Load Rating Analysis
Report of Findings

CLINE AVENUE BRIDGE
S.R. 912 OVER THE INDIANA HARBOR CANAL
AT EAST CHICAGO, INDIANA
LAKE COUNTY

Prepared by:

URS

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INDIANA DOT – LOAD RATING ANALYSIS
REPORT OF FINDINGS
CLINE AVENUE BRIDGE – CONCRETE CAST-IN-PLACE BOX STRUCTURE

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1. INTRODUCTION

The following report summarizes the load rating evaluations performed for the Cline Avenue Bridge (SR 912) shown in Figures 1.1 through 1.13. The mainline, built in 1983 and located in East Chicago, Indiana, consists of six segments carrying 27 spans of eastbound and 28 spans of westbound traffic across the Indiana Harbor Canal, Riley Road, and various local railroad tracks. A one-inch gap separates the 56′-0″ wide (average width) eastbound and westbound segments for all mainline segments except Segment 1. Segment 1 is a continuous deck supported by three cast-in-place single cell post-tensioned concrete box girders. Segments 2 through 6 are a combination of various double cell and twin single cell cast-in-place post-tensioned concrete box girders.

Ramps A through D were also built in 1983 and are comprised of a combination of single and double cell cast-in-place, post-tensioned concrete box girders. Ramp A varies in width from 28′-4″ to 48′-4″ and Ramps B through D are a constant width of 28′-4″. The ramps carry traffic to and from the mainline Cline Avenue Bridge (SR 912) and Riley Road.

Figure 1.1 – Aerial View of the Cline Avenue Bridge – East Chicago, IN

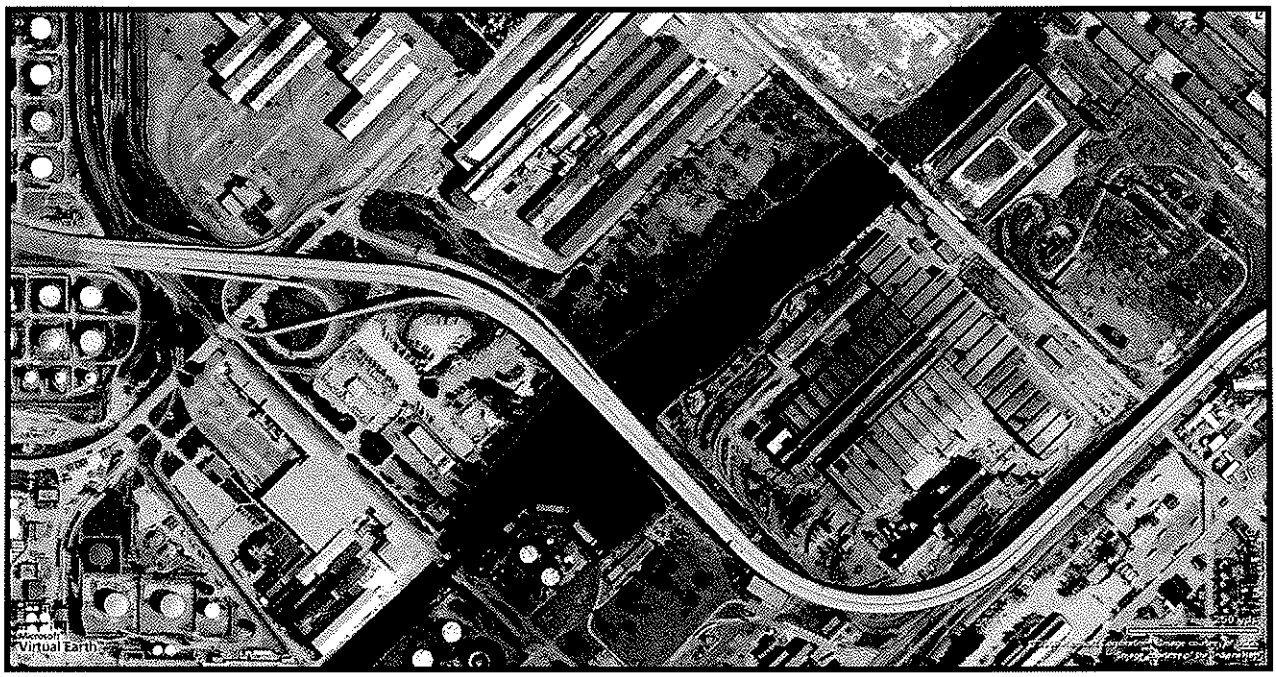
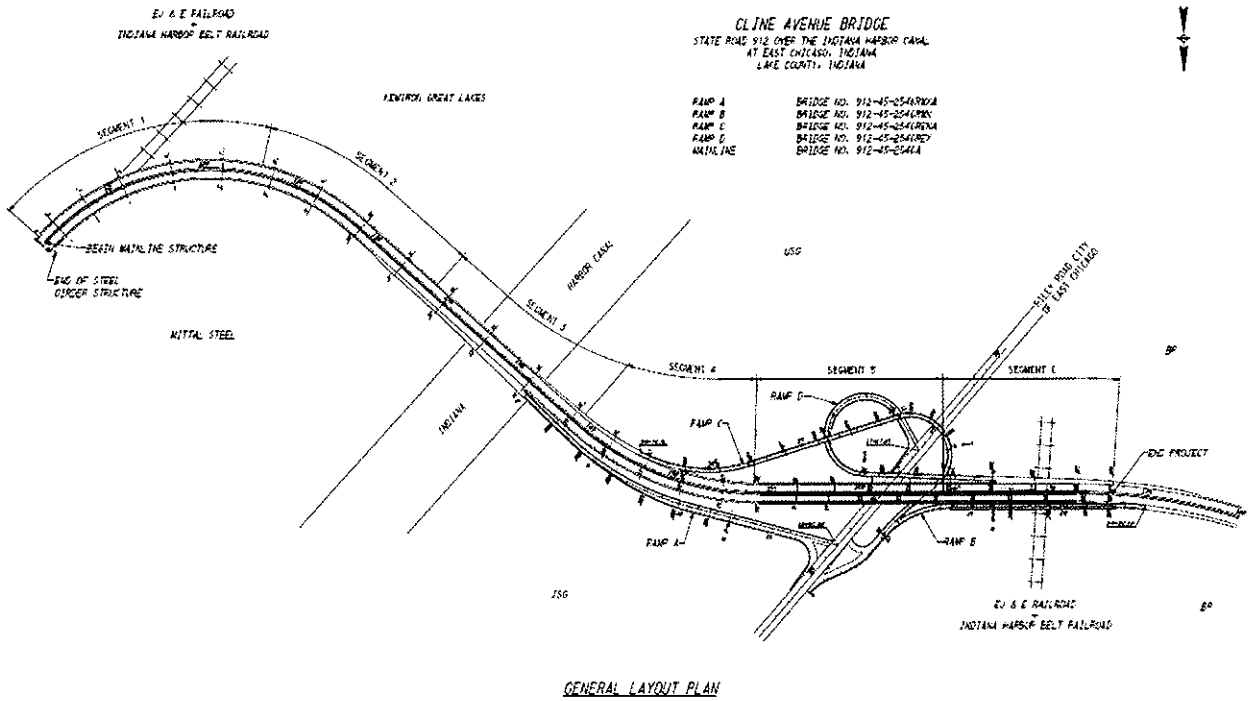


Figure 1.2 – General Plan



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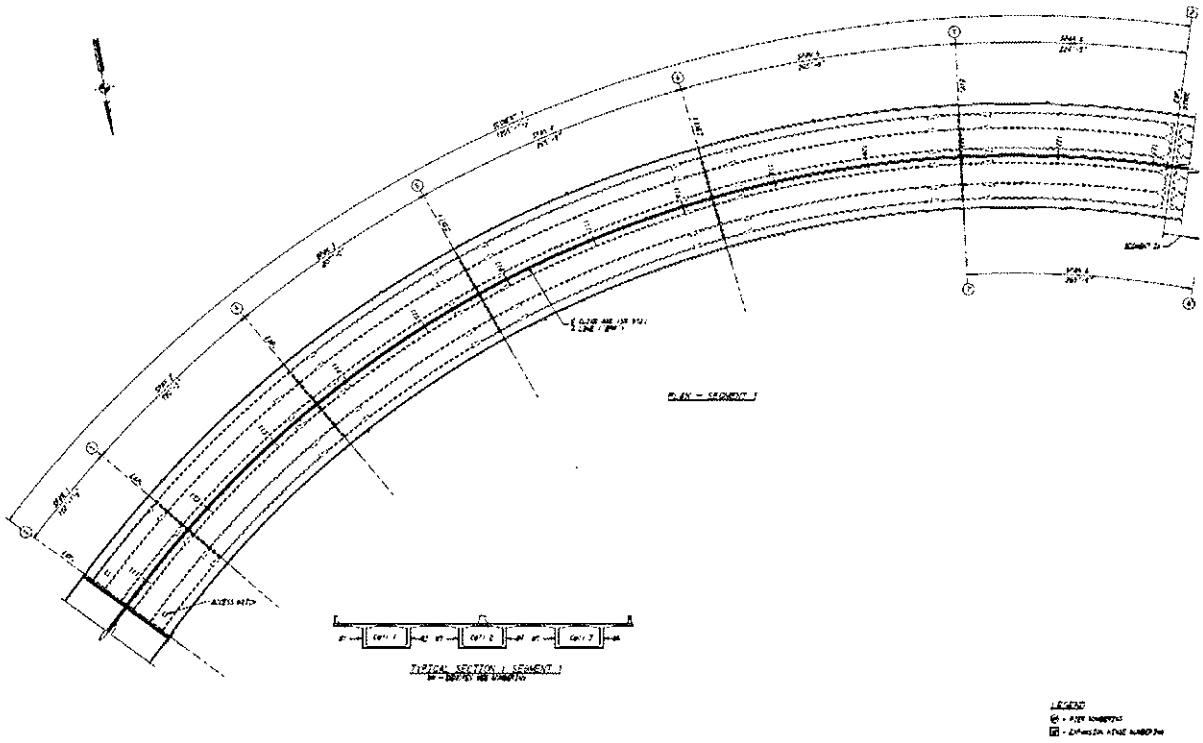


Figure 1.4 – Plan—Segment 2

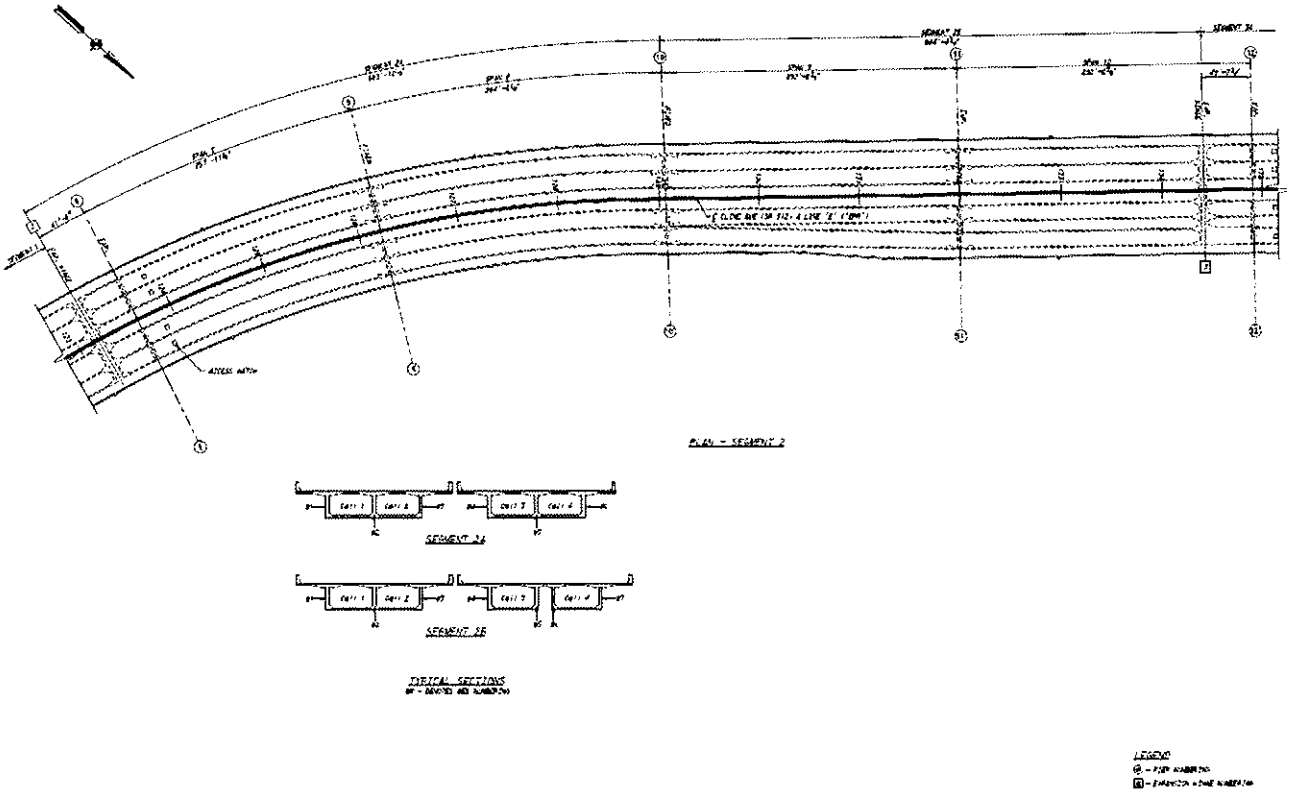


Figure 1.5 – Plan—Segment 3

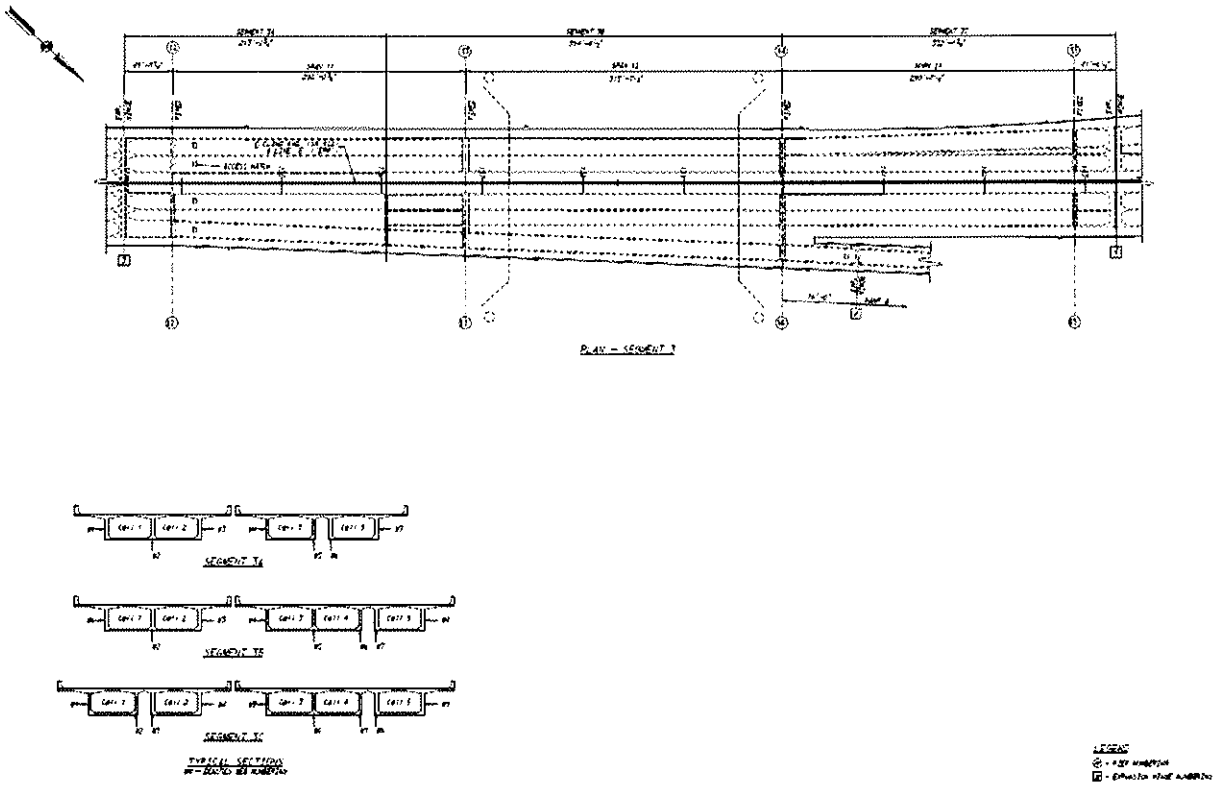
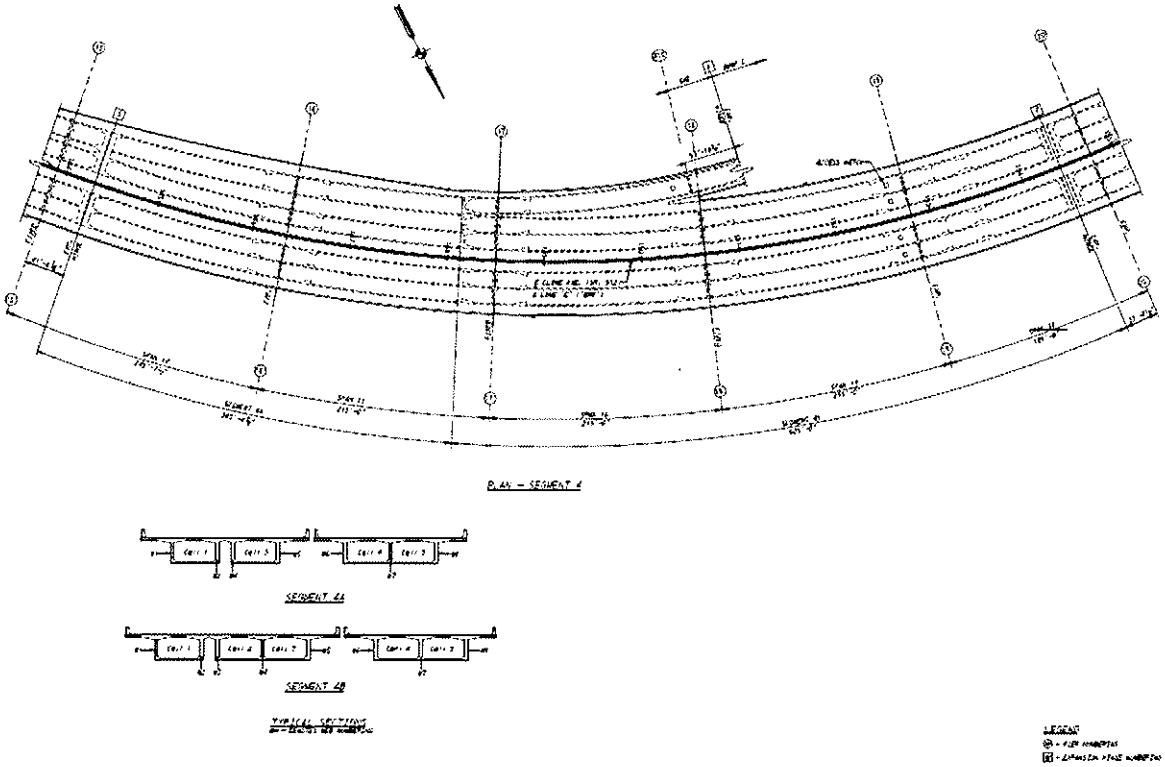


Figure 1.6 – Plan—Segment 4



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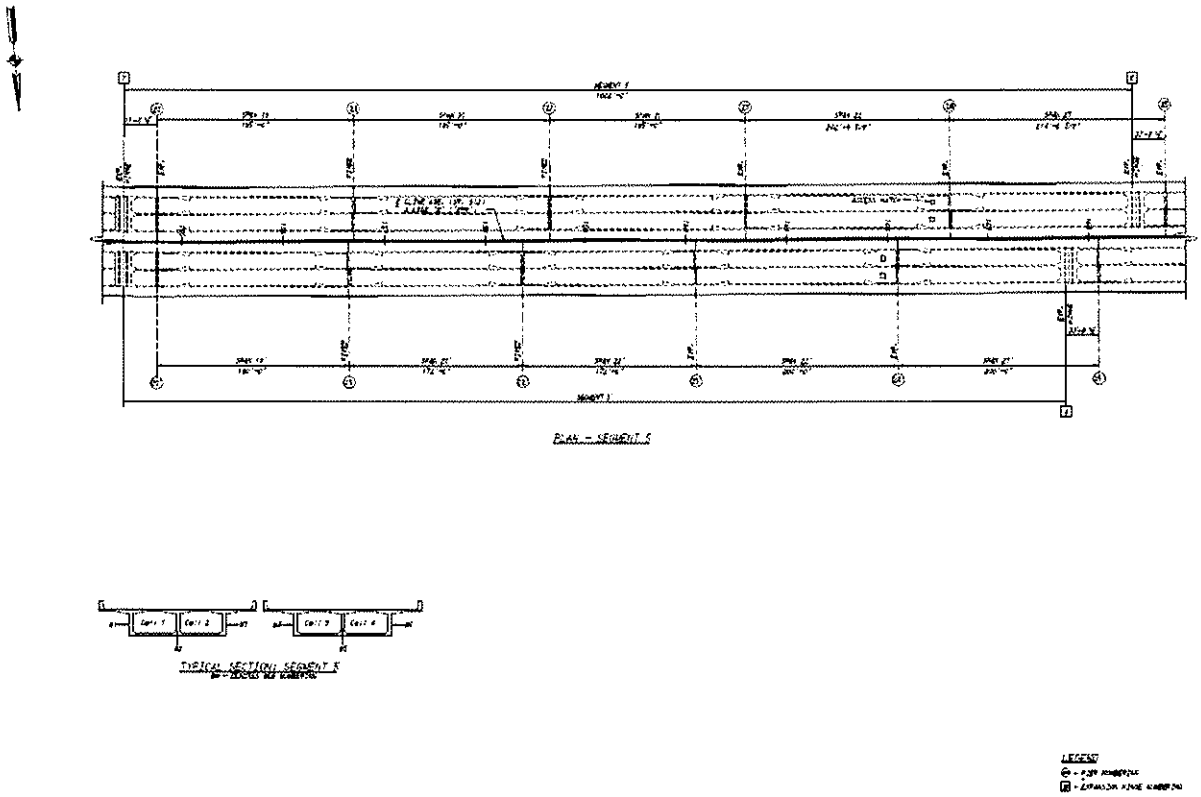

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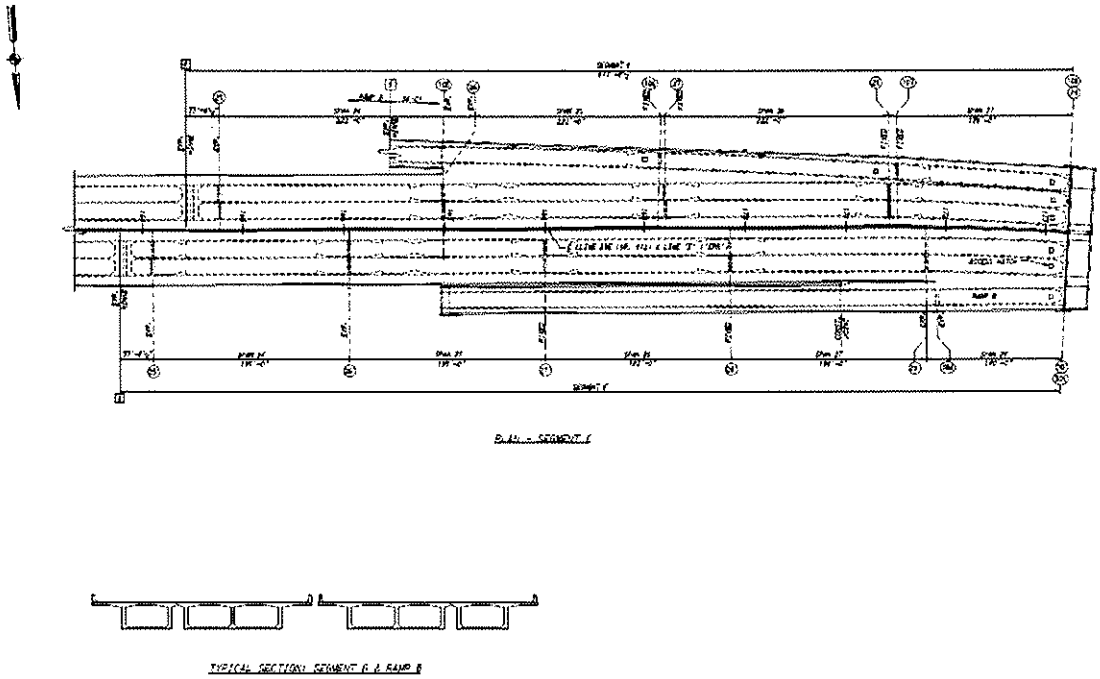
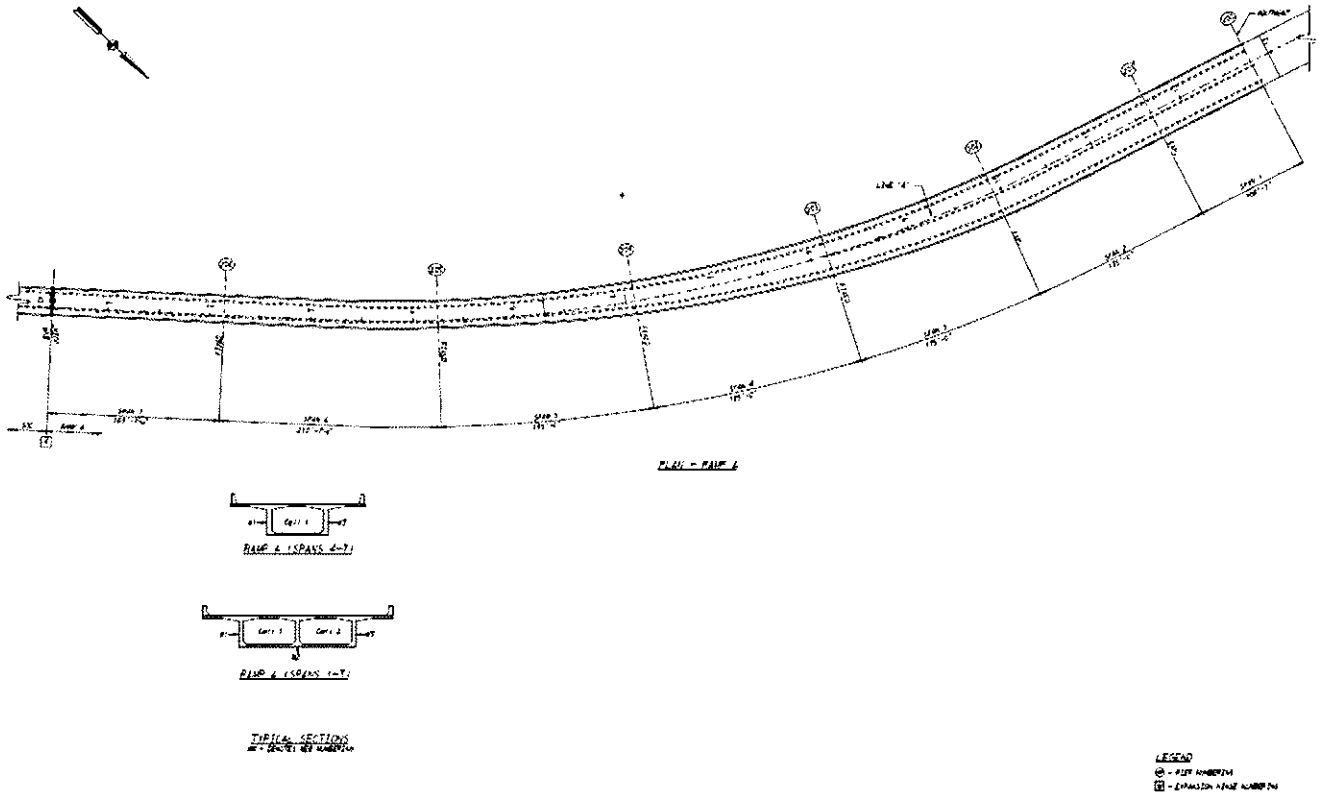


Figure 1.9 – Plan—Ramp A



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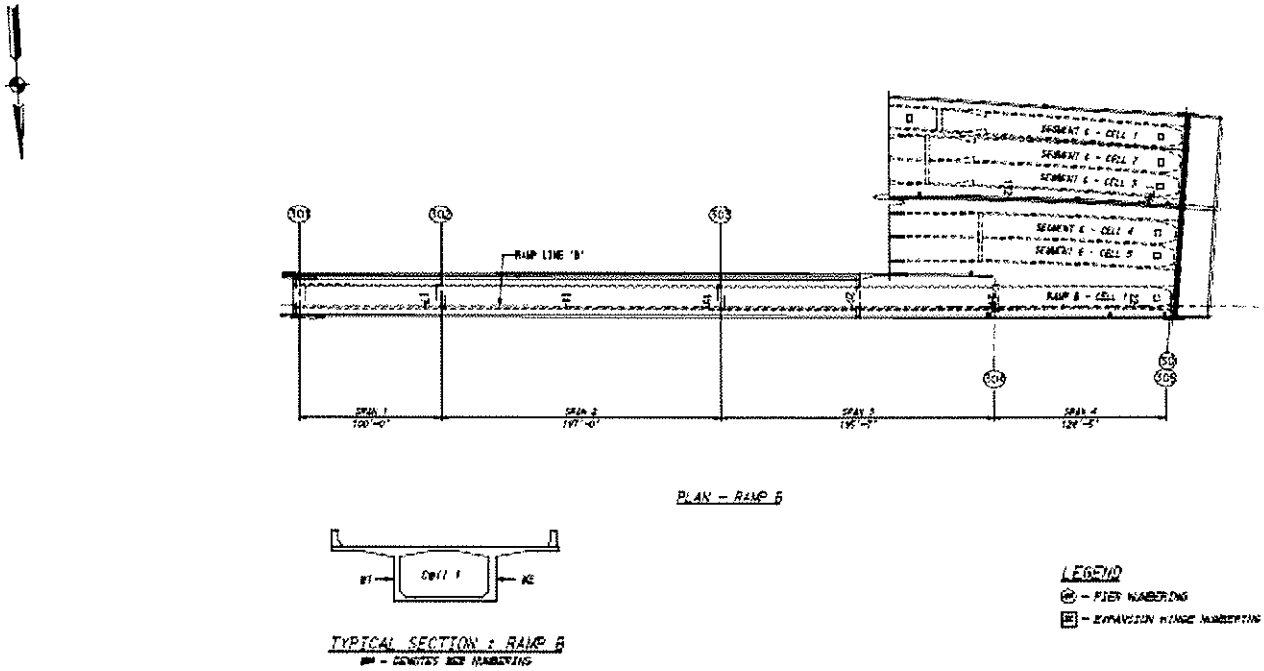

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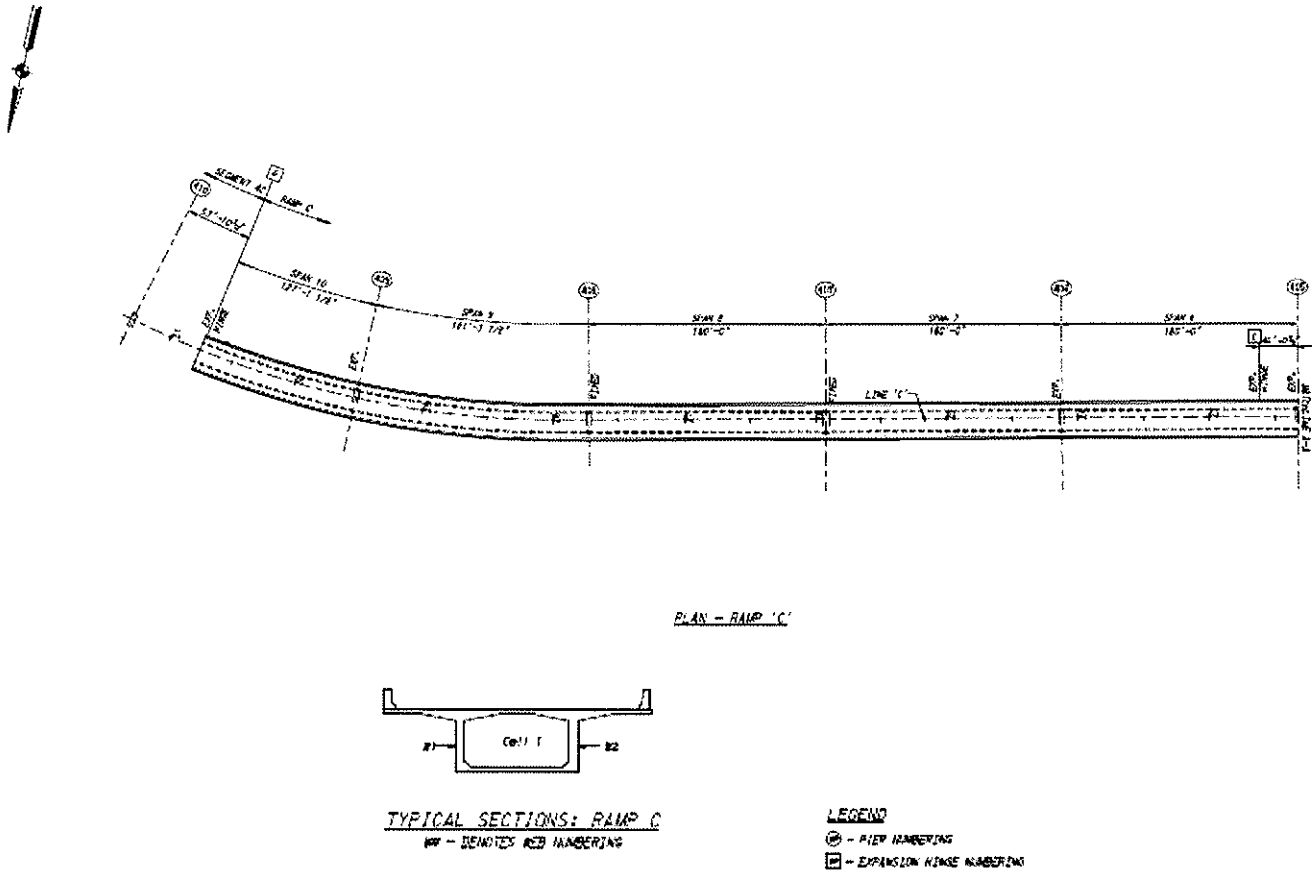

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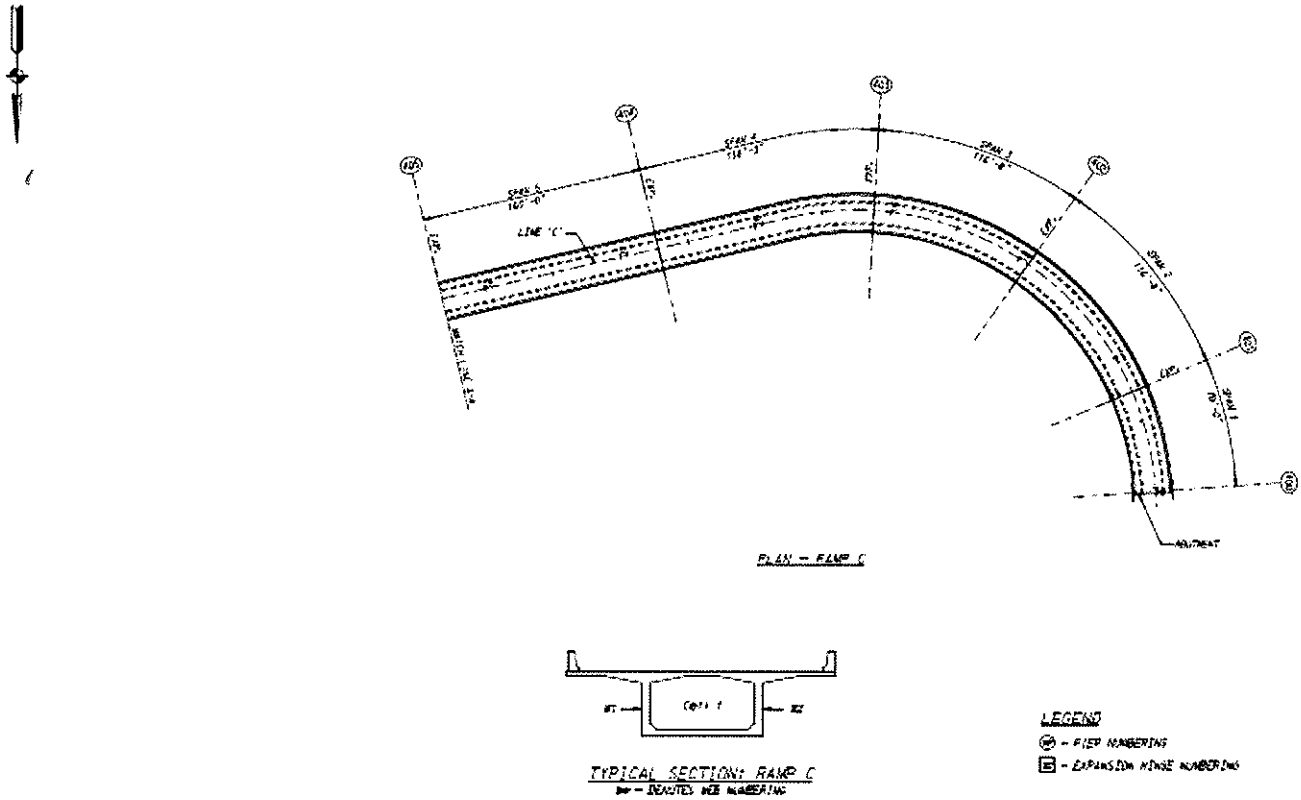
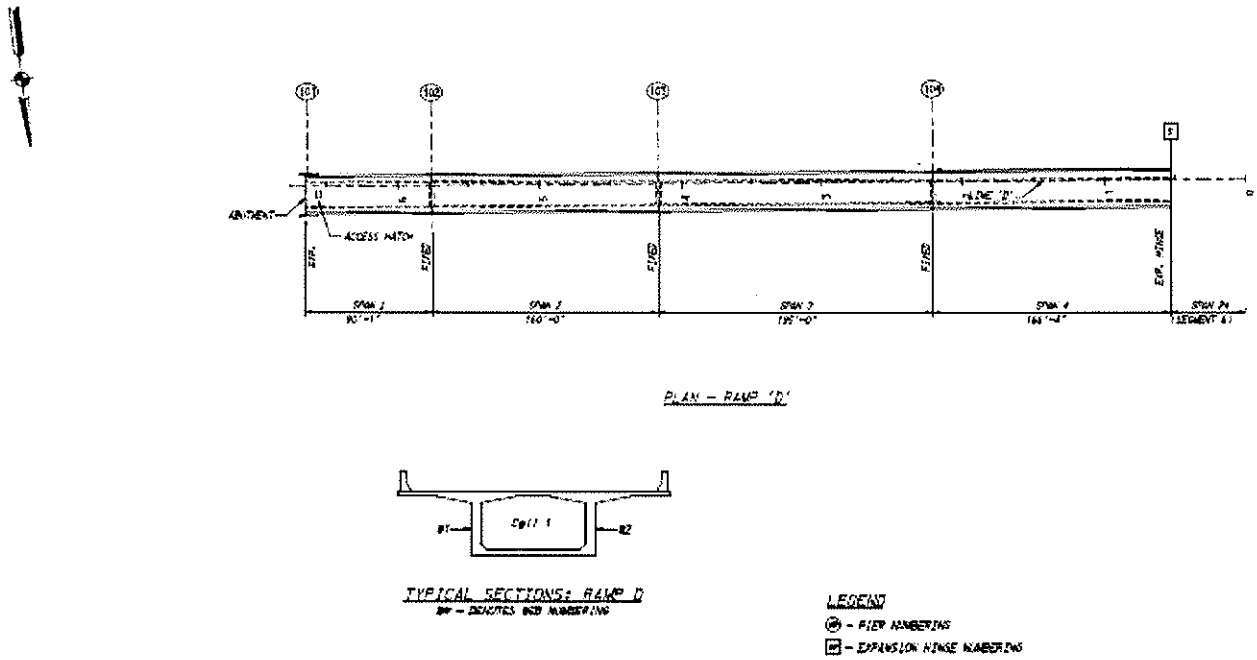


Figure 1.13 – Plan—Ramp D



2. RATING PROCEDURE

2.1 General

The Load Rating Analysis – Report of Findings summarizes the evaluations of how the AASHTO LRFD HL-93, legal and permit loadings (AASHTO and striped lane definitions) affect the structural integrity of the bridge. The rating factors are a correlation of available live load carrying capacity of the bridge for the design, legal, and permit vehicles beyond the permanent load.

The load ratings have been performed using the AASHTO LRFR[1] recommendations and the provisions summarized herein. Additionally, service levels including service flexural stresses and principal stresses were evaluated per recommendations from the Florida Department of Transportation[2].

2.2 Inventory and Operating Rating Levels

The Inventory Rating (design level) represents the load level at which a structure can be utilized for an indefinite period of time. The Operating Rating represents the absolute maximum permissible load level allowed on the bridge which includes legal and permit loads. Overload permits, including superloads, were analyzed using the operating level. The Inventory and Operating Ratings differ by the use of different load factors at ultimate limits or different allowable stresses at service load limits.

Normally, for prestressed / post-tensioned concrete members, Inventory Ratings are associated with service levels and Operating Ratings with factored loads. However, due to construction techniques used for post-tensioned bridges, these bridges require rating at Inventory and Operating levels for both the service and factored levels. AASHTO LRFR does not require load rating for serviceability checks using operating levels—only the strength features listed below are required for rating. This load rating evaluation performs a load rating for serviceability based on recommendations from the Florida Department of Transportation, and the intent of these limits are to ensure a minimum level of durability that avoids the development or propagation of cracks or the potential breach of corrosion protections afforded to post-tensioning tendons. Deficient rating factors (less than 1) for serviceability checks do not require a posting of the bridge per the AASHTO LRFR; however, the Department may consider, at its sole discretion, posting the bridge to increase the durability of the bridge over its design life.

Inventory and Operating Ratings are developed for the following five features pertaining to post-tensioned concrete bridges:

---

[1] AASHTO Guide Manual for the Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges Specifications - Customary U.S. Units, First Edition, 2004, with Interim Specifications through 2005.

[2] Florida DOT, Structures Design Manual, Volume 8, FDOT Modifications to the "Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges", January 2008. (www.dot.state.fl.us/structures/StructuresManual/CurrentRelease/StructuresManual.htm)

At service levels:

1. Longitudinal Box Girder Flexure
2. Principle Web Tension

At factored levels:

1. Longitudinal Box Girder Flexure
2. Transverse Top Slab and Web Flexure
3. Web Shear
4. Transverse Bending with Web Shear.

For each "feature", described in Section 3, an analysis model or chart must be used to determine the sectional demands. Depending on the complexity of the structure and the construction scheme, these models also vary in complexity.

The above is a brief discussion of the load rating process. A more complete summary of the load rating criteria used in making all load rating evaluations is found in Appendix A of this report.

2.3 Load Rating Assumptions

The following assumptions have been made for the load rating evaluations:

1. The longitudinal multiple spine 3-D analysis is time dependent and conducted with the time dependent RM 2000 program.

2. Each tendon profile was considered individually.

3. Two (2) service level and three (3) strength level features were evaluated.

5. The Rating includes the HL-93 truck and lane combination, tandem and lane combination, three legal load vehicles, five permit vehicles, and two permit superloads (See Appendix A for further explanation).

6. The rating factors are derived for the effects of AASHTO design vehicles and INDOT legal and permit vehicles and assumes the bridges to be in good condition (deficiencies of the bridge will be evaluated at a later date.) No section losses related to the loss of reinforcement area or post-tensioning tendon area due to corrosion have been considered (See Appendix A).

3. ANALYSIS AND EVALUATION

3.1 Method of Analysis

3.1.1 Longitudinal Analysis

The bridge was analyzed to determine sectional demands due to dead and live loads, and the sectional capacities were computed. Post-tensioning is generally a primary load

path and each tendon profile was modeled individually for this rating. The analysis was accomplished using the computer program RM 2000 which models the time dependent characteristics of concrete bridges and utilizes a 3-D beam element analysis. The RM 2000 program enables the user to numerically model the application of self-weight, post-tensioning, locked-in effects from construction sequence, and time-dependent effects associated with the progressive change in structural systems and post-tensioning forces during and after construction. The stage analysis tracked the complete stress history of the structure leading to the final stresses for which the rating was performed.

The RM 2000 computer model, shown in Figures 3.1 and 3.2, applies as a minimum, dead and superimposed dead loads, AASHTO live loading, and legal loads, and solves for forces and displacements at the following selected sections and points of interest along the superstructure:

- Support points at piers and abutments
- Hinges / Expansion Joints

Structural evaluations are also generally made at section changes, where tendons are dropped or added, at locations of peak stresses and forces, and at regular intervals along the length of the bridge to define trends in the load rating factors.

The RM 2000 models were independently verified using a Tango 2-D spline model also capable of time-dependent modeling. Each bridge cross-section of the RM 2000 model was independently modeled in Tango using a spring support at the hinges to simulate the stiffness of the adjacent unit. The 2-D results from Tango were then compared to the corresponding RM 2000 results. A representative comparision of RM 2000 and Tango results is shown in Figure 3.3.

Figure 3.1 – RM 2000 Model Layout—Global

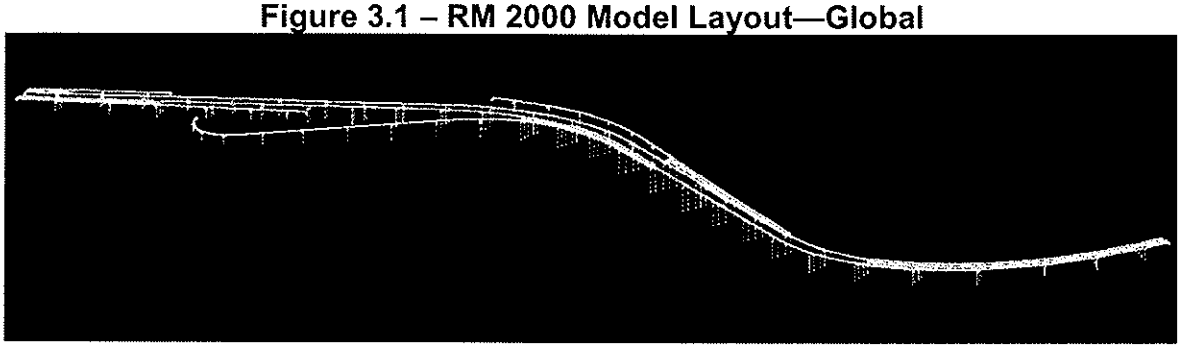


Figure 3.2 – RM 2000 Model Layout—Segment 1

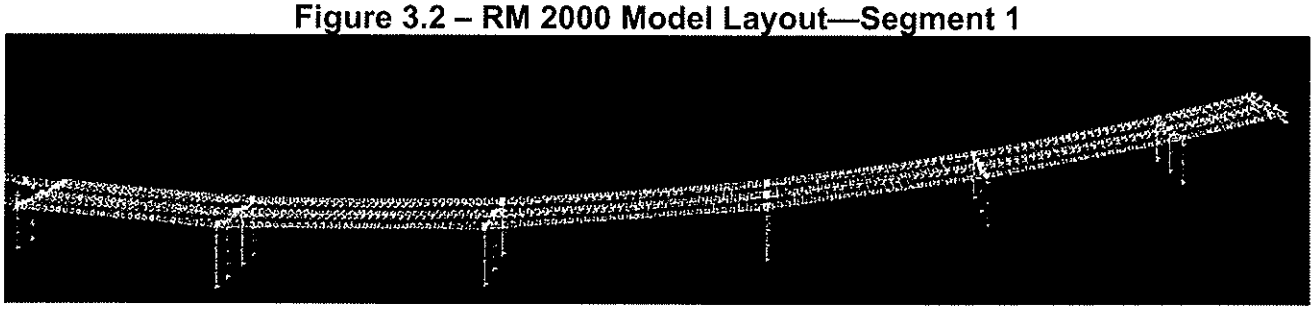
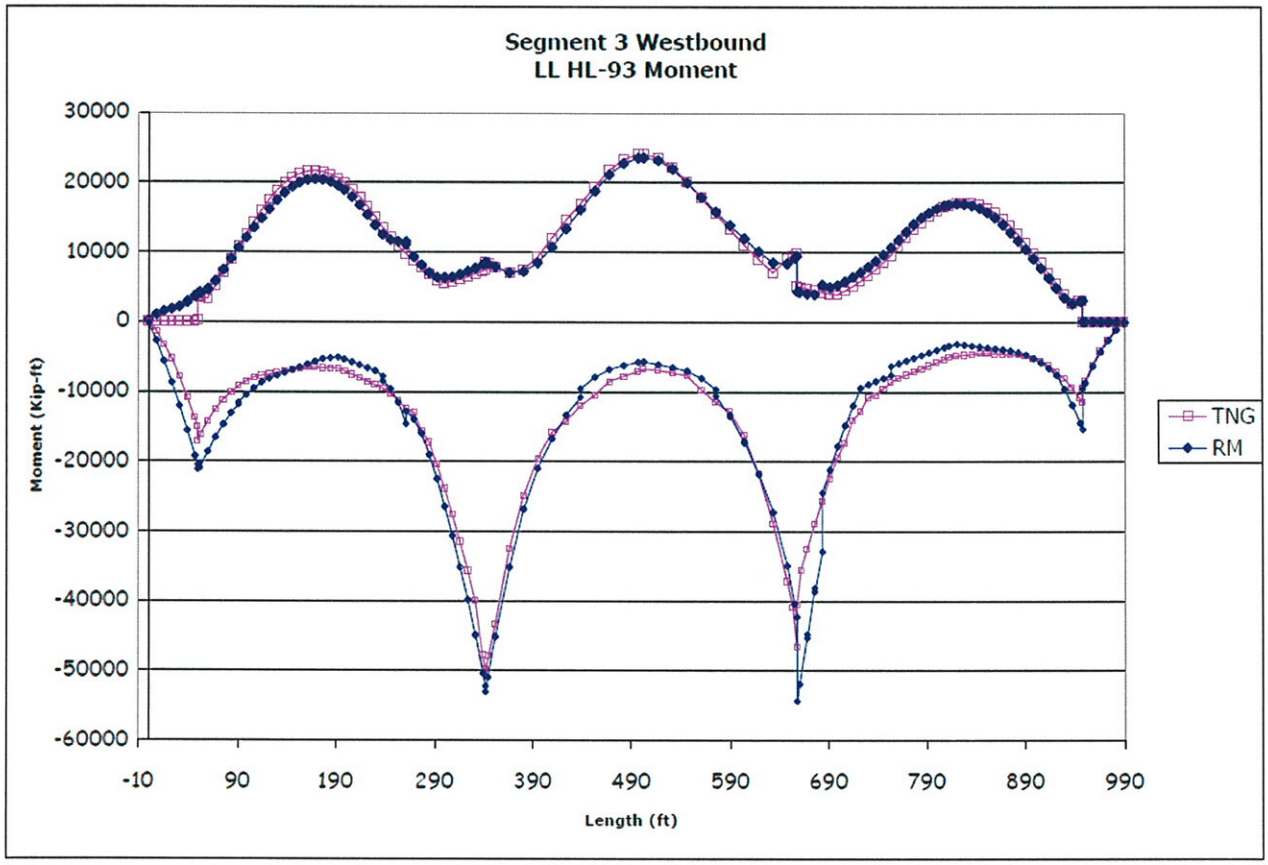


Figure 3.3 – RM 2000 versus Tango Live Load Comparison



3.1.2 Transverse Analysis

The bridge was analyzed using the BRUG program which performs a finite element analysis with plate bending elements to derive the cross section's bending forces for load rating.

The transverse analysis tasks performed include:

1. Using 3-D BRUG Models to estimate the dead and live load transverse moments.

2. For the top slab, ultimate capacities were calculated and compared to ultimate demands using the rating equation.

3. For the webs, the ultimate transverse flexural demands were independently calculated from the ultimate longitudinal shear; see Section 3.2.2 for a complete description.

The BRUG program results were verified as follows:

1. Using influence Homberg charts to determine live load fixed end moments for each load condition.

2. Using 2-D GTSTRUDL models to:

   a. Estimate dead load moments.
   b. Redistribute fixed end live load moments on continuous system(s).

3. Using 3-D Midas Civil finite element models.

The BRUG program results showed a lower force distribution to the webs than the Homberg charts and GTSTRUDL model. The BRUG force distribution to the webs was independently verified using a Midas Civil finite element model, incorporating plate elements, using the extreme loading case for web bending. The Midas Civil finite element model results verified the BRUG results for web transverse bending. Since the BRUG program uses a more accurate distribution than Homberg charts used in conjunction with the GT Strudl model and the BRUG results are more favorable, the FEM results from BRUG were used for the transverse evaluation.

Table 3.1 – Transverse Evaluation Points—Mainline

UNIT	Transverse Section ID	Rating Node	RM Segment
Segment 1 - Gdr 1	IA	1-173	1001-1172
Segment 1 - Gdr 2	IA	1-173	2001-2172
Segment 1 - Gdr 3	IA	1-173	3001-3172
Segment 2 - EBL	IIB	1-151	1174-1323
Segment 2 - WBL	IIB	1-80	2174-2252
	IIIA	80-151	2253-2323
Segment 3 - EBL	IIB	1-72	1325-1395
	IIIA	72-117	1396-1440
Segment 3 - WBL	IIIA	1-8	2325-2331
	IIIB	8-36	2332-2359
	IVA	36-76	2360-2399
	IIB	76-117	2400-2440
Segment 4 - EBL	IIIA	1-11	1442-1451
	IIIB	11-53	1452-1493
	IVA	53-87	1494-1527
	IIB	87-138	1528-1578
Segment 4 - WBL	IIB	1-138	2442-2578
Segment 5 - EBL	IIB	1-138	1580-1716
Segment 5 - WBL	IIB	1-128	2580-2706
Segment 6 - EBL	IIB	1-36	1718-1752
	IVA	36-122	1753-1838
Segment 6 - WBL	IIB	1-100	2708-2806
	IVA	100-133	2807-2839

Table 3.2 – Transverse Evaluation Points—Ramps

UNIT	Transverse Section ID	Rating Node	RM Segment
Ramp A - Segment 2	IIIA	1-72	4001-4071
Ramp A - Segment 3	IIIA	1-8	4073-4079
	IIIB	8-36	4080-4107
	IVA (VC)	36-74	4108-4147
	VC	74-83	4148-4154
Ramp A	VA	1-57	4156-4211
	VB	57-97	4212-4251
	IIA	97-155	4252-4309
Ramp B	VA	1-48	4501-4547
Ramp B - Segment 6	IVA (VC)	1-35	4548-4581
Ramp C - Segment 3	IIIA	1-46	5001-5045
Ramp C - Segment 4	IIIA	1-11	5047-5056
	IIIB	11-53	5057-5098
	IVA (VC)	53-86	5099-5131
	VC	86-94	5132-5139
Ramp C - Units 2-5	VA	1-100	5141-5239
Ramp C - Units 1 6-8	VA	1-107	5241-5346
Ramp D	VA	1-81	5501-5580
Ramp D - Segment 6	IVA (VC)	1-100	5582-5680

Figure 3.4 – Transverse Evaluation Points—Section IA

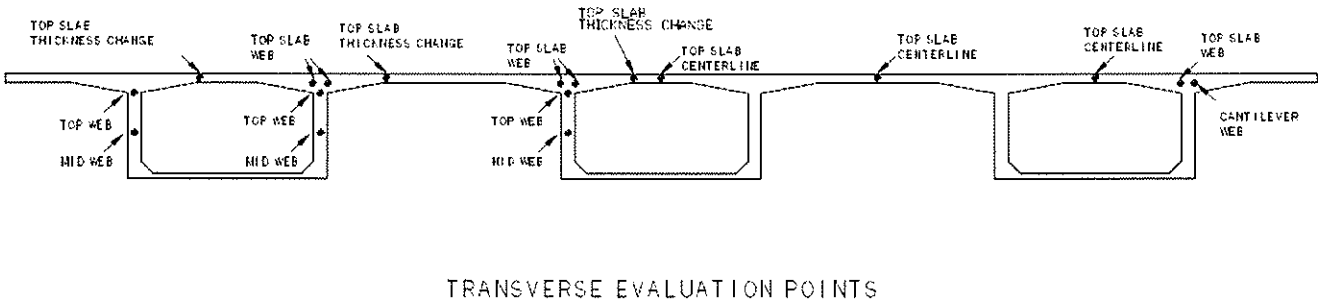


Figure 3.5 – Transverse Evaluation Points—Section IB

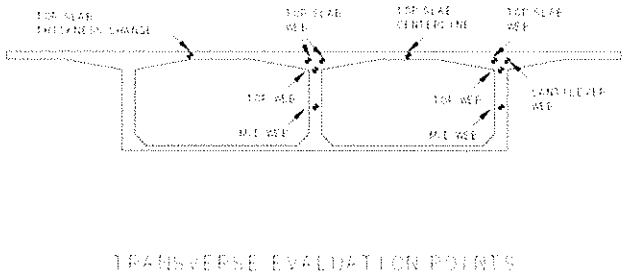


Figure 3.6 – Transverse Evaluation Points—Section IIA

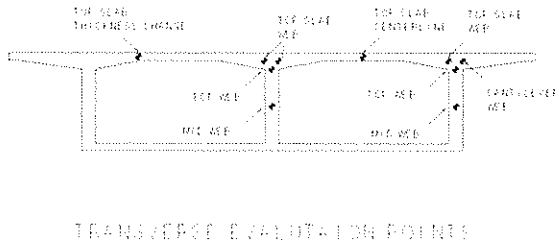


Figure 3.7 – Transverse Evaluation Points—Section IIB

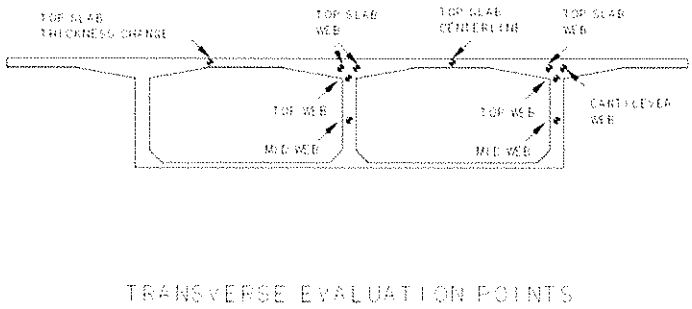


Figure 3.8 – Transverse Evaluation Points—Section IIIA

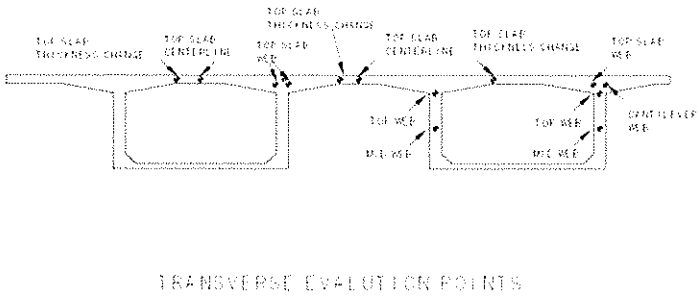


Figure 3.9 – Transverse Evaluation Points—Section IIIB

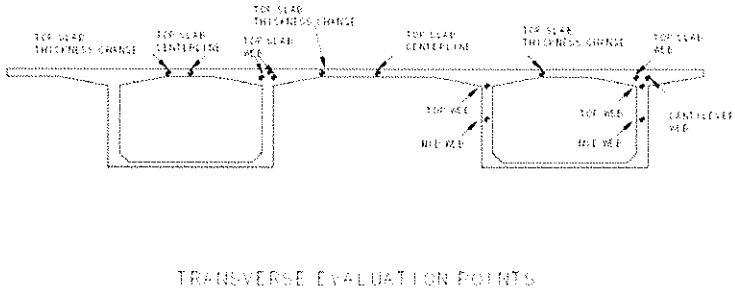


Figure 3.10 – Transverse Evaluation Points—Section IVA

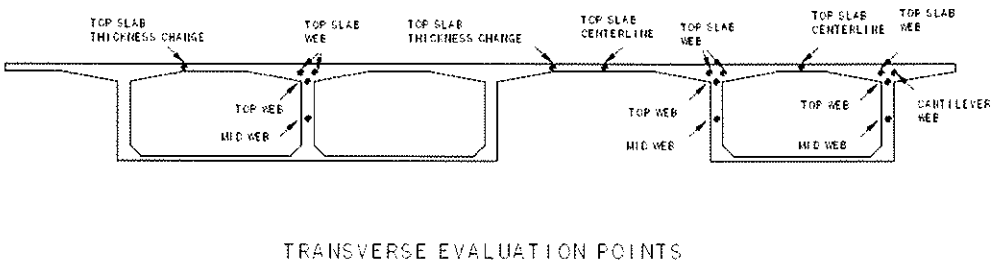


Figure 3.11 – Transverse Evaluation Points—Section VA

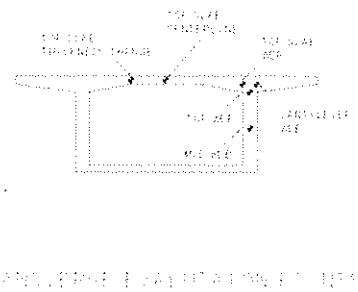
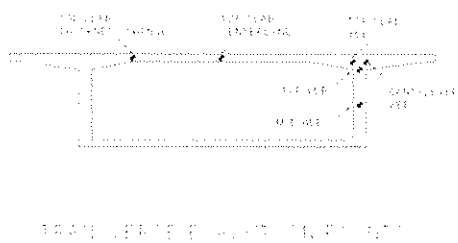


Figure 3.12 – Transverse Evaluation Points—Section VB



3.2 Method of Evaluation

3.2.1 Flexure

The capacity of a section in transverse and longitudinal flexure was determined using the relevant formulae in the LRFD Code. Factored resistance of any section is based on the conditions of equilibrium and strain compatibility as specified in Section 5.7 of the AASHTO LRFD Bridge Design Specification. Additional flexural demand was added due to longitudinal forces produced from the shear analysis using modified compression field theory and is described in more detail in Section 4 of this report.

Allowable Service level stresses are given in Appendix A. The LRFR requires service level checks for prestressed concrete, further for post-tensioned structures, the recommendations from the Florida Department of Transportation were used to check service stresses at inventory and operating levels. The intent of these limits are to ensure a minimum level of durability that avoids the development or propagation of

cracks or the potential breach of corrosion protection provided to post-tensioning tendons. For the box girder structure, mild steel is provided in the top and bottom slabs, the Service level tensile stresses are limited to values shown in Appendix A Section 2.2 for both the inventory and operating ratings. Gross section properties were used for the service level flexural stress checks.

3.2.2 Shear

The shear capacity was determined using the relevant formulae or methods in the LRFD Code. The following is a list of design assumptions:

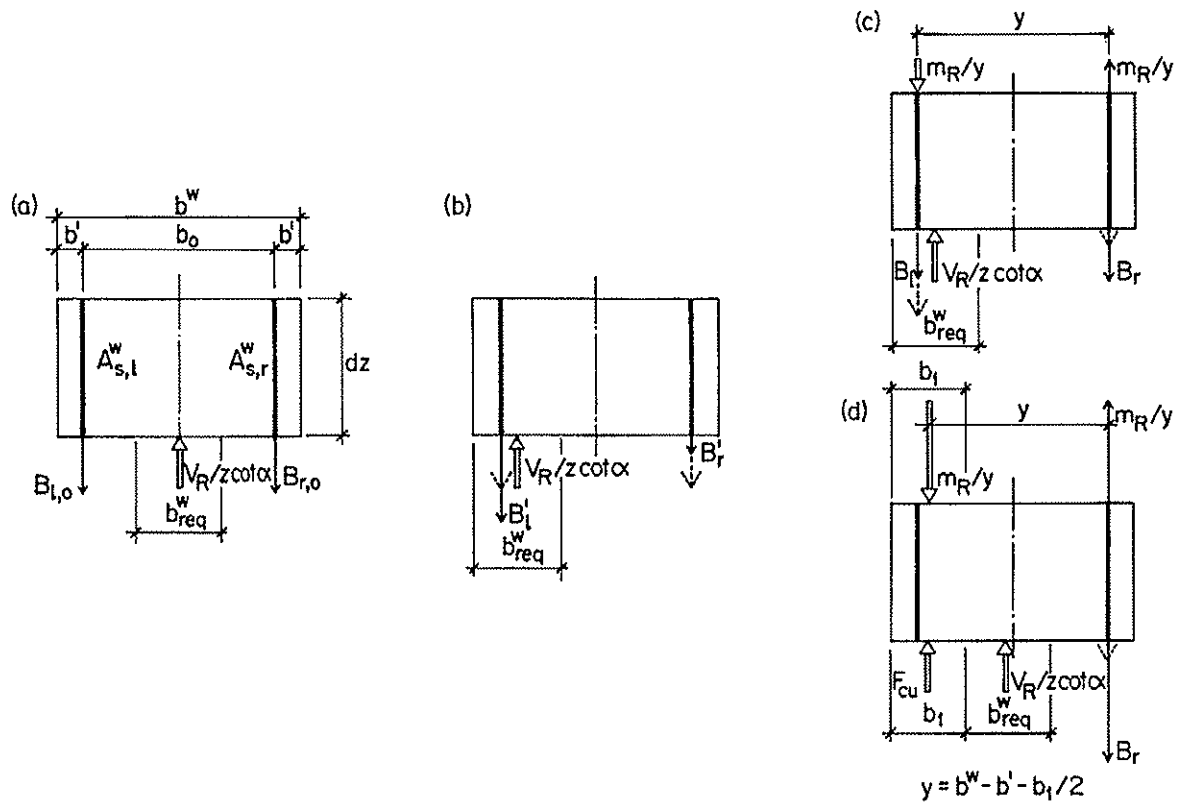
1. Shear reinforcing in the webs was evaluated to satisfy AASHTO LRFD Section 5.8, with contribution of concrete resistance V_c calculated using the "General Procedure" (modified compression field theory) according to Section 5.8.3.4.2.

2. Provisions of Section 5.8 of the AASHTO LRFD code have been utilized to evaluate the effects of shear with torsion. Two cases are considered for the Cline Avenue Bridge: 1) maximum shear with corresponding torsion; and 2) maximum torsion with corresponding shear.

The webs were analyzed for the combination of transverse web bending and shear using the method proposed by Menn[3]. The analysis of the web for transverse bending and shear/torsion may be done independently and the reinforcement requirements for both behaviors superimposed. However, utilizing the Menn's method it is apparent that a certain amount of transverse bending can be resisted by the web without additional web reinforcement. This behavior is illustrated in Figure 3.13. When the web is subjected to pure shear (Fig. 3.13 a), the resultant shear force is centered. In the presence of transverse bending, this shear force shifts towards the flexural compression (left) side of the web (Fig. 3.13 b,c, and d) and the transverse bending moment is resisted by further changes in the stirrup tensions. For all segments and ramps, it was observed that the ultimate shear force is not influenced by transverse bending such that the shear force may be shifted towards the compression zone of the web without disturbing equilibrium. Therefore, the rating factor of the web reinforcement can be based on the individual behavior of transverse bending and shear. These rating factors are shown on separate rows of the rating table.

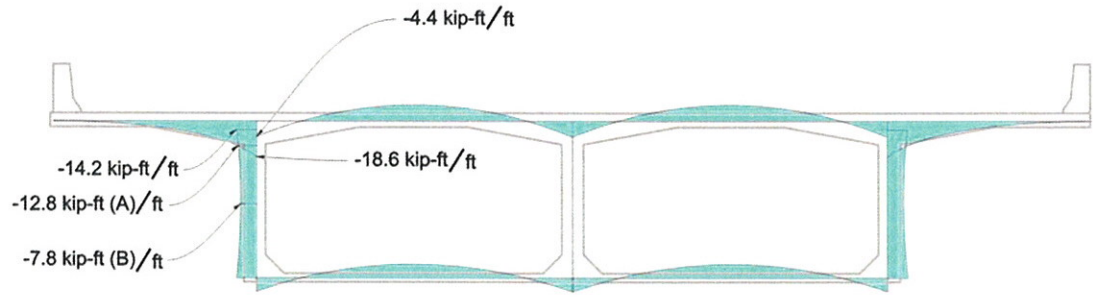
[3] Menn, C., Prestressed Concrete Bridges, Birkhauser, 1991 , pp 259-264.

Figure 3.13 – Web Equilibrium[3]

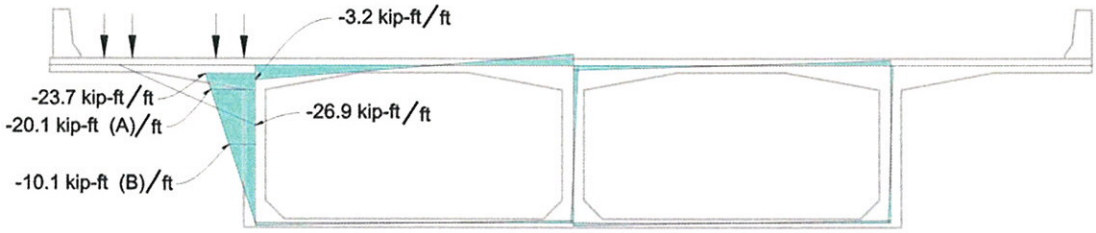


Overall, the controlling rating factors are due to transverse slab and web bending. The transverse slab rating factors less than one are limited to segment 1. Maximum transverse web bending is typically produced from a single truck placed on the cantilever wing of the box as shown for Section IIB in Figure 3.14. The interior bay loading case of Figure 3.14 shows a loading produced from traffic within the striped lanes on the bridge. The moment demand is approximately half of the demand for the maximum transverse bending load case. Loading the bridge in the striped lanes significantly improves the transverse web bending rating factors in most cases. Therefore, two shear and transverse bending analysis were performed, one where traffic is allowed to occupy any transverse space along the bridge allowed by AASHTO (AASHTO Lanes), and a second where traffic is only allowed in the striped lanes (Striped Lanes).

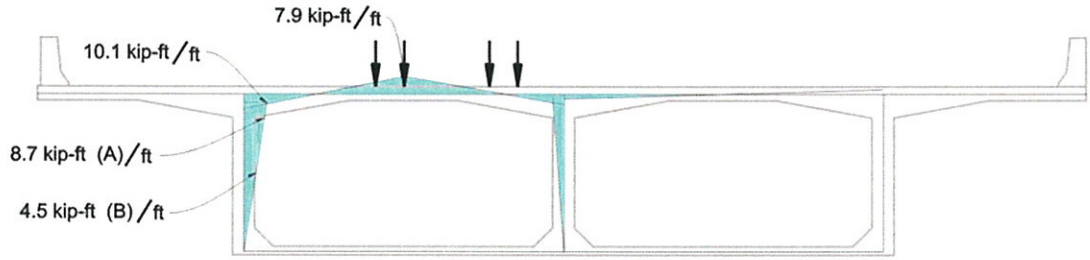
Figure 3.14 – Transverse Bending Loading and Moments for Section IIB



Dead Load Moment (DC + DW)



Live Load Moment - Cantilever Loaded



Live Load Moment - Interior Bay Loaded

3.2.3 Principal Tensile Stress - Service Level

A check of the principal tensile stress was performed to verify the adequacy of webs for longitudinal shear at service. The verification, made at the neutral axis, using the prescribed procedure, as follows:

All stresses at the elevation of the neutral axis due to thermal gradient at Inventory conditions have been disregarded for principal tension checks.

Sections were considered only at locations greater than "H/2" from the edge of the bearing surface or face of diaphragm, where classical beam theory applies (away from discontinuity regions). Verification at the elevation of the neutral axis was made without regard to any local transverse flexural stress in the web given that in most large, well proportioned boxes the maximum web shear force and local web flexure are mutually exclusive load cases—this is a convenient simplification.

Classical beam theory and Mohr's circle for stress were used to determine shear and principal tensile stresses. An excellent discussion regarding load rating the principal stress effect is provided in Volume 10A of Florida's "New Directions for Florida's Post-Tensioned Bridges" (www.dot.state.fl.us/structures/posttensioning/NewDirectionsPostTensioningVol10A.pdf). At service levels, the shear stress and principal tensile stress were determined at the neutral axis (or critical elevation) under the long-term residual axial force, maximum shear and/or maximum shear force combined with shear from torsion in the highest loaded web, using a live load factor equal to 1.00. The live load was then increased in magnitude so that the shear stress in the highest loaded web increases until the principal tensile stress reaches its allowable maximum value (Appendix A – Criteria: Table 2.2.1).

4. RATING FACTOR SUMMARY

Tables 4.2a through 4.26a (AASHTO lane definition) and 4.2b through 4.26b (striped lane definition), and corresponding location key sheets, show the summary of the bridge live load rating factors for the mainline segments and ramps, and include all rating factors for inventory and operating levels for HL-93 loading, three uniquely configured legal load trucks, five permit trucks, and two permit superloads.

The end product of a load rating is the factor derived from the rating equation found in Appendix A of this report. The values input into the rating equation are the dead loads, superimposed dead loads, differential temperature loads, live loads and the appropriate load factors. Once these values are found, the rating equation can be computed to give the appropriate rating factor for the defined live load. Rating factors greater than 1.0 indicate sufficient capacity exists for the design loading and factors less then 1.0 show less the adequate capacity.

Posting values given in the rating tables are only for the HL-93 Operating rating and only consider flexural strength and shear. The posting values are not given for service flexure and principal stresses since both cases are serviceability issues and are not

strength concerns. Nonetheless, serviceability issues may affect the long term durability and maintainability of the bridge, and may also ultimately lead to corresponding strength concerns due to loss of section and overall structural degradation.

To complete the "Rating Factor Table", numerous longitudinal and transverse evaluations are required. Each evaluation includes:

1. Determine the most critical point of consideration.

2. Determine the dead load at point of consideration.

3. Determine the live load at point of consideration.

4. Input dead load and live load demands into the rating equation and compute the rating factor.

5. Compare the derived rating factor with previously derived rating factors to see which controls overall.

The current findings of this load rating evaluation show these general trends:

- Overall for the HL93 loadings (operating), the lowest rating factors were controlled consistently by transverse slab and web bending. When the trucks are limited to their design lanes (striped lane case), the transverse web bending rating factors show improvement. Generally, the transverse web bending controls the rating factor with the exception of Segment 1 where the slab transverse bending controlled. The low web bending rating factors, less than 1.0, occur over a significant portion of the mainline bridge where the web reinforcing is reduced to #5's at 18" spacing.

- Overall for the HL93 loadings (operating), the factored longitudinal shear/principal stress case are usually the next higher rating factor after transverse slab and web bending (few exceptions). These rating factors are highly localized near the piers. Also, there are a few exceptions when flexure controls the rating factor.

- The ramps generally rate much better than the mainline.

- Additional operating rating factor comparisons for web shear and transverse web bending are shown in Table 4.1 below.

Table 4.0 –Rating Factor Summary Comparisons for Web Shear and Transverse Web Bending

Loading Description		Rating Factor	
		Web Shear	Transverse Web Bending
Inventory	HL-93 – AASHTO Lanes	0.52	0.49
	HL-93 – Striped Lanes	0.72	0.54
Operating	HL-93 – AASHTO Lanes	0.68	0.64
	HL-93 – Striped Lanes	0.90	0.70
	Legal Load – AASHTO Lanes	0.41	0.52
	Permit Load – AASHTO Lanes	0.36	0.38
	Permit Super Load – AASHTO Lanes	0.32	0.38

Based on the load rating evaluations summarized herein, the following actions are recommended:

- Not allow any permit loads on the mainline bridge or ramps;
- Post the mainline bridge and ramps for reduced live loads not to exceed 18 tons;
- Restrict traffic to striped lanes and use prudent maintenance of traffic schemes to restrict traffic from the bridge shoulders;
- Immediately begin retrofit and/or replacement evaluation and strengthening implementation to correct structural deficiencies related to service level longitudinal bending stresses, factored web shear, and factored transverse bending in the top deck slab; and
- Continually monitor the bridge and ramps with a six month cycle inspection process.

4.1 Rating Tables / Summary

Figure 4.1 Key Sheet—Segment 1 Girder 1

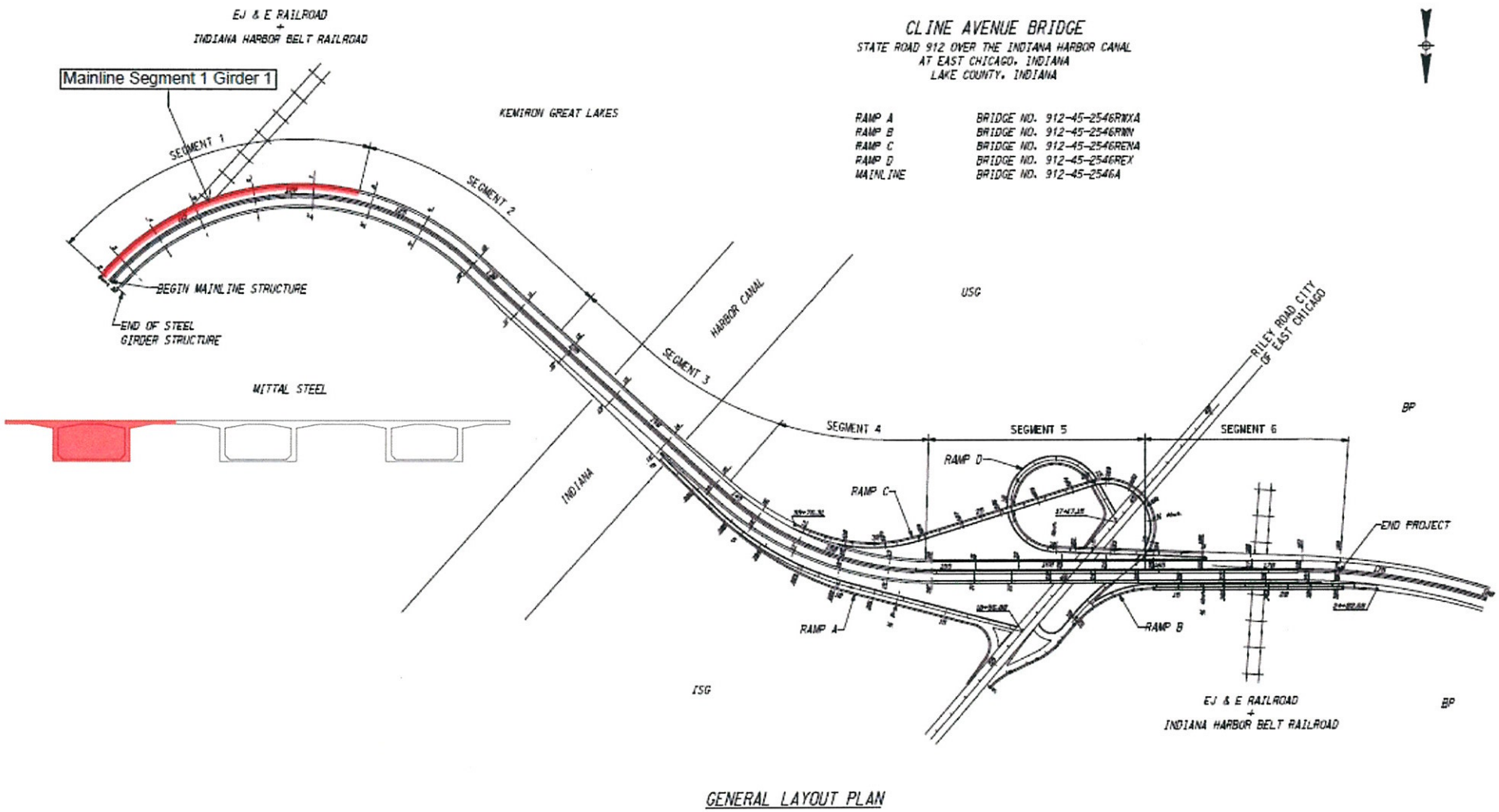


Table 4.1 Rating Table—Segment 1 Girder 1

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.52	2.00	1.97	2.59	1.42	1.48	1.39	1.75	1.74	1.69	1.71	1.49	1.63	1.45
		Shear	0.82	1.29	1.04	1.62	0.87	0.82	0.69	0.78	0.78	0.65	0.66	0.60	0.56	0.56
	Service	Flexure	0.46	0.54	1.52	1.82	1.35	1.41	1.30	1.37	1.36	1.29	1.29	1.17	1.27	1.15
		Principal Stress	1.31	1.84	1.33	1.86	1.15	1.16	0.99	1.01	1.01	0.83	0.83	0.77	0.69	0.69
Transverse	Factored	Top Slab Centerline	0.98	0.98	1.27	1.27	1.48	1.55	1.64	1.33	1.29	1.24	1.25	1.11	1.30	1.16
		Top Slab Thickness Change	0.56	0.56	0.73	0.73	0.81	0.81	0.72	0.66	0.68	0.58	0.60	0.50	0.58	0.50
		Top Slab Webs & Cantilever	1.85	2.36	2.40	3.07	2.33	2.31	1.90	1.92	2.01	1.68	1.68	1.39	1.60	1.37
		Web Bending	0.71	1.41	0.92	2.19	0.75	0.89	0.95	0.89	0.76	0.83	0.83	0.60	0.88	0.69

Overall Minimum Rating Factor*	0.46	0.54	0.73	0.73	0.69	0.50	0.50
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	16.56	19.44	26.28	26.28	33.96		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.2 Key Sheet—Segment 1 Girder 2

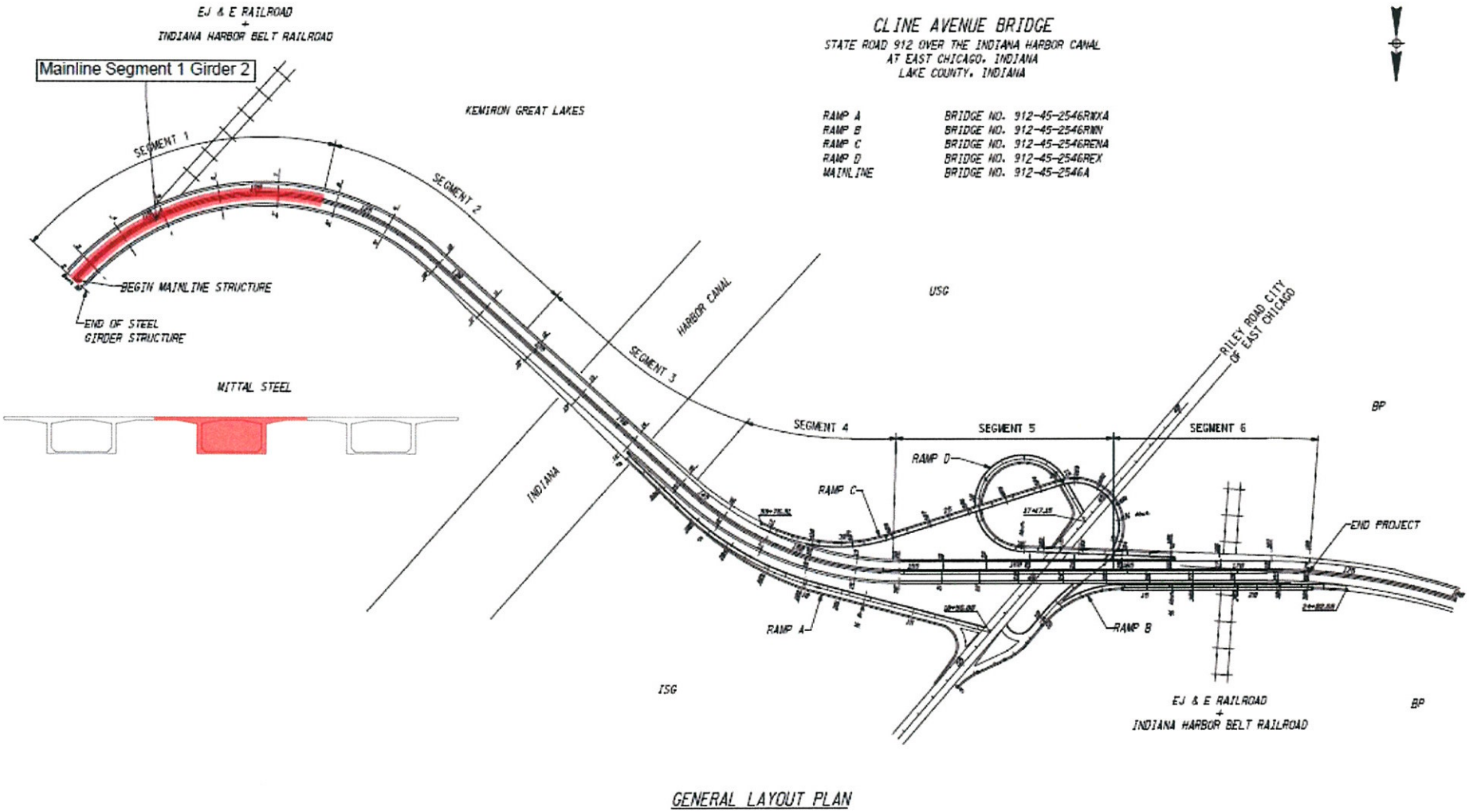


Table 4.2 Rating Table—Segment 1 Girder 2

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.61	2.06	2.09	2.68	1.71	1.73	1.49	1.89	1.89	2.19	2.19	2.06	2.16	1.96
		Shear	1.59	1.59	2.06	2.06	1.46	1.47	1.27	1.58	1.58	2.01	2.03	1.80	1.96	1.66
	Service	Flexure	0.88	1.05	2.34	2.40	2.08	2.14	1.96	2.18	2.15	2.07	2.08	1.92	2.04	1.89
		Principal Stress	2.33	2.33	2.51	2.51	2.16	2.18	1.88	2.33	2.33	2.20	2.22	1.88	2.07	1.76
Transverse	Factored	Top Slab Centerline	0.98	0.98	1.27	1.27	1.48	1.55	1.64	1.33	1.29	1.24	1.25	1.11	1.30	1.16
		Top Slab Thickness Change	0.56	0.56	0.73	0.73	0.81	0.81	0.72	0.66	0.68	0.58	0.60	0.50	0.58	0.50
		Top Slab Webs & Cantilever	1.85	2.36	2.40	3.07	2.33	2.31	1.90	1.92	2.01	1.68	1.68	1.39	1.60	1.37
		Web Bending	0.71	1.41	0.92	2.19	0.75	0.89	0.95	0.89	0.76	0.83	0.83	0.60	0.88	0.69

Overall Minimum Rating Factor*	0.56	0.56	0.73	0.73	0.72	0.50	0.50
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	20.16	20.16	26.28	26.28	33.96		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.3 Key Sheet—Segment 1 Girder 3

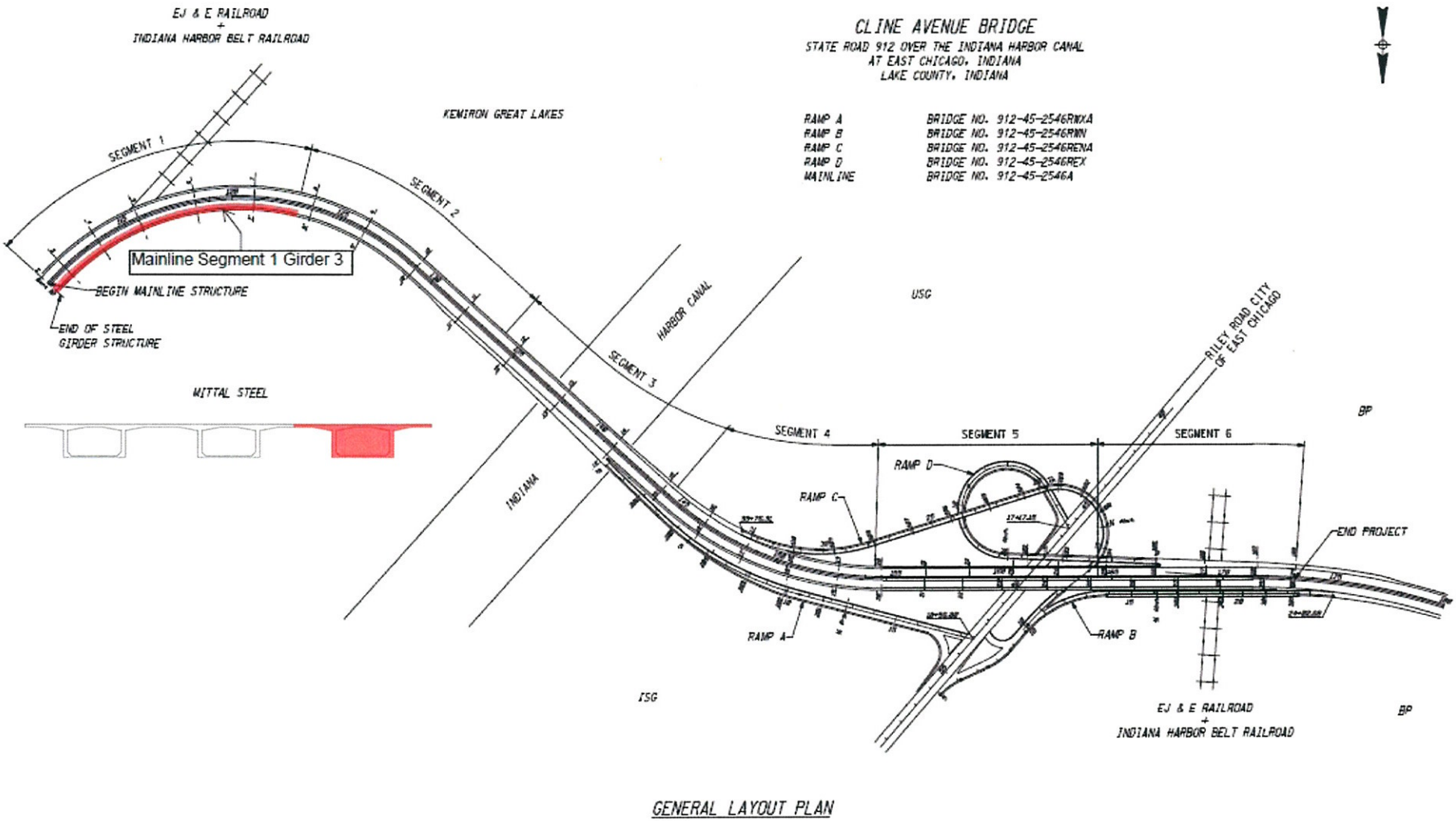


Table 4.3 Rating Table—Segment 1 Girder 3

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.58	2.10	2.05	2.72	1.64	1.69	1.46	1.84	1.83	1.94	1.94	1.74	1.91	1.69
		Shear	1.47	2.11	1.91	2.64	1.34	1.37	1.26	1.37	1.36	1.13	1.13	1.06	1.01	0.95
	Service	Flexure	0.92	1.16	2.07	2.51	1.82	1.90	1.76	1.85	1.83	1.73	1.73	1.57	1.71	1.54
		Principal Stress	2.13	2.99	2.17	3.03	1.86	1.88	1.61	1.64	1.64	1.35	1.36	1.27	1.37	1.15
Transverse	Factored	Top Slab Centerline	0.98	0.98	1.27	1.27	1.48	1.55	1.64	1.33	1.29	1.24	1.25	1.11	1.30	1.16
		Top Slab Thickness Change	0.56	0.56	0.73	0.73	0.81	0.81	0.72	0.66	0.68	0.58	0.60	0.50	0.58	0.50
		Top Slab Webs & Cantilever	1.85	2.36	2.40	3.07	2.33	2.31	1.90	1.92	2.01	1.68	1.68	1.39	1.60	1.37
		Web Bending	0.71	1.41	0.92	2.19	0.75	0.89	0.95	0.89	0.76	0.83	0.83	0.60	0.88	0.69

Overall Minimum Rating Factor*	0.56	0.56	0.73	0.73	0.72	0.50	0.50
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	20.16	20.16	26.28	26.28	33.96		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.4 Key Sheet—Segment 2 Eastbound

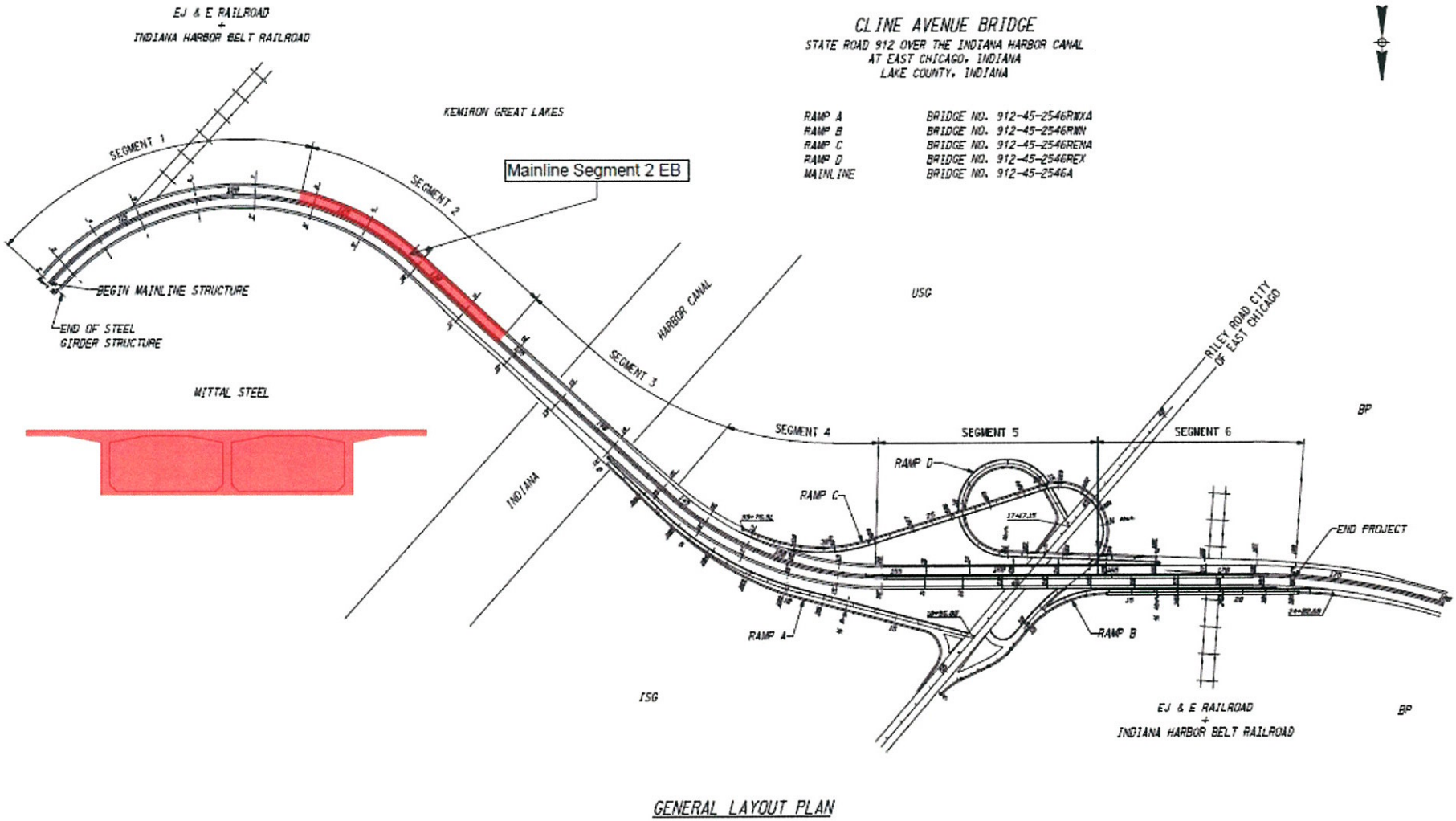


Table 4.4 Rating Table—Segment 2 Eastbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.81	1.81	2.35	2.35	1.70	1.74	1.54	2.06	2.05	1.83	1.83	1.63	1.76	1.54
		Shear	2.24	2.43	2.90	3.15	2.04	2.07	1.75	2.09	2.08	1.48	1.48	1.33	1.23	1.17
	Service	Flexure	0.70	0.71	1.33	1.33	1.20	1.22	1.09	1.21	1.20	1.09	1.10	1.00	1.06	0.95
		Principal Stress	3.13	3.30	3.14	3.32	2.83	2.84	2.37	2.52	2.52	2.09	2.09	1.85	1.71	1.67
Transverse	Factored	Top Slab Centerline	1.69	1.69	2.19	2.19	2.47	2.59	2.76	2.21	2.14	2.12	2.13	1.88	2.17	1.97
		Top Slab Thickness Change	1.78	2.23	2.31	2.89	2.54	2.59	2.59	2.38	2.41	2.20	2.31	1.84	2.36	1.89
		Top Slab Webs & Cantilever	1.85	3.02	2.40	3.92	2.36	2.93	2.90	2.85	2.25	2.27	2.32	1.81	2.65	2.00
		Web Bending	0.49	2.59	0.64	3.47	0.52	0.61	0.61	0.60	0.52	0.52	0.52	0.38	0.54	0.42

Overall Minimum Rating Factor*	0.49	0.71	0.64	1.33	0.52	0.38	0.42
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	25.56	23.04	47.88	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.5 Key Sheet—Segment 2 Westbound

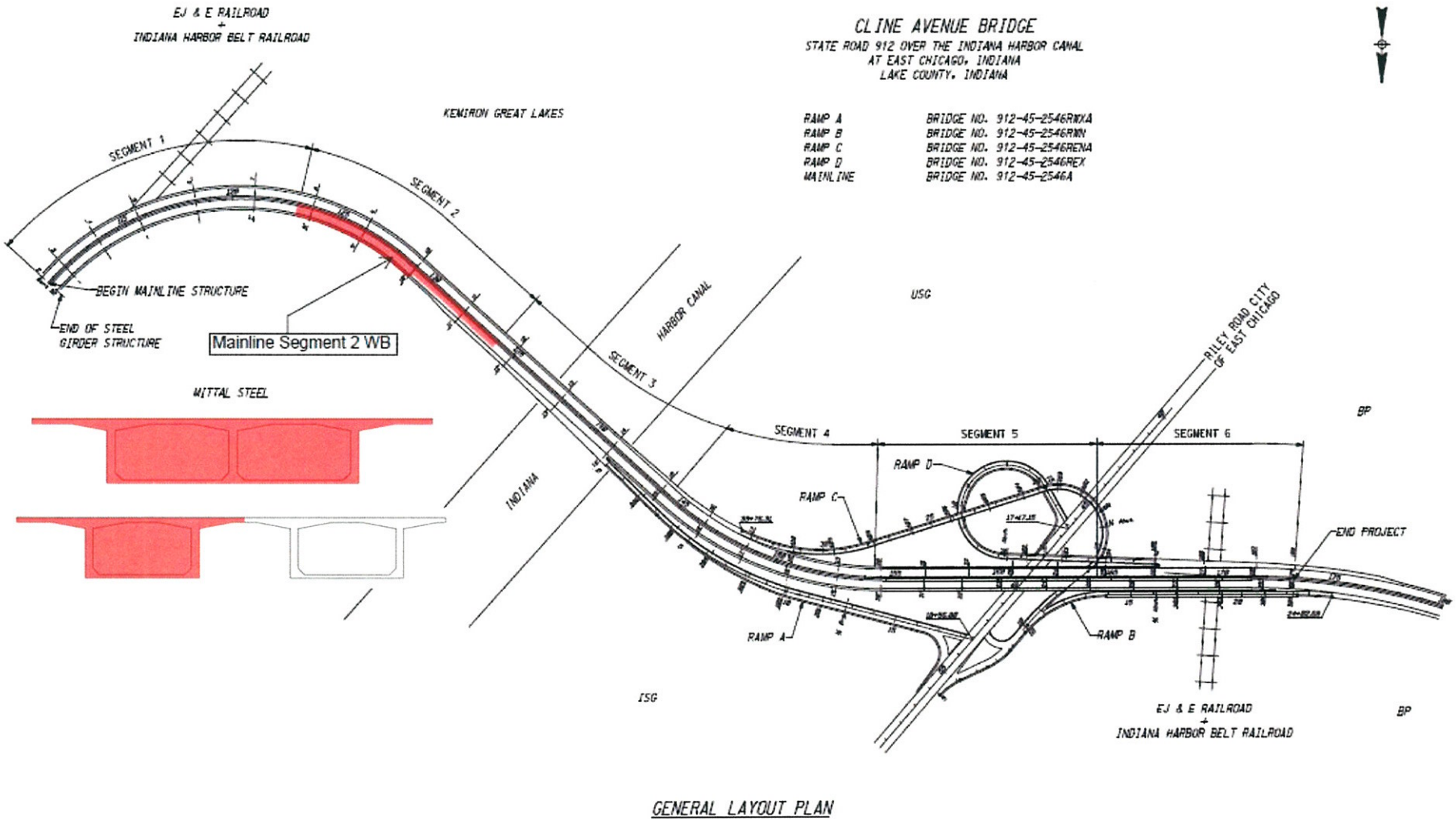


Table 4.5 Rating Table—Segment 2 Westbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.40	1.49	1.82	1.93	1.51	1.52	1.36	1.70	1.70	1.59	1.58	1.46	1.53	1.36
		Shear	1.77	1.87	2.32	2.45	1.68	1.69	1.44	1.68	1.68	1.29	1.28	1.11	0.97	0.97
	Service	Flexure	0.45	0.51	1.10	1.15	0.99	1.01	0.93	1.00	0.99	0.91	0.92	0.83	0.89	0.80
		Principal Stress	2.64	3.22	2.65	3.23	2.35	2.36	2.00	2.03	2.03	1.65	1.65	1.47	1.29	1.30
Transverse	Factored	Top Slab Centerline	1.65	1.65	2.13	2.13	2.30	2.43	2.48	2.07	2.00	1.95	1.95	1.71	1.97	1.77
		Top Slab Thickness Change	1.71	1.71	2.22	2.22	2.47	2.51	2.42	2.15	2.18	1.89	1.98	1.62	1.93	1.63
		Top Slab Webs & Cantilever	1.85	2.43	2.40	3.15	2.35	2.33	1.97	1.90	2.02	1.70	1.70	1.38	1.58	1.33
		Web Bending	0.49	2.59	0.64	3.47	0.52	0.61	0.61	0.60	0.52	0.52	0.52	0.38	0.54	0.42

Overall Minimum Rating Factor*	0.45	0.51	0.64	1.15	0.52	0.38	0.42
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	16.20	18.36	23.04	41.40	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.6 Key Sheet—Segment 3 Eastbound

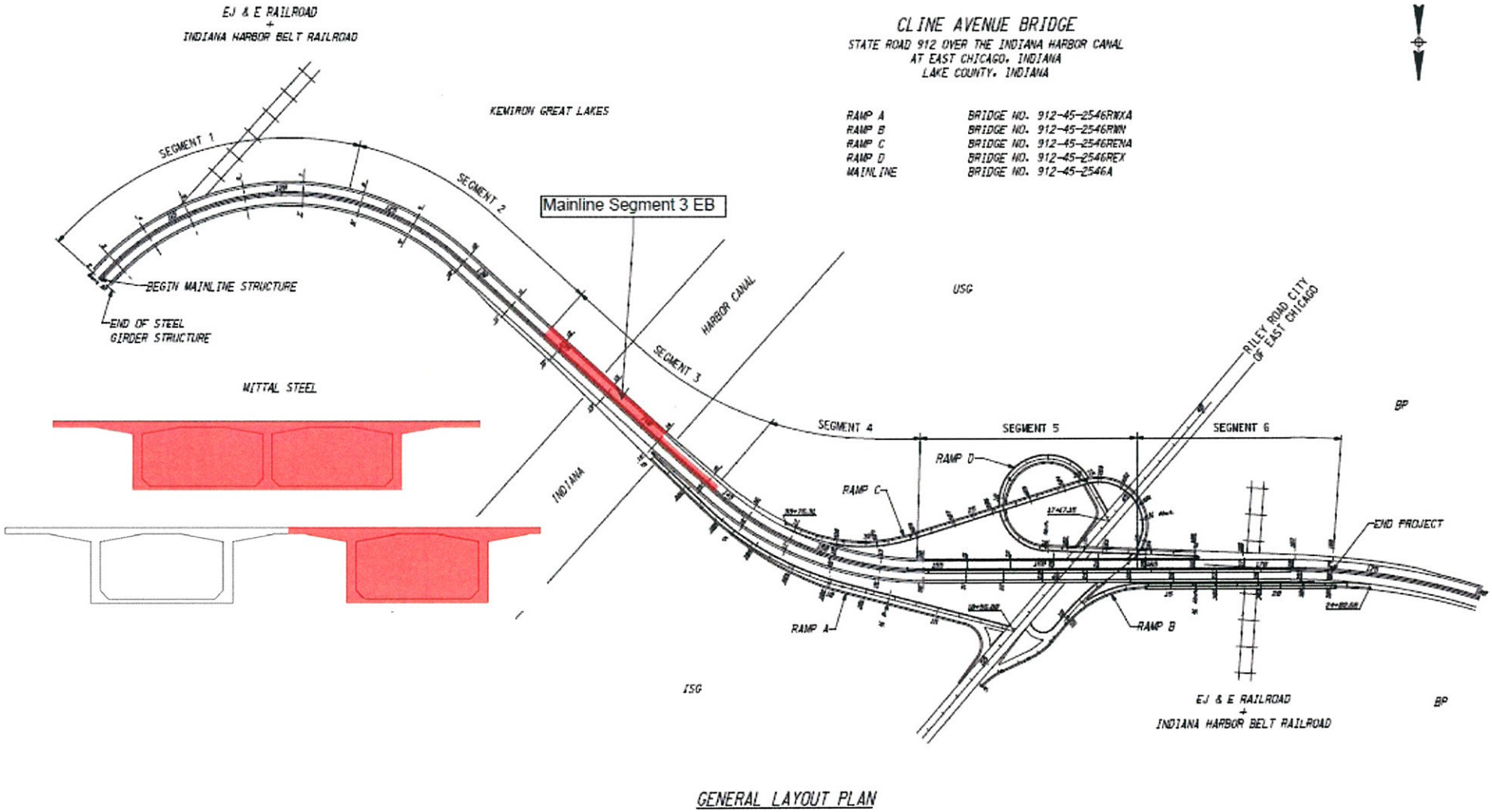


Table 4.6 Rating Table—Segment 3 Eastbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.07	1.09	1.39	1.42	1.01	1.03	0.93	1.22	1.21	1.10	1.09	0.98	1.06	0.93
		Shear	0.69	0.85	0.90	1.10	0.65	0.66	0.58	0.65	0.65	0.52	0.52	0.44	0.43	0.40
	Service	Flexure	0.57	0.57	1.69	1.69	1.52	1.55	1.40	1.53	1.52	1.40	1.39	1.27	1.36	1.21
		Principal Stress	1.30	1.65	1.32	1.68	1.09	1.34	1.53	1.31	1.28	1.03	1.06	0.94	1.00	0.80
Transverse	Factored	Top Slab Centerline	1.65	1.65	2.13	2.13	2.30	2.43	2.48	2.07	2.00	1.95	1.95	1.71	1.97	1.77
		Top Slab Thickness Change	1.71	1.71	2.22	2.22	2.47	2.51	2.42	2.15	2.18	1.89	1.98	1.62	1.93	1.63
		Top Slab Webs & Cantilever	1.85	2.43	2.40	3.15	2.35	2.33	1.97	1.90	2.02	1.70	1.70	1.38	1.58	1.33
		Web Bending	0.49	2.59	0.64	3.47	0.52	0.61	0.61	0.60	0.52	0.52	0.52	0.38	0.54	0.42

Overall Minimum Rating Factor*	0.49	0.57	0.64	1.10	0.52	0.38	0.40
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	16.56	20.52	23.04	39.60	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.7 Key Sheet—Segment 3 Westbound

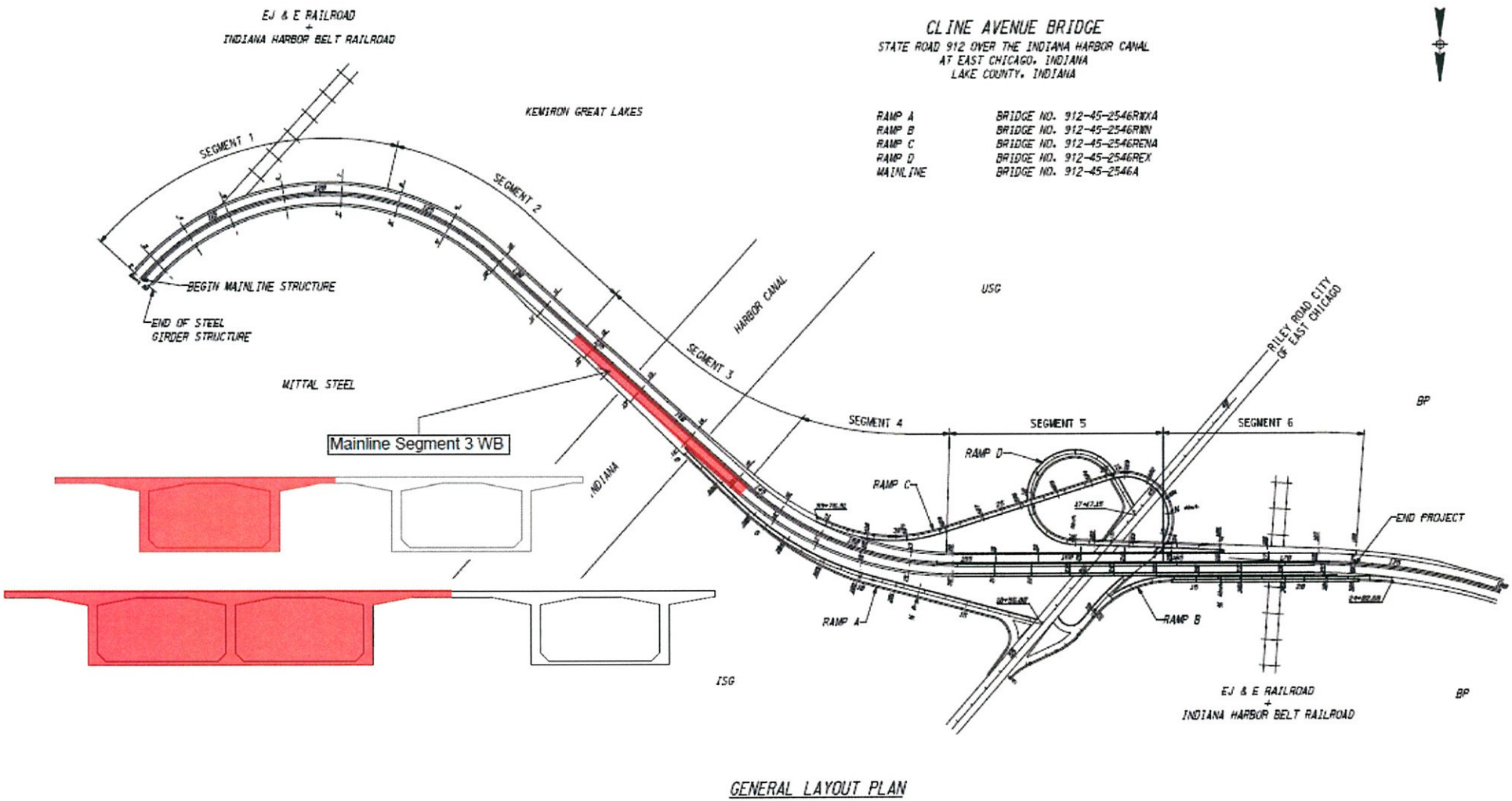


Table 4.7 Rating Table—Segment 3 Westbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	0.82	1.09	1.06	1.42	0.86	0.86	0.75	0.94	0.94	1.04	1.03	0.96	1.01	0.88
		Shear	0.52	0.72	0.68	0.90	0.48	0.49	0.41	0.49	0.49	0.39	0.40	0.36	0.39	0.32
	Service	Flexure	0.53	0.66	2.09	2.13	1.87	1.92	1.74	1.88	1.86	1.72	1.71	1.55	1.66	1.48
		Principal Stress	0.86	1.01	1.10	1.23	0.97	0.98	0.86	0.85	0.85	0.71	0.71	0.62	0.68	0.58
Transverse	Factored	Top Slab Centerline	0.86	0.86	1.11	1.11	1.29	1.35	1.46	1.16	1.13	1.09	1.10	0.98	1.15	1.03
		Top Slab Thickness Change	1.35	1.35	1.75	1.75	1.78	1.80	1.61	1.54	1.53	1.34	1.36	1.14	1.32	1.14
		Top Slab Webs & Cantilever	1.85	1.89	2.40	2.45	2.26	2.33	1.97	1.90	1.92	1.67	1.67	1.38	1.58	1.33
		Web Bending	0.49	0.54	0.64	0.70	0.52	0.61	0.56	0.57	0.52	0.47	0.47	0.38	0.46	0.38

Overall Minimum Rating Factor*	0.49	0.54	0.64	0.70	0.41	0.36	0.32
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	19.44	23.04	25.20	21.63		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.8 Key Sheet—Segment 4 Eastbound

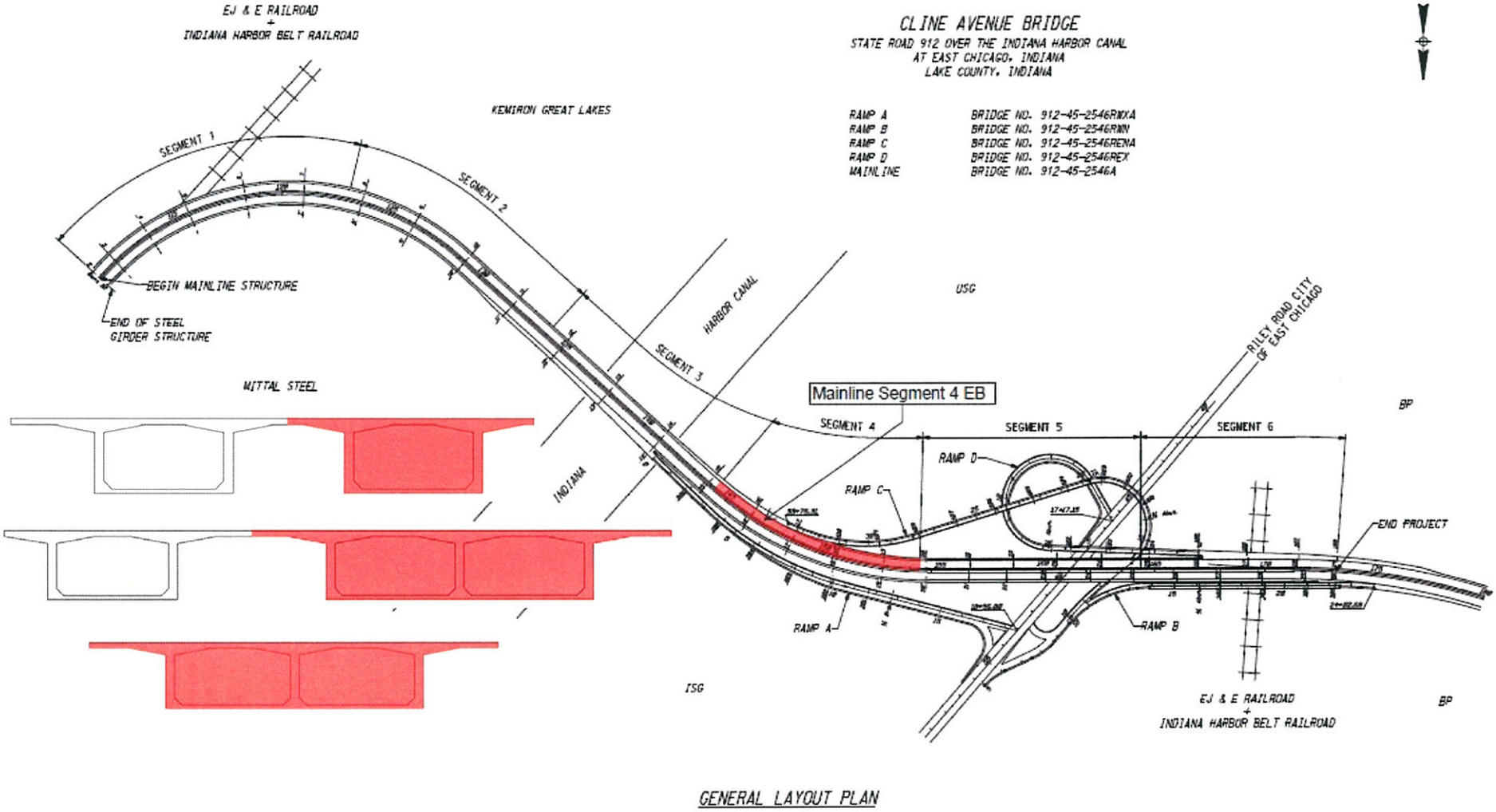


Table 4.8 Rating Table—Segment 4 Eastbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.54	1.95	2.10	2.53	1.46	1.51	1.40	1.61	1.60	1.42	1.44	1.25	1.37	1.19
		Shear	1.40	1.54	1.82	2.02	1.28	1.29	1.07	1.30	1.29	0.93	0.93	0.84	0.85	0.76
	Service	Flexure	1.24	1.47	2.08	2.24	1.86	1.91	1.75	1.87	1.85	1.72	1.72	1.58	1.71	1.52
		Principal Stress	1.49	1.56	1.34	1.59	1.17	1.18	1.00	1.03	1.03	0.86	0.86	0.79	0.76	0.72
Transverse	Factored	Top Slab Centerline	0.86	0.86	1.11	1.11	1.29	1.35	1.46	1.16	1.13	1.09	1.10	0.98	1.15	1.03
		Top Slab Thickness Change	1.35	1.35	1.75	1.75	1.78	1.80	1.61	1.54	1.53	1.34	1.36	1.14	1.32	1.14
		Top Slab Webs & Cantilever	1.85	1.89	2.40	2.45	2.26	2.33	1.97	1.90	1.92	1.67	1.67	1.38	1.58	1.33
		Web Bending	0.49	0.54	0.64	0.70	0.52	0.61	0.56	0.57	0.52	0.47	0.47	0.38	0.46	0.38

Overall Minimum Rating Factor*	0.49	0.54	0.64	0.70	0.52	0.38	0.38
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	19.44	23.04	25.20	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.9 Key Sheet—Segment 4 Westbound

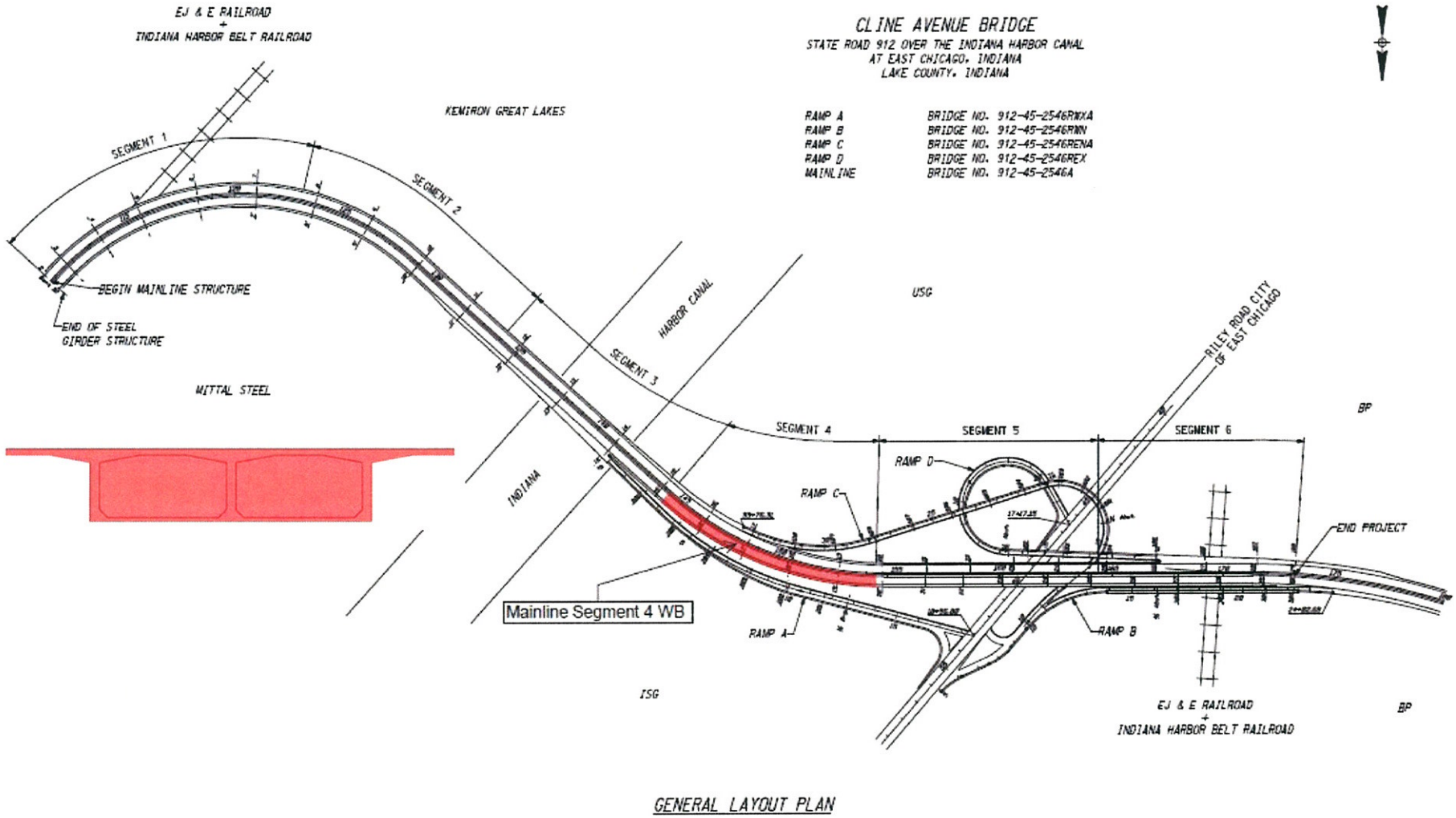


Table 4.9 Rating Table—Segment 4 Westbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.80	1.84	2.33	2.39	1.90	1.93	1.65	2.06	2.05	1.81	1.80	1.65	1.76	1.53
		Shear	0.93	1.00	1.21	1.34	0.86	0.87	0.72	0.84	0.84	0.62	0.62	0.54	0.47	0.47
	Service	Flexure	1.24	1.26	1.97	1.98	1.76	1.80	1.61	1.77	1.76	1.61	1.61	1.50	1.60	1.44
		Principal Stress	1.30	1.44	1.16	1.46	1.03	1.04	0.89	0.91	0.91	0.73	0.73	0.64	0.58	0.58
Transverse	Factored	Top Slab Centerline	1.69	1.69	2.19	2.19	2.47	2.59	2.76	2.21	2.14	2.12	2.13	1.88	2.17	1.97
		Top Slab Thickness Change	1.78	2.23	2.31	2.89	2.54	2.59	2.59	2.38	2.41	2.20	2.31	1.84	2.36	1.89
		Top Slab Webs & Cantilever	1.85	3.02	2.40	3.92	2.36	2.93	2.90	2.85	2.25	2.27	2.32	1.81	2.65	2.00
		Web Bending	0.49	2.59	0.64	3.47	0.52	0.61	0.61	0.60	0.52	0.52	0.52	0.38	0.54	0.42

Overall Minimum Rating Factor*	0.49	1.00	0.64	1.34	0.52	0.38	0.42
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	36.00	23.04	48.24	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.10 Key Sheet—Segment 5 Eastbound

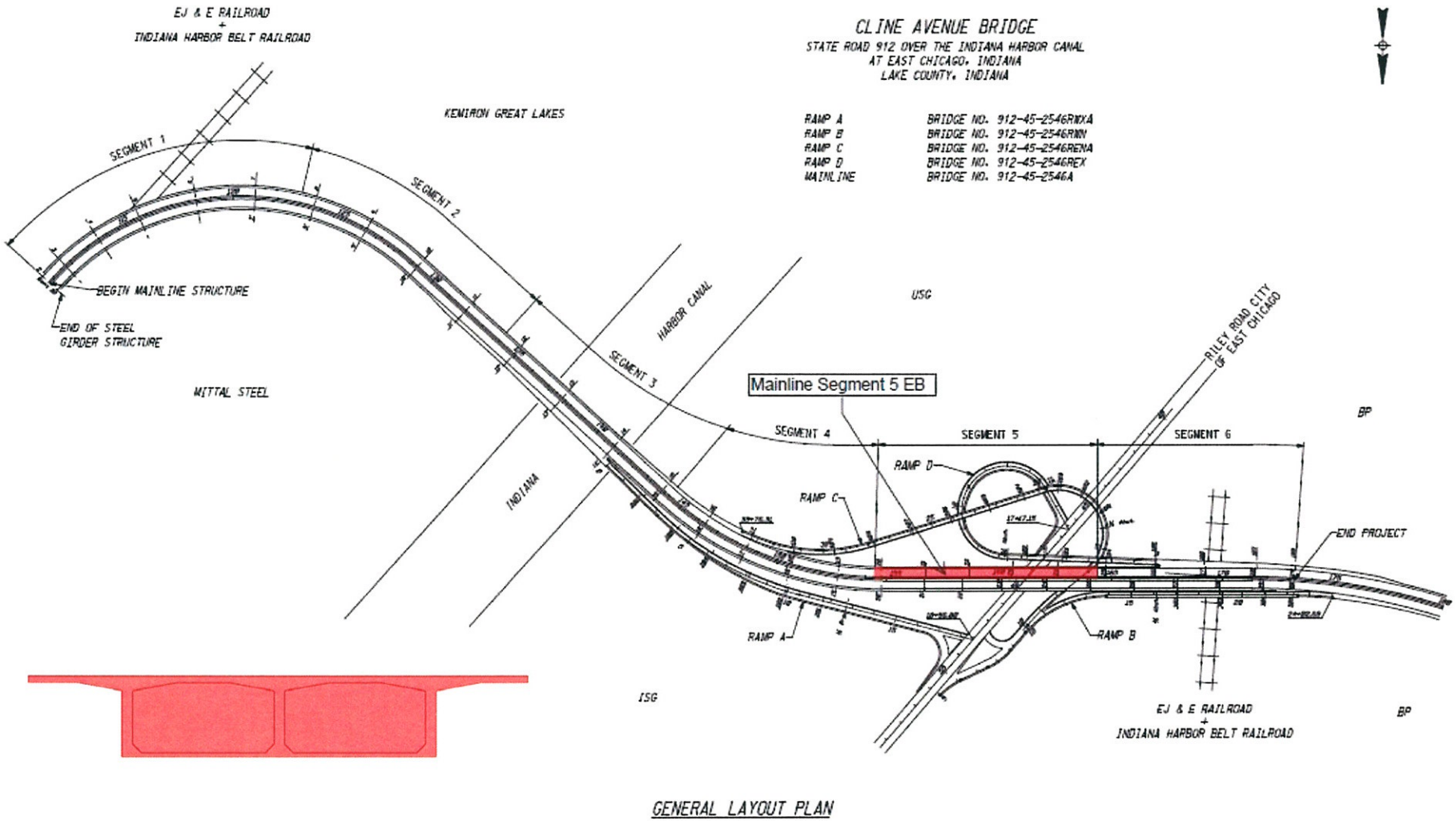


Table 4.10 Rating Table—Segment 5 Eastbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.99	2.03	2.59	2.64	1.83	1.90	1.72	2.26	2.24	2.09	2.10	1.87	2.04	1.83
		Shear	1.26	1.52	1.64	1.93	1.15	1.16	0.97	1.16	1.16	0.90	0.91	0.81	0.73	0.73
	Service	Flexure	1.04	1.06	2.29	2.29	2.03	2.07	1.87	2.05	2.03	1.88	1.89	1.70	1.83	1.66
		Principal Stress	1.13	1.22	1.04	1.23	0.94	1.07	1.19	1.02	1.01	0.87	0.93	0.83	0.87	0.84
Transverse	Factored	Top Slab Centerline	1.69	1.69	2.19	2.19	2.47	2.59	2.76	2.21	2.14	2.12	2.13	1.88	2.17	1.97
		Top Slab Thickness Change	1.78	2.23	2.31	2.89	2.54	2.59	2.59	2.38	2.41	2.20	2.31	1.84	2.36	1.89
		Top Slab Webs & Cantilever	1.85	3.02	2.40	3.92	2.36	2.93	2.90	2.85	2.25	2.27	2.32	1.81	2.65	2.00
		Web Bending	0.49	2.59	0.64	3.47	0.52	0.61	0.61	0.60	0.52	0.52	0.52	0.38	0.54	0.42

Overall Minimum Rating Factor*	0.49	1.06	0.64	1.23	0.52	0.38	0.42
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	38.16	23.04	44.28	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.11 Key Sheet—Segment 5 Westbound

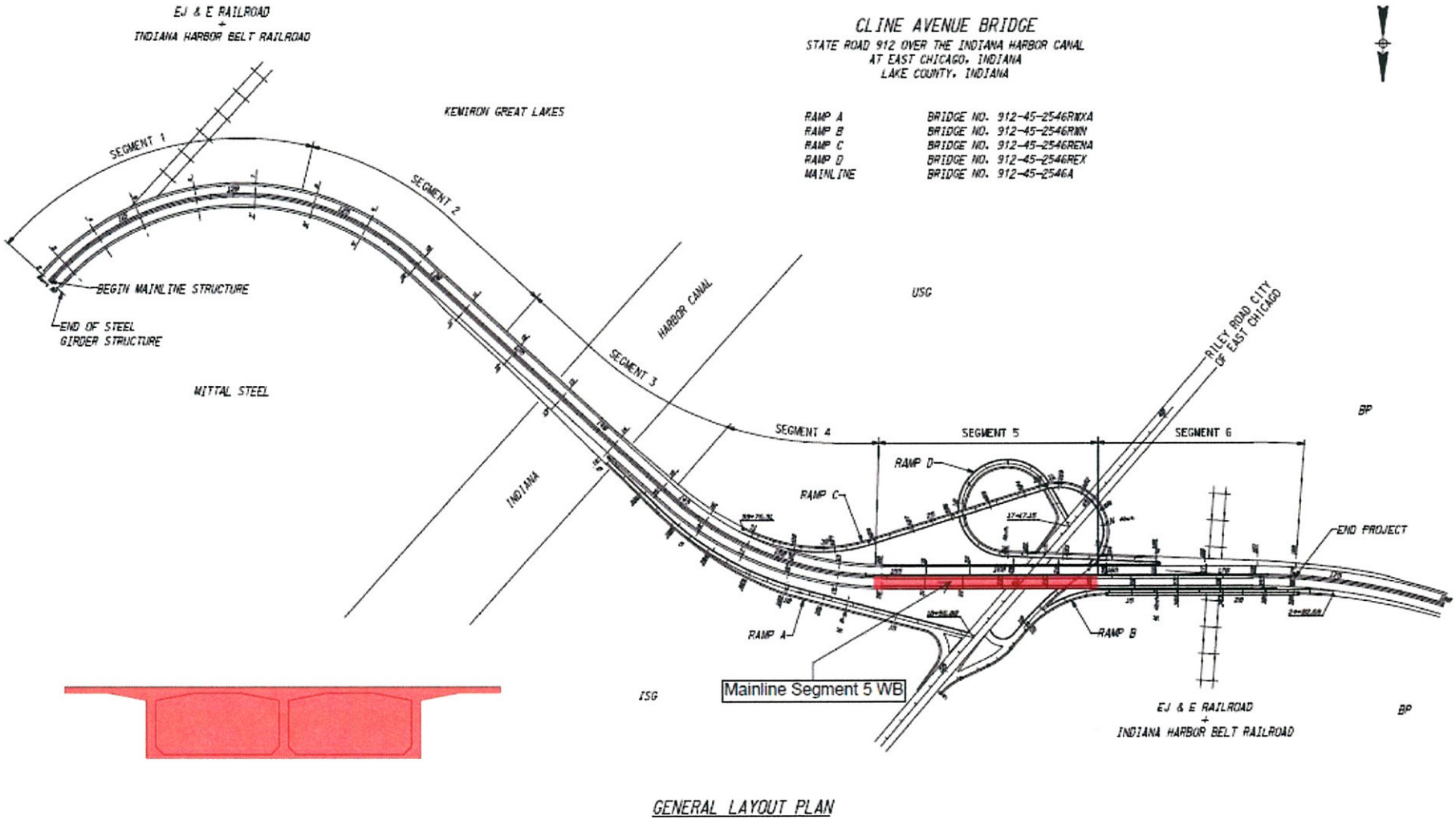


Table 4.11 Rating Table—Segment 5 Westbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.67	1.70	2.16	2.21	1.62	1.74	1.71	2.03	1.99	1.78	1.85	1.68	1.84	1.65
		Shear	1.33	1.64	1.73	2.09	1.21	1.23	1.06	1.30	1.30	1.06	1.06	0.90	0.82	0.82
	Service	Flexure	0.88	0.89	2.22	2.22	1.97	2.03	1.85	2.00	1.98	1.85	1.85	1.69	1.83	1.65
		Principal Stress	1.15	1.35	1.09	1.35	0.99	1.05	1.19	1.07	1.06	0.91	0.98	0.87	0.87	0.87
Transverse	Factored	Top Slab Centerline	1.69	1.69	2.19	2.19	2.47	2.59	2.76	2.21	2.14	2.12	2.13	1.88	2.17	1.97
		Top Slab Thickness Change	1.78	2.23	2.31	2.89	2.54	2.59	2.59	2.38	2.41	2.20	2.31	1.84	2.36	1.89
		Top Slab Webs & Cantilever	1.85	3.02	2.40	3.92	2.36	2.93	2.90	2.85	2.25	2.27	2.32	1.81	2.65	2.00
		Web Bending	0.49	2.59	0.64	3.47	0.52	0.61	0.61	0.60	0.52	0.52	0.52	0.38	0.54	0.42

Overall Minimum Rating Factor*	0.49	0.89	0.64	1.35	0.52	0.38	0.42
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	32.04	23.04	48.60	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.12 Key Sheet—Segment 6 Eastbound

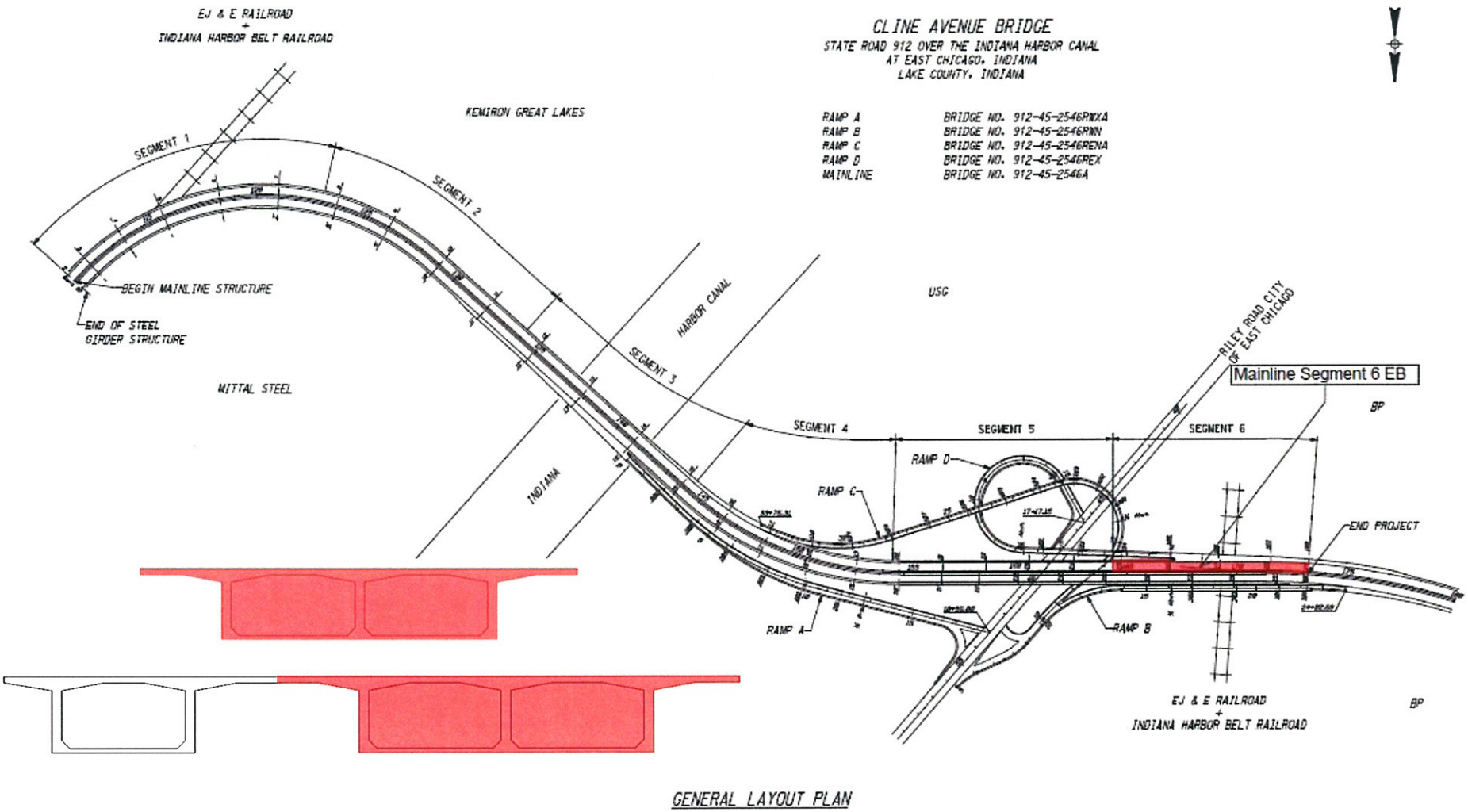


Table 4.12 Rating Table—Segment 6 Eastbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.72	1.77	2.23	2.30	1.68	1.79	1.73	1.95	1.95	1.75	1.81	1.66	1.81	1.62
		Shear	0.94	1.11	1.22	1.47	0.94	0.95	0.81	0.96	0.96	0.74	0.74	0.64	0.58	0.58
	Service	Flexure	1.44	1.47	2.38	2.38	2.12	2.16	1.92	2.13	2.12	1.95	1.94	1.76	1.89	1.69
		Principal Stress	1.04	1.19	1.04	1.19	0.94	1.00	1.21	1.02	1.00	0.83	0.91	0.79	0.80	0.80
Transverse	Factored	Top Slab Centerline	1.05	1.05	1.36	1.36	1.53	1.60	1.68	1.40	1.37	1.30	1.32	1.15	1.37	1.20
		Top Slab Thickness Change	1.60	1.60	2.07	2.07	2.26	2.31	2.15	2.01	1.95	1.76	1.77	1.50	1.71	1.42
		Top Slab Webs & Cantilever	1.85	1.89	2.40	2.45	2.26	2.59	2.25	1.94	1.92	1.67	1.67	1.45	1.64	1.40
		Web Bending	0.49	0.54	0.64	0.70	0.52	0.61	0.56	0.57	0.52	0.47	0.47	0.38	0.46	0.38

Overall Minimum Rating Factor*	0.49	0.54	0.64	0.70	0.52	0.38	0.38
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	19.44	23.04	25.20	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.13 Key Sheet—Segment 6 Westbound

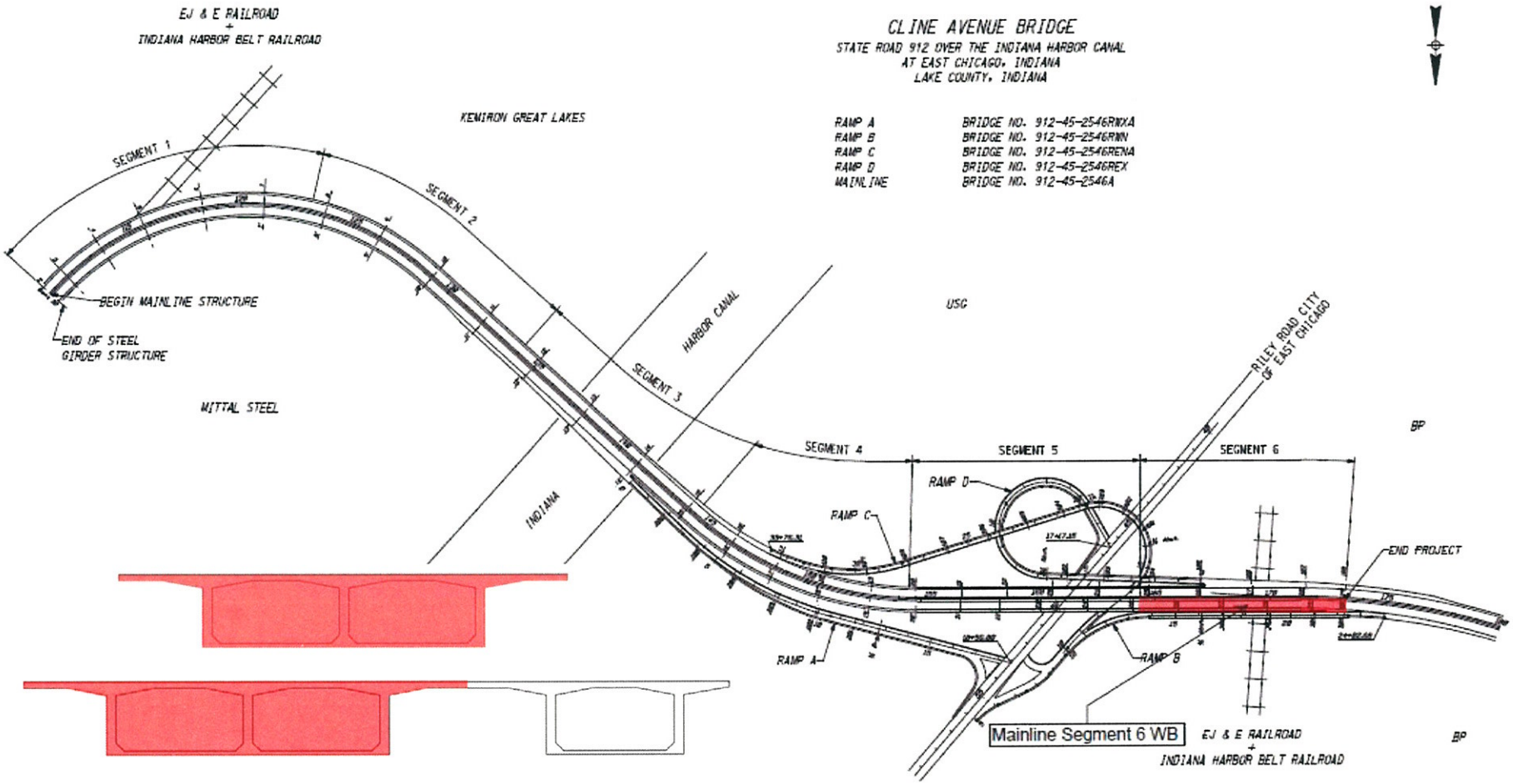


Table 4.13 Rating Table—Segment 6 Westbound

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.38	1.43	1.78	1.86	1.37	1.42	1.24	1.59	1.59	1.50	1.55	1.39	1.49	1.29
		Shear	0.90	1.04	1.13	1.31	0.86	0.88	0.78	0.93	0.93	0.74	0.75	0.63	0.69	0.56
	Service	Flexure	1.27	1.41	2.54	2.54	2.25	2.30	2.06	2.27	2.25	2.10	2.10	1.90	2.05	1.86
		Principal Stress	1.65	1.77	1.68	1.92	1.42	1.45	1.28	1.36	1.35	1.27	1.28	1.08	1.18	0.98
Transverse	Factored	Top Slab Centerline	1.05	1.05	1.36	1.36	1.53	1.60	1.68	1.40	1.37	1.30	1.32	1.15	1.37	1.20
		Top Slab Thickness Change	1.60	1.60	2.07	2.07	2.26	2.31	2.15	2.01	1.95	1.76	1.77	1.50	1.71	1.42
		Top Slab Webs & Cantilever	1.85	1.89	2.40	2.45	2.26	2.59	2.25	1.94	1.92	1.67	1.67	1.45	1.64	1.40
		Web Bending	0.49	0.54	0.64	0.70	0.52	0.61	0.56	0.57	0.52	0.47	0.47	0.38	0.46	0.38

Overall Minimum Rating Factor*	0.49	0.54	0.64	0.70	0.52	0.38	0.38
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	17.64	19.44	23.04	25.20	23.62		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.14 Key Sheet— Ramp A

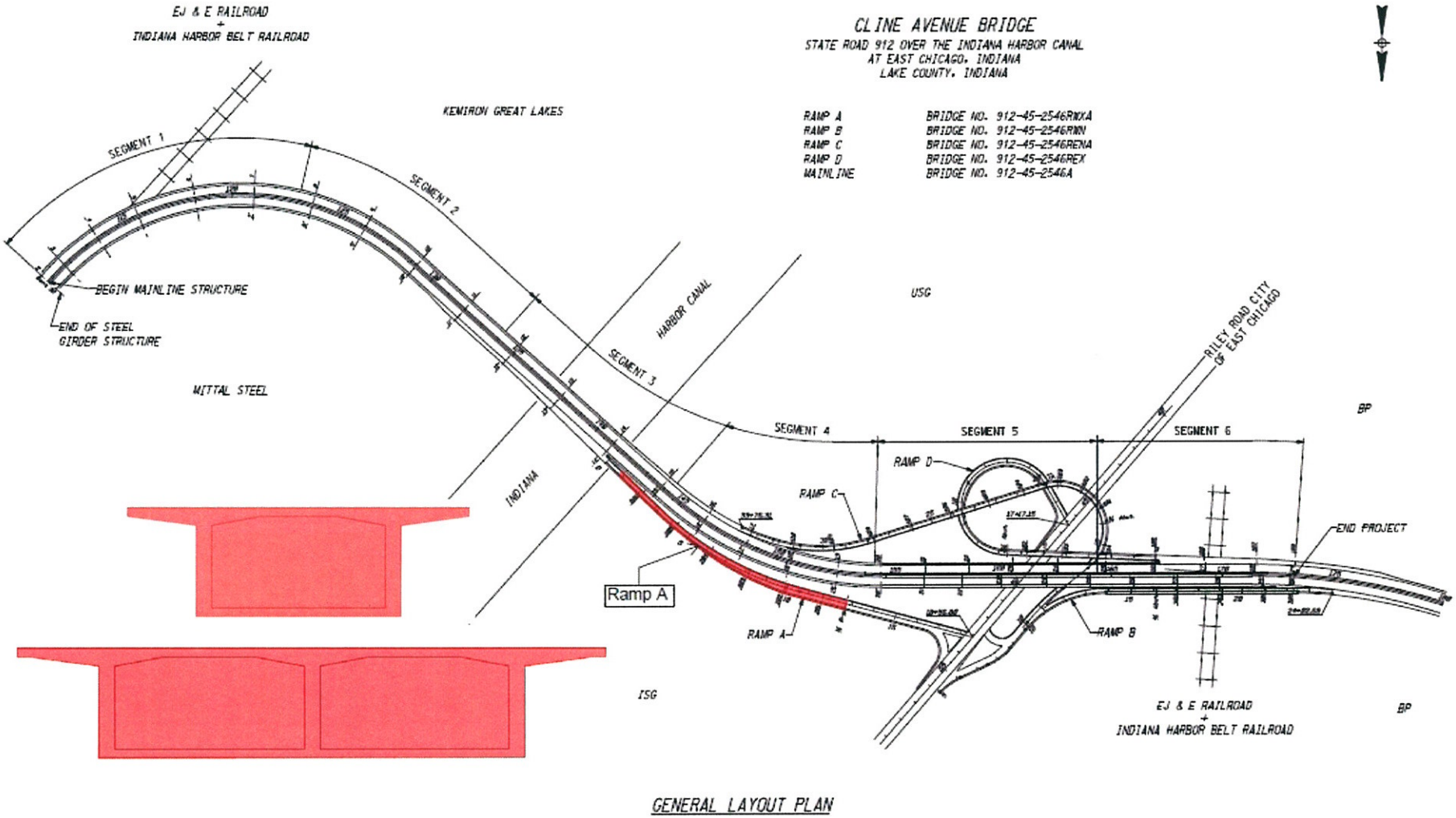


Table 4.14 Rating Table—Ramp A

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.08	1.38	1.40	1.79	1.08	1.09	0.94	1.13	1.13	1.17	1.16	1.04	1.13	0.95
		Shear	1.01	1.24	1.33	1.63	0.94	0.95	0.81	0.72	0.72	0.56	0.56	0.47	0.43	0.43
	Service	Flexure	1.28	2.00	2.28	3.50	2.02	2.07	1.90	1.93	1.92	1.75	1.76	1.58	1.77	1.49
		Principal Stress	2.31	2.80	2.51	2.90	2.21	2.25	1.98	1.96	1.96	1.59	1.60	1.35	1.24	1.25
Transverse	Factored	Top Slab Centerline	0.76	0.76	0.99	0.99	1.15	1.22	1.38	1.05	1.04	0.99	1.00	0.92	1.08	1.20
		Top Slab Thickness Change	0.96	0.96	1.25	1.25	1.49	1.47	1.51	1.45	1.62	1.62	1.71	1.29	1.38	1.50
		Top Slab Webs & Cantilever	1.16	1.16	1.51	1.51	1.61	1.85	1.73	1.43	1.38	1.43	1.47	1.98	1.95	1.40
		Web Bending	2.28	2.28	3.70	3.70	2.54	3.70	4.92	3.27	2.57	3.01	3.01	2.38	4.18	5.30

Overall Minimum Rating Factor*	0.76	0.76	0.99	0.99	0.81	0.47	0.43
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	27.36	27.36	35.64	35.64	42.31		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.15 Key Sheet— Ramp A Mainline Segment 2

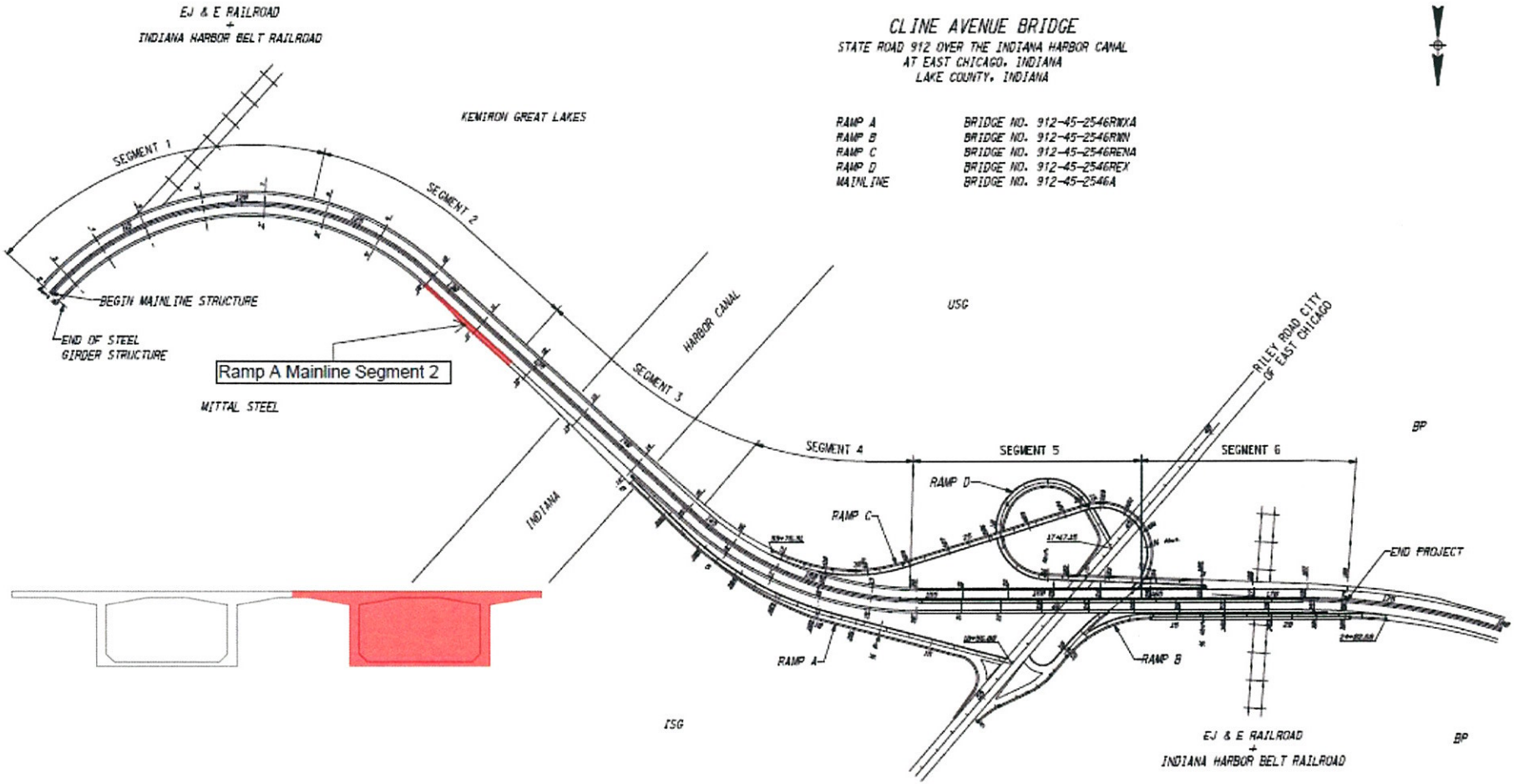


Table 4.15 Rating Table—Ramp A Mainline Segment 2

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.04	1.26	1.35	1.63	1.06	1.06	0.93	1.13	1.13	0.94	0.94	0.85	0.91	0.76
		Shear	1.92	2.54	2.45	3.20	1.95	1.99	1.77	1.88	1.88	1.46	1.46	1.11	1.32	0.94
	Service	Flexure	0.51	0.60	1.15	1.29	1.05	1.07	0.98	1.05	1.04	0.96	0.96	0.87	0.93	0.84
		Principal Stress	2.64	4.02	2.64	4.02	2.33	2.35	1.99	2.02	2.02	1.65	1.64	1.47	1.37	1.31
Transverse	Factored	Top Slab Centerline	1.65	1.65	2.13	2.13	2.30	2.43	2.48	2.07	2.00	1.95	1.95	1.71	1.97	1.77
		Top Slab Thickness Change	1.71	1.71	2.22	2.22	2.47	2.51	2.42	2.15	2.18	1.89	1.98	1.62	1.93	1.63
		Top Slab Webs & Cantilever	1.92	2.43	2.49	3.15	2.35	2.33	1.97	1.90	2.02	1.70	1.70	1.38	1.58	1.33
		Web Bending	0.75	2.73	0.97	3.54	0.80	0.94	1.00	0.95	0.82	0.88	0.88	0.63	0.93	0.72

Overall Minimum Rating Factor*	0.51	0.60	0.97	1.29	0.80	0.63	0.72
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	18.36	21.60	34.92	46.44	36.10		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.16 Key Sheet— Ramp A Mainline Segment 3

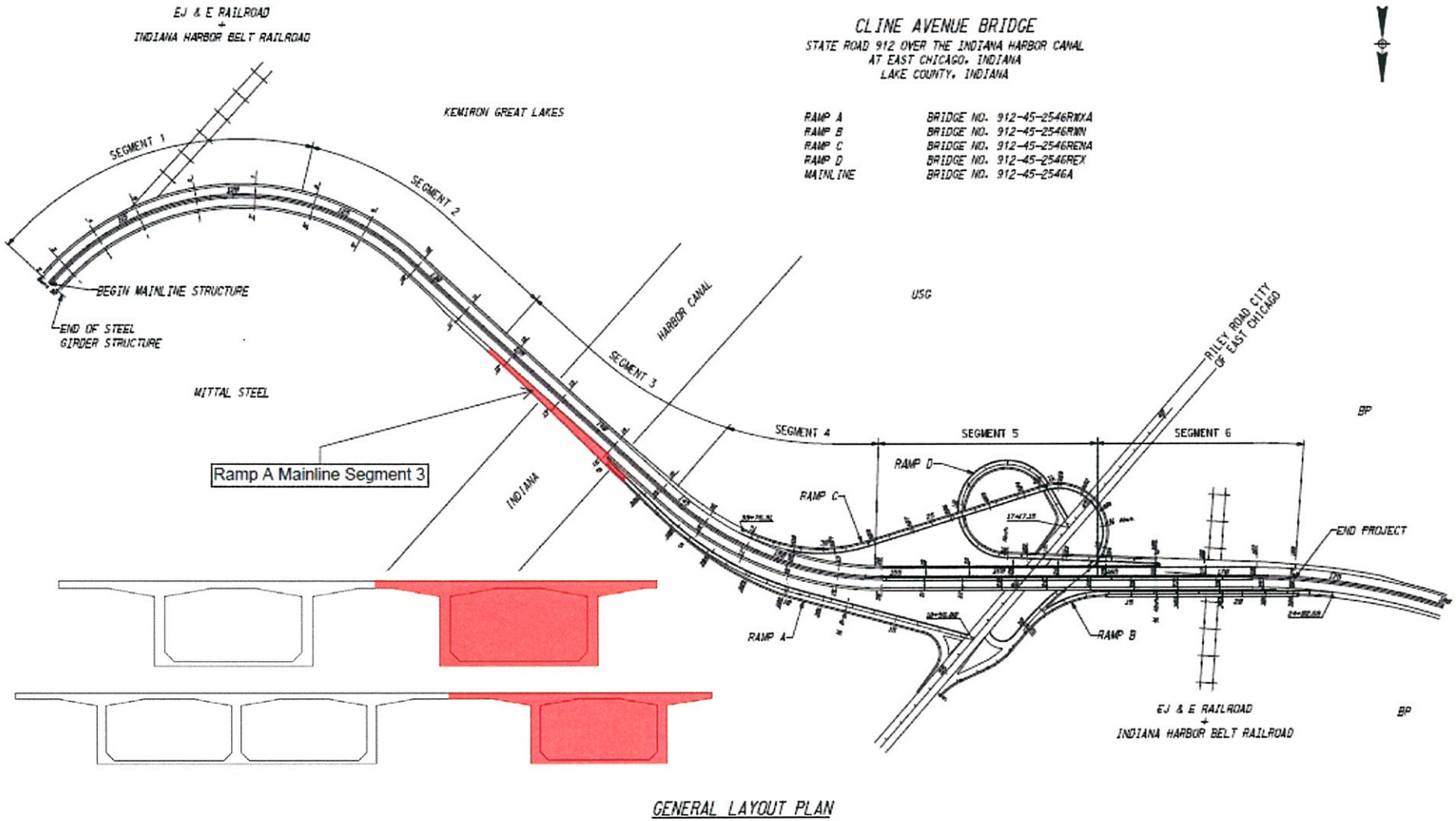


Table 4.16 Rating Table—Ramp A Mainline Segment 3

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	0.88	1.48	1.14	1.91	0.81	0.87	0.84	0.97	0.96	0.87	0.87	0.73	0.82	0.75
		Shear	1.18	1.54	1.53	2.00	1.10	1.14	1.07	1.30	1.30	1.02	1.02	0.85	0.77	0.76
	Service	Flexure	0.28	0.34	1.59	2.06	1.42	1.47	1.37	1.44	1.42	1.32	1.33	1.19	1.28	1.14
		Principal Stress	1.10	1.66	1.31	1.92	1.15	1.20	1.14	1.22	1.22	1.09	1.08	0.91	0.78	0.79
Transverse	Factored	Top Slab Centerline	0.86	0.86	1.11	1.11	1.29	1.35	1.46	1.16	1.13	1.09	1.10	0.98	1.15	1.03
		Top Slab Thickness Change	1.35	1.35	1.75	1.75	1.78	1.80	1.61	1.54	1.53	1.34	1.36	1.14	1.32	1.14
		Top Slab Webs & Cantilever	1.92	2.15	2.49	2.79	2.35	2.33	1.97	1.90	2.02	1.70	1.70	1.38	1.58	1.33
		Web Bending	0.75	1.35	0.97	1.81	0.80	0.94	1.00	0.95	0.82	0.88	0.88	0.63	0.89	0.72

Overall Minimum Rating Factor*	0.28	0.34	0.97	1.11	0.80	0.63	0.72
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	10.08	12.24	34.92	39.96	36.10		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Table 4.17 Key Sheet— Ramp C Units 2-5 (AASHTO Lanes)

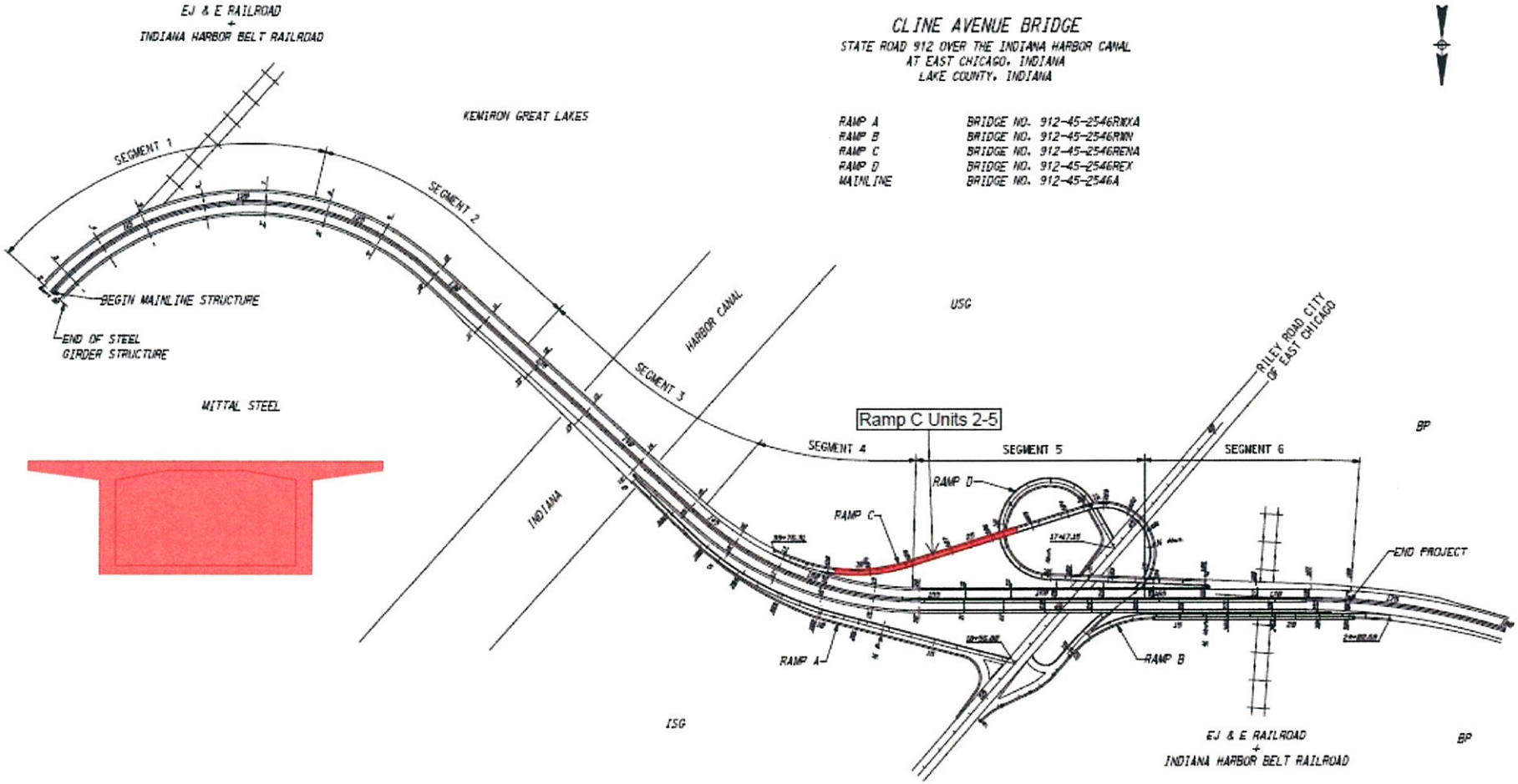


Table 4.17 Rating Table—Ramp C Units 2-5

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.39	3.36	2.66	4.35	1.31	1.33	1.19	1.37	1.37	3.24	3.17	2.57	2.98	1.42
		Shear	1.95	2.65	2.47	3.37	2.14	2.16	1.81	1.94	1.94	1.94	1.96	1.63	1.45	1.45
	Service	Flexure	1.37	2.14	3.87	3.94	3.40	3.50	3.18	3.39	3.31	2.86	2.91	2.28	2.69	2.18
		Principal Stress	3.57	4.86	4.87	4.96	4.22	4.26	3.63	4.05	4.03	2.88	2.90	2.29	2.06	2.06
Transverse	Factored	Top Slab Centerline	1.07	1.07	1.39	1.39	1.80	1.86	1.97	1.48	1.45	1.41	1.42	1.36	1.46	1.41
		Top Slab Thickness Change	1.41	1.46	1.82	1.90	2.29	2.29	2.40	2.82	2.74	2.25	2.43	2.04	2.93	2.38
		Top Slab Webs & Cantilever	2.60	3.15	3.37	4.09	4.38	5.24	4.77	3.98	3.36	3.19	3.33	2.83	3.82	3.40
		Web Bending	14.15	101.04	18.35	88.04	15.16	16.80	16.60	15.64	14.43	15.94	16.74	13.28	19.46	23.25

Overall Minimum Rating Factor*	1.07	1.07	1.39	1.39	1.19	1.36	1.41
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	38.52	38.52	50.04	50.04	58.92		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.18 Key Sheet— Ramp C Units 1, 6-8

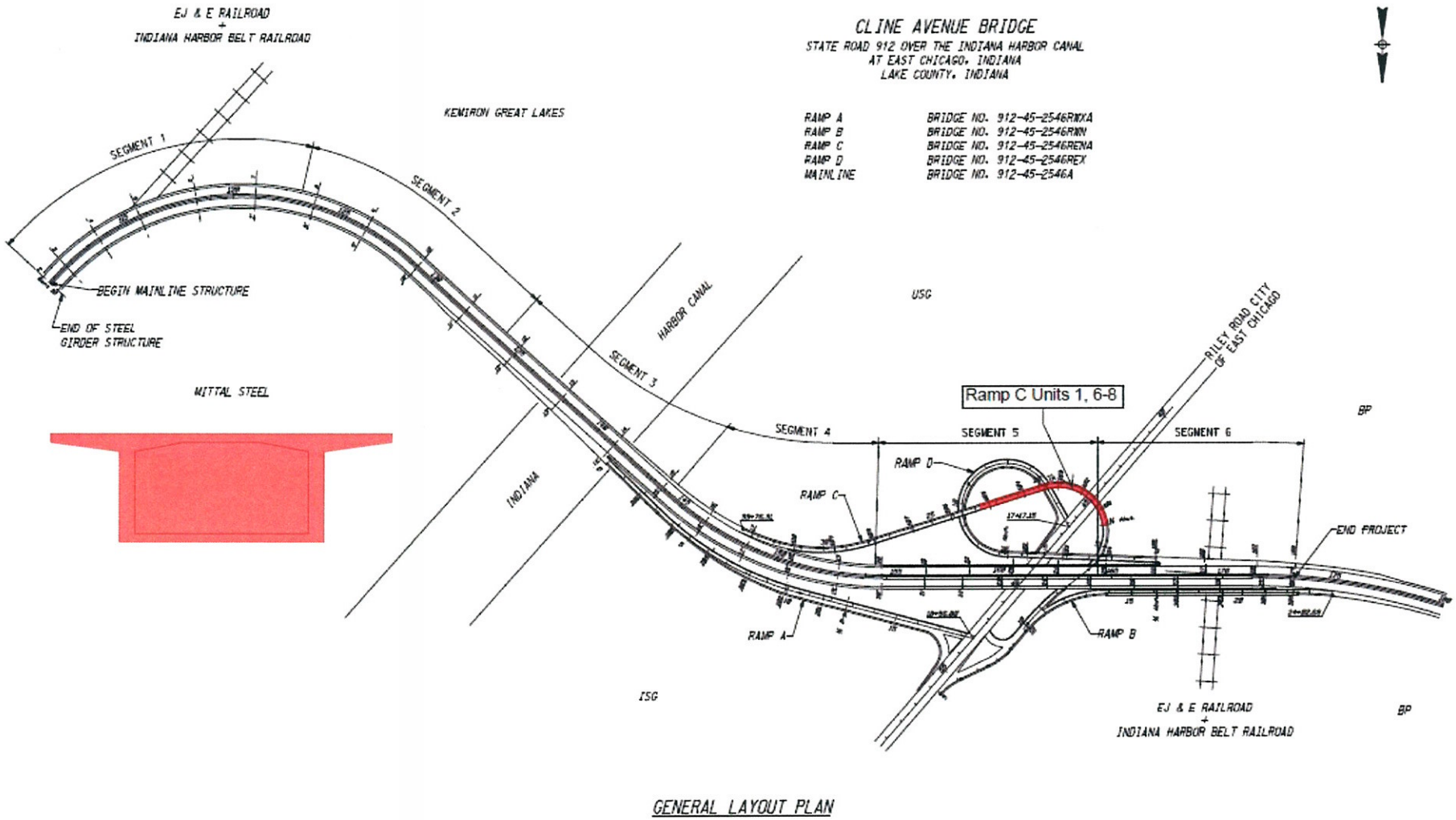


Table 4.18 Rating Table—Ramp C Units 1, 6-8

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.07	1.78	1.39	2.31	1.00	1.09	1.19	1.24	1.20	1.79	1.88	1.77	1.86	1.56
		Shear	1.47	1.77	1.93	2.31	1.17	1.08	0.70	1.43	1.42	1.30	1.31	0.90	0.72	0.71
	Service	Flexure	0.64	0.94	2.54	2.54	2.44	2.53	2.29	2.43	2.40	1.92	1.95	1.57	1.81	1.47
		Principal Stress	3.17	4.18	4.08	4.17	3.57	3.63	3.22	3.46	3.44	2.52	2.54	2.00	1.81	1.81
Transverse	Factored	Top Slab Centerline	1.07	1.07	1.39	1.39	1.80	1.86	1.97	1.48	1.45	1.41	1.42	1.36	1.46	1.41
		Top Slab Thickness Change	1.41	1.46	1.82	1.90	2.29	2.29	2.40	2.82	2.74	2.25	2.43	2.04	2.93	2.38
		Top Slab Webs & Cantilever	2.60	3.15	3.37	4.09	4.38	5.24	4.77	3.98	3.36	3.19	3.33	2.83	3.82	3.40
		Web Bending	14.15	101.04	18.35	88.04	15.16	16.80	16.60	15.64	14.43	15.94	16.74	13.28	19.46	23.25

Overall Minimum Rating Factor*	0.64	0.94	1.39	1.39	0.70	0.90	0.71
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	23.04	33.84	50.04	50.04	44.34		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.19 Key Sheet— Ramp C Mainline Segment 3

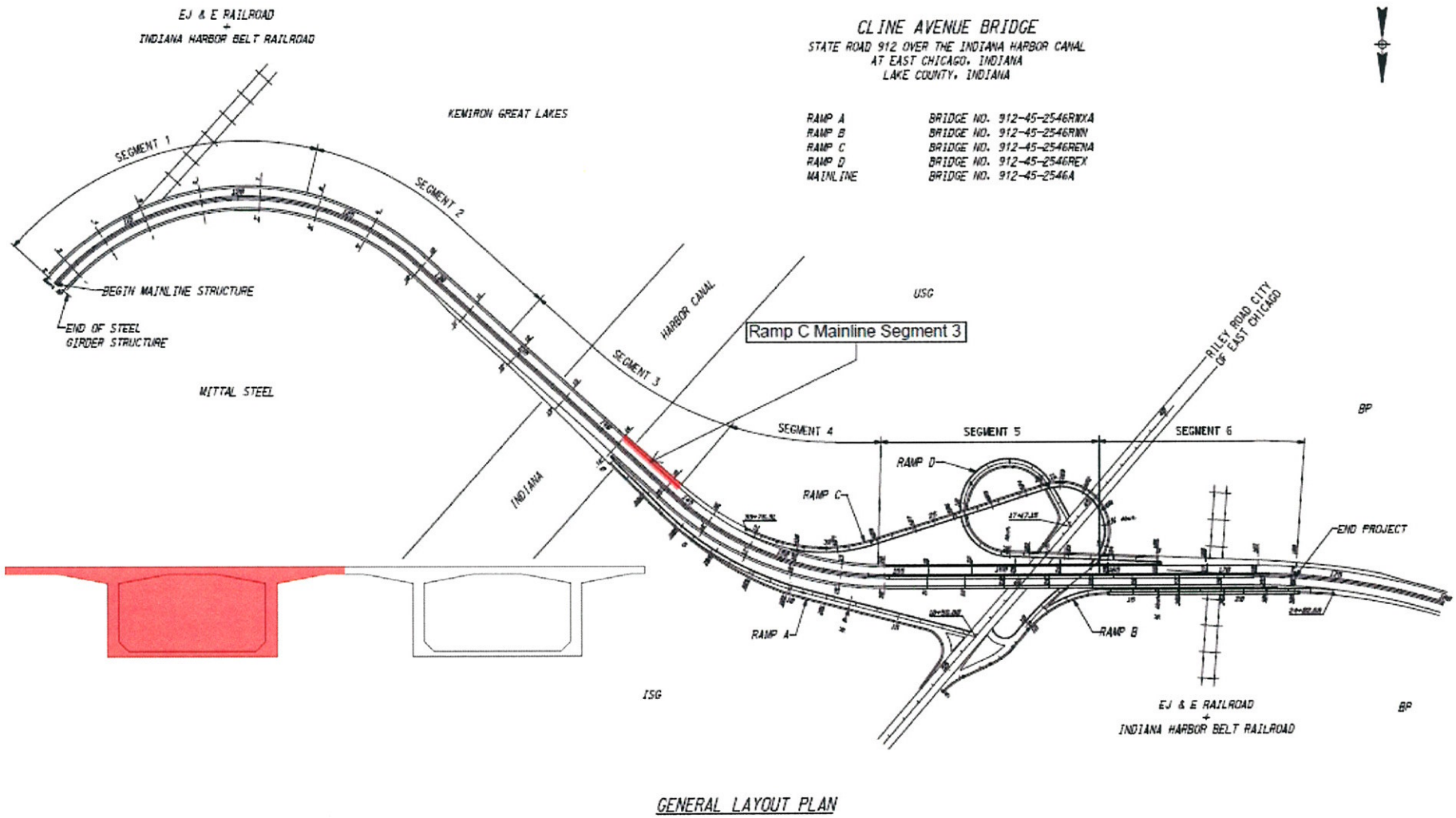


Table 4.19 Rating Table—Ramp C Mainline Segment 3

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.30	1.57	1.68	2.03	1.35	1.36	1.17	1.54	1.54	1.27	1.26	1.13	1.22	1.01
		Shear	1.08	1.83	1.38	2.32	1.12	1.40	1.25	1.28	1.25	0.95	1.01	0.87	0.97	0.82
	Service	Flexure	0.83	0.94	2.24	2.48	2.04	2.09	1.90	2.06	2.04	1.87	1.86	1.67	1.80	1.59
		Principal Stress	2.81	4.07	2.96	4.34	2.45	2.69	2.28	2.44	2.44	1.75	1.75	1.47	1.37	1.31
Transverse	Factored	Top Slab Centerline	1.65	1.65	2.13	2.13	2.30	2.43	2.48	2.07	2.00	1.95	1.95	1.71	1.97	1.77
		Top Slab Thickness Change	1.71	1.71	2.22	2.22	2.47	2.51	2.42	2.15	2.18	1.89	1.98	1.62	1.93	1.63
		Top Slab Webs & Cantilever	1.92	2.43	2.49	3.15	2.35	2.33	1.97	1.90	2.02	1.70	1.70	1.38	1.58	1.33
		Web Bending	0.75	2.73	0.97	3.54	0.80	0.94	1.00	0.95	0.82	0.88	0.88	0.63	0.93	0.72

Overall Minimum Rating Factor*	0.75	0.94	0.97	2.03	0.80	0.63	0.72
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	27.00	33.84	34.92	73.08	36.10		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.20 Key Sheet— Ramp C Mainline Segment 4

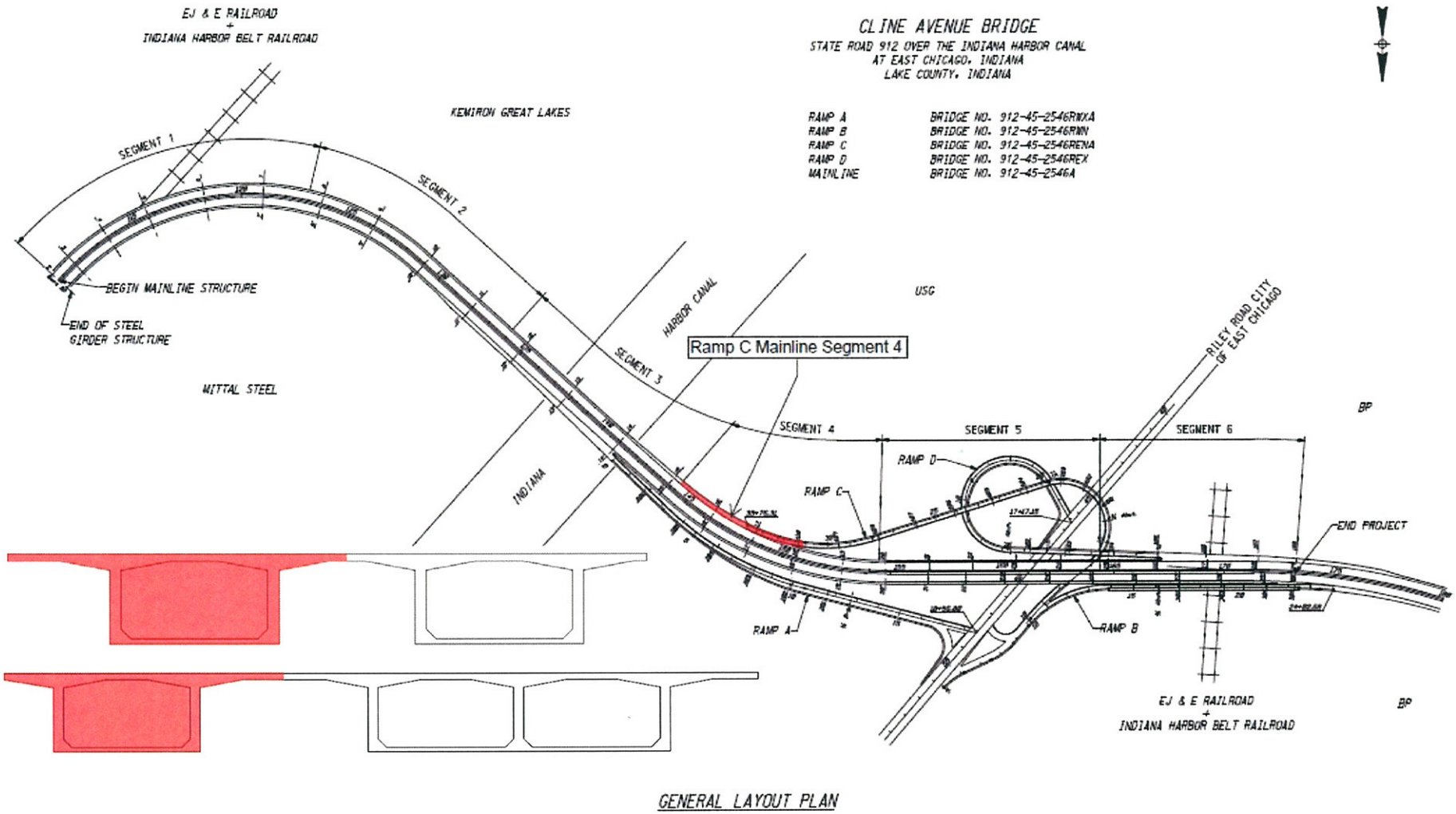


Table 4.20 Rating Table—Ramp C Mainline Segment 4

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	2.17	2.93	2.82	3.80	2.00	2.03	1.78	2.47	2.46	2.42	2.42	2.16	2.33	2.00
		Shear	1.60	2.49	2.07	3.15	1.50	1.53	1.35	1.64	1.64	1.30	1.30	1.10	1.23	0.91
	Service	Flexure	1.55	2.05	2.47	2.90	2.19	2.26	2.07	2.21	2.18	2.02	2.02	1.85	2.01	1.79
		Principal Stress	0.73	0.73	0.82	0.82	0.78	0.80	0.88	0.78	0.78	0.68	0.68	0.52	0.64	0.49
Transverse	Factored	Top Slab Centerline	0.86	0.86	1.11	1.11	1.29	1.35	1.46	1.16	1.13	1.09	1.10	0.98	1.15	1.03
		Top Slab Thickness Change	1.35	1.35	1.75	1.75	1.78	1.80	1.61	1.54	1.53	1.34	1.36	1.14	1.32	1.14
		Top Slab Webs & Cantilever	1.92	2.15	2.49	2.79	2.35	2.33	1.97	1.90	2.02	1.70	1.70	1.38	1.58	1.33
		Web Bending	0.75	1.35	0.97	1.81	0.80	0.94	1.00	0.95	0.82	0.88	0.88	0.63	0.89	0.72

Overall Minimum Rating Factor*	0.73	0.73	0.82	0.82	0.78	0.52	0.49
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	26.28	26.28	29.52	29.52	36.10		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.21 Key Sheet— Ramp B

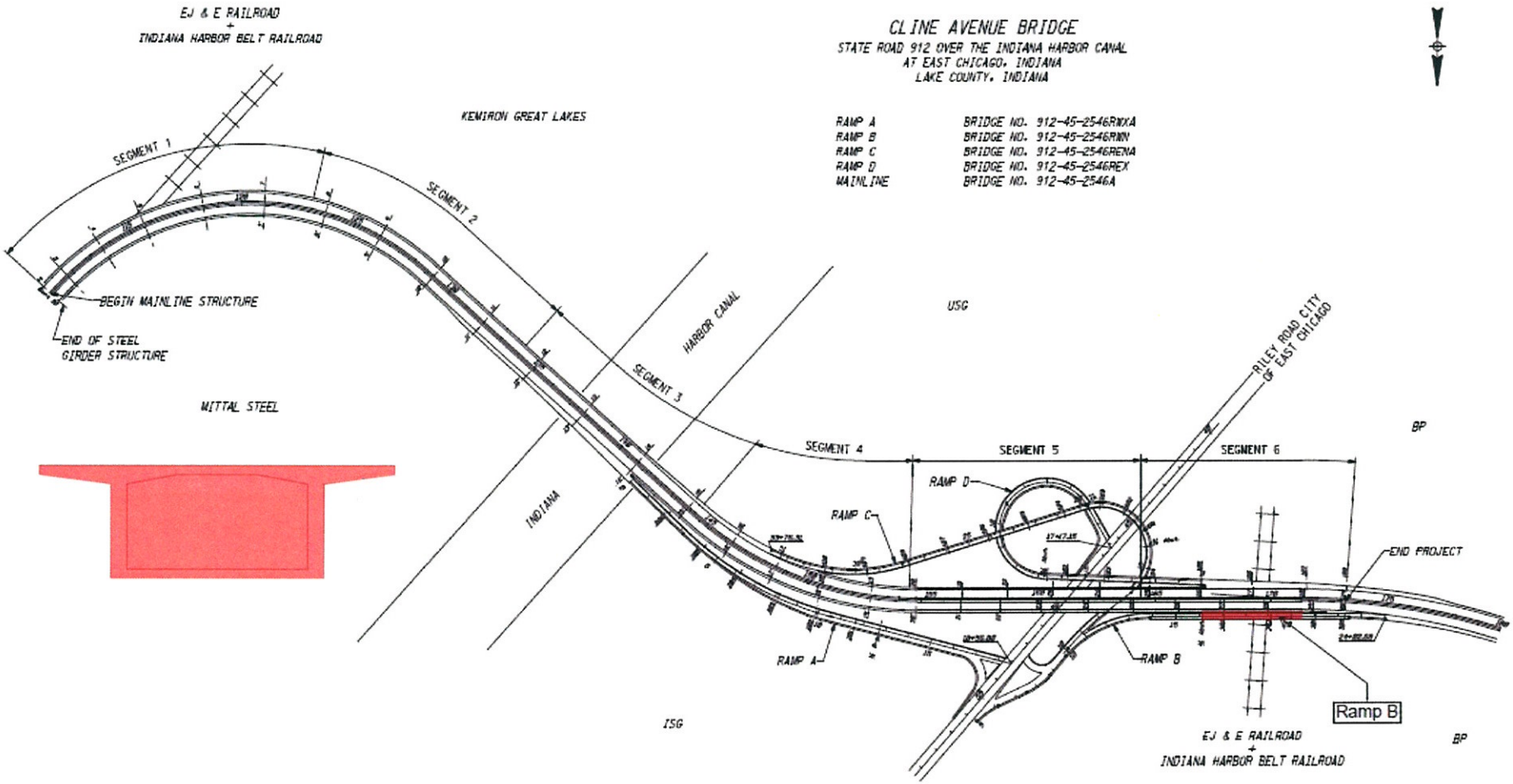


Table 4.21 Rating Table—Ramp B

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	2.08	3.46	2.69	4.48	1.92	2.00	1.85	2.14	2.14	3.17	3.19	2.52	3.03	2.39
		Shear	2.52	3.14	3.16	5.23	2.40	2.44	2.13	2.51	2.50	2.31	2.32	1.82	1.64	1.63
	Service	Flexure	1.37	2.15	3.80	3.80	3.34	3.45	3.14	3.34	3.25	2.75	2.75	2.31	2.72	2.19
		Principal Stress	4.26	5.93	5.93	6.02	4.96	5.05	4.64	4.75	4.72	4.29	4.31	3.24	3.09	2.70
Transverse	Factored	Top Slab Centerline	1.07	1.07	1.39	1.39	1.80	1.86	1.97	1.48	1.45	1.41	1.42	1.36	1.46	1.41
		Top Slab Thickness Change	1.41	1.46	1.82	1.90	2.29	2.29	2.40	2.82	2.74	2.25	2.43	2.04	2.93	2.38
		Top Slab Webs & Cantilever	2.60	3.15	3.37	4.09	4.38	5.24	4.77	3.98	3.36	3.19	3.33	2.83	3.82	3.40
		Web Bending	14.15	101.04	18.35	88.04	15.16	16.80	16.60	15.64	14.43	15.94	16.74	13.28	19.46	23.25

Overall Minimum Rating Factor*	1.07	1.07	1.39	1.39	1.80	1.36	1.41
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	38.52	38.52	50.04	50.04	81.01		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.22 Key Sheet— Ramp B Mainline Segment 6

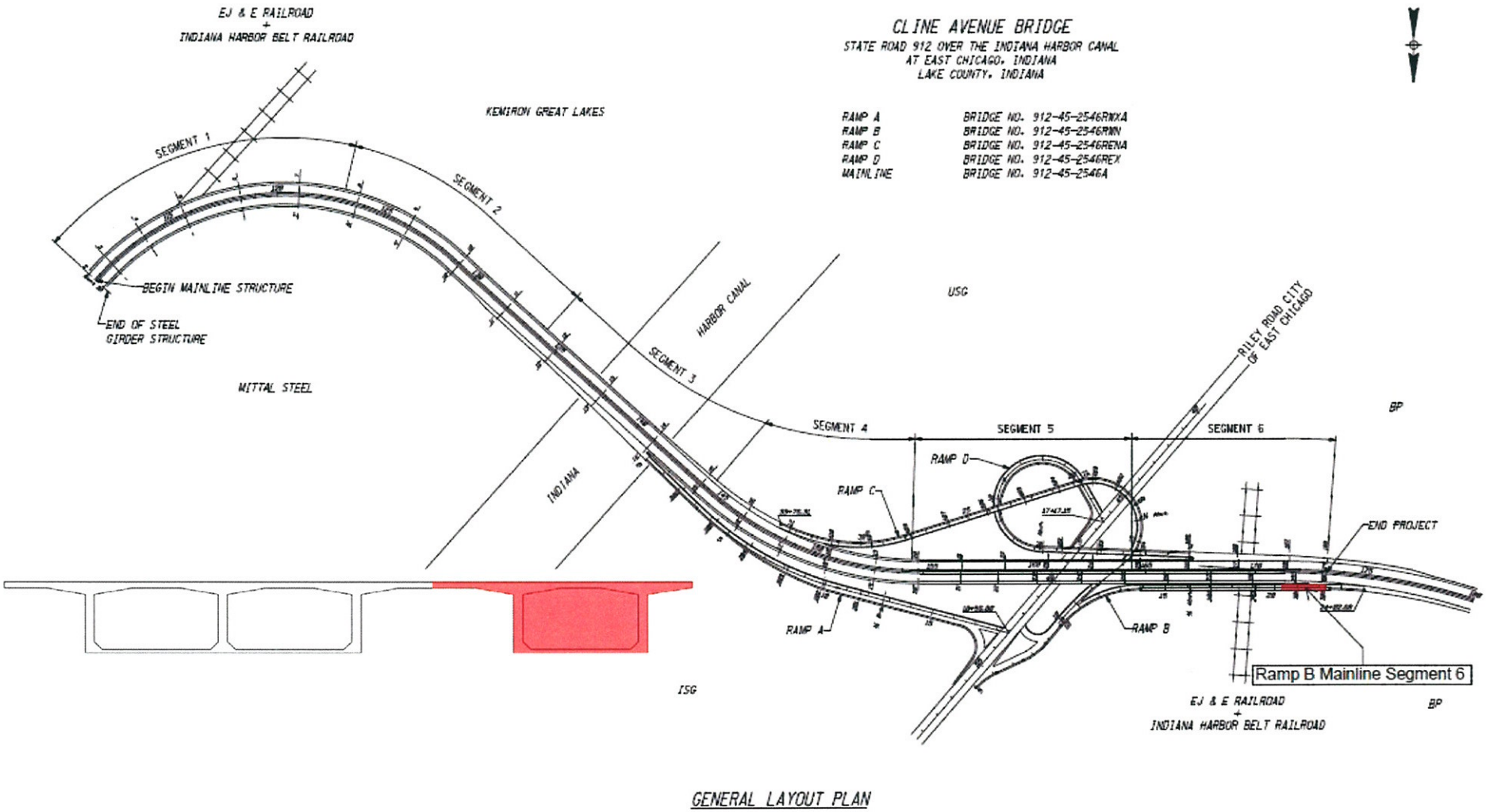


Table 4.22 Rating Table—Ramp B Mainline Segment 6

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	2.41	4.81	3.12	6.23	2.22	2.35	2.30	2.78	2.75	2.64	2.63	2.39	2.60	2.21
		Shear	2.29	3.60	2.99	4.67	2.13	2.23	1.92	2.22	2.21	2.06	2.05	1.59	1.52	1.52
	Service	Flexure	1.85	3.20	3.14	5.32	2.74	2.89	2.78	2.81	2.76	2.67	2.69	2.43	2.67	2.36
		Principal Stress	2.10	4.05	2.44	5.53	2.18	2.34	2.31	2.24	2.23	2.05	2.06	1.63	1.66	1.64
Transverse	Factored	Top Slab Centerline	1.53	1.55	1.99	2.00	2.11	2.22	2.22	1.90	1.83	1.76	1.76	1.54	1.78	1.58
		Top Slab Thickness Change	1.60	1.60	2.07	2.07	2.26	2.31	2.27	2.01	1.95	1.86	1.88	1.56	1.86	1.60
		Top Slab Webs & Cantilever	4.64	4.64	6.01	6.01	6.56	5.46	5.81	4.27	5.37	4.75	4.69	3.36	4.04	3.45
		Web Bending	1.07	1.37	1.41	1.81	1.14	1.24	1.06	1.08	1.02	0.90	0.90	0.72	0.89	0.72

Overall Minimum Rating Factor*	1.07	1.37	1.41	1.81	1.06	0.72	0.72
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	38.52	49.32	50.76	65.16	51.38		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.23 Key Sheet— Ramp D

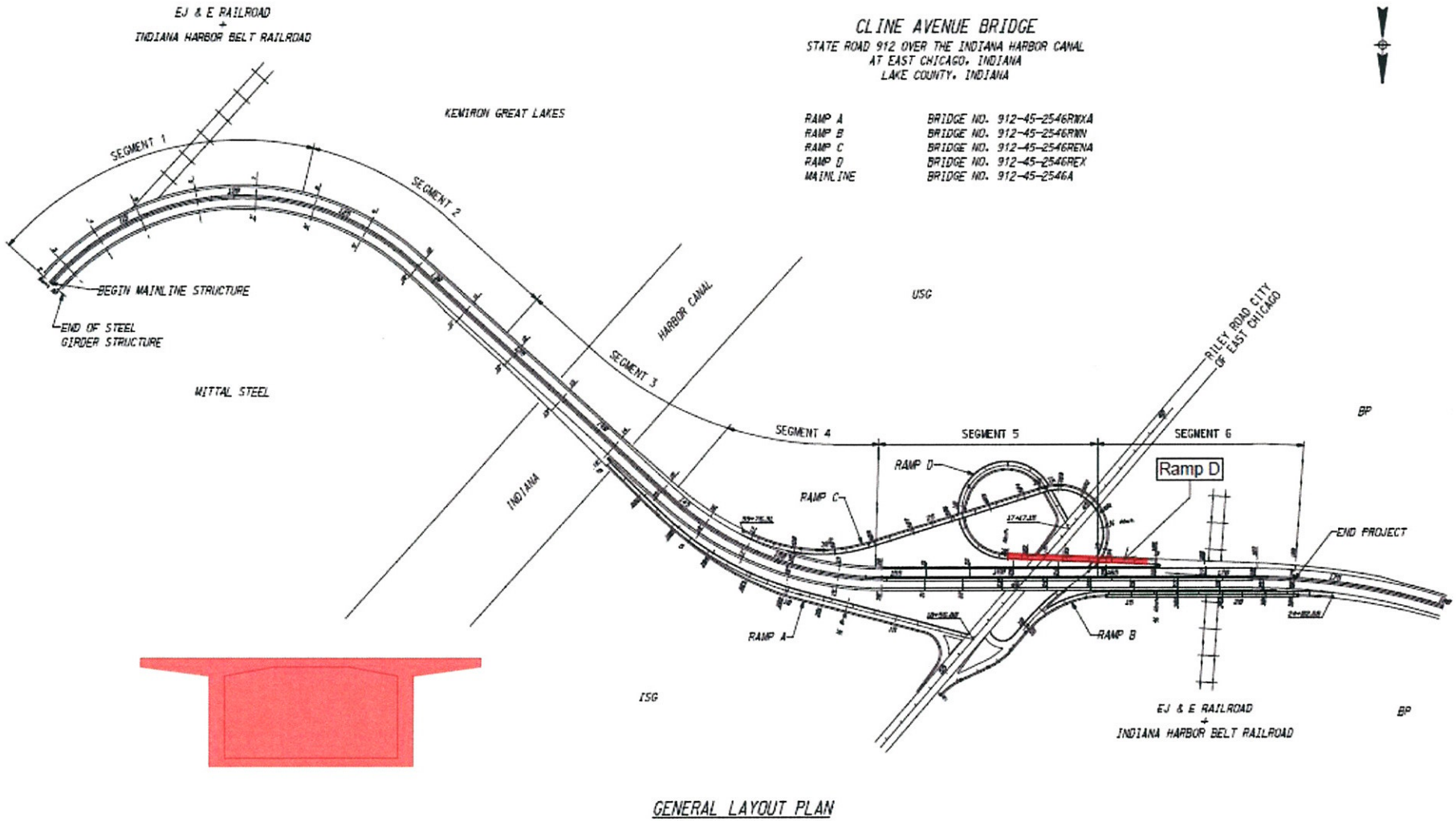


Table 4.23 Rating Table—Ramp D

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.35	2.24	1.75	2.91	1.26	1.28	1.11	1.31	1.31	1.86	1.89	1.52	1.77	1.35
Longitudinal	Factored	Shear	1.98	2.61	2.59	4.38	1.85	1.88	1.66	1.96	1.96	1.88	1.89	1.49	1.35	1.33
Longitudinal	Service	Flexure	1.06	1.63	3.54	3.54	3.11	3.19	2.89	3.08	3.00	2.59	2.65	2.09	2.46	2.04
Longitudinal	Service	Principal Stress	3.80	5.19	5.13	5.22	4.52	4.61	4.08	4.41	4.40	3.15	3.16	2.51	2.30	2.25
Transverse	Factored	Top Slab Centerline	1.07	1.07	1.39	1.39	1.80	1.86	1.97	1.48	1.45	1.41	1.42	1.36	1.46	1.41
Transverse	Factored	Top Slab Thickness Change	1.41	1.46	1.82	1.90	2.29	2.29	2.40	2.82	2.74	2.25	2.43	2.04	2.93	2.38
Transverse	Factored	Top Slab Webs & Cantilever	2.60	3.15	3.37	4.09	4.38	5.24	4.77	3.98	3.36	3.19	3.33	2.83	3.82	3.40
Transverse	Factored	Web Bending	14.15	101.04	18.35	88.04	15.16	16.80	16.60	15.64	14.43	15.94	16.74	13.28	19.46	23.25

Overall Minimum Rating Factor*	1.06	1.07	1.39	1.39	1.11	1.31	1.33
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	38.16	38.52	50.04	50.04	56.76		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Figure 4.24 Key Sheet— Ramp D Mainline Segment 6

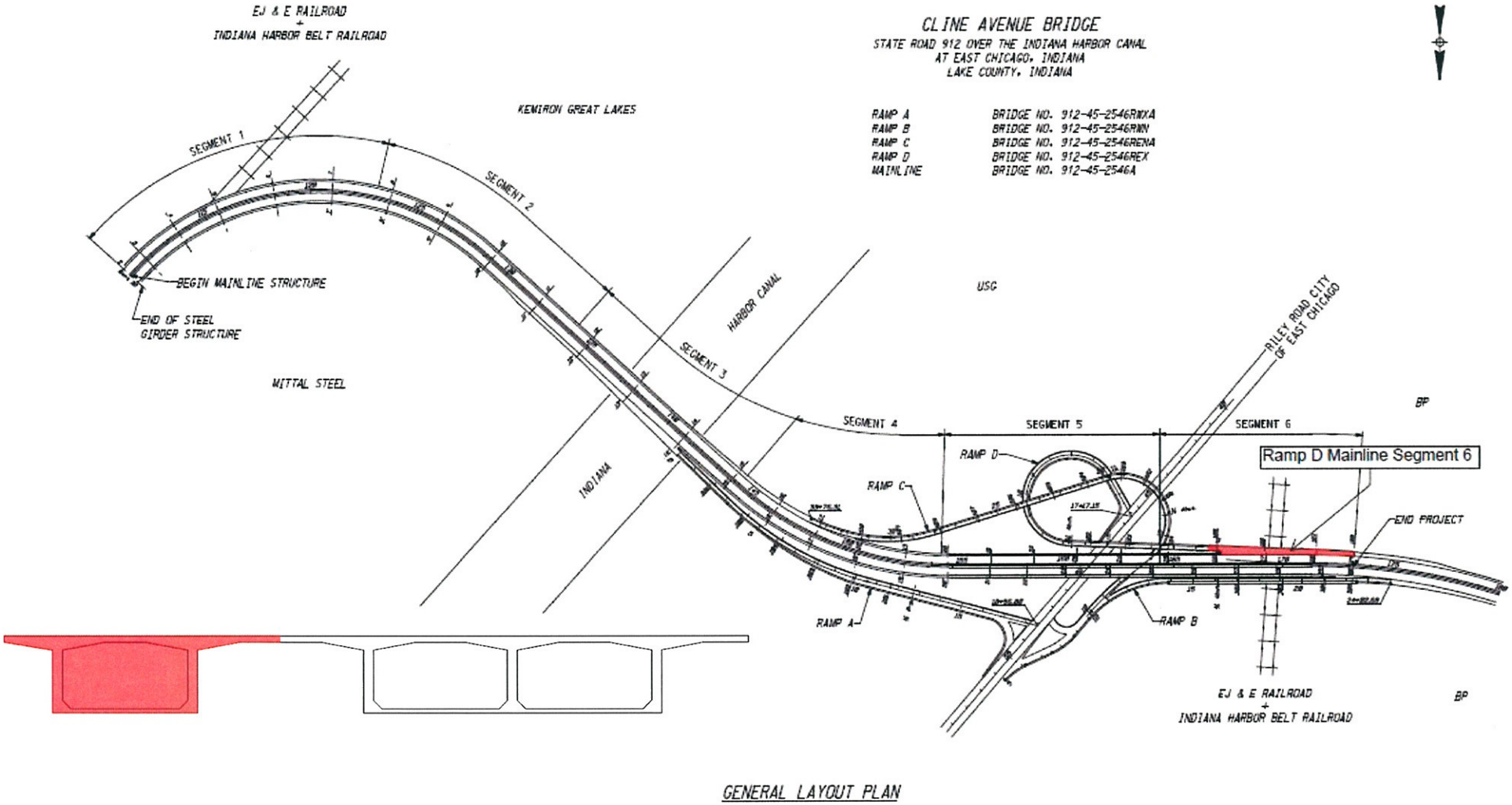


Table 4.24 Rating Table—Ramp D Mainline Segment 6

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.41	1.97	1.83	2.57	1.32	1.36	1.24	1.60	1.59	1.61	1.63	1.35	1.55	1.24
		Shear	1.00	1.54	1.14	1.92	1.16	1.14	1.08	1.18	1.18	1.16	1.16	1.00	1.00	0.92
	Service	Flexure	0.34	0.43	1.72	2.44	1.33	1.42	1.52	1.58	1.56	1.39	1.41	1.21	1.39	1.27
		Principal Stress	1.11	1.49	1.16	1.49	0.75	0.76	0.91	0.96	0.95	0.83	0.86	0.65	0.78	0.67
Transverse	Factored	Top Slab Centerline	1.53	1.55	1.99	2.00	2.11	2.22	2.22	1.90	1.83	1.76	1.76	1.54	1.78	1.58
		Top Slab Thickness Change	1.60	1.60	2.07	2.07	2.26	2.31	2.27	2.01	1.95	1.86	1.88	1.56	1.86	1.60
		Top Slab Webs & Cantilever	4.64	4.64	6.01	6.01	6.56	5.46	5.81	4.27	5.37	4.75	4.69	3.36	4.04	3.45
		Web Bending	1.07	1.37	1.41	1.81	1.14	1.24	1.06	1.08	1.02	0.90	0.90	0.72	0.89	0.72

Overall Minimum Rating Factor*	0.34	0.43	1.14	1.49	0.75	0.65	0.67
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	12.24	15.48	41.04	53.64	51.38		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Table 4.25 Rating Table—Cline Avenue Bridge Global Summary

			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	0.82	1.09	1.06	1.42	0.81	0.86	0.75	0.94	0.94	0.87	0.87	0.73	0.82	0.75
		Shear	0.52	0.72	0.68	0.90	0.48	0.49	0.41	0.49	0.49	0.39	0.40	0.36	0.39	0.32
	Service	Flexure	0.28	0.34	1.10	1.15	0.99	1.01	0.93	1.00	0.99	0.91	0.92	0.83	0.89	0.80
		Principal Stress	0.73	0.73	0.82	0.82	0.75	0.76	0.86	0.78	0.78	0.68	0.68	0.52	0.58	0.49
Transverse	Factored	Top Slab Centerline	0.76	0.76	0.99	0.99	1.15	1.22	1.38	1.05	1.04	0.99	1.00	0.92	1.08	1.03
		Top Slab Thickness Change	0.56	0.56	0.73	0.73	0.81	0.81	0.72	0.66	0.68	0.58	0.60	0.50	0.58	0.50
		Top Slab Webs & Cantilever	1.16	1.16	1.51	1.51	1.61	1.85	1.73	1.43	1.38	1.43	1.47	1.38	1.58	1.33
		Web Bending	0.49	0.54	0.64	0.70	0.52	0.61	0.56	0.57	0.52	0.47	0.47	0.38	0.46	0.38

Overall Minimum Rating Factor*	0.28	0.34	0.64	0.70	0.41	0.36	0.32
Posting Value (tons) (Controlled by Truck with Lowest Rating Factor)	10.08	12.24	23.04	25.20	21.63		

* Overall Minimum Rating Factor is the minimum factor for both service and strength combinations

Table 4.26 Rating Table—HL-93 Inventory Rating Factors—AASHTO Lanes

Segment	Design AASHTO Lanes							
	Longitudinal Analysis				Transverse Analysis			
	Strength		Service		Strength			
	Flexure	Shear	Flexure	Principal Stresses	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs & Cantilever	Transverse Web Bending
Segment 1 Girder 1	1.52	**0.82**	**0.46**	1.31	**0.98**	**0.56**	1.85	**0.71**
Segment 1 Girder 2	1.61	1.59	**0.88**	2.33	**0.98**	**0.56**	1.85	**0.71**
Segment 1 Girder 3	1.58	1.47	**0.92**	2.13	**0.98**	**0.56**	1.85	**0.71**
Segment 2 EB	1.81	2.24	**0.70**	3.13	1.69	1.78	1.85	**0.49**
Segment 2 WB	1.40	1.77	**0.45**	2.64	1.65	1.71	1.85	**0.49**
Segment 3 EB	1.07	**0.69**	**0.57**	1.30	1.65	1.71	1.85	**0.49**
Segment 3 WB	**0.82**	**0.52**	**0.53**	**0.86**	**0.86**	1.35	1.85	**0.49**
Segment 4 EB	1.54	1.40	1.24	1.49	**0.86**	1.35	1.85	**0.49**
Segment 4 WB	1.80	**0.93**	1.24	1.30	1.69	1.78	1.85	**0.49**
Segment 5 EB	1.99	1.26	1.04	1.13	1.69	1.78	1.85	**0.49**
Segment 5 WB	1.67	1.33	**0.88**	1.15	1.69	1.78	1.85	**0.49**
Segment 6 EB	1.72	**0.94**	1.44	1.04	1.05	1.60	1.85	**0.49**
Segment 6 WB	1.38	**0.90**	1.27	1.65	1.05	1.60	1.85	**0.49**
Ramp A	1.08	1.01	1.28	2.31	**0.76**	**0.96**	1.16	2.28
Ramp A Mainline Segment 2	1.04	1.92	**0.51**	2.64	1.65	1.71	1.92	**0.75**
Ramp A Mainline Segment 3	**0.88**	1.18	**0.28**	1.10	**0.86**	1.35	1.92	**0.75**
Ramp C Units 2-5	1.39	1.95	1.37	3.57	1.07	1.41	2.60	14.15
Ramp C Units 1, 6-8	1.07	1.47	**0.64**	3.17	1.07	1.41	2.60	14.15
Ramp C Mainline Segment 3	1.30	1.08	**0.83**	2.81	1.65	1.71	1.92	**0.75**
Ramp C Mainline Segment 4	2.17	1.60	1.55	**0.73**	**0.86**	1.35	1.92	**0.75**
Ramp B	2.08	2.52	1.37	4.26	1.07	1.41	2.60	14.15
Ramp B Mainline Segment 6	2.41	2.29	1.85	2.10	1.53	1.60	4.64	1.07
Ramp D	1.35	1.98	1.06	3.80	1.07	1.41	2.60	14.15
Ramp D Mainline Segment 6	1.41	1.00	**0.34**	1.11	1.53	1.60	4.64	1.07
Global Summary	**0.82**	**0.52**	**0.28**	**0.73**	**0.76**	**0.56**	1.16	**0.49**

0.28 -- Rating Factor Less than 1.00

1.00 -- Rating Factor Greater than or equal to 1.00

Table 4.27 Rating Table—HL-93 Inventory Rating Factors—Striped Lanes

Segment	Striped Lanes							
	Longitudinal Analysis				Transverse Analysis			
	Strength		Service		Strength			
	Flexure	Shear	Flexure	Principal Stresses	Top Slab Centerline	Top Slab Thickness Change	Top Slab Webs & Cantilever	Transverse Web Bending
Segment 1 Girder 1	2.00	1.29	**0.54**	1.84	**0.98**	**0.56**	2.36	1.41
Segment 1 Girder 2	2.06	1.59	1.05	2.33	**0.98**	**0.56**	2.36	1.41
Segment 1 Girder 3	2.10	2.11	1.16	2.99	**0.98**	**0.56**	2.36	1.41
Segment 2 EB	1.81	2.43	**0.71**	3.30	1.69	2.23	3.02	2.59
Segment 2 WB	1.49	1.87	**0.51**	3.22	1.65	1.71	2.43	2.59
Segment 3 EB	1.09	**0.85**	**0.57**	1.65	1.65	1.71	2.43	2.59
Segment 3 WB	1.09	**0.72**	**0.66**	1.01	**0.86**	1.35	1.89	**0.54**
Segment 4 EB	1.95	1.54	1.47	1.56	**0.86**	1.35	1.89	**0.54**
Segment 4 WB	1.84	1.00	1.26	1.44	1.69	2.23	3.02	2.59
Segment 5 EB	2.03	1.52	1.06	1.22	1.69	2.23	3.02	2.59
Segment 5 WB	1.70	1.64	**0.89**	1.35	1.69	2.23	3.02	2.59
Segment 6 EB	1.77	1.11	1.47	1.19	1.05	1.60	1.89	**0.54**
Segment 6 WB	1.43	1.04	1.41	1.77	1.05	1.60	1.89	**0.54**
Ramp A	1.38	1.24	2.00	2.80	**0.76**	**0.96**	1.16	2.28
Ramp A Mainline Segment 2	1.26	2.54	**0.60**	4.02	1.65	1.71	2.43	2.73
Ramp A Mainline Segment 3	1.48	1.54	**0.34**	1.66	**0.86**	1.35	2.15	1.35
Ramp C Units 2-5	3.36	2.65	2.14	4.86	1.07	1.46	3.15	101.04
Ramp C Units 1, 6-8	1.78	1.77	**0.94**	4.18	1.07	1.46	3.15	101.04
Ramp C Mainline Segment 3	1.57	1.83	**0.94**	4.07	1.65	1.71	2.43	2.73
Ramp C Mainline Segment 4	2.93	2.49	2.05	**0.73**	**0.86**	1.35	2.15	1.35
Ramp B	3.46	3.14	2.15	5.93	1.07	1.46	3.15	101.04
Ramp B Mainline Segment 6	4.81	3.60	3.20	4.05	1.55	1.60	4.64	1.37
Ramp D	2.24	2.61	1.63	5.19	1.07	1.46	3.15	101.04
Ramp D Mainline Segment 6	1.97	1.54	**0.43**	1.49	1.55	1.60	4.64	1.37
Global Summary	1.09	**0.72**	**0.34**	**0.73**	**0.76**	**0.56**	1.16	**0.54**

0.34 -- Rating Factor Less than 1.00

1.00 -- Rating Factor Greater than or Equal to 1.00