PS Conc Slab (Sonovoid)/ Wearing Surfaces

The asphalt overlay has transverse cracks up to roadway width x 1/4in. W with rutting and upheaving up to 3in. H and vegetation growth over the expansion joints.

WORK ORDER RECOMMENDATION:
Clean and repair cracks and rutting along the expansion joints.

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Photo 14 Element/Env 301/3: Pourable Joint Seal

There is evidence of moderate to heavy water seepage through the expansion joints on bents and abutment caps.

WORK ORDER RECOMMENDATION:
None.

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Photo 15 Element/Env 301/3: Pourable Joint Seal

The sealant along the sidewalk expansion joints has deteriorated.

WORK ORDER RECOMMENDATION:
Install new sealant along the sidewalk expansion joints.

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Photo 16 Element/Env 8290/3: Channel

Divers conducting the Underwater Inspection.

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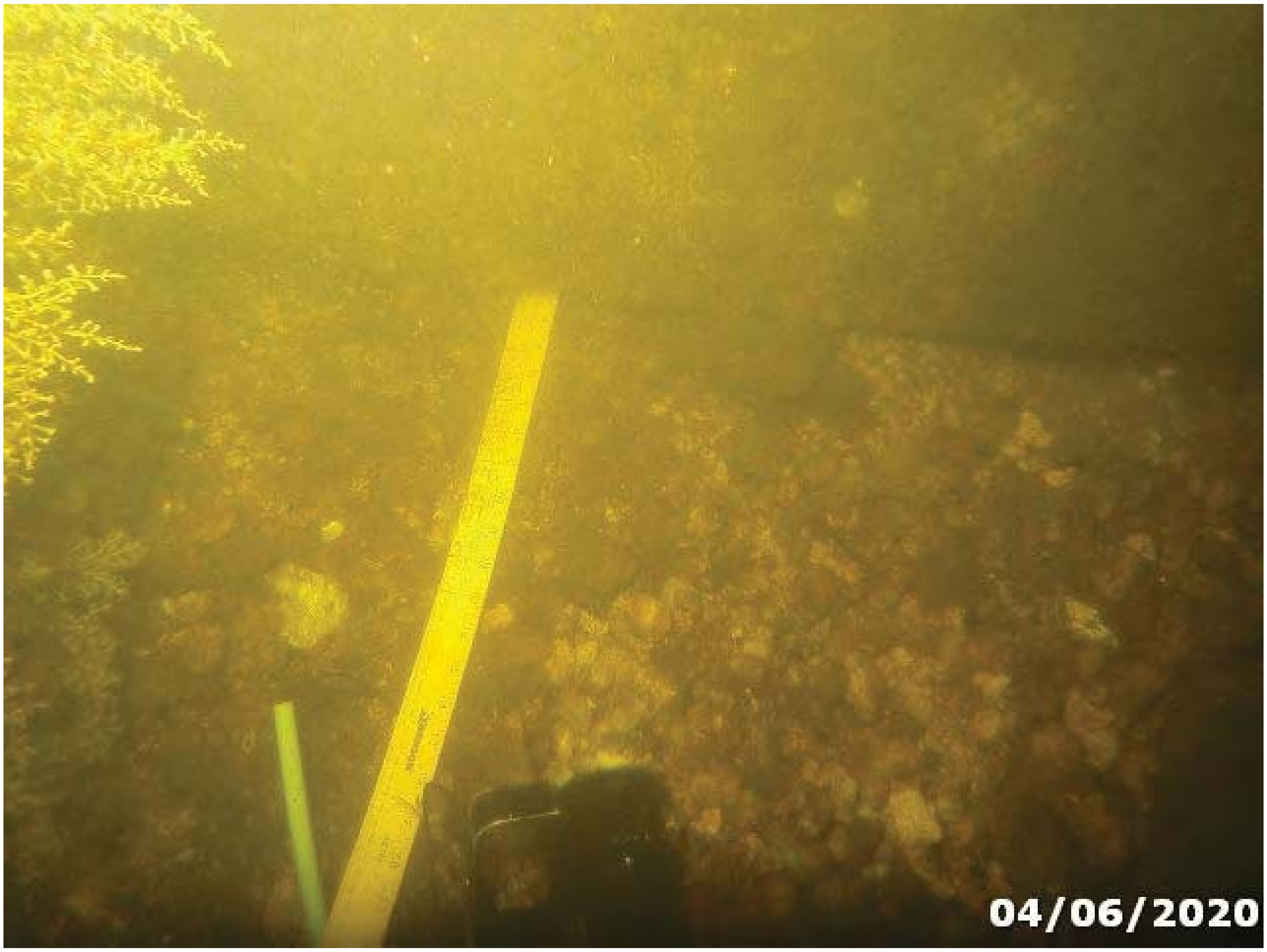

Photo 17 Element/Env 8290/3: Channel

There are two areas of undermining up to 22ft. L x 3in. H x 21in. of penetration with backfill migration under the north seawall, below Slab Units 2-2 and 2-5.

WORK ORDER RECOMMENDATION:
Repair undermining areas at the north seawall.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 18 Element/Env 321/3: R/Conc Approach Slab

There are several approach roadway guardrails posts spalled/delaminated up to 14in. H x 3.5in. W x 1-1/4in D with exposed and corroded rebars. Shown Post 1 at NW approach guardrail.

WORK ORDER RECOMMENDATION:
Replace spalled and delaminated posts along the roadway approach guardrails.

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Photo 19 Element/Env 321/3: R/Conc Approach Slab

The approach guardrail panels exhibit moderate to heavy corrosion with numerous corrosion holes throughout.

WORK ORDER RECOMMENDATION:
Replace all the approach guardrail panels.

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Inspection

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 20 Element/Env 205/3: Re Conc Column

Column 2-2, south face has a spall/delamination up to 7ft. H x 3ft. W x 3in. D with one exposed rebar and one stirrup, having areas of up to 80% section remaining. Additionally, there are areas of delamination around the column circumference covering the entire column height with associated cracks up to 1/4in. W.

WORK ORDER RECOMMENDATION:
Remove any loose concrete and repair delaminations and spalls along the Column 2-2.
Install cathodic protection to Bents 2 and 3 columns.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 21 Element/Env 205/3: Re Conc Column

Columns 2-1, 3-1, and 3-2 have delaminated areas along their entire length with associated cracks up to full height x 1/16in. W, as a result of corrosion of the steel reinforcement.

WORK ORDER RECOMMENDATION:
Install cathodic protection to Bents 2 and 3 columns.
Repair delaminations and seal cracks along Bents 2 and 3 columns.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 22 Element/Env 215/3: Re Conc Abutment

Abutment 4 cap has a spall/delamination up to 5ft. L x full height x 2in. D with associated cracks up to 1/16in. W under Slab Units 3-10 and 3-11.

WORK ORDER RECOMMENDATION:
Repair spall/delamination on Abutment 4 cap under Slab Units 3-10 and 3-11.

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Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 23 Element/Env 234/3: Re. Concrete Pier Cap

Bents 2 and 3 caps have vegetation growth along the west end.

WORK ORDER RECOMMENDATION:
Remove vegetation growing on west end of Bents 2 and 3 caps.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 24 Element/Env 234/3: Re. Concrete Pier Cap

Bent 2 cap has a spall/delamination up to 3ft. L x 16in. H x 1 in. D on the south face over Column 2-2, and on the same location, north face a delamination 20in. L x 12in. H.

WORK ORDER RECOMMENDATION:
Repair spalls and delaminations along Bents 2 and 3 caps.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 25 Element/Env 8393/3: Bulkhead Seawall Any Material

The brackets and fasteners attaching the clearance gauges to the seawalls exhibit heavy to severe corrosion.

WORK ORDER RECOMMENDATION:
Replace the clearance gauges and hardware on the seawall at both sides of the channel.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 26 Element/Env 8393/3: Bulkhead Seawall Any Material

SE and NW clearance gauges have moderate decay at bottom 3ft.

WORK ORDER RECOMMENDATION:
Replace the clearance gauges and hardware on the seawall at both sides of the channel.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

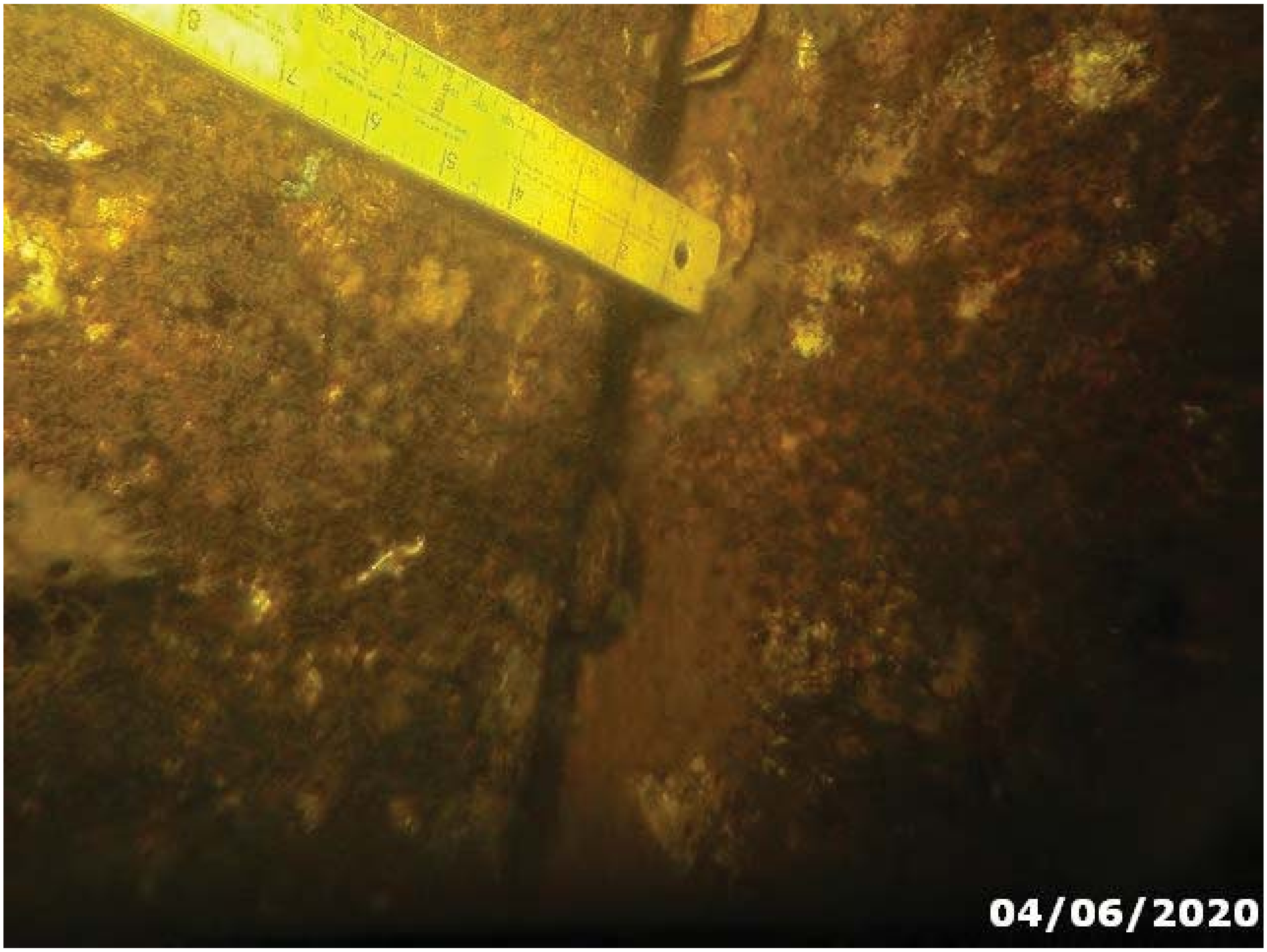

Photo 27 Element/Env 8393/3: Bulkhead Seawall Any Material

The south seawall has two open joints up to 4in. W with backfill leakage behind Piles 15 and 18 from west.

WORK ORDER RECOMMENDATION:
Seal open joints at the south seawall behind Piles 15 and 18.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 28 Element/Env 8393/3: Bulkhead Seawall Any Material

The seawall caps on the north and south walls have up to 1/4in W cracks, with associated delaminations/spalls throughout their entire lengths.

WORK ORDER RECOMMENDATION:
Repair delaminations and spalls along the seawall caps.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 29 Element/Env 8394/3: R/Conc Abut Slope Protection

The slope protection toe has a fractured and settled area of 15ft. x 7ft. x 2ft deep at the NW corner behind the seawall cap. The channel water reach this area at high tide.

WORK ORDER RECOMMENDATION:
Repair settled and fractured areas along the slope protections.

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Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 30 Element/Env 8394/3: R/Conc Abut Slope Protection

The SW slope protection toe has 5 fractured panels that have settled up to 3in. H. The channel water reach this area at high tide.

WORK ORDER RECOMMENDATION:
Repair settled and fractured areas along the slope protections.

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Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 31 Element/Env 333/3: Other Bridge Railing

The rail anchor bolt nuts and washers have moderate corrosion at random locations: 25 nuts at west railing, and 5 nuts at east railing.

WORK ORDER RECOMMENDATION:
Clean and paint or replace corroded hardware along the bridge aluminium rail.

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Photo 32 Element/Env 333/3: Other Bridge Railing

There are several missing anchor bolt nuts at the aluminium rail posts: west rail, Posts 1-1 and 2-6; and east rail, Post 1-5.

WORK ORDER RECOMMENDATION:
Replace missing nuts at the aluminium rail post connections.

FLORIDA DEPARTMENT OF TRANSPORTATION
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DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

Photo 33 STRUCTURE NOTES: South Approach Posting Sign

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Photo 34 STRUCTURE NOTES: North Approach Posting Sign

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Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

SCOUR EVALUATION

Channel looking West

FLORIDA DEPARTMENT OF TRANSPORTATION
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Inspection

Structure ID: 874294

DISTRICT: D6 - Miami **INSPECTION DATE: 4/6/2020 GZJW**

SCOUR EVALUATION

Channel looking East

F. FIELD PREPARATION and CHECKLIST

Structure ID: 874294

Inspection Date: 04/06/2020 Underwater: 04/06/2020

A. Tools and Equipment

Full Size Cargo Van: Yes: X No: Pick-up Truck: Yes: X No:
Automobile: Yes: No: X
Camera: Yes: X No: Video: Yes: _ No: X
NDT Equipment: Yes: No: X
NDT Type: N/A
Binoculars: Yes: No: X
Diving Performed: Yes: X No: Max Depth: 10.6 ft. Current: Moderate
Dive Mode: SCUBA
Hand Tools:

1. Standard Inspection Tools
2. Chipping Hammer
3. Inspection Hand Tools
4. Flashlight
5. Folding Rulers

Other:

B. Services

Flag Crew: N/A Snooper: N/A
Electrician: N/A Other:______________________

C. Scheduling (Brief Explanation)

Routine Inspection, no special scheduling needed.
Man Hours: 0 hrs. Dive Time: 2 hrs. Travel Time: 1 hr. Office Time: 1 hr.

D. Site Conditions

Boat Needed: NO Type of Boat: N/A

Location of Boat Ramp: N/A
Lengthy Travel Required: N/A
Difficult Access: NO
Water Obviously Polluted: NO
Water quality is fair: Yes
Strong Water Current: Yes

Other: N/A

E. UNDERWATER ELEMENTS INSPECTED:

- 8290 Channel – 1ea.
- 8393 Bulkhead Seawall Any Material – 354 ft.

Bridge No.	874294	**Analysis Method:**	LRFR-LRFD
Location	Matheson hammock Road over matheson Hammock Canal		
Description	3 Spans, 2-30'&1-40', Prestressed voided slab beams 36"x17"		

FDOT Bridge Load Rating Summary Form (Page 1 of 1)

Rating Type	Rating Type	Gross Axle Weight (tons)	Moment/Shear/Service		Dead Load Factor	Live Load Factor	Live Load Distrib. Factor (axles)	Rating Factor	Span No. - Girder No., Interior/Exterior, %Span Length	RF·Weight (tons)
Level	**Vehicle**	**Weight**	**Member Type**	**Limit**	**DC**	**LL**	**LLDF**	**RF**	**Governing Location**	**RATING**
Inventory	HL93	36	Prestressed	Service	1.00	0.80	0.600	0.210	Central span, midspan	7.6
Operating	HL93	36	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.330	Central span, midspan	11.9
Permit	FL120	60	Prestressed	Strength, Shear	1.25/0.90	1.35	0.500	0.270	Central span, 1/4 point	16.2
Permit Max Span	FL120	60	Prestressed	Strength, Shear	1.25/0.90	1.35	0.500	0.270	Central span, 1/4 point	16.2
Legal	SU2	17	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.690	Central span, midspan	11.7
	SU3	33	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.370	Central span, midspan	12.2
	SU4	35	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.340	Central span, midspan	11.9
	C3	28	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.650	Central span, midspan	18.2
	C4	36.7	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.460	Central span, midspan	16.9
	C5	40	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.440	Central span, midspan	17.6
	ST5	40	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.460	Central span, midspan	18.4
Emergency Vehicle (EV)	EV2	28.75	Prestressed	NA	NA	NA	0.600			-1
	EV3	43	Prestressed	NA	NA	NA	0.600			-1

Original Design Load	HS20 or HS20-S16-44	
Rating Type, *Analysis*	LRFR-LRFD	
Distribution Method	Others	
Impact Factor	33.0%	(axle loading)
FL120 Gov. Span Length	38.3	(feet)
Minimum Span Length	28.3	(feet)
Recommended Posting	> 39.9% below (0.000-0.600) (Required)	
Recommended SU Posting*	11	(tons)
Recommended C Posting	16	(tons)
Recommended ST5 Posting	18	(tons)
Owner	02 County Highway Agency	
Location	Neither interstate traffic nor within 1 mile reasonable access to an interstate	
EV Posting	No. EV posting is not recommended. The FAST Act does not apply	
Floor Beam Present?	No	
Segmental Bridge?	No	
Project No. & Reason	432907-1-72-02	Deterioration
Plans Status	Built	

Performed by:	Mengyuan Chen	Date:	01/13/20
Checked by:	Juan A. Sobrino	Date:	01/13/20
Sealed By:	Juan A. Sobrino	Date:	01/13/20
FL P.E. No.:	73121		
Cert. Auth. No.:	27244		
Phone & email:	(+1) 305 648 00 10, miami@pedelta.om		
Company:	Pedelta Inc.		
Address:	2000 Ponce de Leon Blvd., Suite 624, Coral Gables, Florida 33134, USA		

P.E. Seal, Comments by the Engineer

Juan Sobrino

Digitally signed by Juan Sobrino
Date: 2020.01.13 15:58:25 -05'00'

Juan A. Sobrino, State of Florida, Professional Engineer, License No 73121.
This document has been electronically signed and sealed by Juan A. Sobrino on January 13th, 2020 using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

This 10-11-2019 summary follows the FDOT Bridge Load Rating Manual (BLRM), and the FDOT BMS Coding Guide.
*Recommended SU Posting levels for Florida SU trucks adequately restricts AASHTO SU trucks; see BLRM Chapter 7.

fdot.gov/maintenance/LoadRating.shtm

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR/Bridge Profile Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 5/18/2020

Description

Structure Unit Identification

Bridge/Unit Key: 874294 0
Structure Name:
Description: SPANS 1 THRU 3
Type: M - Main

Roadway Identification

NBI Structure No (8): 874294
Position/Prefix (5): 1 - Route On Structure
Kind Hwy (Rte Prefix): 4 County Hwy
Design Level of Service: 8 Service Road
Route Number/Suffix: 00000 / 0 N/A (NBI)
Feature Intersect (6): Matheson Hammock Canal
Critical Facility: Not Defense-crit
Facility Carried (7): Matheson Hmk Road
Mile Point (11): 0.08
Latitude (16): 025d40'44.2" Long (17): 080d15'43.8"

Roadway Traffic and Accidents

Lanes (28): 2 Medians: 0 Speed: 15 mph
ADT Class: 2 ADT Class 2
Recent ADT (29): 736 Year (30): 2014
Future ADT (114): 1168 Year (115): 2036
Truck % ADT (109): 1
Detour Length (19): 99 mi
Detour Speed:
Accident Count: -1 Rate:

Roadway Classification

Nat. Hwy Sys (104): 0 Not on NHS
National base Net (12): 0 - Not on Base Network
LRS Inventory Rte (13a): 87 000 757 Sub Rte (13b): 00
Functional Class (26): 09 Rural Local
Federal Aid System: OFF
Defense Hwy (100): 0 Not a STRAHNET hwy
Direction of Traffic (102): 2 2-way traffic
Emergency: X

Roadway Clearances

Vertical (10): 99.99 ft Appr. Road (32): 26.25 ft
Horiz. (47): 26.25 ft Roadway (51): 26.25 ft
Truck Network (110): 0 Not part of natl netwo
Toll Facility (20): 3 On free road
Fed. Lands Hwy (105): 0 N/A (NBI)
School Bus Route:
Transit Route:

NBI Project Data

Proposed Work (075A): Not Applicable (P)
Work To Be Done By (075B): Not Applicable (P)
Improvement Length (076): 0 ft

Improvement Cost (094): $ 0.00
Roadway Improvement Cost (095): $ 0.00
Total Cost (096): $ 0.00
Year of Estimate (097):

NBI Rating

Channel (61): 6 Bank Slumping
Deck (58): 3 Serious
Superstructure (59): 3 Serious
Substructure (60): 4 Poor

Culvert (62): N N/A (NBI)
Waterway (71): 8 Equal Desirable
Unrepaired Spalls: -1 sq.ft.
Review Required: X

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR/Bridge Profile Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 5/18/2020

Structure Identification

Admin Area: Miami-Dade
District (2): D6 - Miami
County (3): (87)Miami-Dade
Place Code (4): South Miami Heights
Location (9): Matheson Hammock Park
Border Br St/Reg (98): Not Applicable (P) Share: 0 %
Border Struct No (99):
FIPS State/Region (1): 12 Florida Region 4-Atlanta
NBIS Bridge Len (112): Y - Meets NBI Length

Parallel Structure (101): No || bridge exists
Temp. Structure (103): Not Applicable (P)
Maint. Resp. (21): 2 County Hwy Agency
Owner (22): 2 County Hwy Agency
Historic Signif. (37): 5 Not eligible for NRHP

Geometrics

Spans in Main Unit (45): 3
Approach Spans (46): 0
Length of Max Span (48): 38.3 ft
Structure Length (49): 100.33 ft
Total Length: 140.33 ft
Deck Area: 3536 sqft
Structure Flared (35): 0 No flare

Age and Service

Year Built (27): 1967
Year Reconstructed (106): 0
Type of Service On (42a): 5 Highway-pedestrian
Under (42b): 5 Waterway
Fracture Critical Details: Not Applicable

Structure Type and Material

Curb/Sidewalk (50): Left: 1.5 ft Right: 5.5 ft
Bridge Median (33): 0 No median
Main Span Material (43A): 5 Prestressed Concrete
Appr Span Material (44A): Not Applicable (P)
Main Span Design (43B): 01 Slab
Appr Span Design (44B): 00 Other (NBI)

Deck Type and Material

Deck Width (52): 35.25 ft
Skew (34): 0 deg
Deck Type (107): 2 Concrete Precast Panel
Surface (108): 6 Bituminous
Membrane: 0 None
Deck Protection: None

Appraisal

Structure Appraisal

Open/Posted/Closed (41): P Posted for load
Deck Geometry (68): 5 Above Tolerable
Underclearances (69): N Not applicable (NBI)
Approach Alignment (72): 8-No Speed Red thru Curv
Bridge Railings (36a): 0 Substandard
Transitions (36b): 0 Substandard

Approach Guardrail (36c): 0 Substandard
Approach Guardrail Ends (36d): 0 Substandard
Scour Critical (113): U Unknown Foundation

Navigation Data

Navigation Control (38): Permit Not Required
Nav Vertical Clr (39): 0 ft
Nav Horizontal Clr (40): 0 ft
Min Vert Lift Clr (116): 0 ft
Pier Protection (111): 1 Not Required

NBI Condition Rating

Sufficiency Rating: 15.5
Health Index: 86.68
Structural Eval (67): 3 Intolerable - Correct
Deficiency: Structurally Deficient

Minimum Vertical Clearance

Over Structure (53): 99.99 ft
Under (reference) (54a): N Feature not hwy or RR
Under (54b): 0 ft

Minimum Lateral Underclearance

Reference (55a): N Feature not hwy or RR
Right Side (55b): 0 ft
Left Side (56): 0 ft

Schedule

Current Inspection

Inspection Date: 04/06/2020
Inspector: KNMEIOP - Omar Porras
Bridge Group: CA611
Alt. Bridge Group:
Primary Type: Regular NBI
Review Required: X

Next Inspection Date Scheduled

NBI: 04/06/2022
Element: 10/06/2020
Fracture Critical:
Underwater: 04/06/2022
Other/Special: 10/06/2020
Inventory Photo Update Due: 04/06/2024

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR/Bridge Profile Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 5/18/2020

Schedule Cont.

Inspection Types Performed NBI [X] Element [X] Fracture Critical [ ] Underwater [X] Other Special [X]

Inspection Intervals	Required (92)	Frequency (92)	Last Date (93)		Inspection Resources	
Fracture Critical	[ ]	mos			Crew Hours:	4
Underwater	[X]	24 mos	04/06/2020		Flagger Hours:	0
Other Special	[X]	6 mos	04/06/2020		Helper Hours:	0
NBI		24 mos (91)	04/06/2020	(90)	Snooper Hours:	0
					Special Crew Hours:	3
					Special Equip Hours:	0

Bridge Related

General Bridge Information

Parallel Bridge Seq:
Channel Depth: 10.6 ft
Radio Frequency: -1
Phone Number:
Exception Date:
Exception Type: Unknown
Accepted By Maint: 01/01/1967
Warranty Expiration: 00/00/0000
Performance Rating: Poor

Bridge Rail 1: Conc parapet-alum-rail
Bridge Rail 2: Not applicable-No rail
Electrical Devices: No electric service
Culvert Type: Not applicable
Maintenance Yard: Not FDOT Maintained
FIHS ON / OFF: No Routes on FIHS
Previous Structure:
2nd Previous Structure:
Replacement Structure:

Permitted Utilities: Power [ ] Water [X] Gas [ ] Fiber Optic [ ] Sewage [X] Other [ ]

Bridge Load Rating Information

Inventory Type (065): 3 LRFR Load & Res. Fact
Operating Type (063): 3 LRFR Load & Res. Fact
Original Design Load (031): HL 93
Date: 01/13/2020
Initials: JA
Load Rating Rev. Recom.: No
Load Rating Plans Status: Field Measurements

Inventory Rating (066): 7.6 tons
Operating Rating (064): 11.9 tons
FL120 Permit Rating: 16.2 tons
HS20/FL120 Max Span Rating: 16.2 tons
Dynamic Impact in Percent: 33 %
Governing Span Length: 38.3 ft
Minimum Span Length: 28.3 ft
Distribution Method: Others

Load Rating Notes:

LEGAL LOADS

SU2: 11.7 tons
SU3: 12.2 tons
SU4: 11.9 tons
C3: 18.2 tons
C4: 16.9 tons
C5: 17.6 tons
ST5: 18.4 tons
Posting (070): 2 20.0-29.9%below
Open/Posted/Closed (041): P Posted for load

POSTING

Recom. SU Posting: 11 tons
Recom. C Posting: 16 tons
Recom. ST5 Posting: 18 tons
Actual SU Posting: 11 tons
Actual C Posting: 16 tons
Actual ST5 Posting: 18 tons
Actual Blanket Posting: 99 tons
Emergency Vehicle: 1 EV inapplicable

FLOOR BEAM (FB) FB Present: No

FB Span Length, Gov: 0.0 ft
FB Spacing, Gov: 0.0 ft
FB OPR Rating: 0.0 tons
FB SU4 OPR Rating: 0.0 tons
FB FL120 Rating: 0.0 tons

SEGMENTAL (SEG)

SEG Wing-Span: -1.0 ft
SEG Web-to-Web Span: -1.0 ft
SEG Transverse HL93 Operating: -1.00 RF

Bridge Scour and Storm Information

Pile Driving Record: No pile driving records
Foundation Type: Unknown
Mode of Flow: Tidal
Rating Scour Eval: Unknown
Highest Scour Eval: Unknown
Scour Evaluation Method:

Scour Recommended I: Unknown
Scour Recommended II: Unknown
Scour Recommended III: Unknown
Scour Elevation: -1 ft
Action Elevation: -1 ft
Storm Frequency: -1

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR/Bridge Profile Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 5/18/2020

Elements

Inspection Date: 04/06/2020 **GZJW**

DECKS : Decks/Slabs

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8099 / 3	PS Conc Slab (Sonovoid)	3178	89.88	114	3.22	244	6.9	0	.	3536 (SF)
0	1080 / 3	Delamination/Spall/Patched Area	0	.	114	59.07	79	40.93	0	.	193 (SF)
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 (SF)
0	1100 / 3	Exposed Prestressing	0	.	0	.	20	100	0	.	20 (SF)
0	1110 / 3	Cracking (PSC)	0	.	0	.	144	100	0	.	144 (SF)
0	510 / 3	Wearing Surfaces	1929	73.23	0	.	705	26.77	0	.	2634 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	705	100	0	.	705 sq.ft

DECKS : Joints

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	301 / 3	Pourable Joint Seal	0	.	0	.	104	74.29	36	25.71	140 ft
0	2310 / 3	Leakage	0	.	0	.	104	100	0	.	104 ft
0	2330 / 3	Seal Damage	0	.	0	.	0	.	36	100	36 ft

MISCELLANEOUS : Channel

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8290 / 3	Channel	0	.	0	.	1	100	0	.	1 (EA)
0	9150 / 3	Bank Erosion	0	.	0	.	1	100	0	.	1 (EA)

MISCELLANEOUS : Other Elements

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	321 / 3	Re Conc Approach Slab	1410	100	0	.	0	.	0	.	1410 sq.ft
0	510 / 3	Wearing Surfaces	957	91.14	0	.	93	8.86	0	.	1050 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	93	100	0	.	93 sq.ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	205 / 3	Re Conc Column	0	.	0	.	4	100	0	.	4 each
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 each
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	3	100	0	.	3 each

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	215 / 3	Re Conc Abutment	65	92.86	0	.	5	7.14	0	.	70 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	0	.	5	100	0	.	5 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	234 / 3	Re Conc Pier Cap	49	72.06	12	17.65	7	10.29	0	.	68 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	12	63.16	7	36.84	0	.	19 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8393 / 3	Bulkhead Seawall Any Material	0	.	0	.	354	100	0	.	354 ft
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	314	100	0	.	314 ft

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005 **Inspection/CIDR/Bridge Profile Report with PDF attachment(s)**

Structure ID: 874294 **CIDR** **DATE PRINTED: 5/18/2020**

0	6000 / 3	Scour	0	.	0	.	40	100	0	.	40 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8394 / 3	R/Conc Abut Slope Protection	3968	73.81	0	.	1408	26.19	0	.	5376 (SF)
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	320	100	0	.	320 (SF)
0	4000 / 3	Settlement	0	.	0	.	1088	100	0	.	1088 (SF)

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	333 / 3	Other Bridge Railing	167	83.5	33	16.5	0	.	0	.	200 ft
0	1000 / 3	Corrosion	0	.	30	100	0	.	0	.	30 ft
0	1020 / 3	Connection	0	.	3	100	0	.	0	.	3 ft

Total Number of Elements*: 10
*excluding defects/protective systems

Inspection Information

Inspection Date: 04/06/2020 **Type:** Regular NBI

Inspector: KNMEIOP - Omar Porras

Inspection Notes: Sufficiency Rating Calculation Accepted by knmeira at 5/13/2020 9:36:35 AM

The Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (04/06/2020)

The Substructure NBI Rating is coded 4 (Poor) due to the significant deterioration of Column 2-2. (04/06/2020)

The Channel NBI Rating was lowered from 7 to 6 due to areas of undermining on the channel below the North seawall. (04/06/2020)

LOAD CAPACITY EVALUATION:
Since the current load rating dated 1/13/2020, there is no indication that deterioration, geometric changes or additional dead load have occurred that would warrant a new load rating analysis. This only applies to this inspection dated 04/06/2020 per Julie A.Vers, P.E.

The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure.

Element 8475 R/Conc Walls was replaced by 8393 Bulkhead Seawall Any Material during this inspection cycle. All previous notes were transferred accordingly. (04/06/2020)

The following elements were inspected underwater by the divers:
8290 Channel
8393 Bulkhead Seawall Any Material

LEGEND:
NCAR: NO CORRECTIVE ACTION RECOMMENDED.
RT: Right
LT: Left
NC: No Change
INC: Increase
CAT: Corrective Action Taken
L: Long
W: Wide
H: High
D: Deep
UW: Underwater
S.L.: Section Loss
in.: Inches
ft.: Feet

Structure Notes

BRIDGE OWNER: MIAMI-DADE COUNTY

Bridge inventoried from south to north.

P/S Slab Units on R/Conc Caps and Abutments over P/Conc Columns. (3 spans)

Element 227/3 Re Conc Pile notes have been replaced by Element 205/3 Re Conc Column on 10/29/2019.

TRAFFIC RESTRICTIONS:
Based on the current load rating analysis dated 1/13/2020, it is recommended that this bridge be posted for the SU, C and ST5 type vehicles as follows: SU = 11 tons, C = 16 tons, ST5 = 18 tons. The bridge is currently posted for SU = 11 tons, C = 16 tons, ST5 = 18 tons. Refer to posting signs Photos 33 and 34.

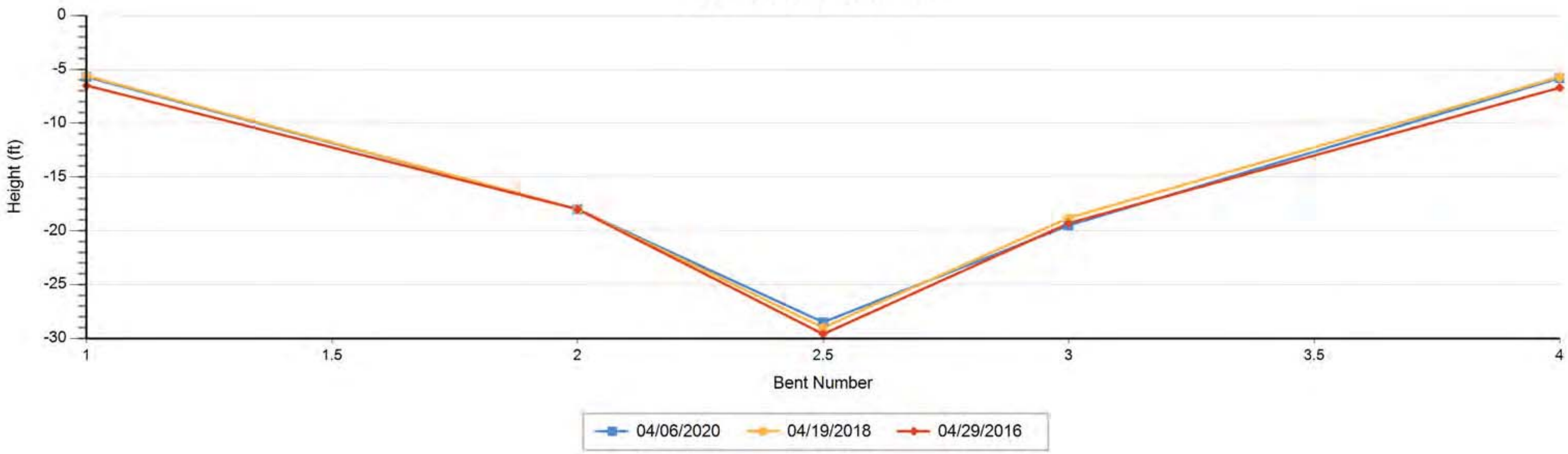
REVIEWED BY:

Schedule Notes

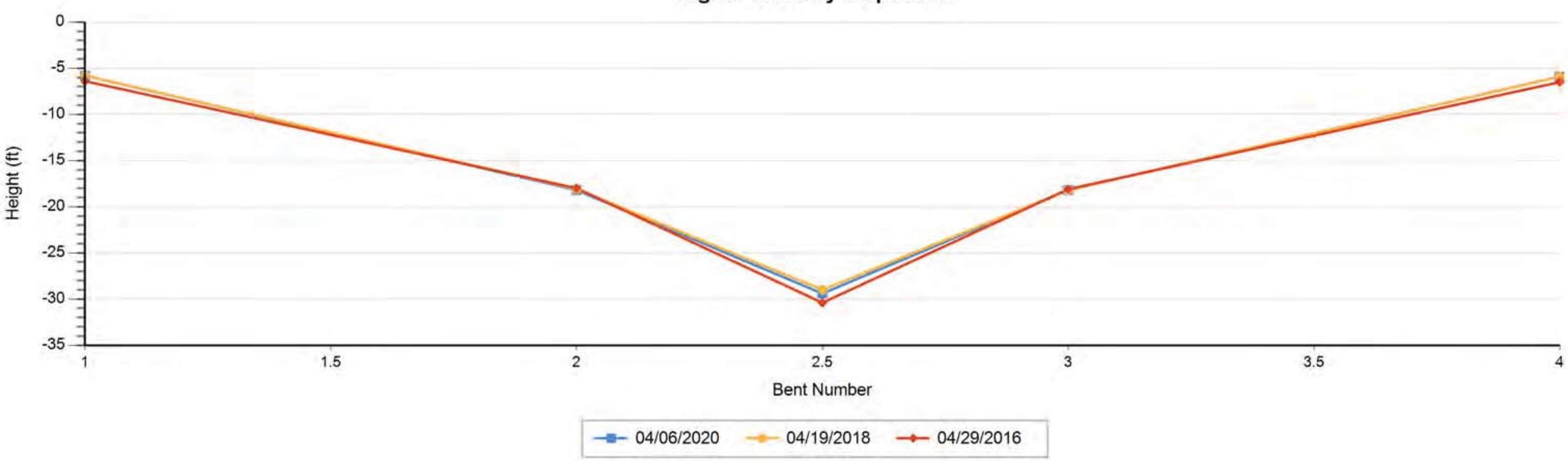
The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure.

FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Bridge Profile

Left Profile by Inspection



Right Profile by Inspection



REPORT ID : INSP005
Structure ID : 874294

FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Bridge Profile

DATE PRINTED: 5/18/2020 12:12:35 PM

Profile Data - Numerical Summary

(All Heights are in Feet)

Inspection Date and Key: 4/6/2020 GZJW

Bent #	Left Height	Right Height
1	5.70	5.80
2	18.00	18.20
2.5	28.50	29.40
3	19.50	18.20
4	5.80	5.90

Air Temp: 82
Profile Notes:

Measurements were referenced from the top of the concrete barriers.
Waterline taken at mid channel: Left = 18.7 ft. and Right = 18.8 ft.
Maximum channel depth: 10.6 ft.

Inspection Date and Key: 4/19/2018 ODLG

Bent #	Left Height	Right Height
1	5.60	5.80
2	18.00	18.10
2.5	29.00	29.00
3	18.80	18.20
4	5.70	5.90

Air Temp: 74
Profile Notes:

Measurements were referenced from the top of the concrete barriers.
Waterline taken at mid channel: Left = 18.3 ft. and Right = 18.4 ft.
Maximum channel depth: 10.7 ft.

FLORIDA DEPARTMENT OF TRANSPORTATION BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR/Bridge Profile Report with PDF attachment(s)
Bridge Profile

DATE PRINTED: 5/18/2020 12:12:35 PM

Profile Data - Numerical Summary

(All Heights are in Feet)

Inspection Date and Key: 4/29/2016 MQSY

Bent #	Left Height	Right Height
1	6.50	6.40
2	18.00	18.00
2.5	29.60	30.40
3	19.30	18.10
4	6.70	6.50

Air Temp: 1

Profile Notes:

Measurements referenced from the top of the concrete bridge rail.
Waterline at C/L of Channel = 19.2ft.
Water depth = 11.2ft.

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Bridge Number - 4/25/2014

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
STRUCTURE LEVEL INVENTORY REPORT

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Typical Bridge Rail - 4/25/2014

Southeast Oncoming Transition - 4/25/2014

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
STRUCTURE LEVEL INVENTORY REPORT

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Northwest Oncoming Transition - 4/25/2014

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Southwest Off-Going Transition - 4/25/2014

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
STRUCTURE LEVEL INVENTORY REPORT

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Northeast Off-Going Transition - 4/25/2014

BRIDGE ID : 874294

Structure Inventory Photo Due Date : 04/06/2024

South Approach Looking North - 4/25/2014

South Approach Looking South - 4/25/2014

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
STRUCTURE LEVEL INVENTORY REPORT

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

North Approach Looking South - 4/25/2014

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

North Approach Looking North - 4/25/2014

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

West Elevation - 4/25/2014

East Elevation - 4/25/2014

Typical Underside - 4/25/2014

BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Channel Looking West - 4/25/2014

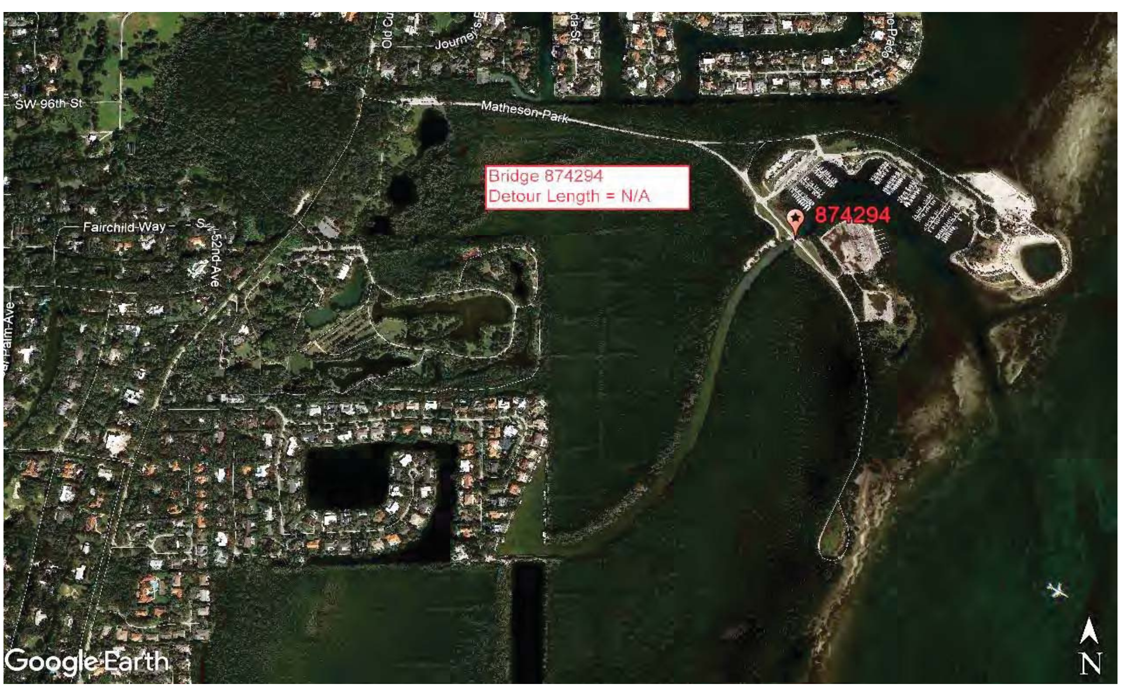
BRIDGE ID : 874294 **Structure Inventory Photo Due Date : 04/06/2024**

Channel Looking East - 4/25/2014

FDOT	**BRIDGE INSPECTION REPORT** PREPARED FOR: FDOT District 6 BRIDGE OWNER: Miami-Dade County INSPECTION TYPE: Interim CONTRACT No. CA611	Inspected by: **LARS Engineering, Inc.**
Bridge No. 874294	**REPORT CONTAINS**	**Inspection Date: 10-22-20**

- ☒ BrM Inspection Report
- ☒ CIDR Information
- ☐ Bridge Profile
- ☐ UW Inspection Report
- ☐ Fracture Critical Data
- ☒ Load Rating Summary Sheet
- ☐ Addendum
- ☐ Mechanical and Electrical Data

Matheson Hammock Road over Matheson Hammock Canal	**Facility Carried & Location**	**Matheson Hammock Park**



Location Map		**Detour Length = 3.13 mi.**

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

BY:	LARS Engineering, Inc.	STRUCTURE NAME:	Not recorded
OWNER:	2 County Hwy Agency	YEAR BUILT:	1967
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	87 000 757
STRUCTURE TYPE:	5 Prestressed Concrete - 01 Slab	MP:	0.080
LOCATION:	Matheson Hammock Park	ROUTE:	00000
SERV. TYPE ON:	5 Highway-pedestrian	FACILITY CARRIED:	Matheson Hmk Road
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Matheson Hammock Canal

☐ FUNCTIONALLY OBSOLETE ☒ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Interim

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 10/22/2020 UNDERWATER: 4/6/2020

SUFFICIENCY RATING: 15.5
HEALTH INDEX: 85.67

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 — **Inspection**

DISTRICT: D6 - Miami — **INSPECTION DATE: 10/22/2020 MIGV**

BY:	LARS Engineering, Inc.	STRUCTURE NAME:	Not recorded
OWNER:	2 County Hwy Agency	YEAR BUILT:	1967
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	87 000 757
STRUCTURE TYPE:	5 Prestressed Concrete - 01 Slab	MP:	0.080
LOCATION:	Matheson Hammock Park	ROUTE:	00000
SERV. TYPE ON:	5 Highway-pedestrian	FACILITY CARRIED:	Matheson Hmk Road
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Matheson Hammock Canal

[ ] THIS BRIDGE CONTAINS FRACTURE CRITICAL COMPONENTS

[ ] THIS BRIDGE IS SCOUR CRITICAL

[X] THIS REPORT IDENTIFIES DEFICIENCIES WHICH REQUIRE PROMPT CORRECTIVE ACTION

[ ] FUNCTIONALLY OBSOLETE [X] STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Interim

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 10/22/2020 UNDERWATER: 4/6/2020

OVERALL NBI RATINGS:

DECK:	3 Serious	CHANNEL:	6 Bank Slumping
SUPERSTRUCTURE:	3 Serious	CULVERT:	N N/A (NBI)
SUBSTRUCTURE:	4 Poor	SUFF. RATING:	15.5
PERF. RATING:	Poor	HEALTH INDEX:	85.67

FIELD PERSONNEL / TITLE / NUMBER:	INITIALS
Marquez, Loren - Professional Engineer (P.E. # 85631) (lead)	________
Lledias, Jorge - Bridge Inspector Assistant	________

REVIEWING BRIDGE INSPECTION SUPERVISOR:

Leon, Adrian - Professional Engineer (P.E. #83827) ________

CONFIRMING REGISTERED PROFESSIONAL ENGINEER:

Marquez, Loren - Professional Engineer (P.E. # 85631) LARS Engineering, Inc.
7225 NW 25th Street
Suite 211
Miami Florida 33122

SIGNATURE: ______________________

DATE: ______________________

The official record of this package has been electronically signed and sealed by Loren Marquez, P.E. on the date adjacent to the seal as required by Rule 61G15-23.004, F.A.C. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

All Elements

DECKS : Decks/Slabs

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8099 / 3	PS Conc Slab (Sonovoid)	3122	88.29	5	0.14	409	11.57	0	.	3536 (SF)
0	1080 / 3	Delamination/Spall/Patched Area	0	.	5	45.45	6	54.55	0	.	11 (SF)
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 (SF)
0	1100 / 3	Exposed Prestressing	0	.	0	.	20	100	0	.	20 (SF)
0	1110 / 3	Cracking (PSC)	0	.	0	.	292	100	0	.	292 (SF)
0	1900 / 3	Distortion	0	.	0	.	90	100	0	.	90 (SF)
0	510 / 3	Wearing Surfaces	1629	61.85	0	.	1005	38.15	0	.	2634 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	1005	100	0	.	1005 sq.ft

Element Inspection Notes:

8099/3 Notes: The top of the slab units is not visible due to an asphalt overlay. The width of the sonovoid slab units was field verified to be 3ft. wide.

SECONDARY:
_Object markers and centerline raised pavement markers are missing on the structure. (14 SF). - NO CHANGE. Refer to Photo 01.

_Sidewalk panels are loose and move under pedestrian load. (300 SF). - NO CHANGE.

_The slab unit joints show evidence of water seepage. - NO CHANGE. NCAR.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
1_Replace missing object markers at the four corners of the bridge.
2_Properly secure the sidewalk panels.
3_Repair spalls, delaminations, and cracks along the underside of the slab units.
4_Clean and coat exposed prestressing and reinforce Slab Unit 2-8.

CORRECTIVE ACTION EVALUATION:
1_Work not completed. Recommendation will be repeated.
2_Work not completed. Recommendation will be repeated.
3_Work not completed. Recommendation will be repeated.
4_Work not completed. Recommendation will be repeated.

For additional deficiencies refer to Defects 1080, 1090, 1100, 1110, and 1900.

1080/3 CS-3:
_Slab Unit 1-9, center line has a spall/delamination up to 36in. L x 24in. W x 2.5in. D over Abutment 1, with an exposed stirrup. (6 SF). - INCREASE. Refer to Photo 02.

CS-2:
_Slab Unit 2-6, east edge has a delamination 30in. L x 4in. W starting at Pier 2 cap. (3 SF). - NO CHANGE.

_Slab Unit 2-7, west edge has a delamination up to 24in. L x 4in. W starting at Pier 2 cap. (2 SF). - NO CHANGE.

1090/3 CS-3:
_Slab Unit 1-6 exhibits a spall with exposed rebar up to 11in. L x 5in. W x 1/8in. D with minor section loss and evidence of previous failed repair, at 9ft. from Abutment 1. (1

SF). – NO CHANGE. Refer to Photo 03.

1100/3 CS-3:
_Slab Unit 2-8 has a spall 10ft. L x 24in. W x up to 4in. D at mid-span with 6 exposed and corroded transverse rebars with up to 60% section remaining and 5 exposed and corroded prestressing strands with up to 0% section remaining (2 broken threads). (20 SF). – NO CHANGE. Refer to Photo 04.

1110/3 CS-3:
_Slab Unit 1-6 east edge has two delamination areas, one up to 5ft. L x 6in. W starting at Abutment 1 and the other starting at Pier Cap 2 up to 9ft. L x 12in. W with associated cracks up to 1/16in. W with efflorescence throughout. (Previously noted as a delamination full length x 12in. W.) (14 SF). – DECREASE. Refer to Photos 05 and 06.

_Slab Unit 1-7 east edge has a spall/delamination 24in. L x 12in. W with associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out over Abutment 1. (2 SF). – NO CHANGE. Refer to Photo 07.

_Slab Unit 1-7, east edge has a delamination 7ft. L x 4in. W, with an associated crack of up to 1/16in. starting at Pier 2 cap. (7 SF). – INCREASE. Refer to Photo 08.

_Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W starting at Abutment 1 with associated cracks up to 1/4in. W with efflorescence and corrosion bleed-out and associated spalling up to 4ft. L x 6in. W x 2in. D approximately 10ft from Abutment 1. (Spalling was previously noted as spall/delamination on the east edge) (19 SF). – INCREASE. Refer to Photos 09 and 10.

_Slab Unit 1-8 east edge has a delamination 4ft. L x 15in. W and associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out, 9ft. from Pier Cap 2. (Previously noted as spall/delamination near mid-span). (5 SF). – DECREASE. Refer to Photo 11.

_Slab Unit 1-8 has a delaminated area up to 8ft. L x 3ft. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out starting at Pier Cap 2. (24 SF). – INCREASE. Refer to Photo 12.

_Slab Unit 1-9 west edge has a delaminated area 9ft. L x 10in. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out, starting near the 3/4 point and extending to Pier 2 cap. (9 SF). – NO CHANGE. Refer to Photo 13.

_Slab Unit 2-7 east edge is intermittently cracked/delaminated up to span length x 16in. W (average width) with up to 1/4in. W cracks. (38 SF). – NO CHANGE. Refer to Photo 14.

_Slab Unit 2-8 west half has two delaminated areas up to 15ft. L x 18in. W (average width) at south and north ends, with associated cracks of up to 1/4in. W. (60 SF). – NO CHANGE. Refer to Photo 15.

_Slab Unit 2-9 west edge has a delaminated area up to 5ft. L x 5in. W with associated cracking up to 1/4in. wide, starting at the Pier 2 cap. (5 SF). – NO CHANGE.

_Slab Unit 3-6 has a delamination up to 24in. L x 6in. W on the east edge over Pier 3, with an associated crack of up to 1/16in. W. (2 SF). – INCREASE. Refer to Photo 16.

_Slab Unit 3-6 east edge has a delaminated area up to 42in. L x 8in. W with associated cracks up to 1/16in. W. (4 SF). – NEW. Refer to Photo 17.

_Slabs Unit 3-7 has two delaminated areas, one starting at Pier 3 up to 8ft. L x 15in. W (average width) with associated cracks, and the second, near mid-span up to 3ft. L x 30in. W. (25 SF). – NO CHANGE. Refer to Photos 18 and 19.

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_Slab Unit 3-7 has an unsound repaired area 12ft. L x up to slab width (3ft.) starting from Abutment 4 with hollow sounding throughout and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out. (30 SF). – INCREASE. Refer to Photo 20.

_Slab Unit 3-8 has a spall/delamination up to 8ft. L x 3ft. W x 1in. D and associated cracks with corrosion bleed-out starting at Pier 3. (24 SF). – INCREASE. Refer to Photo 21.

_Slab Unit 3-8 has an unsound repair/delamination up to 42in. L x 30in. W with associated cracks up to 1/16in. W with efflorescence starting at Abutment 4. (9 SF). – INCREASE. Refer to Photo 22.

_Slab Unit 3-8 has an unsound repair/delamination up to 74in. L x up to slab width (3ft.) with associated cracks up to 1/16in. W with efflorescence starting 5.5ft. from Abutment 4. (15 SF). – INCREASE. Refer to Photo 23.

1900/3 CS-3:
_Slab Unit 1-1 exhibits a slight outward rotation at Abutment 1 with up to 1/4in. height difference in reference to the top of the cap, potentially indicating shear key failure. (90 SF). – NO CHANGE. Refer to Photo 24.

510/3 PREVIOUS RECOMMENDED CORRECTIVE ACTION:
1_Monitor the slab units for independent movement.
2_Repair cracks on the asphalt along the slab unit joints.
3_Clean and repair cracks and rutting along the expansion joints.

CORRECTIVE ACTION EVALUATION:
1_Work not completed. Recommendation will be repeated.
2_Work not completed. Recommendation will be repeated.
3_Work not completed. Recommendation will be repeated.

For deficiencies refer to Defect 3220.

3220/3 CS-3:
_The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated 1in. W rutting over the slab unit joints and upheaving up to 1in. H at the shoulders, possibly indicating independent slab unit movement. (600 SF). – NO CHANGE. Refer to Photos 25 and 26.

_The asphalt overlay at Spans 1 and 2 has multi-directional cracking up to 1/2in. W on Lane 2 (NB), worse condition is on Span 1 which has a 19.5ft L x 11ft. W area with hollow-sounding starting 1 ft. from the right sidewalk. (300 SF). – NEW. Refer to Photo 27.

_The asphalt overlay has transverse cracks up to roadway width x 1/4in. W with rutting and upheaving up to 3in. W and vegetation growth over the expansion joints. (105 SF). – NO CHANGE. Refer to Photo 28.

Total Number of Elements*: 1
*excluding defects/protective systems

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

Inspector Recommendations

UNIT: 0 **DECKS**

ELEMENT/ENV: 8099 / 3 PS Conc Slab (Sonovoid) **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
1 , 2 , 3	MMS Quantity: 14 sf Element Estimated Quantity: 14 (SF)	3

WORK ORDER RECOMMENDATION:

_Replace missing object markers at the four corners of the bridge and provide missing RPMs throughout the bridge. Refer to Photo 01.

1 , 2 , 3	MMS Quantity: 300 sf Element Estimated Quantity: 300 (SF)	3

WORK ORDER RECOMMENDATION:

_Properly secure the sidewalk panels.

ELEMENT/ENV: 8099:510:3220 / 3 Crack (Wearing Surface) **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
3	MMS Quantity: 900 sf Element Estimated Quantity: 900 sq.ft	3

WORK ORDER RECOMMENDATION:

_Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2. Refer to Photos 25, 26, and 27.

3	MMS Quantity: 105 sf Element Estimated Quantity: 105 sq.ft	3

WORK ORDER RECOMMENDATION:

_Clean and seal cracks and rutting along the expansion joints. Refer to Photo 28.

3	MMS Quantity: 600 sf Element Estimated Quantity: 600 sq.ft	3

WORK ORDER RECOMMENDATION:

_Monitor cracks along slab unit joints for independent movement of the slab units. Refer to Photos 25 and 26.

ELEMENT/ENV: 8099:1080 / 3 Delamination/Spall/Patched Area **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
2 , 3	MMS Quantity: 303 sf Element Estimated Quantity: 303 (SF)	3

WORK ORDER RECOMMENDATION:

_Repair spalls, delaminations, and cracks along the underside of the slab units. Refer to Photos 02 and 05 through 23.

ELEMENT/ENV: 8099:1090 / 3 Exposed Rebar **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
3	MMS Quantity: 1 sf Element Estimated Quantity: 1 (SF)	3

WORK ORDER RECOMMENDATION:

_Clean and coat exposed rebar and repair spall along the underside of slab unit 1-6, 9ft. from Abutment 1. Refer to Photo 03.

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Inspector Recommendations

UNIT: 0 **DECKS**

ELEMENT/ENV: 8099:1100 / 3 Exposed Prestressing **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE			PRIORITY
3	MMS Quantity: 20 sf	Element Estimated Quantity: 20 (SF)	3

WORK ORDER RECOMMENDATION:

_Clean and coat exposed prestressing and reinforce Slab Unit 2-8. Refer to Photo 04.

ELEMENT/ENV: 8099:1900 / 3 Distortion **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE			PRIORITY
3	MMS Quantity: 90 sf	Element Estimated Quantity: 90 (SF)	3

WORK ORDER RECOMMENDATION:

_Monitor slab unit 1-1 for possible independent movement on the slab unit. Refer to Photo 24.

Structure Notes

BRIDGE OWNER: MIAMI-DADE COUNTY

Bridge inventoried from south to north. (Entrance on North end, boat ramp on South end).

P/S Slab Units on R/Conc Caps and Abutments over P/Conc Columns. (3 spans)

Element 227/3 Re Conc Pile notes have been replaced by Element 205/3 Re Conc Column on 10/29/2019.

Element 8475/3 R/Conc Walls notes have been replaced by Element 8393/3 Bulkhead Seawall Any Material on 04/06/2020.

The NBI Rating for Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (04/06/2020).

The Substructure NBI Rating is coded 4 (Poor) due to the significant deterioration of Column 2-2. (04/06/2020).

The Channel NBI Rating was lowered from 7 to 6 due to areas of undermining on the channel below the North seawall. (04/06/2020).

TRAFFIC RESTRICTIONS:
Based on the current load rating analysis dated 1/13/2020, it is recommended that this bridge be posted for the SU, C and ST5 type vehicles as follows: SU = 11 tons, C = 16 tons, ST5 = 18 tons. The bridge is currently posted for SU = 11 tons, C = 16 tons, ST5 = 18 tons. Refer to posting signs Photos 29 and 30.

REVIEWED BY:

FLORIDA DEPARTMENT OF TRANSPORTATION
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DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

INSPECTION NOTES: **MIGV** **10/22/2020**

Sufficiency Rating Calculation Accepted by KNLREJP at 11/18/2020 2:56:35 PM

This Interim inspection (10/22/2020) was conducted to evaluate Element 8099 PS Conc Slab (Sonovoid), for the status of the entire structure refer to the last Regular NBI Inspection (04/06/2020).

LOAD CAPACITY EVALUATION:
Since the current load rating dated 1/13/2020, there is no indication that deterioration, geometric changes or additional dead load have occurred that would warrant a new load rating analysis. This only applies to this inspection dated 10/22/2020 per Loren Marquez, P.E.

The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure.

The Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (10/22/2020).

LEGEND:
NCAR: NO CORRECTIVE ACTION RECOMMENDED
RT: Right
LT: Left
L: Long
W: Wide
H: High
D: Deep
in.: Inches
ft.: Feet
LF: Linear Feet
SF: Square Feet
NE: Northeast
NW: Northwest
SE: Southeast
SW: Southwest

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PHOTO 01: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Object markers and centerline raised pavement markers are missing on the structure.

REPAIR RECOMMENDATION:
Replace missing object markers at the four corners of the bridge and provide missing RPMs throughout the bridge.

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PHOTO 02: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-9, center line has a spall/delamination up to 36in. L x 24in. W x 2.5in. D over Abutment 1, with an exposed stirrup.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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PHOTO 03: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-6 exhibits a spall with exposed rebar up to 11in. L x 5in. W x 1/8in. D with minor section loss and evidence of previous failed repair, at 9ft. from Abutment 1.

REPAIR RECOMMENDATION:
Clean and coat exposed rebar and repair spall along the underside of slab unit 1-6, 9ft. from Abutment 1.

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PHOTO 04: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 2-8 has a spall 10ft. L x 24in. W x up to 4in. D at mid-span with 6 exposed and corroded transverse rebars with up to 60% section remaining and 5 exposed and corroded prestressing strands with up to 0% section remaining (2 broken threads).

REPAIR RECOMMENDATION:
Clean and coat exposed prestressing and reinforce Slab Unit 2-8.

FLORIDA DEPARTMENT OF TRANSPORTATION
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PHOTO 05: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-6 east edge has two delamination areas, one up to 5ft. L x 6in. W starting at Abutment 1 and the other starting at Pier Cap 2 up to 9ft. L x 12in. W with associated cracks up to 1/16in. W with efflorescence throughout.
(Abutment 1 shown).

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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PHOTO 06: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-6 east edge has two delamination areas, one up to 5ft. L x 6in. W starting at Abutment 1 and the other starting at Pier Cap 2 up to 9ft. L x 12in. W with associated cracks up to 1/16in. W with efflorescence throughout.
(Pier Cap 2 shown).

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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PHOTO 07: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-7 east edge has a spall/delamination 24in. L x 12in. W with associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out over Abutment 1.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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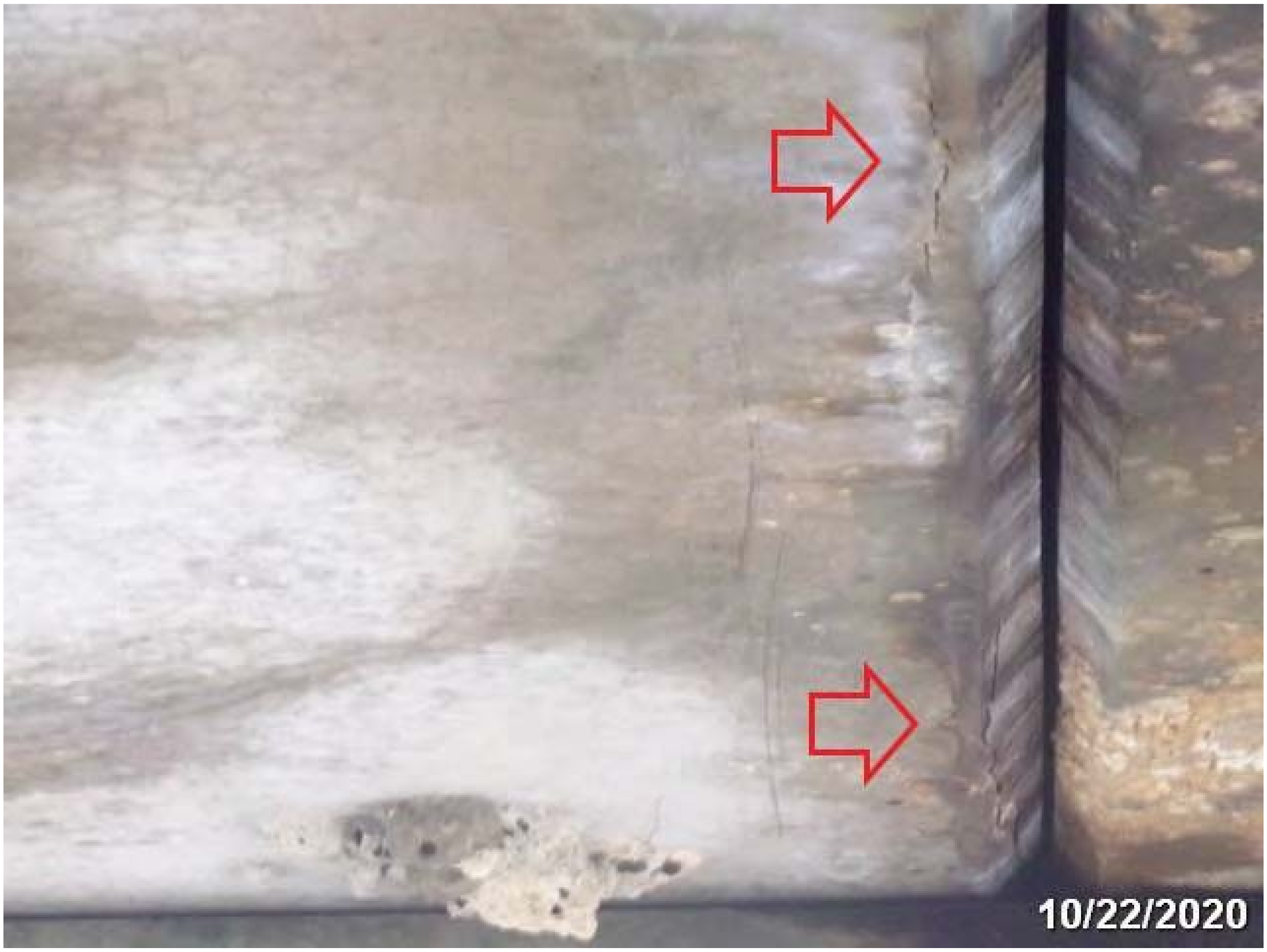

PHOTO 08: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-7, east edge has a delamination 7ft. L x 4in. W, with an associated crack of up to 1/16in. starting at Pier 2 cap.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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PHOTO 09: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W starting at Abutment 1 with associated cracks up to 1/4in. W with efflorescence and corrosion bleed-out and associated spalling up to 4ft. L x 6in. W x 2in. D approximately 10ft from Abutment 1.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 10: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W starting at Abutment 1 with associated cracks up to 1/4in. W with efflorescence and corrosion bleed-out and associated spalling up to 4ft. L x 6in. W x 2in. D approximately 10ft from Abutment 1.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

FLORIDA DEPARTMENT OF TRANSPORTATION
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DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 11: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-8 east edge has a delamination 4ft. L x 15in. W and associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out, 9ft. from Pier Cap 2.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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PHOTO 12: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-8 has a delaminated area up to 8ft. L x 3ft. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out starting at Pier Cap 2.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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PHOTO 13: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-9 west edge has a delaminated area 9ft. L x 10in. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out, starting near the 3/4 point and extending to Pier 2 cap.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 14: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 2-7 east edge is intermittently cracked/delaminated up to span length x 16in. W (average width) with up to 1/4in. W cracks.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 15: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 2-8 west half has two delaminated areas up to 15ft. L x 18in. W (average width) at south and north ends, with associated cracks of up to 1/4in. W.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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Structure ID: 874294 **Inspection**
DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 16: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 3-6 has a delamination up to 24in. L x 6in. W on the east edge over Pier 3, with an associated crack of up to 1/16in. W.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

FLORIDA DEPARTMENT OF TRANSPORTATION
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PHOTO 17: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 3-6 east edge has a delaminated area up to 42in. L x 8in. W with associated cracks up to 1/16in. W.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

PHOTO 18: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slabs Unit 3-7 has two delaminated areas, one starting at Pier 3 up to 8ft. L x 15in. W (average width) with associated cracks, and the second, near mid-span up to 3ft. L x 30in. W.
(Pier 3 shown).

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 19: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slabs Unit 3-7 has two delaminated areas, one starting at Pier 3 up to 8ft. L x 15in. W (average width) with associated cracks, and the second, near mid-span up to 3ft. L x 30in. W.
(Mid-span shown).

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

FLORIDA DEPARTMENT OF TRANSPORTATION
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 20: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 3-7 has an unsound repaired area 12ft. L x up to slab width (3ft.) starting from Abutment 4 with hollow-sounding throughout and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 21: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 3-8 has a spall/delamination up to 8ft. L x 3ft. W x 1in. D and associated cracks with corrosion bleed-out starting at Pier 3.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 22: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 3-8 has an unsound repair/delamination up to 42in. L x 30in. W with associated cracks up to 1/16in. W with efflorescence starting at Abutment 4.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 23: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 3-8 has an unsound repair/delamination up to 74in. L x up to slab width (3ft.) with associated cracks up to 1/16in. W with efflorescence starting 5.5ft. from Abutment 4.

REPAIR RECOMMENDATION:
Repair spalls, delaminations, and cracks along the underside of the slab units.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 24: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

Slab Unit 1-1 exhibits a slight outward rotation at Abutment 1 with up to 1/4in. height difference in reference to the top of the cap, potentially indicating shear key failure.

REPAIR RECOMMENDATION:
Monitor slab unit 1-1 for possible independent movement of the slab unit.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 25: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated 1in. W rutting over the slab unit joints and upheaving up to 1in. H at the shoulders, possibly indicating independent slab unit movement.

REPAIR RECOMMENDATION:
1) Monitor cracks along slab unit joints for independent movement of the slab units.
2) Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2.

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Structure ID: 874294 **Inspection**
DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 26: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated 1in. W rutting over the slab unit joints and upheaving up to 1in. H at the shoulders, possibly indicating independent slab unit movement.

REPAIR RECOMMENDATION:
1) Monitor cracks along slab unit joints for independent movement of the slab units.
2) Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2.

FLORIDA DEPARTMENT OF TRANSPORTATION
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 27: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

The asphalt overlay at Spans 1 and 2 has multi-directional cracking up to 1/2in. W on Lane 2 (NB), worse condition is on Span 1 which has a 19.5ft L x 11ft. W area with hollow-sounding starting 1 ft. from the right sidewalk.

REPAIR RECOMMENDATION:
Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2.

FLORIDA DEPARTMENT OF TRANSPORTATION
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 28: ELEMENT/ENV: 8099/3 PS Conc Slab (Sonovoid)

The asphalt overlay has transverse cracks up to roadway width x 1/4in. W with rutting and upheaving up to 3in. W and vegetation growth over the expansion joints.

REPAIR RECOMMENDATION:
Clean and seal cracks and rutting along the expansion joints.

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Structure ID: 874294 **Inspection**

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PHOTO 29: STRUCTURE NOTES

South Approach Posting Sign.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**
DISTRICT: D6 - Miami **INSPECTION DATE: 10/22/2020 MIGV**

PHOTO 30: STRUCTURE NOTES

North Approach Posting Sign.

Bridge No.	874294	**Analysis Method:** LRFR-LRFD	**FDOT Bridge Load Rating Summary Form (Page 1 of 1)**
Location	Matheson hammock Road over matheson Hammock Canal		
Description	3 Spans, 2-30'&1-40', Prestressed voided slab beams 36"x17"		

Rating Type	Rating Type	Gross Axle Weight (tons)	Moment/Shear/Service		Dead Load Factor	Live Load Factor	Live Load Distrib. Factor (axles)	Rating Factor	Span No. - Girder No., Interior/Exterior, %Span Length	RF·Weight (tons)
Level	**Vehicle**	**Weight**	**Member Type**	**Limit**	**DC**	**LL**	**LLDF**	**RF**	**Governing Location**	**RATING**
Inventory	HL93	36	Prestressed	Service	1.00	0.80	0.600	0.210	Central span, midspan	7.6
Operating	HL93	36	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.330	Central span, midspan	11.9
Permit	FL120	60	Prestressed	Strength, Shear	1.25/0.90	1.35	0.500	0.270	Central span, 1/4 point	16.2
Permit Max Span	FL120	60	Prestressed	Strength, Shear	1.25/0.90	1.35	0.500	0.270	Central span, 1/4 point	16.2
Legal	SU2	17	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.690	Central span, midspan	11.7
	SU3	33	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.370	Central span, midspan	12.2
	SU4	35	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.340	Central span, midspan	11.9
	C3	28	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.650	Central span, midspan	18.2
	C4	36.7	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.460	Central span, midspan	16.9
	C5	40	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.440	Central span, midspan	17.6
	ST5	40	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.460	Central span, midspan	18.4
Emergency Vehicle (EV)	EV2	28.75	Prestressed	NA	NA	NA	0.600			-1
	EV3	43	Prestressed	NA	NA	NA	0.600			-1

Original Design Load	HS20 or HS20-S16-44		Performed by:	Mengyuan Chen	Date:	01/13/20
Rating Type, *Analysis*	LRFR-LRFD		Checked by:	Juan A. Sobrino	Date:	01/13/20
Distribution Method	Others		Sealed By:	Juan A. Sobrino	Date:	01/13/20
Impact Factor	33.0%	(axle loading)	FL P.E. No.:	73121		
FL120 Gov. Span Length	38.3	(feet)	Cert. Auth. No.:	27244		
Minimum Span Length	28.3	(feet)	Phone & email:	(+1) 305 648 00 10, miami@pedelta.com		
Recommended Posting	> 39.9% below (0.000-0.600) (Required)		Company:	Pedelta Inc.		
Recommended SU Posting*	11	(tons)	Address:	2000 Ponce de Leon Blvd., Suite 624, Coral Gables, Florida 33134, USA		
Recommended C Posting	16	(tons)				
Recommended ST5 Posting	18	(tons)				
Owner	02 County Highway Agency					
Location	Neither interstate traffic nor within 1 mile reasonable access to an interstate					
EV Posting	No. EV posting is not recommended. The FAST Act does not apply					
Floor Beam Present?	No					
Segmental Bridge?	No					
Project No. & Reason	432907-1-72-02	Deterioration				
Plans Status	Built					

P.E. Seal, Comments by the Engineer

Juan Sobrino

Digitally signed by Juan Sobrino
Date: 2020.01.13 15:58:25 -05'00'

Juan A. Sobrino, State of Florida, Professional Engineer, License No 73121.
This document has been electronically signed and sealed by Juan A. Sobrino on January 13th, 2020 using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

This 10-11-2019 summary follows the FDOT Bridge Load Rating Manual (BLRM), and the FDOT BMS Coding Guide.
*Recommended SU Posting levels for Florida SU trucks adequately restricts AASHTO SU trucks; see BLRM Chapter 7.

fdot.gov/maintenance/LoadRating.shtm

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 11/24/2020

Description

Structure Unit Identification

Bridge/Unit Key: 874294 0
Structure Name:
Description: SPANS 1 THRU 3
Type: M - Main

Roadway Identification

NBI Structure No (8): 874294
Position/Prefix (5): 1 - Route On Structure
Kind Hwy (Rte Prefix): 4 County Hwy
Design Level of Service: 8 Service Road
Route Number/Suffix: 00000 / 0 N/A (NBI)
Feature Intersect (6): Matheson Hammock Canal
Critical Facility: Not Defense-crit
Facility Carried (7): Matheson Hmk Road
Mile Point (11): 0.08
Latitude (16): 025d40'44.2" Long (17): 080d15'43.8"

Roadway Traffic and Accidents

Lanes (28): 2 Medians: 0 Speed: 15 mph
ADT Class: 2 ADT Class 2
Recent ADT (29): 736 Year (30): 2014
Future ADT (114): 1168 Year (115): 2041
Truck % ADT (109): 1
Detour Length (19): 99 mi
Detour Speed:
Accident Count: -1 Rate:

Roadway Classification

Nat. Hwy Sys (104): 0 Not on NHS
National base Net (12): 0 - Not on Base Network
LRS Inventory Rte (13a): 87 000 757 Sub Rte (13b): 00
Functional Class (26): 09 Rural Local
Federal Aid System: OFF
Defense Hwy (100): 0 Not a STRAHNET hwy
Direction of Traffic (102): 2 2-way traffic
Emergency: X

Roadway Clearances

Vertical (10): 99.99 ft Appr. Road (32): 26.25 ft
Horiz. (47): 26.25 ft Roadway (51): 26.25 ft
Truck Network (110): 0 Not part of natl netwo
Toll Facility (20): 3 On free road
Fed. Lands Hwy (105): 0 N/A (NBI)
School Bus Route:
Transit Route:

NBI Project Data

Proposed Work (075A): Not Applicable (P)
Work To Be Done By (075B): Not Applicable (P)
Improvement Length (076): 0 ft

Improvement Cost (094): $ 0.00
Roadway Improvement Cost (095): $ 0.00
Total Cost (096): $ 0.00
Year of Estimate (097):

NBI Rating

Channel (61): 6 Bank Slumping
Deck (58): 3 Serious
Superstructure (59): 3 Serious
Substructure (60): 4 Poor

Culvert (62): N N/A (NBI)
Waterway (71): 8 Equal Desirable
Unrepaired Spalls: -1 sq.ft.
Review Required: X

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 11/24/2020

Structure Identification

Admin Area:	Miami-Dade
District (2):	D6 - Miami
County (3):	(87)Miami-Dade
Place Code (4):	South Miami Heights
Location (9):	Matheson Hammock Park
Border Br St/Reg (98):	Not Applicable (P) Share: 0 %
Border Struct No (99):	
FIPS State/Region (1):	12 Florida Region 4-Atlanta
NBIS Bridge Len (112):	Y - Meets NBI Length
Parallel Structure (101):	No || bridge exists
Temp. Structure (103):	Not Applicable (P)
Maint. Resp. (21):	2 County Hwy Agency
Owner (22):	2 County Hwy Agency
Historic Signif. (37):	5 Not eligible for NRHP

Geometrics

Spans in Main Unit (45):	3
Approach Spans (46):	0
Length of Max Span (48):	38.3 ft
Structure Length (49):	100.33 ft
Total Length:	140.33 ft
Deck Area:	3536 sqft
Structure Flared (35):	0 No flare

Age and Service

Year Built (27):	1967
Year Reconstructed (106):	0
Type of Service On (42a):	5 Highway-pedestrian
Under (42b):	5 Waterway
Fracture Critical Details:	Not Applicable

Structure Type and Material

Curb/Sidewalk (50):	Left: 1.5 ft Right: 5.5 ft
Bridge Median (33):	0 No median
Main Span Material (43A):	5 Prestressed Concrete
Appr Span Material (44A):	Not Applicable (P)
Main Span Design (43B):	01 Slab
Appr Span Design (44B):	00 Other (NBI)

Deck Type and Material

Deck Width (52):	35.25 ft
Skew (34):	0 deg
Deck Type (107):	2 Concrete Precast Panel
Surface (108):	6 Bituminous
Membrane:	0 None
Deck Protection:	None

Appraisal

Structure Appraisal

Open/Posted/Closed (41):	P Posted for load
Deck Geometry (68):	5 Above Tolerable
Underclearances (69):	N Not applicable (NBI)
Approach Alignment (72):	8-No Speed Red thru Curv
Bridge Railings (36a):	0 Substandard
Transitions (36b):	0 Substandard
Approach Guardrail (36c):	0 Substandard
Approach Guardrail Ends (36d):	0 Substandard
Scour Critical (113):	U Unknown Foundation

Navigation Data

Navigation Control (38):	Permit Not Required
Nav Vertical Clr (39):	0 ft
Nav Horizontal Clr (40):	0 ft
Min Vert Lift Clr (116):	0 ft
Pier Protection (111):	1 Not Required

NBI Condition Rating

Sufficiency Rating:	15.5
Health Index:	85.67
Structural Eval (67):	3 Intolerable - Correct
Deficiency:	Structurally Deficient

Minimum Vertical Clearance

Over Structure (53):	99.99 ft
Under (reference) (54a):	N Feature not hwy or RR
Under (54b):	0 ft

Minimum Lateral Underclearance

Reference (55a):	N Feature not hwy or RR
Right Side (55b):	0 ft
Left Side (56):	0 ft

Schedule

Current Inspection

Inspection Date:	10/22/2020
Inspector:	KNLRELM - Loren Marquez
Bridge Group:	CA611
Alt. Bridge Group:	
Primary Type:	Interim
Review Required:	X

Next Inspection Date Scheduled

NBI:	04/06/2022
Element:	04/06/2021
Fracture Critical:	
Underwater:	04/06/2022
Other/Special:	04/06/2021
Inventory Photo Update Due:	04/06/2024

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 11/24/2020

Schedule Cont.

Inspection Types Performed

NBI [ ] Element [X] Fracture Critical [ ] Underwater [ ] Other Special [X]

Inspection Intervals	Required (92)	Frequency (92)		Last Date (93)	
Fracture Critical	[ ]	mos			
Underwater	[X]	24 mos		04/06/2020	
Other Special	[X]	6 mos		10/22/2020	
NBI		24 mos	(91)	04/06/2020	(90)

Inspection Resources

Crew Hours:	4
Flagger Hours:	0
Helper Hours:	0
Snooper Hours:	0
Special Crew Hours:	3
Special Equip Hours:	0

Bridge Related

General Bridge Information

Parallel Bridge Seq:
Channel Depth: 10.6 ft
Radio Frequency: -1
Phone Number:
Exception Date:
Exception Type: Unknown
Accepted By Maint: 01/01/1967
Warranty Expiration: 00/00/0000
Performance Rating: Poor

Bridge Rail 1: Conc parapet-alum-rail
Bridge Rail 2: Not applicable-No rail
Electrical Devices: No electric service
Culvert Type: Not applicable
Maintenance Yard: Not FDOT Maintained
FIHS ON / OFF: No Routes on FIHS
Previous Structure:
2nd Previous Structure:
Replacement Structure:

Permitted Utilities: Power [ ] Water [X] Gas [ ] Fiber Optic [ ] Sewage [X] Other [ ]

Bridge Load Rating Information

Inventory Type (065): 3 LRFR Load & Res. Fact
Operating Type (063): 3 LRFR Load & Res. Fact
Original Design Load (031): HL 93
Date: 01/13/2020
Initials: JS
Load Rating Rev. Recom.: No
Load Rating Plans Status: Field Measurements

Inventory Rating (066): 7.6 tons
Operating Rating (064): 11.9 tons
FL120 Permit Rating: 16.2 tons
HS20/FL120 Max Span Rating: 16.2 tons
Dynamic Impact in Percent: 33 %
Governing Span Length: 38.3 ft
Minimum Span Length: 28.3 ft
Distribution Method: Others

Load Rating Notes:

LEGAL LOADS

SU2: 11.7 tons
SU3: 12.2 tons
SU4: 11.9 tons
C3: 18.2 tons
C4: 16.9 tons
C5: 17.6 tons
ST5: 18.4 tons
Posting (070): 2 20.0-29.9%below
Open/Posted/Closed (041): P Posted for load

POSTING

Recom. SU Posting: 11 tons
Recom. C Posting: 16 tons
Recom. ST5 Posting: 18 tons
Actual SU Posting: 11 tons
Actual C Posting: 16 tons
Actual ST5 Posting: 18 tons
Actual Blanket Posting: 99 tons
Emergency Vehicle: 1 EV inapplicable

FLOOR BEAM (FB) FB Present: No

FB Span Length, Gov: 0.0 ft
FB Spacing, Gov: 0.0 ft
FB OPR Rating: 0.0 tons
FB SU4 OPR Rating: 0.0 tons
FB FL120 Rating: 0.0 tons

SEGMENTAL (SEG)

SEG Wing-Span: -1.0 ft
SEG Web-to-Web Span: -1.0 ft
SEG Transverse HL93 Operating: -1.00 RF

Bridge Scour and Storm Information

Pile Driving Record: No pile driving records
Foundation Type: Unknown
Mode of Flow: Tidal
Rating Scour Eval: Minimal Risk
Highest Scour Eval: Unknown
Scour Evaluation Method:

Scour Recommended I: Unknown
Scour Recommended II: Unknown
Scour Recommended III: Unknown
Scour Elevation: -1 ft
Action Elevation: -1 ft
Storm Frequency: -1

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 11/24/2020

Elements

Inspection Date: 10/22/2020 **MIGV**

DECKS : Decks/Slabs

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8099 / 3	PS Conc Slab (Sonovoid)	3122	88.29	5	0.14	409	11.57	0	.	3536 (SF)
0	1080 / 3	Delamination/Spall/Patched Area	0	.	5	45.45	6	54.55	0	.	11 (SF)
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 (SF)
0	1100 / 3	Exposed Prestressing	0	.	0	.	20	100	0	.	20 (SF)
0	1110 / 3	Cracking (PSC)	0	.	0	.	292	100	0	.	292 (SF)
0	1900 / 3	Distortion	0	.	0	.	90	100	0	.	90 (SF)
0	510 / 3	Wearing Surfaces	1629	61.85	0	.	1005	38.15	0	.	2634 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	1005	100	0	.	1005 sq.ft

DECKS : Joints

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	301 / 3	Pourable Joint Seal	0	.	0	.	104	74.29	36	25.71	140 ft
0	2310 / 3	Leakage	0	.	0	.	104	100	0	.	104 ft
0	2330 / 3	Seal Damage	0	.	0	.	0	.	36	100	36 ft

MISCELLANEOUS : Channel

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8290 / 3	Channel	0	.	0	.	1	100	0	.	1 (EA)
0	9150 / 3	Bank Erosion	0	.	0	.	1	100	0	.	1 (EA)

MISCELLANEOUS : Other Elements

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	321 / 3	Re Conc Approach Slab	1410	100	0	.	0	.	0	.	1410 sq.ft
0	510 / 3	Wearing Surfaces	957	91.14	0	.	93	8.86	0	.	1050 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	93	100	0	.	93 sq.ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	205 / 3	Re Conc Column	0	.	0	.	4	100	0	.	4 each
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 each
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	3	100	0	.	3 each

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	215 / 3	Re Conc Abutment	65	92.86	0	.	5	7.14	0	.	70 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	0	.	5	100	0	.	5 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	234 / 3	Re Conc Pier Cap	49	72.06	12	17.65	7	10.29	0	.	68 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	12	63.16	7	36.84	0	.	19 ft

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 11/24/2020

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8393 / 3	Bulkhead Seawall Any Material	0	.	0	.	354	100	0	.	354 ft
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	314	100	0	.	314 ft
0	6000 / 3	Scour	0	.	0	.	40	100	0	.	40 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8394 / 3	R/Conc Abut Slope Protection	3968	73.81	0	.	1408	26.19	0	.	5376 (SF)
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	320	100	0	.	320 (SF)
0	4000 / 3	Settlement	0	.	0	.	1088	100	0	.	1088 (SF)

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	333 / 3	Other Bridge Railing	167	83.5	33	16.5	0	.	0	.	200 ft
0	1000 / 3	Corrosion	0	.	30	100	0	.	0	.	30 ft
0	1020 / 3	Connection	0	.	3	100	0	.	0	.	3 ft

Total Number of Elements*: 10
*excluding defects/protective systems

Inspection Information

Inspection Date: 10/22/2020 **Type:** Interim

Inspector: KNLRELM - Loren Marquez

Inspection Notes: Sufficiency Rating Calculation Accepted by KNLREJP at 11/18/2020 2:56:35 PM

This Interim inspection (10/22/2020) was conducted to evaluate Element 8099 PS Conc Slab (Sonovoid), for the status of the entire structure refer to the last Regular NBI Inspection (04/06/2020).

LOAD CAPACITY EVALUATION:
Since the current load rating dated 1/13/2020, there is no indication that deterioration, geometric changes or additional dead load have occurred that would warrant a new load rating analysis. This only applies to this inspection dated 10/22/2020 per Loren Marquez, P.E.

The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure.

The Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (10/22/2020).

LEGEND:
NCAR: NO CORRECTIVE ACTION RECOMMENDED
RT: Right
LT: Left
L: Long
W: Wide
H: High
D: Deep
in.: Inches
ft.: Feet
LF: Linear Feet
SF: Square Feet
NE: Northeast
NW: Northwest
SE: Southeast
SW: Southwest

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 11/24/2020

Structure Notes

BRIDGE OWNER: MIAMI-DADE COUNTY

Bridge inventoried from south to north. (Entrance on North end, boat ramp on South end).

P/S Slab Units on R/Conc Caps and Abutments over P/Conc Columns. (3 spans)

Element 227/3 Re Conc Pile notes have been replaced by Element 205/3 Re Conc Column on 10/29/2019.

Element 8475/3 R/Conc Walls notes have been replaced by Element 8393/3 Bulkhead Seawall Any Material on 04/06/2020.

The NBI Rating for Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (04/06/2020).

The Substructure NBI Rating is coded 4 (Poor) due to the significant deterioration of Column 2-2. (04/06/2020).

The Channel NBI Rating was lowered from 7 to 6 due to areas of undermining on the channel below the North seawall. (04/06/2020).

TRAFFIC RESTRICTIONS:
Based on the current load rating analysis dated 1/13/2020, it is recommended that this bridge be posted for the SU, C and ST5 type vehicles as follows: SU = 11 tons, C = 16 tons, ST5 = 18 tons. The bridge is currently posted for SU = 11 tons, C = 16 tons, ST5 = 18 tons. Refer to posting signs Photos 29 and 30.

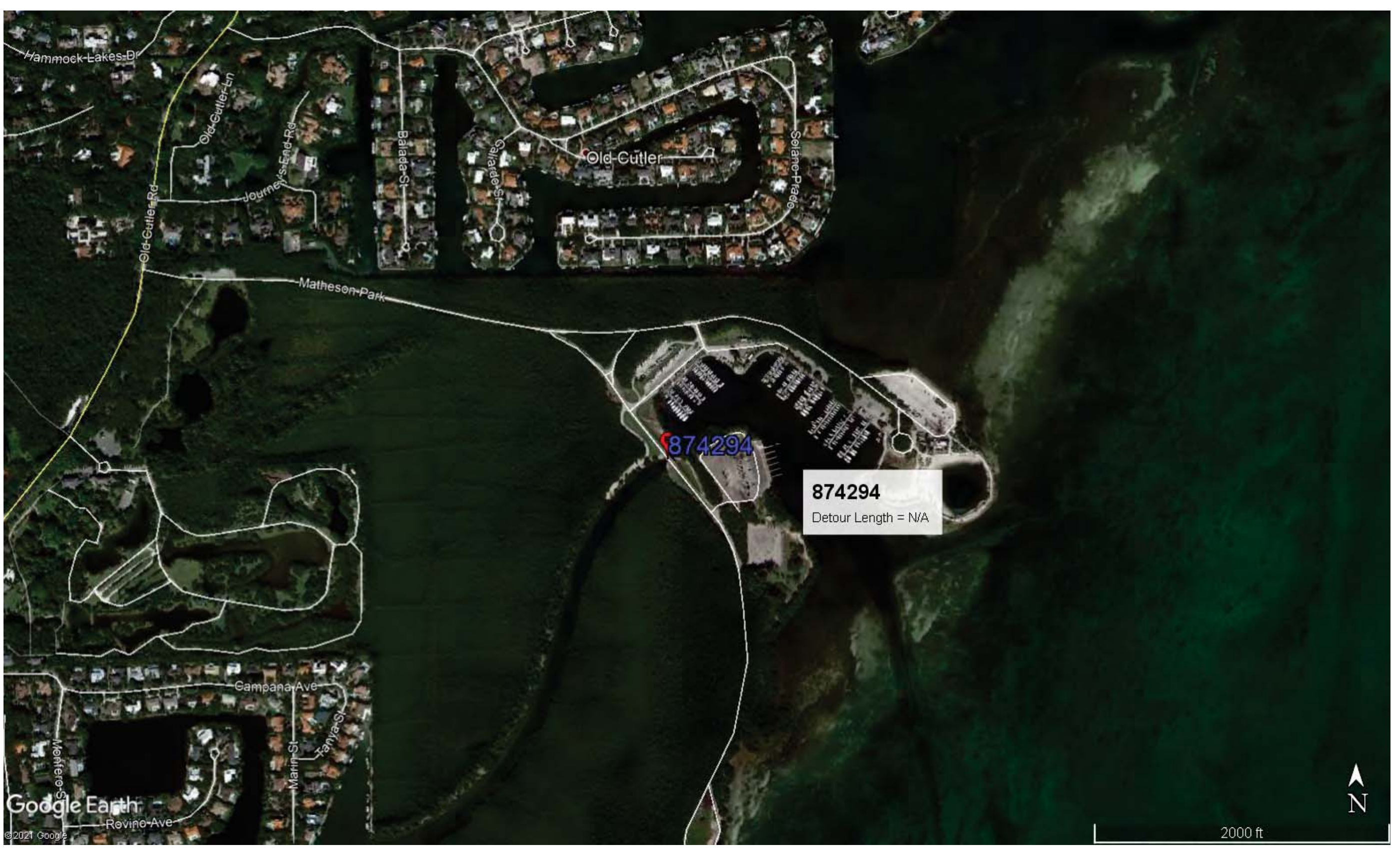
REVIEWED BY:

Schedule Notes

	BRIDGE INSPECTION REPORT PREPARED FOR: FDOT District 6 BRIDGE OWNER: MIAMI-DADE COUNTY INSPECTION TYPE: Interim CONTRACT No. CA611	Inspected by: **Marlin Engineering, Inc.**
Bridge No. 874294	**REPORT CONTAINS**	**Inspection Date: 04-26-21**

☒ BrM Inspection Report
☒ CIDR Information
☐ Bridge Profile
☐ Underwater Inspection
☐ Fracture Critical Data
☒ Load Rating Summary Sheet
☐ Addendum
☐ Mechanical and Electrical Data

Matheson Hmk Road over Matheson Hammock Canal	**Facility Carried & Location**	**Matheson Hammock Park**



Location Map		**Detour Length = N/A**

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

BY:	Marlin Engineering, Inc.	STRUCTURE NAME:	Not recorded
OWNER:	2 County Hwy Agency	YEAR BUILT:	1967
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	87 000 757
STRUCTURE TYPE:	5 Prestressed Concrete - 01 Slab	MP:	0.080
LOCATION:	Matheson Hammock Park	ROUTE:	00000
SERV. TYPE ON:	5 Highway-pedestrian	FACILITY CARRIED:	Matheson Hmk Road
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Matheson Hammock Canal

☐ FUNCTIONALLY OBSOLETE

☒ STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Interim

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 4/26/2021 UNDERWATER: 4/6/2020

SUFFICIENCY RATING: 15.5
HEALTH INDEX: 85.48

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

BY:	Marlin Engineering, Inc.	STRUCTURE NAME:	Not recorded
OWNER:	2 County Hwy Agency	YEAR BUILT:	1967
MAINTAINED BY:	2 County Hwy Agency	SECTION NO.:	87 000 757
STRUCTURE TYPE:	5 Prestressed Concrete - 01 Slab	MP:	0.080
LOCATION:	Matheson Hammock Park	ROUTE:	00000
SERV. TYPE ON:	5 Highway-pedestrian	FACILITY CARRIED:	Matheson Hmk Road
SERV. TYPE UNDER:	5 Waterway	FEATURE INTERSECTED:	Matheson Hammock Canal

- [ ] THIS BRIDGE CONTAINS FRACTURE CRITICAL COMPONENTS
- [ ] THIS BRIDGE IS SCOUR CRITICAL
- [X] THIS REPORT IDENTIFIES DEFICIENCIES WHICH REQUIRE PROMPT CORRECTIVE ACTION
- [ ] FUNCTIONALLY OBSOLETE
- [X] STRUCTURALLY DEFICIENT

TYPE OF INSPECTION: Interim

DATE FIELD INSPECTION WAS PERFORMED: ABOVE WATER: 4/26/2021 UNDERWATER: 4/6/2020

OVERALL NBI RATINGS:

DECK:	3 Serious	CHANNEL:	6 Bank Slumping
SUPERSTRUCTURE:	3 Serious	CULVERT:	N N/A (NBI)
SUBSTRUCTURE:	4 Poor	SUFF. RATING:	15.5
PERF. RATING:	Poor	HEALTH INDEX:	85.48

FIELD PERSONNEL / TITLE / NUMBER:	INITIALS
Guzman, Armando - Bridge Inspector (CBI#00407) (lead)	________
Montersil, Jonathan - Assistant Bridge Inspector	________
Rego, Alexis - Bridge Inspector (CBI#00409)	________
Campo, Luis - Bridge Inspector (CBI #00619)	________
Alfonso, Rene - Bridge Inspector Assistance	________

REVIEWING BRIDGE INSPECTION SUPERVISOR:

Rego, Alexis - Bridge Inspector (CBI#00409) ________

CONFIRMING REGISTERED PROFESSIONAL ENGINEER:

Vers, Julie - Structural Design Manager (P.E. # 77896) Marlin Engineering
1700 NW 66 Avenue
Suite 106
Plantation Florida 33313

JULIE ANN VERS
LICENSE
No. 77896
STATE OF FLORIDA
PROFESSIONAL ENGINEER

SIGNATURE: ____________________

DATE: ____________________

The official record of this package has been electronically signed and sealed by Julie A. Vers, P.E. on the date adjacent to the seal as required by Rule 61G15-23.004, F.A.C.. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

All Elements

DECKS : Decks/Slabs

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8099 / 3	PS Conc Slab (Sonovoid)	3099	87.64	14	0.4	423	11.96	0	.	3536 (SF)
0	1080 / 3	Delamination/Spall/Patched Area	0	.	14	70	6	30	0	.	20 (SF)
0	1100 / 3	Exposed Prestressing	0	.	0	.	35	100	0	.	35 (SF)
0	1110 / 3	Cracking (PSC)	0	.	0	.	292	100	0	.	292 (SF)
0	1900 / 3	Distortion	0	.	0	.	90	100	0	.	90 (SF)
0	510 / 3	Wearing Surfaces	1734	65.83	0	.	900	34.17	0	.	2634 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	900	100	0	.	900 sq.ft

Element Inspection Notes:

8099/3

Notes: The top of the slab units is not visible due to an asphalt overlay. The width of the sonovoid slab units was field verified to be 3ft. wide.

SECONDARY:
_Centerline raised pavement markers are missing along the structure. Previously missing object markers were installed. Refer to Photo 01. NO CHANGE.

_Sidewalk concrete panels are loose and move under pedestrian load. (Total 300 SF). Refer to Photo 02. NO CHANGE.

_The underside of the slab unit joints and bent caps show evidence of water seepage. NO CHANGE. NCAR.

_There is one exposed piece of corroded scrap metal on Slab Unit 1-6 underside at 9ft. from Abutment 1. Previously documented under Defect 1090 as a spall with exposed rebar having minor section loss. Refer to Photo 03. NO CHANGE.

Refer to Defects 1080, 1100, 1110, and 1900 for additional deficiencies

PREVIOUS RECOMMENED CORRECTIVE ACTION:
_Replace missing object markers at the four corners of the bridge and provide missing RPMs throughout the bridge.
_Properly secure the sidewalk panels.
_Monitor slab unit 1-1 for possible independent movement on the slab unit.
_Clean and coat exposed prestressing and reinforce Slab Unit 2-8.
_Repair spalls, delaminations, and cracks along the underside of the slab units
_Clean and coat exposed rebar and repair spall along the underside of slab unit 1-6, 9ft. from Abutment 1.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was partially completed. Recommendation will be issued to provide missing RPMs.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.

1080/3

CS-3:
_Slab Unit 1-9 exhibits a spall/delamination up to 36in. L x 24in. W x 2.5in. D over Abutment 1, with an exposed stirrup, no measurable section loss. (Total 6 SF). Refer to Photo 04. NO CHANGE.

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BRIDGE MANAGEMENT SYSTEM
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

CS-2:
_Slab Unit 2-6, east edge exhibits a delamination 30in. L x 4in. W starting at Pier 2 cap. (Total 3 SF). NO CHANGE.

_Slab Unit 2-7, west edge exhibits a delamination up to 24in. L x 4in. W starting at Pier 2 cap. (Total 2 SF). NO CHANGE.

_Slab Unit 2-8 underside exhibits a delamination up to full width x 36in. L with associated cracks and rust staining, starting at Bent 2 cap. (Total 9 SF). Refer to Photo 05. NEW.

1100/3 CS-3:
_Slab Unit 2-8, midspan has a spall 15ft. L x 24in. W x up to 4in. D with 7 exposed and corroded transverse rebars with up to 60% section remaining and 5 exposed and corroded prestressing strands with up to 0% section remaining (3 broken strands). Previously noted a spall 10ft. L x 24in. W x up to 4in. D with 5 exposed strands, 2 broken threads, and 6 exposed transverse rebars. (Total 20 SF). Refer to Photo 06. INCREASE.

_Slab Unit 2-9, midspan has a spall/delamination up to 15ft. L x 12in. W x 2in. D with 2 prestressing strands and 7 transverse rebars having up to 90% section remaining. (Total 15 SF). Refer to Photo 06. NEW.

1110/3 CS-3:
_Slab Unit 1-6 east edge has two delamination areas, one up to 5ft. L x 6in. W starting at Abutment 1 and the other starting at Pier Cap 2 up to 9ft. L x 12in. W with associated cracks up to 1/16in. W with efflorescence throughout. (Total 14 SF). NO CHANGE.

_Slab Unit 1-7 east edge has a spall/delamination 24in. L x 12in. W with associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out over Abutment 1. (Total 2 SF). NO CHANGE.

_Slab Unit 1-7, east edge has a delamination 7ft. L x 4in. W, with an associated crack of up to 1/16in. starting at Pier 2 cap. (Total 7 SF). NO CHANGE.

_Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W starting at Abutment 1 with associated cracks up to 1/4in. W with efflorescence and corrosion bleed-out and associated spalling up to 4ft. L x 6in. W x 2in. D approximately 10ft from Abutment 1. (Total 19 SF). Refer to Photo 07. NO CHANGE.

_Slab Unit 1-8 east edge has a delamination 4ft. L x 15in. W and associated cracks up to 1/32in. W with efflorescence and corrosion bleed-out, 9ft. from Pier Cap 2. (Total 5 SF). NO CHANGE.

_Slab Unit 1-8 has a delaminated area up to 8ft. L x 3ft. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out starting at Pier Cap 2. (Total 24 SF). NO CHANGE.

_Slab Unit 1-9 west edge has a delaminated area 9ft. L x 10in. W and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out, starting near the 3/4 point and extending to Pier 2 cap. (Total 9 SF). NO CHANGE.

_Slab Unit 2-7 east edge is intermittently cracked/delaminated up to span length x 16in. W (average width) with up to 1/4in. W cracks. (Total 38 SF). NO CHANGE.

_Slab Unit 2-8 west half has two delaminated areas up to 15ft. L x 18in. W (average width) at south and north ends, with associated cracks of up to 1/4in. W. (Total 60 SF). NO CHANGE.

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_Slab Unit 2-9 west edge has a delaminated area up to 5ft. L x 5in. W with associated cracking up to 1/4in. wide, starting at the Pier 2 cap. (Total 5 SF). NO CHANGE.

_Slab Unit 3-6 has a delamination up to 24in. L x 6in. W on the east edge over Pier 3, with an associated crack of up to 1/16in. W. (Total 2 SF). NO CHANGE.

_Slab Unit 3-6 east edge has a delaminated area up to 42in. L x 8in. W with associated cracks up to 1/16in. W. (Total 4 SF). NO CHANGE.

_Slabs Unit 3-7 has two delaminated areas, one starting at Pier 3 up to 8ft. L x 15in. W (average width) with associated cracks, and the second, near mid-span up to 3ft. L x 30in. W. (Total 25 SF). NO CHANGE.

_Slab Unit 3-7 has an unsound repaired area 12ft. L x up to slab width (3ft.) starting from Abutment 4 with hollow sounding throughout and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out. (Total 30 SF). Refer to Photo 08. NO CHANGE.

_Slab Unit 3-8 has a spall/delamination up to 8ft. L x 3ft. W x 1in. D and associated cracks with corrosion bleed-out starting at Pier 3. (Total 24 SF). Refer to Photo 09. NO CHANGE.

_Slab Unit 3-8 has an unsound repair/delamination up to 42in. L x 30in. W with associated cracks up to 1/16in. W with efflorescence starting at Abutment 4. (Total 9 SF). NO CHANGE.

_Slab Unit 3-8 has an unsound repair/delamination up to 74in. L x up to slab width (3ft.) with associated cracks up to 1/16in. W with efflorescence starting 5.5ft. from Abutment 4. (Total 15 SF). NO CHANGE.

1900/3 CS-3:
_Slab Unit 1-1 exhibits a slight outward rotation at Abutment 1 with up to 1/4in. height difference in reference to the top of the cap, potentially indicating shear key failure. (Total 90 SF). Refer to Photo 10. NO CHANGE. NCAR.

510/3 For deficiencies refer to Defect 3220.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Clean and seal cracks and rutting along the expansion joints.
_Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2.
_Monitor cracks along slab unit joints for independent movement of the slab units.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was completed.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.

3220/3 CS-3:
_The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated 1in. W rutting over the slab unit joints and upheaving up to 1in. H at the shoulders, possibly indicating independent slab unit movement. (Total 600 SF). Refer to Photo 11. NO CHANGE.

_The asphalt overlay at Spans 1 and 2 has multi-directional cracking up to 1/2in. W on Lane 2 (NB), worse condition is on Span 1 which has a hollow-sounding area 19.5ft L x 11ft. W, starting 1 ft. from the right sidewalk. (Total 300 SF). Refer to Photo 12. NO CHANGE.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	205 / 3	Re Conc Column	0	.	0	.	4	100	0	.	4 each
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 each
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	3	100	0	.	3 each

Element Inspection Notes:

205/3 Note: At high tide, the seawater reaches the lower section of the columns.

Refer to Defects 1090 and 1130 for deficiencies.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Remove any loose concrete and repair delaminations and spalls along the Column 2-2.
_Repair delaminations and seal cracks along Bents 2 and 3 columns.
_Install cathodic protection to Bents 2 and 3 columns.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.
_The corrective action noted above was not completed. Recommendation will be repeated.

1090/3 CS-3:
_Column 2-2, south face has a spall/delamination up to 55in. H x 32in. W x 4in. D with two exposed longitudinal rebars and five stirrups, having areas of up to 80% section remaining. Additionally, there are areas of delamination around the column circumference covering the entire column height with associated cracks up to 1/4in. W as a consequence of corrosion of the steel reinforcement. Previously noted as a spall/delamination 7ft. H x 3ft. W x 3in. D with one exposed rebar and one stirrup. (Total 1 ea.) Refer to Photos 13, 14, and 15. INCREASE.

1130/3 CS-3:
_Columns 2-1, 3-1, and 3-2 have delaminated areas along their entire length with associated cracks up to full height x 1/16in. W, as a result of corrosion of the steel reinforcement. (Total 3 ea.) NO CHANGE.

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	234 / 3	Re Conc Pier Cap	48	70.59	12	17.65	8	11.76	0	.	68 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	12	60	8	40	0	.	20 ft

Element Inspection Notes:

234/3 Refer to Defect 1080 for additional deficiencies.

PREVIOUS RECOMMENDED CORRECTIVE ACTION:
_Remove vegetation growing on west end of Bents 2 and 3 caps.
_Repair spalls and delaminations along Bents 2 and 3 caps.

CORRECTIVE ACTION EVALUATION:
_The corrective action noted above was completed.
_The corrective action noted above was not completed. Recommendation will be repeated.

1080/3 CS-3:
_Bent 2 cap, south face has a spall/delamination up to 48in. L x 17in. H x 3/4 in. D over Column 2-2, and on the same location, north face a delamination 20in. L x 12in. H. Previously noted in the south face as a spall/delamination up to 3ft. L x 16in. H x 1 in.

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D. (Total 4 LF) Refer to Photos 16 and 17. INCREASE.

_Bent 3 cap, bottom and north faces has two unsound repaired areas up to 30in. L x 24in. W with multidirectional cracks up to 1/64in. W between Columns 3-1 and 3-2. (Total 4 LF) Refer to Photo 18. NO CHANGE.

CS-2:
_Pier 3 cap has intermittent delaminated areas up to 3ft. L x 16in. H between Columns 3-1 and 3-2, along the top and bottom north edges. (Total 12 LF) Refer to Photo 18. NO CHANGE.

Total Number of Elements*: 3
*excluding defects/protective systems

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Inspector Recommendations

UNIT: 0 **DECKS**

ELEMENT/ENV: 8099 / 3 PS Conc Slab (Sonovoid) **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
1 , 2 , 3	MMS Quantity: 300 sf Element Estimated Quantity: 300 (SF)	3

WORK ORDER RECOMMENDATION:

Properly secure the sidewalk concrete panels. Photo 02

CONDITION STATE		PRIORITY
1 , 2 , 3	MMS Quantity: 10 sf Element Estimated Quantity: 10 (SF)	3

WORK ORDER RECOMMENDATION:

Replace missing raised pavement markers along the centerline of the structure. Photo 01

ELEMENT/ENV: 8099:510:3220 / 3 Crack (Wearing Surface) **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
3	MMS Quantity: 600 sf Element Estimated Quantity: 600 sq.ft	3

WORK ORDER RECOMMENDATION:

Monitor the slab units for independent movement. Photo 11

CONDITION STATE		PRIORITY
3	MMS Quantity: 900 sf Element Estimated Quantity: 900 sq.ft	3

WORK ORDER RECOMMENDATION:

Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2. Photos 11 and 12

ELEMENT/ENV: 8099:1080 / 3 Delamination/Spall/Patched Area **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
2 , 3	MMS Quantity: 298 sf Element Estimated Quantity: 298 (SF)	3

WORK ORDER RECOMMENDATION:

Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs. Photos 03 to 05 and 07 to 09

ELEMENT/ENV: 8099:1100 / 3 Exposed Prestressing **ELEM CATEGORY: Decks/Slabs**

CONDITION STATE		PRIORITY
3	MMS Quantity: 35 sf Element Estimated Quantity: 35 (SF)	2

WORK ORDER RECOMMENDATION:

Clean and coat exposed prestressing strands and rebars, repair spalls and reinforce the Slab units 2-8 and 2-9. Photo 06

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Inspector Recommendations

UNIT: 0 **SUBSTRUCTURE**

ELEMENT/ENV: 205:1090 / 3 Exposed Rebar **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
3	MMS Quantity: 40 mh	Element Estimated Quantity: 1 each	2

WORK ORDER RECOMMENDATION:

Clean and coat exposed rebars, repair spalls/delaminations and reinforce Column 2-2. Photos 13 to 15

ELEMENT/ENV: 205:1130 / 3 Cracking (RC and Other) **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
3	MMS Quantity: 40 mh	Element Estimated Quantity: 4 each	3

WORK ORDER RECOMMENDATION:

Repair delaminations and seal cracks along Bents 2 and 3 columns. Photos 13 to 15

3	MMS Quantity: 80 mh	Element Estimated Quantity: 4 each	3

WORK ORDER RECOMMENDATION:

Install jackets with cathodic protection to Bents 2 and 3 columns. Photos 13 to 15

ELEMENT/ENV: 234:1080 / 3 Delamination/Spall/Patched Area **ELEM CATEGORY: Substructure**

CONDITION STATE			PRIORITY
2 , 3	MMS Quantity: 40 mh	Element Estimated Quantity: 20 ft	2

WORK ORDER RECOMMENDATION:

Repair spalls and delaminations along Bents 2 and 3 caps. Photos 16 to 18

Structure Notes

BRIDGE OWNER: MIAMI-DADE COUNTY

Bridge inventoried from south to north. (Entrance on North end, boat ramp on South end).

P/S Slab Units on R/Conc Caps and Abutments over P/Conc Columns. (3 spans)

TRAFFIC RESTRICTIONS:
Based on the current load rating analysis dated 1/13/2020, the bridge is posted for the SU, C and ST5 type vehicles as follows: SU = 11 tons, C = 16 tons, ST5 = 18 tons. Refer to posting signs Photos 19 and 20.

REVIEWED BY:

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

INSPECTION NOTES: HIXS 4/26/2021

Sufficiency Rating Calculation Accepted by knmeira at 5/5/2021 3:15 PM.

The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure. (04/26/2021).

This Interim inspection (04/26/2021) was conducted to evaluate Element 8099 PS Conc Slab (Sonovoid), Element 234 Re Conc Pier Cap and Element 205 Re Conc Column, for the status of the entire structure refer to the last Regular NBI Inspection (04/06/2020).

The Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (04/26/2021).

The Substructure NBI Rating is coded 4 (Poor) due to extensive spalls with exposed rebars along Column 2-2, and delaminations and cracks along the columns and pier caps throughout the structure. (04/26/2021).

LOAD CAPACITY EVALUATION:
Since the current load rating dated 1/13/2020, there is no indication that deterioration, geometric changes or additional dead load have occurred that would warrant a new load rating analysis. This only applies to this inspection dated 04/26/2021 per Julie A. Vers, P.E.

LEGEND:
NCAR: NO CORRECTIVE ACTION RECOMMENDED
RT: Right
LT: Left
L: Long
W: Wide
H: High
D: Deep
in.: Inches
ft.: Feet
LF: Linear Feet
SF: Square Feet
NE: Northeast
NW: Northwest
SE: Southeast
SW: Southwest

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 01 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Centerline raised pavement markers are missing along the structure. Previously missing object markers were installed.

WORK ORDER RECOMMENDATION:
Replace missing raised pavement markers along the centerline of the structure.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 02 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Sidewalk concrete panels are loose and move under pedestrian load.

WORK ORDER RECOMMENDATION:
Properly secure the sidewalk concrete panels.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 03 Element/Env 8099/3: PS Conc Slab (Sonovoid)

There is one exposed piece of corroded scrap metal on Slab Unit 1-6 underside at 9ft. from Abutment 1.

WORK ORDER RECOMMENDATION:
Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 04 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-9 exhibits a spall/delamination up to 36in. L x 24in. W x 2.5in. D over Abutment 1, with an exposed stirrup, no measurable section loss.

WORK ORDER RECOMMENDATION:
Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 05 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 2-8 underside exhibits a delamination up to full width x 36in. L with associated cracks and rust staining, starting at Bent 2 cap.

WORK ORDER RECOMMENDATION:
Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 06 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 2-8, midspan has a spall 15ft. L x 24in. W x up to 4in. D with 7 exposed and corroded transverse rebars with up to 60% section remaining and 5 exposed and corroded prestressing strands with up to 0% section remaining (3 broken strands).
Slab Unit 2-9, midspan has a spall/delamination up to 15ft. L x 12in. W x 2in. D with 2 prestressing strands and 7 transverse rebars having up to 90% section remaining.

WORK ORDER RECOMMENDATION:
Clean and coat exposed prestressing strands and rebars, repair spalls and reinforce the Slab units 2-8 and 2-9.

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 07 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-8 west edge is intermittently delaminated up to 15ft. L x 15in. W starting at Abutment 1 with associated cracks up to 1/4in. W with efflorescence and corrosion bleed-out and associated spalling up to 4ft. L x 6in. W x 2in. D approximately 10ft from Abutment 1.

WORK ORDER RECOMMENDATION:
Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 08 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 3-7 has an unsound repaired area 12ft. L x up to slab width (3ft.) starting from Abutment 4 with hollow sounding throughout and associated cracks up to 1/16in. W with efflorescence and corrosion bleed-out.

WORK ORDER RECOMMENDATION:
Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs.

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BRIDGE MANAGEMENT SYSTEM
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 09 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 3-8 has a spall/delamination up to 8ft. L x 3ft. W x 1in. D and associated cracks with corrosion bleed-out starting at Pier 3.

WORK ORDER RECOMMENDATION:
Clean and coat exposed steel and repair spalls and delaminations along the underside of sonovoid slabs.

FLORIDA DEPARTMENT OF TRANSPORTATION
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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 10 Element/Env 8099/3: PS Conc Slab (Sonovoid)

Slab Unit 1-1 exhibits a slight outward rotation at Abutment 1 with up to 1/4in. height difference in reference to the top of the cap, potentially indicating shear key failure. No anti-rotation block is in place.

WORK ORDER RECOMMENDATION:
None.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 11 Element/Env 8099/ 510/3: PS Conc Slab (Sonovoid)/ Wearing Surfaces

The asphalt overlay has longitudinal cracks up to span length x 1/4in. W with associated 1in. W rutting over the slab unit joints and upheaving up to 1in. H at the shoulders, possibly indicating independent slab unit movement.

WORK ORDER RECOMMENDATION:
_Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2.
_Monitor the slab units for independent movement.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 12 Element/Env 8099/ 510/3: PS Conc Slab (Sonovoid)/ Wearing Surfaces

The asphalt overlay at Spans 1 and 2 has multi-directional cracking up to 1/2in. W on Lane 2 (NB), worse condition is on Span 1 which has a hollow-sounding area 19.5ft L x 11ft. W, starting 1 ft. from the right sidewalk.

WORK ORDER RECOMMENDATION:
Seal cracks on the asphalt along the slab unit joints and multi-directional cracks on Lane 2 (NB) in Spans 1 and 2.

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Photo 13 Element/Env 205/3: Re Conc Column

Column 2-2, south face has a spall/delamination up to 55in. H x 32in. W x 4-3/4in. D with two exposed longitudinal rebars and five stirrups, having areas of up to 80% section remaining.

WORK ORDER RECOMMENDATION:
_Clean and coat exposed rebars, repair spalls/delaminations and reinforce Column 2-2.
_Repair delaminations and seal cracks along Bents 2 and 3 columns.
_Install jackets with cathodic protection to Bents 2 and 3 columns.

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DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 14 Element/Env 205/3: Re Conc Column

Spall/delamination with exposed reinforcement having up to 80% remaining in south face of Column 2-2. (close up view)

WORK ORDER RECOMMENDATION:
_Clean and coat exposed rebars, repair spalls/delaminations and reinforce Column 2-2.
_Repair delaminations and seal cracks along Bents 2 and 3 columns.
_Install jackets with cathodic protection to Bents 2 and 3 columns.

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Photo 15 Element/Env 205/3: Re Conc Column

Areas of delamination around the column circumference covering the entire column height with associated cracks up to 1/4in. W as a consequence of corrosion of the steel reinforcement.

WORK ORDER RECOMMENDATION:
_Clean and coat exposed rebars, repair spalls/delaminations and reinforce Column 2-2.
_Repair delaminations and seal cracks along Bents 2 and 3 columns.
_Install jackets with cathodic protection to Bents 2 and 3 columns.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 16 Element/Env 234/3: Re. Concrete Pier Cap

Bent 2 cap, south face has a spall/delamination up to 48in. L x 17in. H x 3/4 in. D over Column 2-2, and on the same location, north face a delamination 20in. L x 12in. H. (south view)

WORK ORDER RECOMMENDATION:
Repair spalls and delaminations along Bents 2 and 3 caps.

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Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 17 Element/Env 234/3: Re. Concrete Pier Cap

Bent 2 cap, south face has a spall/delamination up to 48in. L x 17in. H x 3/4 in. D over Column 2-2, and on the same location, north face a delamination 20in. L x 12in. H. (bottom view)

WORK ORDER RECOMMENDATION:
Repair spalls and delaminations along Bents 2 and 3 caps.

FLORIDA DEPARTMENT OF TRANSPORTATION
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(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 18 Element/Env 234/3: Re. Concrete Pier Cap

Areas of unsound repairs on the bottom face of Pier 3 cap, intermittent delaminated areas up to 3ft. L x 16in. H between Columns 3-1 and 3-2, along the top and bottom north edges.

WORK ORDER RECOMMENDATION:
Repair spalls and delaminations along Bents 2 and 3 caps.

FLORIDA DEPARTMENT OF TRANSPORTATION
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Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 19: STRUCTURE NOTES

North Approach Posting Sign

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM
Inspection/CIDR Report with PDF attachment(s)
(INTERIM INSPECTION REPORT)

Structure ID: 874294 **Inspection**

DISTRICT: D6 - Miami **INSPECTION DATE: 4/26/2021 HIXS**

Photo 20: STRUCTURE NOTES

South Approach Posting Sign

Bridge No.	874294	**Analysis Method:**	LRFR-LRFD	**FDOT Bridge Load Rating Summary Form (Page 1 of 1)**
Location	Matheson hammock Road over matheson Hammock Canal			
Description	3 Spans, 2-30'&1-40', Prestressed voided slab beams 36"x17"			

Rating Type	Rating Type	Gross Axle Weight (tons)	Moment/Shear/Service		Dead Load Factor	Live Load Factor	Live Load Distrib. Factor (axles)	Rating Factor	Span No. - Girder No., Interior/Exterior, %Span Length	RF·Weight (tons)
Level	**Vehicle**	**Weight**	**Member Type**	**Limit**	**DC**	**LL**	**LLDF**	**RF**	**Governing Location**	**RATING**
Inventory	HL93	36	Prestressed	Service	1.00	0.80	0.600	0.210	Central span, midspan	7.6
Operating	HL93	36	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.330	Central span, midspan	11.9
Permit	FL120	60	Prestressed	Strength, Shear	1.25/0.90	1.35	0.500	0.270	Central span, 1/4 point	16.2
Permit Max Span	FL120	60	Prestressed	Strength, Shear	1.25/0.90	1.35	0.500	0.270	Central span, 1/4 point	16.2
Legal	SU2	17	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.690	Central span, midspan	11.7
	SU3	33	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.370	Central span, midspan	12.2
	SU4	35	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.340	Central span, midspan	11.9
	C3	28	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.650	Central span, midspan	18.2
	C4	36.7	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.460	Central span, midspan	16.9
	C5	40	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.440	Central span, midspan	17.6
	ST5	40	Prestressed	Strength, Moment	1.25/0.90	1.35	0.600	0.460	Central span, midspan	18.4
Emergency Vehicle (EV)	EV2	28.75	Prestressed	NA	NA	NA	0.600			-1
	EV3	43	Prestressed	NA	NA	NA	0.600			-1

Original Design Load	HS20 or HS20-S16-44		Performed by:	Mengyuan Chen	Date:	01/13/20
Rating Type, *Analysis*	LRFR-LRFD		Checked by:	Juan A. Sobrino	Date:	01/13/20
Distribution Method	Others		Sealed By:	Juan A. Sobrino	Date:	01/13/20
Impact Factor	33.0%	(axle loading)	FL P.E. No.:	73121		
FL120 Gov. Span Length	38.3	(feet)	Cert. Auth. No.:	27244		
Minimum Span Length	28.3	(feet)	Phone & email:	(+1) 305 648 00 10, miami@pedelta.om		
Recommended Posting	> 39.9% below (0.000-0.600) (Required)		Company:	Pedelta Inc.		
Recommended SU Posting*	11	(tons)	Address:	2000 Ponce de Leon Blvd., Suite 624, Coral Gables. Florida 33134, USA		
Recommended C Posting	16	(tons)	P.E. Seal, Comments by the Engineer			
Recommended ST5 Posting	18	(tons)				
Owner	02 County Highway Agency					
Location	Neither interstate traffic nor within 1 mile reasonable access to an interstate					
EV Posting	No. EV posting is not recommended. The FAST Act does not apply					
Floor Beam Present?	No					
Segmental Bridge?	No					
Project No. & Reason	432907-1-72-02	Deterioration				
Plans Status	Built					

Juan Sobrino

Digitally signed by Juan Sobrino
Date: 2020.01.13 15:58:25 -05'00'

Juan A. Sobrino, State of Florida, Professional Engineer, License No 73121.
This document has been electronically signed and sealed by Juan A. Sobrino on January 13th, 2020 using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies.

This 10-11-2019 summary follows the FDOT Bridge Load Rating Manual (BLRM), and the FDOT BMS Coding Guide.
*Recommended SU Posting levels for Florida SU trucks adequately restricts AASHTO SU trucks; see BLRM Chapter 7.

fdot.gov/maintenance/LoadRating.shtm

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 6/25/2021

Description

Structure Unit Identification

Bridge/Unit Key: 874294 0
Structure Name:
Description: SPANS 1 THRU 3
Type: M - Main

Roadway Identification

NBI Structure No (8): 874294
Position/Prefix (5): 1 - Route On Structure
Kind Hwy (Rte Prefix): 4 County Hwy
Design Level of Service: 8 Service Road
Route Number/Suffix: 00000 / 0 N/A (NBI)
Feature Intersect (6): Matheson Hammock Canal
Critical Facility: Not Defense-crit
Facility Carried (7): Matheson Hmk Road
Mile Point (11): 0.08
Latitude (16): 025d40'44.2" Long (17): 080d15'43.8"

Roadway Traffic and Accidents

Lanes (28): 2 Medians: 0 Speed: 15 mph
ADT Class: 2 ADT Class 2
Recent ADT (29): 736 Year (30): 2020
Future ADT (114): 1168 Year (115): 2042
Truck % ADT (109): 1
Detour Length (19): 99 mi
Detour Speed:
Accident Count: -1 Rate:

Roadway Classification

Nat. Hwy Sys (104): 0 Not on NHS
National base Net (12): 0 - Not on Base Network
LRS Inventory Rte (13a): 87 000 757 Sub Rte (13b): 00
Functional Class (26): 09 Rural Local
Federal Aid System: OFF
Defense Hwy (100): 0 Not a STRAHNET hwy
Direction of Traffic (102): 2 2-way traffic
Emergency: X

Roadway Clearances

Vertical (10): 99.99 ft Appr. Road (32): 26.25 ft
Horiz. (47): 26.25 ft Roadway (51): 26.25 ft
Truck Network (110): 0 Not part of natl netwo
Toll Facility (20): 3 On free road
Fed. Lands Hwy (105): 0 N/A (NBI)
School Bus Route:
Transit Route:

NBI Project Data

Proposed Work (075A): Not Applicable (P)
Work To Be Done By (075B): Not Applicable (P)
Improvement Length (076): 0 ft

Improvement Cost (094): $ 0.00
Roadway Improvement Cost (095): $ 0.00
Total Cost (096): $ 0.00
Year of Estimate (097):

NBI Rating

Channel (61): 6 Bank Slumping
Deck (58): 3 Serious
Superstructure (59): 3 Serious
Substructure (60): 4 Poor

Culvert (62): N N/A (NBI)
Waterway (71): 8 Equal Desirable
Unrepaired Spalls: -1 sq.ft.
Review Required: X

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 6/25/2021

Structure Identification

Admin Area:	Miami-Dade
District (2):	D6 - Miami
County (3):	(87)Miami-Dade
Place Code (4):	South Miami Heights
Location (9):	Matheson Hammock Park
Border Br St/Reg (98):	Not Applicable (P) Share: 0 %
Border Struct No (99):	
FIPS State/Region (1):	12 Florida Region 4-Atlanta
NBIS Bridge Len (112):	Y - Meets NBI Length
Parallel Structure (101):	No || bridge exists
Temp. Structure (103):	Not Applicable (P)
Maint. Resp. (21):	2 County Hwy Agency
Owner (22):	2 County Hwy Agency
Historic Signif. (37):	5 Not eligible for NRHP

Geometrics

Spans in Main Unit (45):	3
Approach Spans (46):	0
Length of Max Span (48):	38.3 ft
Structure Length (49):	100.33 ft
Total Length:	140.33 ft
Deck Area:	3536 sqft
Structure Flared (35):	0 No flare

Age and Service

Year Built (27):	1967
Year Reconstructed (106):	0
Type of Service On (42a):	5 Highway-pedestrian
Under (42b):	5 Waterway
Fracture Critical Details:	Not Applicable

Structure Type and Material

Curb/Sidewalk (50):	Left: 1.5 ft Right: 5.5 ft
Bridge Median (33):	0 No median
Main Span Material (43A):	5 Prestressed Concrete
Appr Span Material (44A):	Not Applicable (P)
Main Span Design (43B):	01 Slab
Appr Span Design (44B):	00 Other (NBI)

Deck Type and Material

Deck Width (52):	35.25 ft
Skew (34):	0 deg
Deck Type (107):	2 Concrete Precast Panel
Surface (108):	6 Bituminous
Membrane:	0 None
Deck Protection:	None

Appraisal

Structure Appraisal

Open/Posted/Closed (41):	P Posted for load
Deck Geometry (68):	5 Above Tolerable
Underclearances (69):	N Not applicable (NBI)
Approach Alignment (72):	8-No Speed Red thru Curv
Bridge Railings (36a):	0 Substandard
Transitions (36b):	0 Substandard
Approach Guardrail (36c):	0 Substandard
Approach Guardrail Ends (36d):	0 Substandard
Scour Critical (113):	U Unknown Foundation

Navigation Data

Navigation Control (38):	Permit Not Required
Nav Vertical Clr (39):	0 ft
Nav Horizontal Clr (40):	0 ft
Min Vert Lift Clr (116):	0 ft
Pier Protection (111):	1 Not Required

NBI Condition Rating

Sufficiency Rating:	15.5
Health Index:	85.48
Structural Eval (67):	3 Intolerable - Correct
Deficiency:	Structurally Deficient

Minimum Vertical Clearance

Over Structure (53):	99.99 ft
Under (reference) (54a):	N Feature not hwy or RR
Under (54b):	0 ft

Minimum Lateral Underclearance

Reference (55a):	N Feature not hwy or RR
Right Side (55b):	0 ft
Left Side (56):	0 ft

Schedule

Current Inspection

Inspection Date:	04/26/2021
Inspector:	KNMEIAG - Armando Guzman
Bridge Group:	CA611
Alt. Bridge Group:	
Primary Type:	Interim
Review Required:	X

Next Inspection Date Scheduled

NBI:	04/26/2022
Element:	10/26/2021
Fracture Critical:	
Underwater:	04/26/2022
Other/Special:	10/26/2021
Inventory Photo Update Due:	04/26/2024

FLORIDA DEPARTMENT OF TRANSPORTATION
BRIDGE MANAGEMENT SYSTEM

REPORT ID: INSP005

Inspection/CIDR Report with PDF attachment(s)

Structure ID: 874294

CIDR

DATE PRINTED: 6/25/2021

Schedule Cont.

Inspection Types Performed

NBI [ ] Element [X] Fracture Critical [ ] Underwater [ ] Other Special [X]

Inspection Intervals	Required (92)	Frequency (92)		Last Date (93)	
Fracture Critical	[ ]	mos			
Underwater	[X]	24 mos		04/06/2020	
Other Special	[X]	6 mos		04/26/2021	
NBI		24 mos	(91)	04/06/2020	(90)

Inspection Resources

Crew Hours:	2
Flagger Hours:	0
Helper Hours:	0
Snooper Hours:	0
Special Crew Hours:	3
Special Equip Hours:	0

Bridge Related

General Bridge Information

Parallel Bridge Seq:		Bridge Rail 1:	Conc parapet-alum-rail
Channel Depth:	10.6 ft	Bridge Rail 2:	Not applicable-No rail
Radio Frequency:	-1	Electrical Devices:	No electric service
Phone Number:		Culvert Type:	Not applicable
Exception Date:		Maintenance Yard:	Not FDOT Maintained
Exception Type:	Unknown	FIHS ON / OFF:	No Routes on FIHS
Accepted By Maint:	01/01/1967	Previous Structure:	
Warranty Expiration:	00/00/0000	2nd Previous Structure:	
Performance Rating:	Poor	Replacement Structure:	

Permitted Utilities: Power [ ] Water [X] Gas [ ] Fiber Optic [ ] Sewage [X] Other [ ]

Bridge Load Rating Information

Inventory Type (065):	3 LRFR Load & Res. Fact	Inventory Rating (066):	7.6 tons
Operating Type (063):	3 LRFR Load & Res. Fact	Operating Rating (064):	11.9 tons
Original Design Load (031):	HL 93	FL120 Permit Rating:	16.2 tons
Date:	01/13/2020	HS20/FL120 Max Span Rating:	16.2 tons
Initials:	JS	Dynamic Impact in Percent:	33 %
Load Rating Rev. Recom.:	No	Governing Span Length:	38.3 ft
Load Rating Plans Status:	Field Measurements	Minimum Span Length:	28.3 ft
		Distribution Method:	Others

Load Rating Notes:

LEGAL LOADS		POSTING	
SU2:	11.7 tons	Recom. SU Posting:	11 tons
SU3:	12.2 tons	Recom. C Posting:	16 tons
SU4:	11.9 tons	Recom. ST5 Posting:	18 tons
C3:	18.2 tons	Actual SU Posting:	11 tons
C4:	16.9 tons	Actual C Posting:	16 tons
C5:	17.6 tons	Actual ST5 Posting:	18 tons
ST5:	18.4 tons	Actual Blanket Posting:	99 tons
Posting (070):	2 20.0-29.9%below	Emergency Vehicle:	1 EV inapplicable
Open/Posted/Closed (041):	P Posted for load		

FLOOR BEAM (FB)	FB Present: No	SEGMENTAL (SEG)	
FB Span Length, Gov:	0.0 ft	SEG Wing-Span:	-1.0 ft
FB Spacing, Gov:	0.0 ft	SEG Web-to-Web Span:	-1.0 ft
FB OPR Rating:	0.0 tons	SEG Transverse HL93 Operating:	-1.00 RF
FB SU4 OPR Rating:	0.0 tons		
FB FL120 Rating:	0.0 tons		

Bridge Scour and Storm Information

Pile Driving Record:	No pile driving records	Scour Recommended I:	Unknown
Foundation Type:	Unknown	Scour Recommended II:	Unknown
Mode of Flow:	Tidal	Scour Recommended III:	Unknown
Rating Scour Eval:	Minimal Risk	Scour Elevation:	-1 ft
Highest Scour Eval:	Unknown	Action Elevation:	-1 ft
Scour Evaluation Method:		Storm Frequency:	-1

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Structure ID: 874294 CIDR **DATE PRINTED: 6/25/2021**

Elements

Inspection Date: 04/26/2021 **HIXS**

DECKS : Decks/Slabs

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8099 / 3	PS Conc Slab (Sonovoid)	3099	87.64	14	0.4	423	11.96	0	.	3536 (SF)
0	1080 / 3	Delamination/Spall/Patched Area	0	.	14	70	6	30	0	.	20 (SF)
0	1100 / 3	Exposed Prestressing	0	.	0	.	35	100	0	.	35 (SF)
0	1110 / 3	Cracking (PSC)	0	.	0	.	292	100	0	.	292 (SF)
0	1900 / 3	Distortion	0	.	0	.	90	100	0	.	90 (SF)
0	510 / 3	Wearing Surfaces	1734	65.83	0	.	900	34.17	0	.	2634 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	900	100	0	.	900 sq.ft

DECKS : Joints

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	301 / 3	Pourable Joint Seal	0	.	0	.	104	74.29	36	25.71	140 ft
0	2310 / 3	Leakage	0	.	0	.	104	100	0	.	104 ft
0	2330 / 3	Seal Damage	0	.	0	.	0	.	36	100	36 ft

MISCELLANEOUS : Channel

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8290 / 3	Channel	0	.	0	.	1	100	0	.	1 (EA)
0	9150 / 3	Bank Erosion	0	.	0	.	1	100	0	.	1 (EA)

MISCELLANEOUS : Other Elements

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	321 / 3	Re Conc Approach Slab	1410	100	0	.	0	.	0	.	1410 sq.ft
0	510 / 3	Wearing Surfaces	957	91.14	0	.	93	8.86	0	.	1050 sq.ft
0	3220 / 3	Crack (Wearing Surface)	0	.	0	.	93	100	0	.	93 sq.ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	205 / 3	Re Conc Column	0	.	0	.	4	100	0	.	4 each
0	1090 / 3	Exposed Rebar	0	.	0	.	1	100	0	.	1 each
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	3	100	0	.	3 each

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	215 / 3	Re Conc Abutment	65	92.86	0	.	5	7.14	0	.	70 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	0	.	5	100	0	.	5 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	234 / 3	Re Conc Pier Cap	48	70.59	12	17.65	8	11.76	0	.	68 ft
0	1080 / 3	Delamination/Spall/Patched Area	0	.	12	60	8	40	0	.	20 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8393 / 3	Bulkhead Seawall Any Material	0	.	0	.	354	100	0	.	354 ft
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	314	100	0	.	314 ft

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0	6000 / 3	Scour	0	.	0	.	40	100	0	.	40 ft

SUBSTRUCTURE : Substructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	8394 / 3	R/Conc Abut Slope Protection	3968	73.81	0	.	1408	26.19	0	.	5376 (SF)
0	1130 / 3	Cracking (RC and Other)	0	.	0	.	320	100	0	.	320 (SF)
0	4000 / 3	Settlement	0	.	0	.	1088	100	0	.	1088 (SF)

SUPERSTRUCTURE : Superstructure

Str Unit	Elem/Env	Description	Qty1	%1	Qty2	%2	Qty3	%3	Qty4	%4	T Qty
0	333 / 3	Other Bridge Railing	167	83.5	33	16.5	0	.	0	.	200 ft
0	1000 / 3	Corrosion	0	.	30	100	0	.	0	.	30 ft
0	1020 / 3	Connection	0	.	3	100	0	.	0	.	3 ft

Total Number of Elements*: 10
*excluding defects/protective systems

Inspection Information

Inspection Date: 04/26/2021 **Type:** Interim

Inspector: KNMEIAG - Armando Guzman

Inspection Notes: Sufficiency Rating Calculation Accepted by knmeira at 5/5/2021 3:15 PM.

The structure is on a 6 months inspection frequency due to NBI Rating 3 for SIA Items 58 Deck and 59 Superstructure. (04/26/2021).

This Interim inspection (04/26/2021) was conducted to evaluate Element 8099 PS Conc Slab (Sonovoid), Element 234 Re Conc Pier Cap and Element 205 Re Conc Column, for the status of the entire structure refer to the last Regular NBI Inspection (04/06/2020).

The Deck and Superstructure are coded 3 (Serious) due to spalls and delaminations along more than 25% of any of the slab units. Slabs Units 1-6, 2-7, and 2-8 meet this criteria. (04/26/2021).

The Substructure NBI Rating is coded 4 (Poor) due to extensive spalls with exposed rebars along Column 2-2, and delaminations and cracks along the columns and pier caps throughout the structure. (04/26/2021).

LOAD CAPACITY EVALUATION:
Since the current load rating dated 1/13/2020, there is no indication that deterioration, geometric changes or additional dead load have occurred that would warrant a new load rating analysis. This only applies to this inspection dated 04/26/2021 per Julie A. Vers, P.E.

LEGEND:
NCAR: NO CORRECTIVE ACTION RECOMMENDED
RT: Right
LT: Left
L: Long
W: Wide
H: High
D: Deep
in.: Inches
ft.: Feet
LF: Linear Feet
SF: Square Feet
NE: Northeast
NW: Northwest
SE: Southeast
SW: Southwest

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Structure Notes

BRIDGE OWNER: MIAMI-DADE COUNTY

Bridge inventoried from south to north. (Entrance on North end, boat ramp on South end).

P/S Slab Units on R/Conc Caps and Abutments over P/Conc Columns. (3 spans)

TRAFFIC RESTRICTIONS:
Based on the current load rating analysis dated 1/13/2020, the bridge is posted for the SU, C and ST5 type vehicles as follows: SU = 11 tons, C = 16 tons, ST5 = 18 tons. Refer to posting signs Photos 19 and 20.

REVIEWED BY:

Schedule Notes

APPENDIX C – HANNA et. al, "TRANSVERSE POST-TENSIONING DESIGN AND DETAILING OF PRECAST, PRESTRESSED CONCRETE ADJACENT-BOX-GIRDER BRIDGES"

Transverse post-tensioning design and detailing of precast, prestressed concrete adjacent-box-girder bridges

Kromel E. Hanna, George Morcous, and Maher K. Tadros

Editor's quick points

- This paper presents a review of various transverse design and detailing practices for adjacent-box-girder bridges.
- Design charts were developed for various combinations of span length, bridge width, skew angle, and girder depth using the latest loading from *AASHTO LRFD Bridge Design Specifications* to update the information in section 8.9 of the PCI *Precast Prestressed Concrete Bridge Design Manual*, which was based on an earlier version of the AASHTO standard specifications.
- This research was funded by PCI through the Daniel P. Jenny Fellowship.

Precast concrete adjacent-box-girder bridges are the most prevalent box-girder system for short- and medium-span bridges (which typically span from 20 ft to 127 ft [6.1 m to 38.7 m]), especially on secondary roadways. These bridges consist of multiple precast concrete box girders that are butted against each other to form the bridge deck and superstructure.

There is new interest in using these bridges for rapid construction under the Federal Highway Administration (FHWA) Highways for Life program. Adjacent box girders are generally connected using partial- or full-depth grouted shear keys along the sides of each box. Transverse ties are usually used in addition to the grouted shear keys, and they may vary from a limited number of threaded rods to several post-tensioned tendons. In some cases, no topping is applied to the structure, while in other cases a noncomposite topping or a composite structural slab is added.

Bridges built with adjacent precast, prestressed concrete box girders have several advantages:

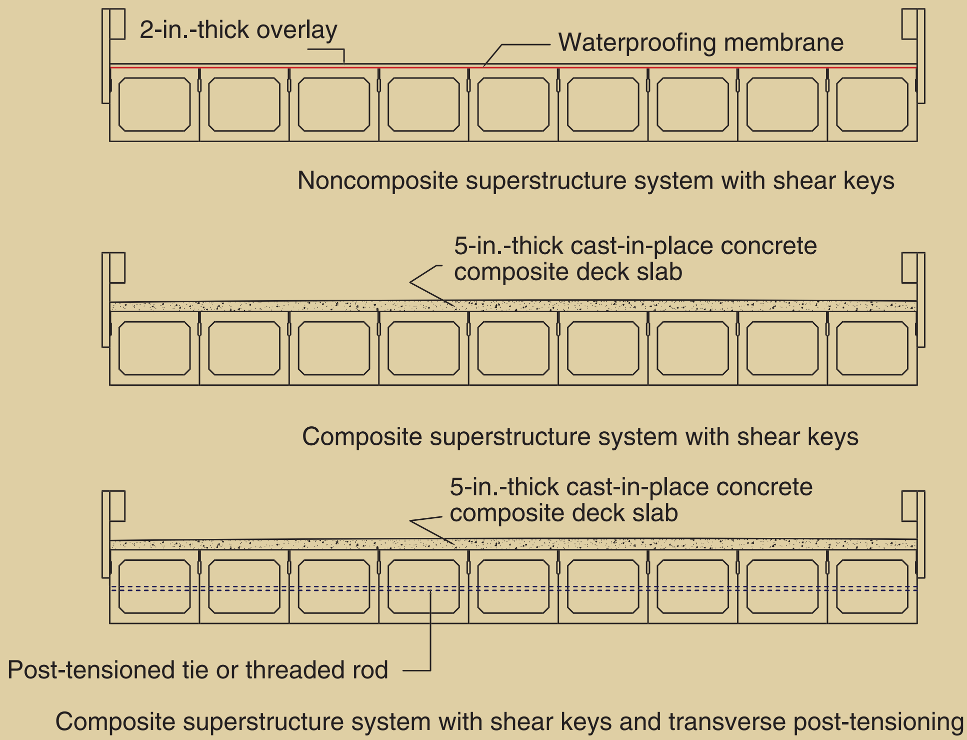

Figure 1. Adjacent-box-girder bridges incorporate various practices in the design and detailing of transverse connecting systems. Note: 1 in. = 25.4 mm.

- ease and speed of construction because of eliminating concrete forming and placing operations (for example, the Arbor Rail Line Bridge in Nebraska City, Neb., was erected and opened to traffic within 72 hr)[1]

- a shallow superstructure depth, which is often necessary to maintain the required vertical clearance (for example, an interstate bridge in Colorado has a span-to-depth ratio of 39)

- low construction cost compared with I-girder bridges and other competing systems

- hollow portions inside the box girders that reduce the self-weight of the girders and provide space for gas lines, water pipes, telephone ducts, storm drains, and other utilities

- improved bridge aesthetics because of the flat soffit and slender superstructure

- high torsional stiffness, which is ideal for curved-bridge construction

Bridges constructed using box girders have been in service for many years and have generally performed well. However, a recurring problem is cracking in the grouted joints between adjacent units, resulting in reflective cracks in the wearing surface.

The development of these longitudinal cracks over the shear keys jeopardizes the durability and structural behavior of adjacent-box-girder bridges.[2,3] In most cases, the cracking leads to leakage, which allows chloride-laden water to penetrate the sides and bottoms of the girders, causing corrosion of the steel reinforcement. In addition, the load distribution among the girders is adversely affected because the loaded girders are required to carry more load than the design load.[3]

These deficiencies have led to severe deterioration and premature replacement of several bridges. On December 27, 2005, the east-side fascia girder of the Lakeview Drive Bridge over Interstate 70 in Washington, Pa., failed near midspan and fell to the highway below. Inspection of the bridge revealed heavy spalling and corrosion of the strands on the bottom flange of the failed noncomposite prestressed concrete box girder. Additional corrosion was revealed on other box girders, and the bridge was subsequently removed from service.[4]

A similar failure occurred in a railroad bridge in Nebraska in 2007. Unfortunately, public attention focuses on the few failed cases and not on the many successful examples.

Current practice

Adjacent-box-girder bridges incorporate various practices in the design and detailing of transverse connecting systems. **Figure 1** shows three configurations. The first is a noncomposite system with a nonstructural overlay as the riding surface applied directly to the top flange of the adjacent box girders. This system depends only on the grouted shear key to provide the shear-transfer mechanism between adjacent box girders.

The second is a thick, reinforced cast-in-place concrete slab anchored to the supporting box girders using shear connectors to act as a composite superstructure system.

The third system is a typical transverse connection made between the adjacent box girders using a post-tensioning tie or a threaded rod. This transverse connection system can be used in conjunction with the composite or noncomposite systems to prevent differential deflection.

According to the Ministry of Transportation of Ontario's (MTO's) *Ontario Highway Bridge Design Code*,[5] the general design philosophy of adjacent-member systems assumes that the entire load between adjacent members is transferred by transverse shear, and the transverse flexural rigidity is completely ignored.

Also, grouted shear keys are considered inadequate to transfer the shear force, and therefore a structural concrete slab of a minimum thickness of 5.9 in. (150 mm) is required. The transverse shear force is determined as a function of the bridge width-to-span ratio, longitudinal flexural rigidity, and longitudinal torsional rigidity.

Some states' departments of transportation (DOTs) combine the use of a structural concrete slab and transverse post-tensioning. This is based on the assumption that both shear and flexure forces must be transversely transferred at the joints between adjacent members to control both translational and rotational deformations.[6]

In Japan, adjacent box girders are designed using sections and design criteria similar to those used in the United States. However, longitudinal joints are detailed differently and transverse post-tensioning is significantly higher. Cast-in-place concrete is placed in full-depth joints that are 6.7 in. (170 mm) wide and 22 in. (560 mm) deep. After grouting, post-tensioning is applied through several ducts located at different elevations. All box girders are covered with a 2-in.-thick to 3-in.-thick (50 mm to 75 mm) asphalt-concrete wearing surface. Using the Japanese practice, longitudinal cracking and concrete deterioration has rarely been reported. El-Remaily et al.[6] give details of the post-tensioning arrangement and joint dimensions used.

In Korea, transverse connection is achieved by using mid-depth shear keys fully filled with cast-in-place concrete in addition to heavy transverse post-tensioning similar to the Japanese practice. The choice of a mid-depth shear key is based on a detailed analysis and full-scale testing.[7]

The state of Oregon has developed empirical transverse design and detailing procedures for adjacent box girders that have demonstrated satisfactory performance over several years. The developed system is based on using transverse threaded ties at several locations according to the span length; grouted, partial-depth shear keys; and recesses as $^1/_4$ in. (6 mm) chamfer at the bottom edges of the girder to prevent spalling due to stress concentration.

The results of research conducted by the West Virginia DOT on several bridges that had joint fracture and topping cracks revealed that vertical shear failure in the key was due to poor grouting and inadequate transverse tie force.[8] As a result of this study, the West Virginia DOT follows certain guidelines:

- Post-tensioned high-strength ties are used.
- A pourable epoxy is used instead of a nonshrink grout in the shear key.
- The surfaces to be grouted are sandblasted.

Before 1992 in New York state, depths of shear keys were about 12 in. (300 mm) from the tops of the precast concrete girders.[9] Transverse tendons applying a compressive force of 30 kip (133 kN) were used across the width of a bridge. Spans up to 50 ft (15 m) long had no transverse tendons, but those from 50 ft to 75 ft (23 m) long had one transverse tendon at the center. For those longer than 75 ft, tendons were used only at the outer quarter points.

The bridge continuity in transverse direction was ensured by using a 6-in.-thick (150 mm), cast-in-place concrete deck slab reinforced with welded-wire reinforcement. A survey in 1990[8] indicated that 54% of such bridges built from 1985 to 1990 had developed longitudinal cracks over the shear keys. In 1992, two major changes were adopted in New York state's design standards:

- Shear keys were placed at almost the full depth of the precast concrete box girders.
- The number of transverse tendons was increased to three for spans less than 50 ft (15 m) and five for longer spans.

Since the changes were adopted, more than 100 bridges have been built statewide. In 1996, a survey was conducted to evaluate the effectiveness of implemented design changes. The survey indicated that only 23% of the bridges built from 1993 to 1996 experienced longitudinal cracks. This indicated the effectiveness of applying transverse post-tensioning to reduce cracking of the deck slab.[9]

The Ohio DOT constructed a high-performance concrete (HPC) adjacent-box-girder bridge.[10] This bridge was constructed as a replacement for a three-span bridge. The bridge used an experimental shear key at mid-depth of the cross section. The girders were tightened together using nonprestressed threaded rods located transversely through diaphragms at the ends and quarter points of the bridge.

The shear keys were grouted after tightening the transverse bars. The area above the shear key was filled with sand and a sealant to further guard against leakage. After constructing the entire bridge width, the bridge was subjected to an eccentric load of 120 kip (534 kN) using four Ohio DOT trucks filled with gravel. The researchers reported that the deflection profiles in the transverse direction showed that all of the girders were working together. In addition, while subjecting the bridge to eccentric load, the deflection on the loaded side was greater than that on the opposite side of the bridge width.

Miller et al.[11] and Hlavacs et al.[12] studied the performance of nonshrink grout and epoxy in shear keys. Nonshrink grout in shear keys close to the top edge of the girder experienced cracks before any load was applied. The researchers reported that these cracks developed because of temperature stresses. The use of epoxy grout made it possible to prevent cracking under either temperature or load effects, but the coefficient of its thermal expansion was two to three times greater than that of concrete.

Gulyas et al.[13] compared the behavior of nonshrink grout with the behavior of magnesium ammonium phosphate mortars in the shear keys. The researchers tested the component material in assemblies using different types of tests, such as vertical shear, direct tension, and longitudinal shear tests. The vertical shear test was intended to simulate the action of a vehicle wheel load on one member and no wheel load on the adjacent member. The direct tension test attempted to simulate the transverse shortening of the precast concrete member due to shrinkage and also to simulate the drying shrinkage that can occur in the keyway grout.

The longitudinal shear tests were performed in the direction parallel to the keyway to simulate the action of the prestressed concrete member shortening because of creep and shrinkage while the grout would not shorten to the same degree. In all tests, the magnesium ammonium phosphate–grouted assembles displayed an exceptionally higher failure load than the nonshrink grout composite assemblies.

In an attempt to overcome the problems associated with the failure of the shear keys, El-Esnawi[14] suggested a new shear-key design. The new design proposed moving the shear key from its position in the upper third of the gap closer to the midheight of the box-girder section. His experimental program included testing the current shear-key design against the proposed one while incorporating different grout materials such as nonshrink grout, magnesium ammonium phosphate mortar, and epoxy resin mortar in both of the designs. The test specimens were loaded gradually until failure.

El-Esnawi observed that the static-load capacity was almost tripled from the current shear-key design with the same grouting material. He reported that magnesium ammonium phosphate was sensitive to carbonated concrete surfaces, and it was difficult to provide a carbonate-free contact surface to prevent the chemical reaction with magnesium ammonium phosphate. The research also revealed that epoxy grout was a strong grouting material that had excellent adhesion with concrete. However, its preparation had many difficulties and its long-term behavior under different temperature changes was questionable.

Annamalai et al.[15] conducted an experimental program to investigate the effect of transverse post-tensioning on the behavior of small assemblies. The parameters studied were the number and thickness of shear keys and the level and distribution of the prestressing. They concluded that post-tensioning significantly improved the shear strength of grouted shear-key connections, and post-tensioned grouted shear-key connections exhibited a high degree of monolithic action.

Assemblies with three keys showed higher rigidity than specimens with two keys. Assemblies with a 1-in.-thick (25 mm) joint were found to have significantly higher shear strengths than specimens with 2-in.-thick (50 mm) joints for the same prestress level. The connections without shear keys and with a prestress of 800 psi (5520 kPa) had nearly the same shear strength as connections with shear keys and no prestress. Prestress in combination with shear keys provided superior performance. The shear strength was not significantly influenced by the distribution of prestress along the height of the specimen.

Stanton and Mattock[16] tested the strength of welded connectors acting alone and with grout keys. The experimental program involved six specimens. Each specimen consisted of two 6-in.-thick (150 mm) reinforced concrete slabs joined together at their edges using a 5-ft-long (1.5 m) shear key.

Stanton and Mattock concluded that the forces from the wheel loads were transferred through the shear key. The steel connectors carried shear forces induced before grouting because of differential camber, and tension forces because of shrinkage. They concluded that the strength of the shear key was affected by inclined cracking in the parts of the member flanges above and below the shear key rather than by failure of the grout itself. They recommended the use of transverse post-tensioning to improve the behavior of transverse connections.

Huckelbridge et al.[3] conducted a total of six field tests on three bridges with noncomposite topping and two field tests with composite cast-in-place concrete decks. One of the bridges was tested before and after repairing a severely deteriorated joint.

They reported that a relative displacement between the girders of more than 0.001 in. (0.025 mm) indicated failure in the shear key. The magnitude of relative displacement experienced by each bridge depended on the actual length of the fracture, stiffness of the girders, and magnitude and proximity of the wheel load to the failed joint. Relative displacements between 0.003 in. and 0.02 in. (0.075 mm and 0.50 mm) were observed at joints that indicated at least partially fractured shear keys. The results also revealed that tie bars had little to no impact on shear-key performance.

Issa et al.[17] tested a total of 36 full-scale specimens for vertical shear, direct tension, and flexural capacity. Four different grout materials were used to construct the shear keys in the specimens. The grout materials were set grout, set 45 for normal temperatures, set 45 for hot weather, and polymer concrete.

Polymer concrete was found to be the best material for transverse joints in terms of strength, bond, and mode of failure. However, they recommended the use of set grout in transverse deck joints due to its ease of use and satisfactory performance and polymer concrete in the joints subjected to excessive stresses or when quick repair is required.

Martin and Osburn[18] tested two precast, prestressed concrete–slab bridge models. Each model consisted of three adjacent precast, prestressed concrete slabs that were connected by two different types of transverse connections. The precast, prestressed concrete slabs had a cross section of 8 in. × 36 in. (200 mm × 910 mm), a length of 18 ft (5.5 m), and a span of 16 ft (4.9 m).

Each bridge model was tested by loading the two outer slabs cyclically at midspan by equal concentrated loads of 16 kip (71 kN), which was intended to simulate American Association of State Highway and Transportation Officials (AASHTO) HS-20 wheel loads.

In the first bridge model, the slabs were joined together by tie rods at the third point of the span, and the tie rods were tensioned to 12 kip (53 kN). The joints were grouted using high-strength, nonshrink grout.

In the second bridge model, the slabs were joined together with three welded connectors located at both supports and midspan. The joints were grouted using relatively low-strength, high-shrinkage grout.

In both bridge models, it was found that the moment resisted by each outer slab was about 33% greater than the moment resisted by the middle slab. Martin and Osburn concluded that a properly grouted shear key and either transverse tie rods or welded connectors are an effective way to transfer shear between adjacent members.

El-Shahawy[19] investigated the behavior of the transverse connections in the double-tee bridges. He tested a half-scale bridge model consisting of three 30-ft-long (8.2 m) double-tees. The transverse connections consisted of V-shaped joints between the girders filled with nonshrink portland cement grout and transverse post-tensioning strands. The developed stresses due to transverse post-tensioning strands were equal to 150 psi (1030 kPa) at the middle portion and 300 psi (2070 kPa) at the ends.

The behavior of the transverse connection was investigated by conducting several punching-shear tests on the deck slab followed by a load-distribution test across the entire bridge width. The results from all tests indicated that the selected level of transverse prestressing satisfied the design requirements. It was also concluded that transverse post-tensioning helped the slab achieve monolithic behavior.

According to the *AASHTO LRFD Bridge Design Specifications*,[20] the use of transverse mild-steel rods secured by nuts is not sufficient to achieve full transverse flexural continuity. Section 5.14.4.3.3d recommends a minimum effective post-tensioning pressure of 250 psi (1720 kPa) through the shear key. There is neither a rational justification for this value nor an adequate explanation regarding the area over which this pressure is applied when different shear keys are used.

The PCI subcommittee on adjacent-member bridges conducted a survey on the current practices in the design and construction of adjacent-box-girder bridges in United States and Canada.[9] This survey indicated that 29 states and 3 provinces are currently using adjacent-box-girder bridges.

Most of these transportation agencies have experienced premature reflective cracks in the wearing surface on the bridges built in the late 1980s and early 1990s. These agencies have emphasized the importance of eliminating these cracks that allow the penetration of water and deicing chemicals and lead to the corrosion of reinforcing steel in the sides and bottoms of concrete box girders. The states and provinces have recommended preventive actions based on the lessons learned in the past two decades:

- Cast-in-place concrete deck on top of the adjacent box girders can prevent water leakage and uniformly distribute the loads on adjacent box girders.

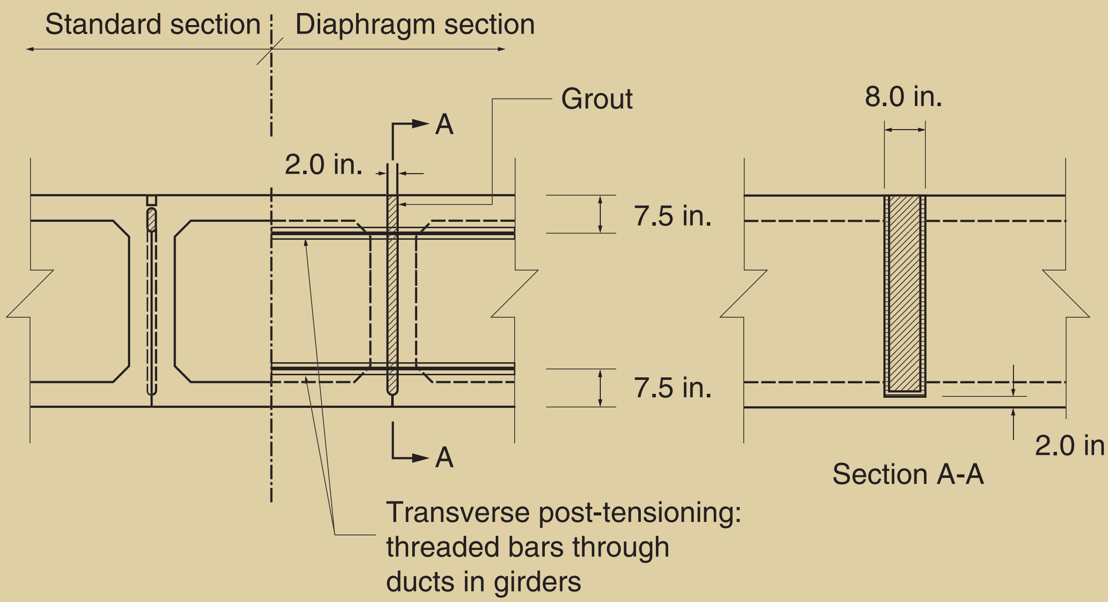

Figure 2. The transverse diaphragms are made continuous across the entire width of the bridge using grouted full-depth shear keys and post-tensioning tendons. Source: Figure 8.9.3-1. PCI Bridge Design Manual Steering Committee, *Precast Prestressed Concrete Bridge Design Manual* (Chicago, IL: PCI, 2003). Note: 1 in. = 25.4 mm.

- Nonshrink grout or the appropriate sealant instead of the conventional sand-cement mortar in the shear keys should be used in addition to blast cleaning of key surfaces prior to grouting. Also, a few states have recommended the use of full-depth shear keys due to their superior performance over the traditional top-flange keys.

- Transverse post-tensioning is recommended to improve load distribution and minimize differential deflections among adjacent box girders. Adequate post-tensioning should be applied after grouting the shear keys to minimize the tensile stresses that cause longitudinal cracking at these joints.

- End diaphragms should be used to ensure proper seating of adjacent box girders, and intermediate diaphragms should be used to provide the necessary stiffness in the transverse direction.

- Wide bearing pads under the middle of the box and sloped bearing seats that match the surface cross slope are recommended to eliminate the rocking of the box while grouting the shear keys.

- Adequate concrete cover and corrosion-inhibiting admixtures should be used in the concrete to resist the chloride-induced corrosion of reinforcing steel.

- It is recommended to eliminate the use of welded connections between adjacent box girders and to avoid dimensional tolerances that result in inadequate sealing of the shear keys.

PCI method

PCI's *Precast Prestressed Concrete Bridge Design Manual*[21] method was developed by El-Remaily et al.[6] and is reported in section 8.9 of the manual. In this method, the post-tensioning force required to achieve adequate stiffness in the transverse direction to keep differential deflection within the acceptable limit (0.02 in. [0.50 mm]) is calculated.

This method assumes that post-tensioned transverse diaphragms are the primary mechanism for the distribution of wheel loads across the bridge. Five diaphragms are provided in each span: one at each end, one at midspan, and one at each quarter point. Without diaphragms, each box girder must be designed to carry a full set of wheel loads without contribution from adjacent box girders. As a result, a large differential deflection between adjacent girders will take place and reflective cracking is generally expected. However, if the box girders are transversely connected using diaphragms, the loads are distributed over the entire bridge width, and the deflected shape becomes a smooth curve. The transverse diaphragms are made continuous across the entire width of the bridge using grouted, full-depth shear keys and post-tensioning tendons (**Fig. 2**).

To determine the required amount of post-tensioning, the bridge is analyzed using a grid model. A series of longitu-

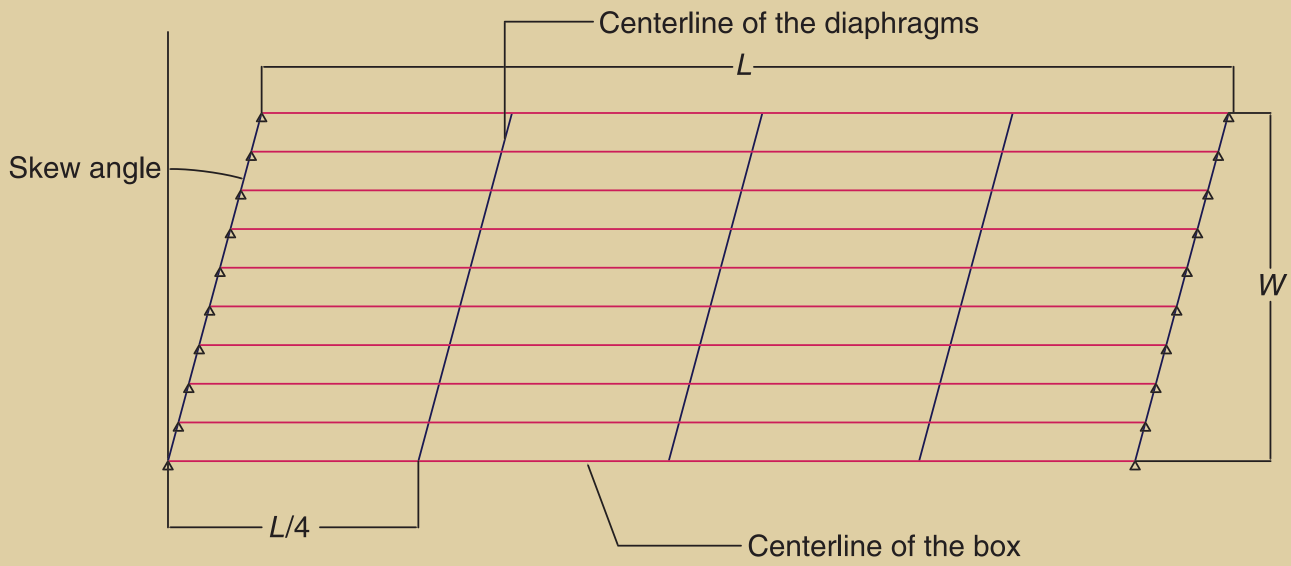

Figure 3. This drawing shows the grid analysis model. Note: L = span length; W = bridge width.

dinal girder elements located at the centerline of each box girder is used to represent the box girders, and a series of transverse girder elements located at the ends and quarter points is used to represent the diaphragms (**Fig. 3**). The joints between elements allow the transmission of shear, bending, and torsion. The weight of barrier rails and live loads are the main source of transverse bending moments generated in the diaphragms. This is because self-weight, deck weight, and wearing-surface weight are considered uniform on all of the elements and therefore do not generate any differential movements.

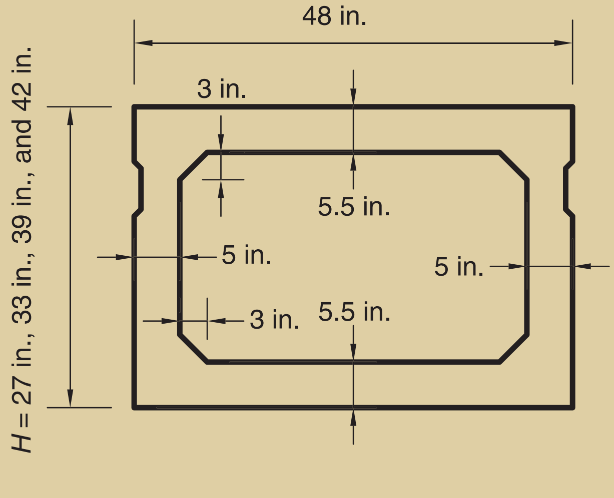

Figure 4. This drawing shows the American Association of State Highway and Transportation Officials' standard box girder used for developing the design charts currently available in the PCI *Precast Prestressed Concrete Bridge Design Manual.* Note: H = height of box girder. 1 in. = 25.4 mm.

Transverse post-tensioning force is calculated so that diaphragm concrete stresses due to both loads and post-tensioning are within the allowable limits (compression = 0.6 f_c' where f_c' is specified compressive strength of concrete and tension is 0). Tensile stresses are not permitted in the diaphragm in order to prevent possible cracking at the interface between precast concrete components and the grout at shear-key locations. Also, post-tensioning force is applied concentrically in the transverse direction because diaphragms experience significant alternating positive and negative bending moments under different loading conditions.

The design chart currently available in the PCI bridge design manual was developed for the AASHTO standard box girders in **Fig. 4** and **Table 1**, assuming mild skew angles (that is, less than 15 deg), average span lengths, and AASHTO HS-25 truck loading with impact.[6] New charts need to be developed to accommodate the cases of highly skewed bridges with different span lengths and using the AASHTO LRFD specifications truck and lane loads in addition to dynamic load allowance.[20]

Updated design charts and design equation

The updated design charts were developed using the same PCI method for the four standard AASHTO box girders in Fig. 4 and Table 1. For each girder, several combinations of bridge width, span length, and skew angle were considered. The AASHTO LRFD specifications for truck and lane live loads (HL-93) and dynamic load allowance (33% for truck load only) were applied in addition to 0.48 kip/ft (7.0 kN/m) for the self-weight of a solid concrete barrier.[20]

Table 1. Box beam properties

Type	Height H, in.	Area A, in.^{2}	Y_{bottom}	Moment of inertia I, in.^{4}
BI-48	27	692.5	13.37	65,941
BII-48	33	752.5	16.33	110,499
BIII-48	39	812.5	19.29	168,367
BIV-48	72	842.5	20.78	203,088

Note: Y_{bottom} = distance from bottom of girder to center of gravity. 1 in. = 25.4 mm.

Figure 5 shows the effective post-tensioning force versus bridge width for the four standard box girders, assuming a 0 deg skew angle and a span-to-depth ratio of 30. This graph indicates that for any girder depth, the wider the bridge, the higher the required post-tensioning force. It also indicates that the required force is higher in shallower girders than in deeper girders for the same bridge width. This is mainly to compensate for the reduction in the transverse stiffness due to the use of shallower diaphragms. Each line in Fig. 5 has two different curvatures. The first curvature represents the relationship when the negative moment controls the design, which occurs in the relatively narrow bridge widths (up to 52.0 ft [15.9 m]). The second curvature represents the relationship when the positive moment controls the design, which occurs in wider bridges.

Figure 6 shows the PCI bridge design manual design chart superimposed over the updated design chart. This graph indicates a significant increase in the required post-tensioning force (up to 40% in some cases) in the updated charts. This is mainly due to the use of the AASHTO LRFD specifications on live-load and dynamic-load allowance. This increase varies depending on the box-girder depth and the bridge width, and it is more noticeable in narrow bridges than in wide bridges. It should be noted that the PCI bridge design manual values correspond to a skew angle of 15 deg and average span length, while the proposed values correspond to a skew angle of 0 deg and a span-to-depth ratio of 30.

Figure 7 shows the required post-tensioning force versus bridge width for a 0 deg skew angle and span-to-depth ratios of 30 and 40. Although the effect of the span-to-depth ratio was evaluated for the four standard box girders, only the lines for the 27-in.-deep and 42-in.-deep (690 mm and 1070 mm) box girders were plotted for clarity. This plot indicates that the span-to-depth ratio has an insignificant and variable effect on the required post-tensioning force per unit length. As the span-to-depth ratio increased, the required prestressing force increased when the design

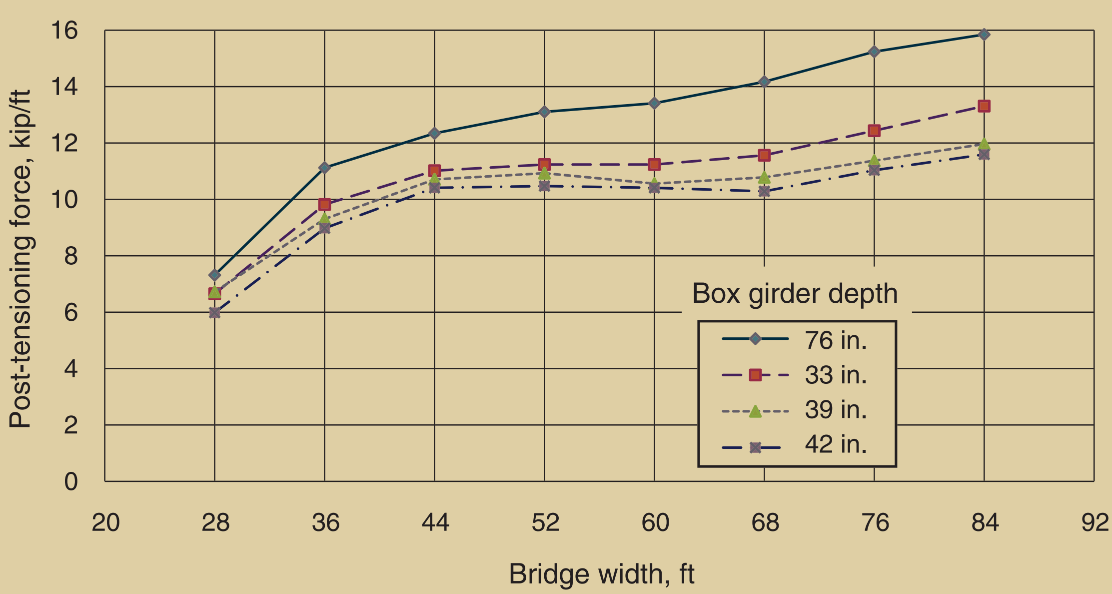

Figure 5. This graph shows the effect of bridge width on post-tensioning force at the midspan diaphragm for the four standard box girders assuming a 0 deg skew angle and a span-to-depth ratio of 30. Note: 1 in. = 25.4 mm; 1 ft = 0.305 m; 1 kip = 4.448 kN.

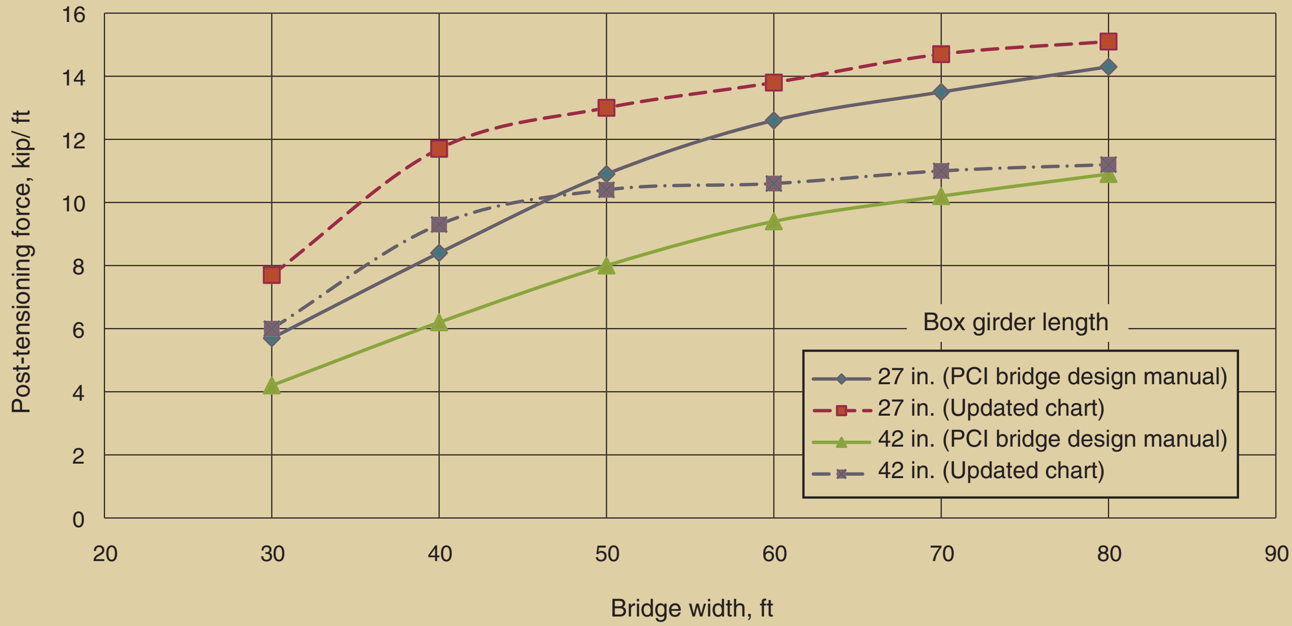

Figure 6. This graph compares the *Precast Prestressed Concrete Bridge Design Manual* design chart with updated charts showing the effect of bridge depth on post-tensioning force. Note: 1 in. = 25.4 mm; 1 ft = 0.305 m; 1 kip = 4.448 kN.

was positive-moment controlled, and decreased when the design was negative-moment controlled. This effect was more noticeable in the shallow girders.

Figure 8 shows the effect of skew angle on the required post-tensioning force at the midspan diaphragm for a bridge width of 52 ft (16 m) and a span-to-depth ratio of 30. Figure 8 indicates that the impact of the skew angle on the required post-tensioning force is minimal, especially on deep girders that usually correspond to longer spans. For shallow girders used in short-span bridges, as the skew angle increased the required post-tensioning force also increased.

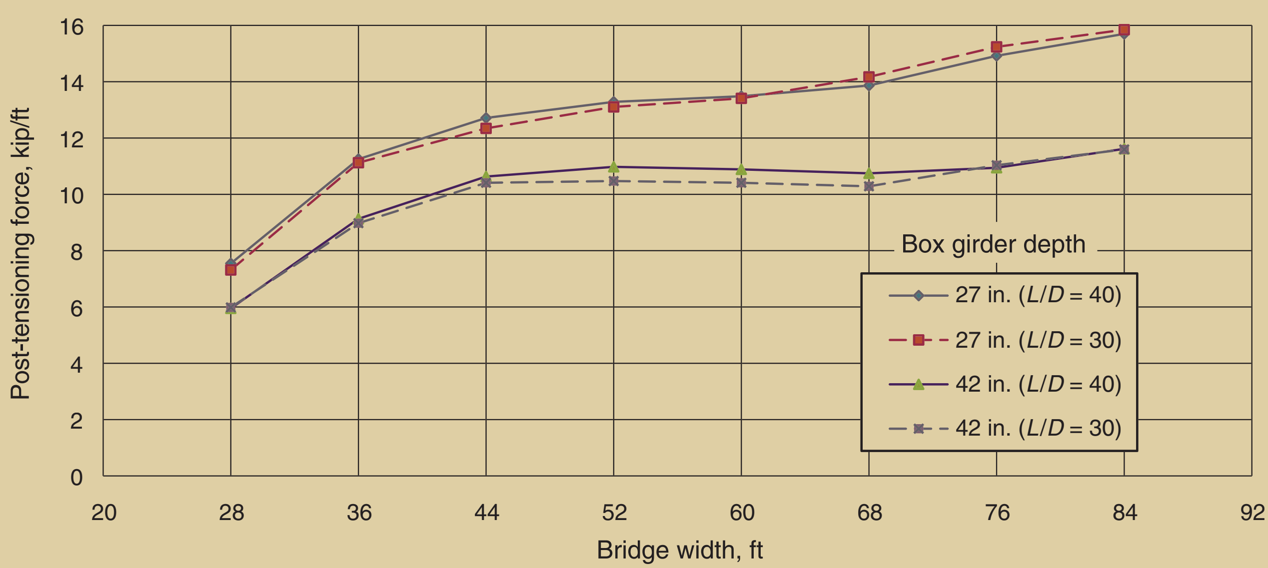

Figure 7. This graph shows the effect of the span-to-depth ratio on post-tensioning force at the midspan diaphragm for a 0 deg skew angle and span-to-depth ratios equal to 30 and 40. Note: D = depth; L = span. 1 in. = 25.4 mm; 1 ft = 0.305 m; 1 kip = 4.448 kN.

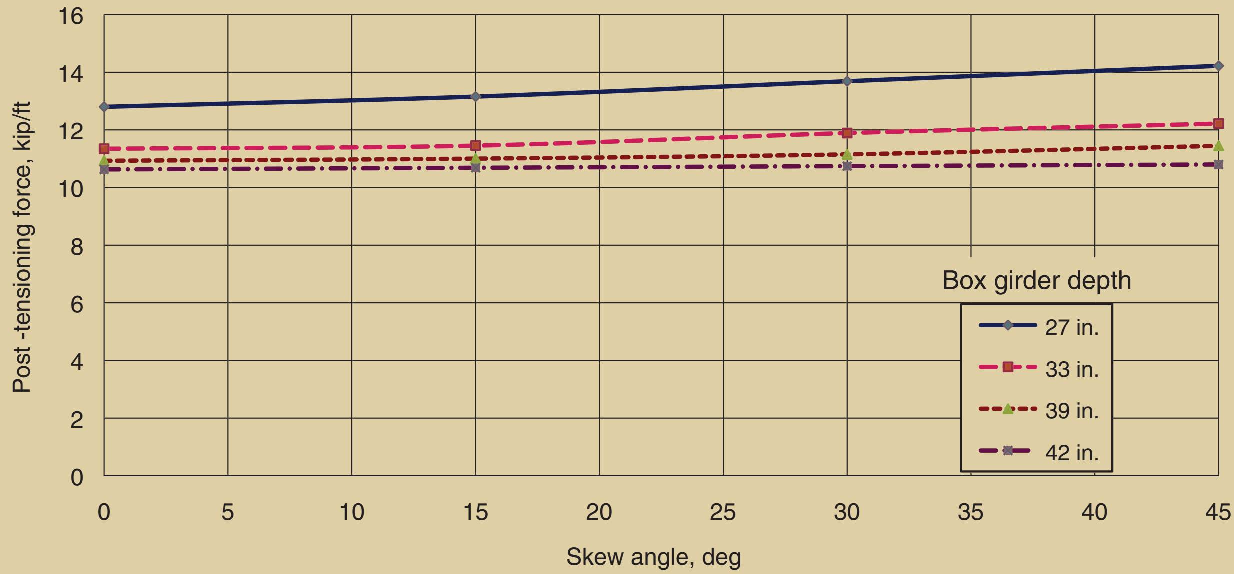

Figure 8. This graph shows the effect of the bridge skew angle on post-tensioning force for the midspan diaphragm for a bridge width of 52 ft and a span-to-depth ratio of 30. Note: 1 in. = 25.4 mm; 1 ft = 0.305 m; 1 kip = 4.448 kN.

Figures 5, 7, and 8 indicate that the bridge width and box-girder depth are the most important parameters in determining the required post-tensioning force per unit length of the bridge. Therefore, the designer should first estimate the force based on the bridge width and girder depth using the proposed design chart (Fig. 5). These values correspond to a span-to-depth ratio of 30 and a skew angle of 0 deg and should be corrected using Fig. 7 and 8, respectively, when different span-to-depth ratios or skew angles are used.

Data from the grid analysis were used to develop a simplified design equation for calculating the required post-

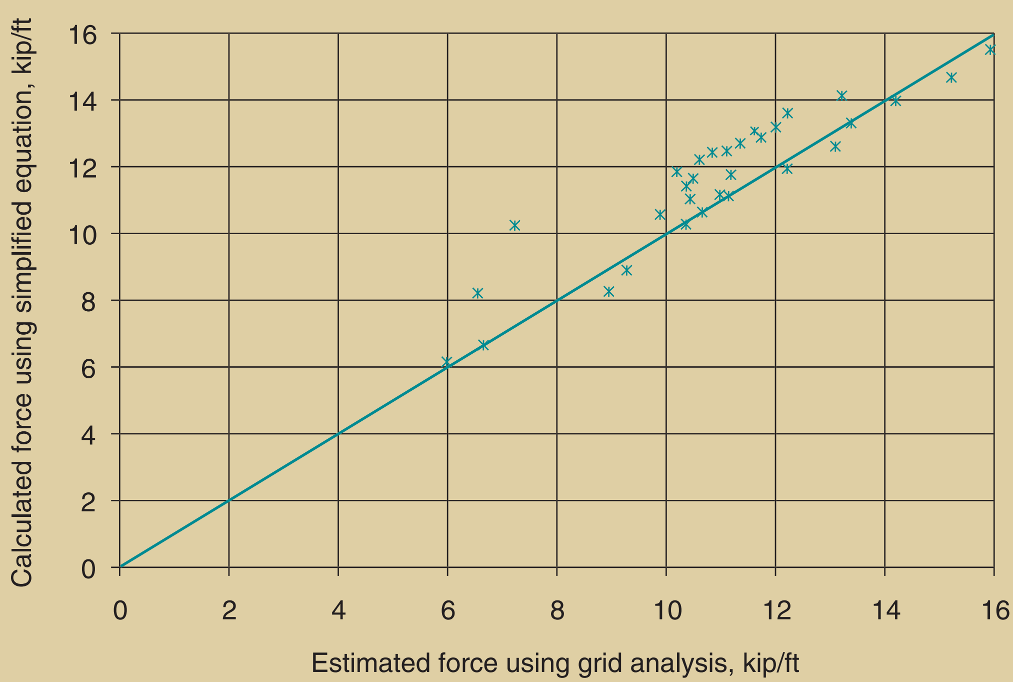

Figure 9. This graph compares the post-tensioning force estimated using grid analysis with the proposed equation. Note: 1 in. = 25.4 mm; 1 ft = 0.305 m; 1 kip = 4.448 kN.

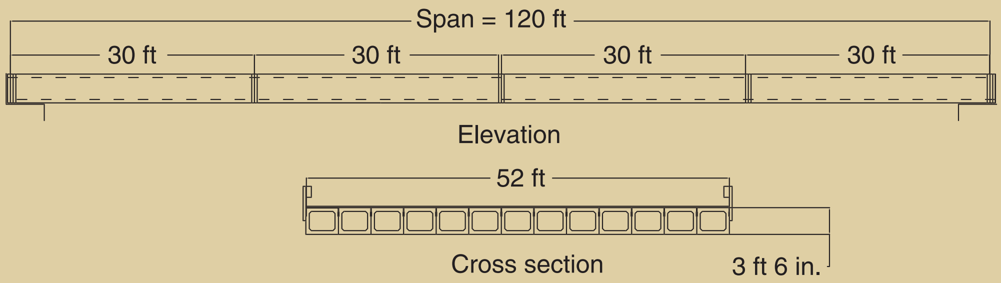

Figure 10. This drawing illustrates the bridge geometry for the design example. Note: 1 in. = 25.4 mm; 1 ft = 0.305 m.

tensioning force P (kip/ft) for the intermediate diaphragm per unit length of the bridge. The following equation was developed by fitting the data points obtained from the grid analysis of all cases. The first part of the equation represents the relationship when the negative moment controls the design, which occurs in smaller bridge widths (up to 52.0 ft [15.9 m]). The second part of the equation represents the relationship when the positive moment controls the design, which occurs in wider bridges. These relationships were assumed to be linear to eliminate sophisticated formulations.

$$P = \left(\frac{0.9W}{D} - 1.0\right) K_L K_S \le \left(\frac{0.2W}{D} + 8.0\right) K_L K_S$$

where

D = box depth

W = bridge width

K_L = correction factor for span-to-depth ratio

$= 1.0 + 0.003\left(\frac{L}{D} - 30\right)$

K_S = correction factor for skew angle more than 0 deg

$= 1.0 + 0.002\theta$

L = bridge span

θ = skew angle

To evaluate the accuracy of the simplified equation in fitting the analysis data, the post-tensioning force values obtained using the equation were compared with those obtained using the grid analysis for several combinations of bridge width and depth. Span-to-depth ratio and skew angle were kept constant to evaluate the accuracy of the basic equation without any correction factors. **Figure 9** shows that the simplified equation provides a conservative estimate of the required transverse post-tensioning force in most of the cases, with an average deviation of 7.7%.

Design example

The provided design example illustrates the design steps of the single-span bridge (**Fig. 10**).

Bridge data

Figure 10 shows the cross section and the elevation of the bridge.

Span = 120 ft (37 m)

Width = 52 ft (16 m)

Depth = 42 in. (1070 mm) (AASHTO LRFD specifications standard box girder)

Skew = 15 deg

Concrete strength

Precast concrete f_c' = 6000 psi (41 MPa)

Grout f_c' = 6000 psi (41 MPa)

Box girder section properties

Area A = 842.5 in.^{2} (543,600 mm^2)

Moment of inertia I = 203,088 in.^{4} (8.453×10^{10} mm^4)

Diaphragm section properties

The cross section of the diaphragms is rectangular. The depth of the diaphragm is equal to the depth of the box girder (42 in. [1070 mm]), and the width is 8 in. (200 mm)

A = 336 in.^{2} (216,800 mm^2)

I = 49,392 in.^{4} (1.68×10^{10} mm^2)

Loading

Dead load: curb and railing w = 0.48 kip/ft (7.0 kN/m)

Live load: HL-93 truck and lane load

Impact factor for truck load = 33%

Calculation of the required transverse post-tensioning force using working stresses analysis

The grid analysis was used to get the member forces. Moments of the midspan diaphragm were used for design calculations. The live-load positions were chosen to give the maximum positive and maximum negative moments. Allowable compressive strength due to effective prestress plus maximum load was calculated using the following equation.

$0.6 f_c' = 0.6(6000) = 3600$ psi (24,800 kPa)

Tension is not permitted. These stresses must be checked for both the maximum positive and maximum negative load cases:

- Positive-moment load case: the unfactored maximum positive moment is 147 kip-ft (199 kN-m).

$$f_{bot} = -\left(\frac{147(12)(1000)(21)}{49{,}392}\right) + \frac{P(1000)}{336} \geq 0$$

where

$P_{diaphragm} \geq 252$ kip (1121 kN)

f_{bot} = stress in bottom of diaphragm

$$f_{top} = -\left(\frac{147(12)(1000)(21)}{49{,}392}\right) + \frac{P(1000)}{336} \leq 3600$$

$P_{diaphragm} \leq 958$ kip (4381 kN)

f_{top} = stress in top of diaphragm

- Negative-moment load case: the unfactored maximum negative moment is 187 kip-ft (254 kN-m).

$$f_{top} = -\left(\frac{187(12)(1000)(21)}{49{,}392}\right) + \frac{P(1000)}{336} \geq 0$$

$P_{diaphragm} \geq 324$ kip (1441 kN)

$$f_{bot} = -\left(\frac{187(12)(1000)(21)}{49{,}392}\right) + \frac{P(1000)}{336} \leq 3600$$

$P_{diaphragm} \leq 890$ kip (3959 kN)

Based on the previous calculations, the total required transverse post-tensioning force per diaphragm is 324 kip (1440 kN). The total required transverse post-tensioning force per foot of the bridge is 324/30, which equals 10.8 kip/ft (158 kN/m).

According to section 5.14.4.3.3d of the AASHTO LRFD specifications and using the area of the full-depth vertical shear key as the contact area, the minimum required transverse post-tensioning force per diaphragm is equal to 0.25(8)(42 - 2), or 80 kip (360 kN). This is low because it represents only 25% of the force calculated using the updated PCI method. If the entire side of the box is used as the contact area, the minimum required transverse post-tensioning force per diaphragm is 0.25(30)(12)(42), or 3780 kip (16,800 kN). This is extremely high because it is 10 times the force calculated using the updated PCI method.

Calculation of the required transverse post-tensioning force using the developed equation

From the proposed equation, the required transverse post-tensioning force is calculated as follows.

$$K_L = 1.0 + 0.003\left(\frac{L}{D} - 30\right)$$

$$= 1.0 + 0.003\left(\frac{120(12)}{42} - 30\right) = 1.013$$

$K_s = 1.0 + 0.002\theta = 1.0 + 0.002(15) = 1.03$

The required post-tensioning force:

$$P = \left(\frac{0.9W}{D} - 1.0\right)K_L K_S \leq \left(\frac{0.2W}{D} + 8.0\right)K_L K_S$$

$$= \left(\frac{0.9(52)(12)}{42} - 1.0\right)(1.013)(1.03)$$

$$\leq \left(\frac{0.2(52)(12)}{42} + 8.0\right)(1.013)(1.03)$$

$= 12.9 \leq 11.5 \therefore P = 11.5$ kip/ft (168 kN/m)

$P_{diaphragm} = 11.5(30) = 345$ kip (1535 kN)

Required prestressing strands

Two tendons will be used in each diaphragm. The required area of post-tensioning force A_{ps} is calculated by dividing the required force $P_{diaphragm}$ by the effective prestress f_s', which is assumed to be 55% of the ultimate strength of the strands f_{pu}.

A_{ps} = 345/(0.55 × 270) = 2.32 in.^{2} (15.0 mm^2)

Try six 0.6-in.-diameter strands at each tendon. The total area is 2.604 in.^{2} (16.80 mm^2), which is acceptable.

Conclusion

Based on the results of the parametric study and the comparison of the updated design chart with the existing PCI bridge design manual design chart, several conclusions are made:

- The latest AASHTO LRFD specifications for live-load and dynamic-load allowance cause a significant increase (up to 40% in some cases) in the required transverse post-tensioning force for adjacent-box-girder bridges.

- The bridge width and girder depth have the most significant effect on the required transverse post-tensioning force. For any girder depth, an increase in the bridge width is accompanied by a higher post-tensioning force. Also, the required force is higher in shallower girders than in deeper girders for the same bridge width.

- Span-to-depth ratio has a variable effect on the required transverse prestressing force per unit length. As the span-to-depth ratio increases, the required prestressing force also increases when positive moment controls the design, and less prestressing force is required when negative moment controls. This effect is more noticeable in the shallow girders.

- Skew angle has a minimal effect on the required transverse post-tensioning force, especially on deep girders that usually correspond to longer spans. For shallow girders used in short-span bridges, greater skew angles require more transverse post-tensioning force.

- The simplified design equation provides the required transverse post-tensioning force per unit length of the bridge as a function of its width and box-girder depth and accounts for the span-to-depth ratio and skew angle using correction factors. The average deviation of the values calculated using the simplified equation and the grid analysis results is 7.7%.

Acknowledgments

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Notation

A = area

A_{ps} = required area of post-tensioning force

D = depth

f_{bot} = stress in bottom of diaphragm

f_c' = specified compressive strength of concrete

f_{pu} = ultimate strength of the strand

f_s' = effective prestress

f_{top} = stress in top of diaphragm

H = height

I = moment of inertia

K_L = correction factor for span-to-depth ratio

K_S = correction factor for skew angle more than 0 deg

L = bridge span

P = post-tensioning force per unit length of the bridge

$P_{diaphragm}$ = post-tensioning force on the diaphragm

w = dead load of curb and railing

W = bridge width

Y_{bottom} = distance from bottom of girder to center of gravity

θ = skew angle

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Synopsis

Precast, prestressed concrete adjacent box girders are widely used in short- and medium-span bridges. Rapid construction and low construction cost are the main attractions of this system. Also, the continuous flat soffit and relatively high span-to-depth ratio make this system aesthetically pleasing.

However, reflective cracking and leakage have been reported along the longitudinal joints between adjacent box girders in a number of bridges. The cracking and leakage are mainly due to inadequate design and detailing of the transverse connection between adjacent box girders, which eventually leads to excessive differential displacement and rotation of adjacent box girders. The reflective cracking and leakage allow chloride-induced corrosion of reinforcing steel and prestressing strand and premature deterioration of the bridge superstructure.

This paper presents a review of the various practices in the transverse design and detailing of adjacent-box-girder bridges. The basis for calculating the transverse post-tensioning force according to PCI's *Precast Prestressed Concrete Bridge Design Manual* is discussed. Design charts and equations were developed for various combinations of span length, bridge width, skew angle, and girder depth using the latest loading from *AASHTO LRFD Bridge Design Specifications*. These aids may be viewed as an update to the information in section 8.9 of the PCI bridge design manual, which was based on an earlier version of the AASHTO standard specifications.

Keywords

Adjacent box girder, bridge deterioration, grid analysis, longitudinal joint, rapid construction, shear key, transverse design.

Review policy

This paper was reviewed in accordance with the Precast/Prestressed Concrete Institute's peer-review process.

Reader comments

Please address any reader comments to *PCI Journal* editor-in-chief Emily Lorenz at elorenz@pci.org or Precast/Prestressed Concrete Institute, c/o *PCI Journal*, 209 W. Jackson Blvd., Suite 500, Chicago, IL 60606.

APPENDIX D – STRUCTURAL TECHNOLOGIES, LLC, “V-WRAP C200HM HIGH MODULUS CARBON FIBER FABRIC”

Strengthening Solutions

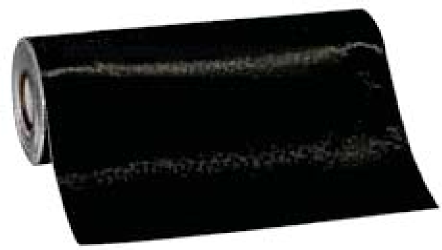
V-Wrap™ C200HM

High Modulus Carbon Fiber Fabric

structural TECHNOLOGIES
structuraltechnologies.com
+1-410-859-6539

Typical Data for V-Wrap C200HM

Storage Conditions:	Store dry at 40°F – 90°F (4°C – 32°C)
Color:	Black
Primary Fiber Direction:	0° (unidirectional)
Weight:	17.7 oz/yd² (600 g/m²)
Shelf life:	10 years



Fiber Properties (Dry)

Tensile Strength:	790,000 psi (5,440 MPa)
Tensile Modulus:	42 x 10^6 psi (289,550 MPa)
Elongation:	1.9 %

Cured Laminate Properties	Average Values	Design Values*
Tensile Strength:	180,000 psi (1,241 MPa)	155,000 psi (1,068 MPa)
Modulus of Elasticity:	14.24 x 10^6 psi (98,181 MPa)	14.0 x 10^6 psi (96,527 MPa)
Elongation at Break:	1.27%	1.1%
Thickness:	0.04 in. (1.02 mm)	0.04 in. (1.02 mm)
Strength per Unit Width:	7,200 lbs/in. (1.26 kN/mm)	6,200 lbs/in. (1.09 kN/mm)

*Design properties are based on ACI 440.2R using average minus three standard deviations.

Description:

V-Wrap C200HM is a unidirectional carbon fiber fabric with fiber oriented in the 0° direction. V-Wrap C200HM system is field laminated using environmentally friendly, two-part 100% solids and high strength structural adhesives to form a carbon fiber reinforced polymer (CFRP) system used to reinforce structural elements.

Product Uses:

V-Wrap strengthening systems can be used to resolve strength deficiencies and increase the load carrying capacity of building, bridges, silos, chimneys, and other structures.

Loading Increases:

- Increasing the live loads capacity of floor systems
- Increasing shear and flexural strengths of reinforced and prestressed beams
- Increasing the axial capacity of columns
- Increasing the live load capacity of parking garages

Seismic Strengthening:

- Column confinement for ductility improvement
- Masonry and concrete shear walls strengthening

Damage to Structural Parts:

- Correct strength deficiency due to deterioration and corrosion
- Restore strength of structural elements damaged by fire

Change in Structural System:

- Load redistribution due to removal of walls, beams or columns
- Removal of slab sections for new openings

Design or Construction Defects:

- Insufficient amount of shear or flexural reinforcement
- Insufficient size and/or layout of reinforcement
- Insufficient reinforcing bar or lap splice length
- Low compressive strength in beams, slabs, and columns

Advantages:

- ICC-ES ESR-3606 listed product
- 0% VOC
- 100% Solvent free
- Non-corrosive reinforcement system
- Lightweight flexible fabric can be wrapped around complex shapes
- Used for shear, confinement or flexural strengthening
- High strength and high modulus
- Light weight
- Reduces crack width
- Alkali resistant
- Low aesthetic impact

Packaging:

Fabric: 24 in. width x 150 ft rolls
0.61 m width x 45.7 m rolls

V-Wrap™ C200HM

High Modulus Carbon Fiber Fabric

structural TECHNOLOGIES
structuraltechnologies.com
+1-410-859-6539

How To Use:

Design:

Design should comply with ACI 440.2R or recognized design/ specification entity and is typically based on CFRP contribution determined by detailed analysis. Design values will vary based on project requirements and applicable environmental and strength reduction factors. Contact STRUCTURAL TECHNOLOGIES to determine applicable design factors.

Surface Preparation:

Surfaces to receive V-Wrap C200HM must be clean and sound. It must be dry and free of frost. All dust, laitance, grease, curing compounds, waxes, deteriorated materials, and other bond inhibiting materials must be removed from the surface prior to application. Existing uneven surfaces must be filled with appropriate epoxy putty or repair mortar. Use abrasive blasting, pressure wash, shotblast, grind or other approved mechanical means to achieve an open-pore texture with a concrete surface profile of CSP-3 or better (ICRI). In certain applications and at the engineer's discretion, the bond between the substrate and the fabric may be determined to be non-critical (such as in column confinement applications). All corners must be rounded to 1/2" radius minimum. A minimum overlap [or lap splice] of 6" is required to achieve continuity. The adhesive strength of the concrete may be verified after surface preparation by random pull-off testing (ASTM D7522) at the discretion of the engineer. Minimum tensile strength of 200 psi must be achieved.

Cutting V-Wrap C200HM:

Fabric can be cut to appropriate length by using a commercial quality heavy-duty scissors.

Application:

Installation of the V-Wrap C200HM strengthening system should be performed only by a specially trained, approved contractor. The V-Wrap C200HM strengthening system shall consist of V-Wrap C200HM carbon fabric and V-Wrap epoxy resins such as: V-Wrap 600, V-Wrap 700S, and V-Wrap 770.

Note the specified number of plies, ply widths, and fiber orientation. Mix resin components using recommended procedures on product datasheet. Apply one coat of V-Wrap epoxy as a primer to the surface using a nap roller. Fill minor concrete defects such as bug holes and other imperfections using V-Wrap 770 epoxy mixed with fumed silica (thickened epoxy) or V-Wrap PF putty. Apply thickened epoxy or putty using a roller or trowel to prime surface. Adjust the gap between saturator rollers to approximately 42 mils. Using a saturator machine, pre-saturate the appropriate length of V-Wrap C200HM with V-Wrap epoxy adhesive as a saturant. Install the saturated FRP sheet. Use a rib roller to remove all air pockets and ensure intimate contact with the surface. If a splice is needed, a minimum 6" overlap is required. On multiple plies with splices, stagger the splice locations. If required, apply topcoat material.

Limitations:

- Design calculations must be approved by a licensed professional engineer.
- System is a vapor barrier.
- Concrete deterioration and steel corrosion must be resolved prior to application.
- Minimum application temperature is 40°F.

Storage:

Store material in a cool, dark space. Low humidity is recommended.

Handling:

Approved personal protection equipment should be worn at all times. Particle mask is recommended for possible airborne particles. Gloves are recommended when handling fabrics and resins to avoid skin irritation. Safety glasses are recommended to prevent eye irritation. Wear chemical resistant clothing/gloves/goggles. Ventilate area. In absence of adequate ventilation, use properly fitted NIOSH respirator.

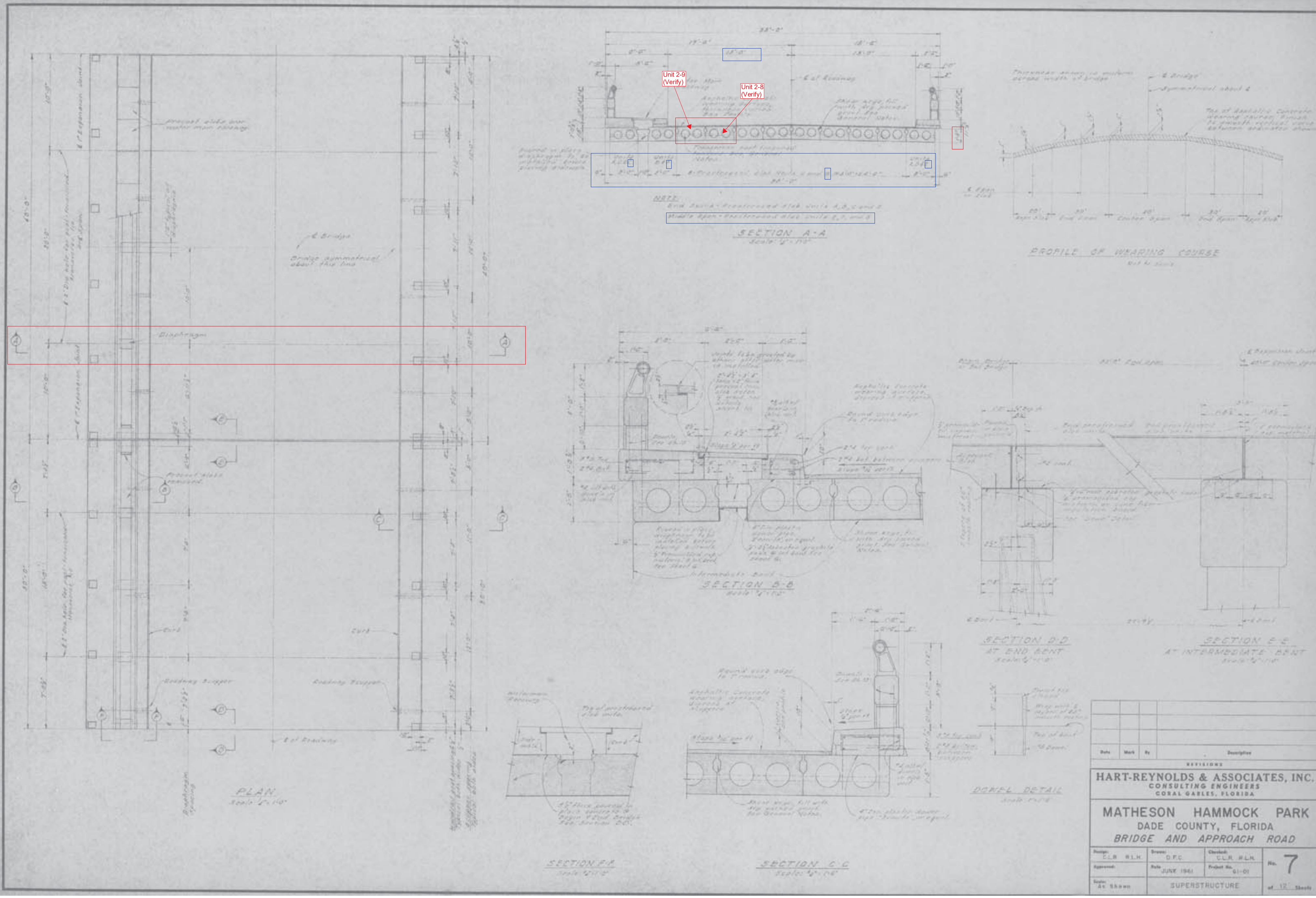
Cleanup:

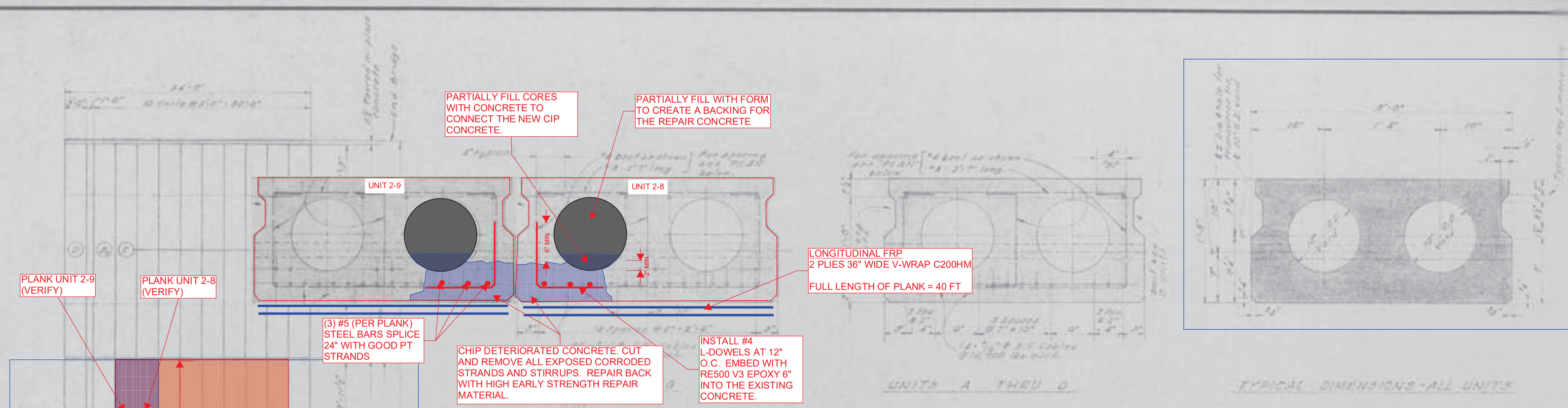
Dispose of material in accordance with local disposal regulations. Uncured material can be removed with approved solvents. Cured materials can only be removed mechanically.

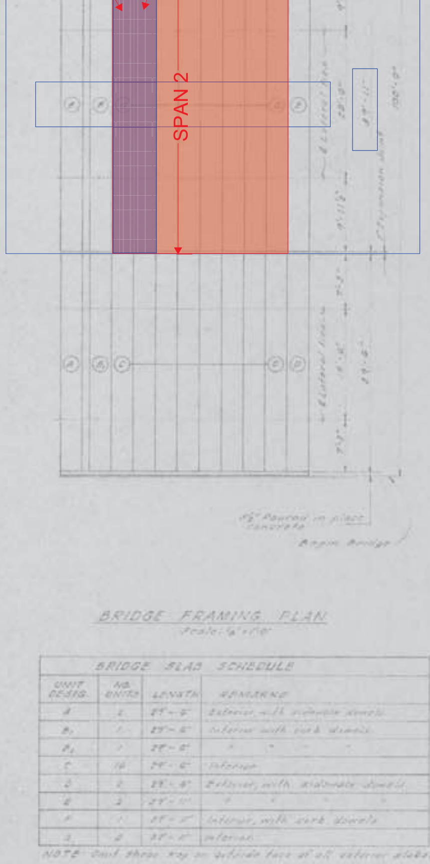
First Aid:

In case of skin contact, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water; contact physician immediately. For respiratory problems, remove to fresh air. Wash clothing before reuse.

APPENDIX E – STRUCTURAL TECHNOLOGIES, LLC., PRELIMINARY BRIDGE REPAIR RECOMMENDATIONS


SECTION A-A
NOTE:
End Spans - Prestressed slab Units A, B, C and D
Middle Span - Prestressed slab Units E, F, and G
Unit 2-9 (Verify)
Unit 2-8 (Verify)
PROFILE OF WEARING COURSE
PLAN
Diaphragm
SECTION B-B
SECTION D-D
AT END BENT
SECTION E-E
AT INTERMEDIATE BENT
SECTION F-F
SECTION C-C
DOWEL DETAIL
REVISIONS
Date
Mark
By
Description
HART-REYNOLDS & ASSOCIATES, INC.
CONSULTING ENGINEERS
CORAL GABLES, FLORIDA
MATHESON HAMMOCK PARK
DADE COUNTY, FLORIDA
BRIDGE AND APPROACH ROAD
Design: C.L.R. R.L.H.
Drawn: D.F.C.
Checked: C.L.R. R.L.H.
Date: JUNE 1961
Project No. 61-01
Scale: As Shown
SUPERSTRUCTURE
No. 7
of 12 Sheets





2021-10-01 MATHESON HAMMOCK ROAD OVER MH CANAL

PROPOSED REPAIR/STRENGTHENING

1. (2) PLANKS - UNIT 2-8 AND UNIT 2-9 AT SECOND SPAN.

2. REMOVE ALL DELAMINATED/SPALLED CONCRETE DOWN TO SOUND CONCRETE. THE EXTENT/LENGTH OF REPAIR WILL BE DEPENDENT ON THE DAMAGE/COROSSION IN THE STRANDS (REFER TO ITEM 4).

3. CUT AND REMOVE SIGNIFICANTLY CORRODED STEEL. EXPOSE AT A MIN. 3 FT OF SOUND PRESTRESSING STRANDS ON BOTH ENDS OF THE REPAIR AREA. NOTE THERE ARE UP TO (7) PT STRANDS AFFECTED BY DAMAGED/REPAIR WHICH NEEDS TO BE EXPOSED.

4. APPLY CORROSION INHIBITORS TO ALL EXPOSED STEEL TO PREVENT FUTURE CORROSION.

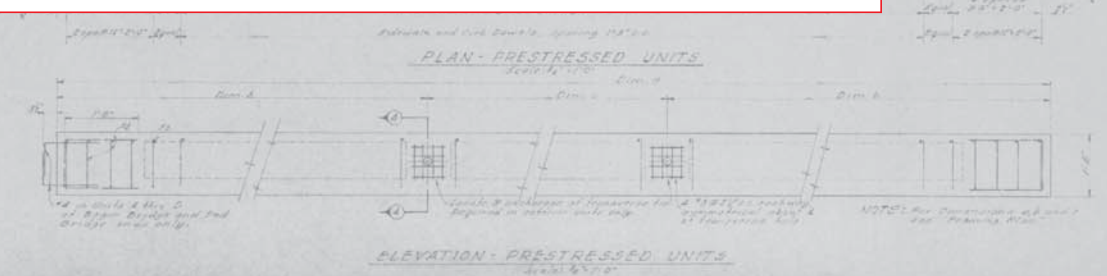
5. INSTALL NEW LONGITUDINAL STEEL AND L-DOWELS, AS SHOWN. SPLICE LONGITUDINAL STEEL WITH THE PT STRANDS 30".

6. PARTIALLY FILL THE CORES WITH FOAM MATERIAL AS SHOWN TO CREATE A BACKING FOR THE REPAIR CONCRETE.

7. FORM AND PUMP HIGH EARLY STRENGTH CONCRETE REPAIR MATERIAL WITH MIN. F'C-6000 PSI.

8. INSTALLV-WRAP FRP REINFORCEMENT AS SHOWN.

9. APPLY 2 COATS OF TSTRATA TC TO BOTTOM OF THE TWO UNITS (CONCRTE AND FRP).



REVISIONS

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CONSULTING ENGINEERS
CORAL GABLES, FLORIDA

MATHESON HAMMOCK PARK
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Design: C.L.R. R.L.H.	Drawn: D.F.C.	Checked: C.L.R. R.L.H.	No. 8
Approved:	Date: JUNE 1961	Project No. 61-01	
Scale: As Shown	PRESTRESSED SLAB UNITS		of 12 Sheets