Structural Load Rating Calculations

Volume 1

Section 1.0 to 2.6

CLINE AVENUE BRIDGE

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

Prepared by:

URS

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URS

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	7.2.2 Brug Results	1	PT	N/A
	7.2.3 Homberg Chart Results	3	PT	N/A
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	7.3.2 Brug Results	1	PT	N/A
	7.3.3. Homberg Chart Results	2	PT	N/A

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Item: Calculation Index
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		Number of Pages	Designed	Checked
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	7.8.3 Homberg Chart Results	2	PT	N/A
	7.8.3.1 Homberg Charts – Fixed End Moment Beam	-	PT	N/A
	7.8.3.2 Homberg Charts – Continuous Beam	-	PT	N/A
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	7.9.3 Homberg Chart Results	2	PT	N/A
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URS **EXHIBIT 4.7-2**

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Project/Calculation Number: Section 1.0

Title: GENERAL

Total Number of Pages (including cover sheet):

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Prepared by: Bob Anderson, Thomas S. Peake Date: 2/17/2009

Checked by: Patricia Thaesler, Daniel Mariscal Date: 2/17/2009

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Design Basis/References/Assumptions
Job Specific Criteria - See Section 1.2.

Remarks/Conclusions/Results:
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Calculation Approved by:

Project Manager/Date

Revision No.: Description of Revision: Approved by:

Project Manager/Date

1.0 General

1.1 Introduction

Cline Avenue Bridge Load Rating—Introduction

URS Tampa was tasked with performing a load rating analysis of the Cline Avenue Bridge assuming pristine conditions. The following calculations are a representation of the tasks performed to complete the above task. All calculations are not printed in this set of calculations because of the size of the project, data, models, and spreadsheets used to rate the bridge.

The Cline Avenue Bridge is located in East Chicago, Indiana and spans the Indiana Harbor Canal, Riley Road and various local railroad tracks. See the rating report for a more complete description of the project location. See the Design Criteria (Section 1.3) for a complete description of the rating process and assumptions.

1.2 Rating Report

Load Rating Analysis
Report of Findings

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CLINE AVENUE BRIDGE

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

Prepared by:

URS

INITIAL ISSUE (I-1)

OCTOBER 15, 2009

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Cline Avenue Bridge –Cast-In-Place Box Structure

Document: Structural Load Rating – Report of Findings

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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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Appendix B – Electronic Copy – As-Built Plans used in Load Rating Evaluation

Appendix C – Electronic Copy – Calculations for Load Rating Evaluation

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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

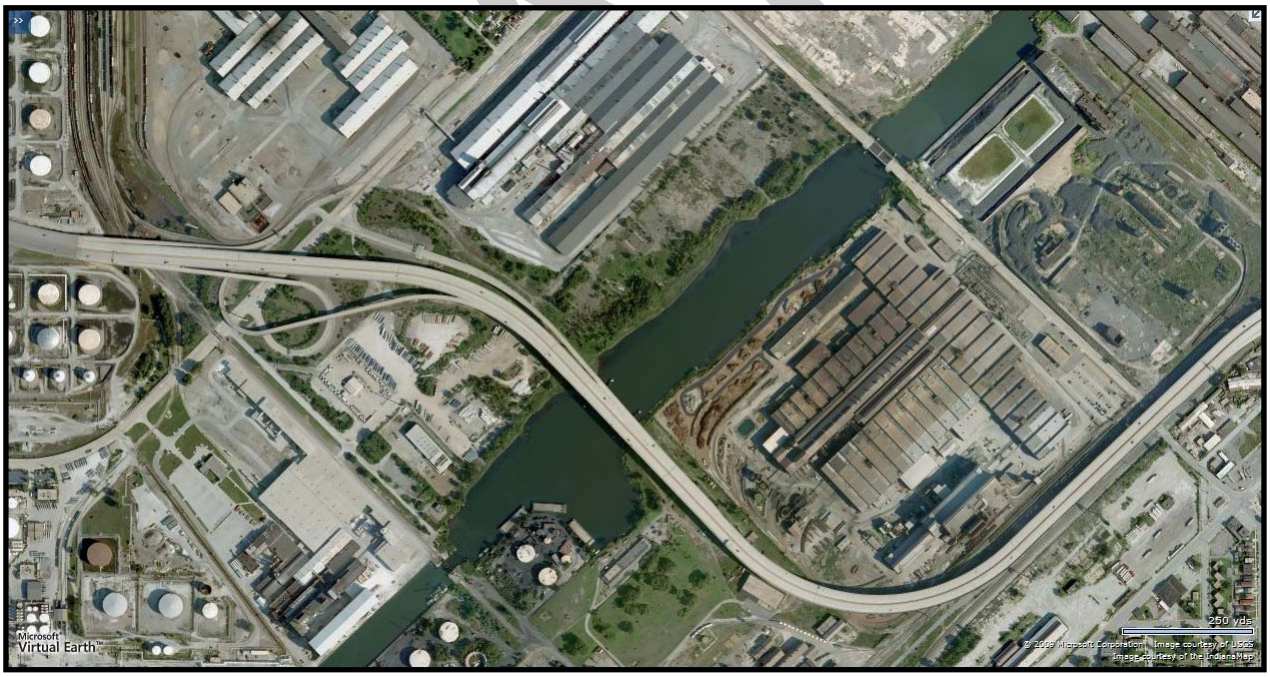


Figure 1.2 – General Plan

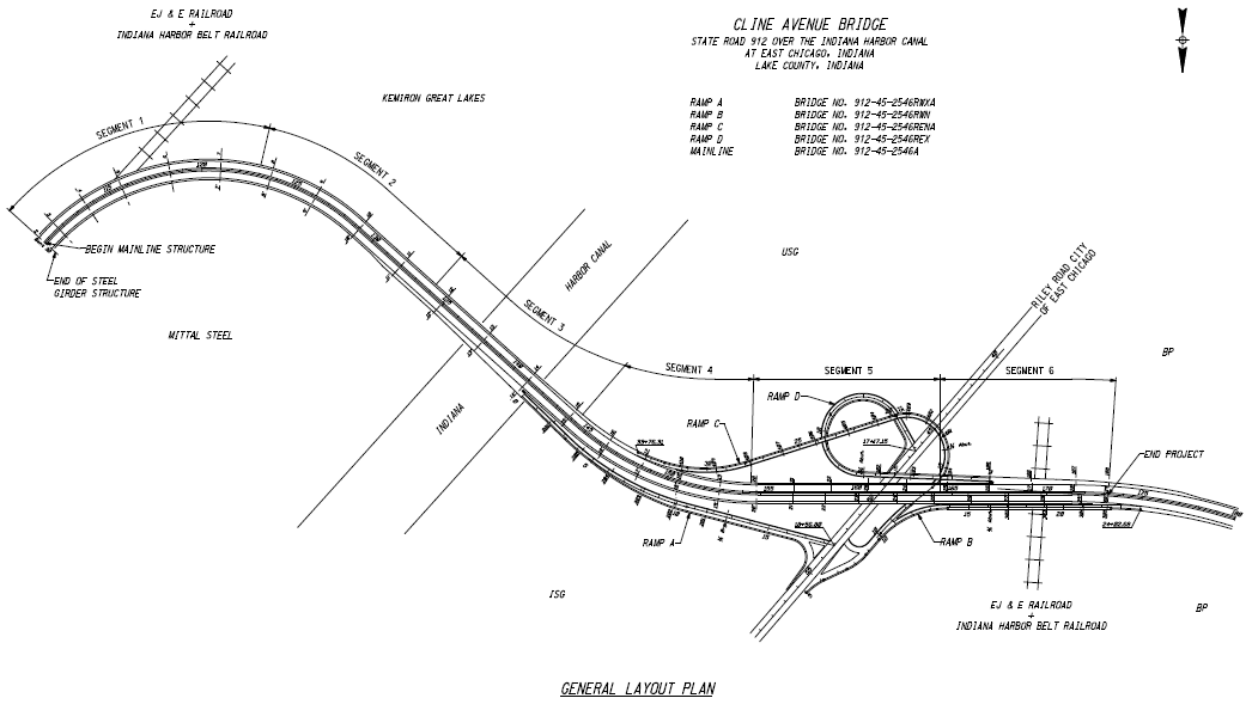


Figure 1.3 – Plan—Segment 1

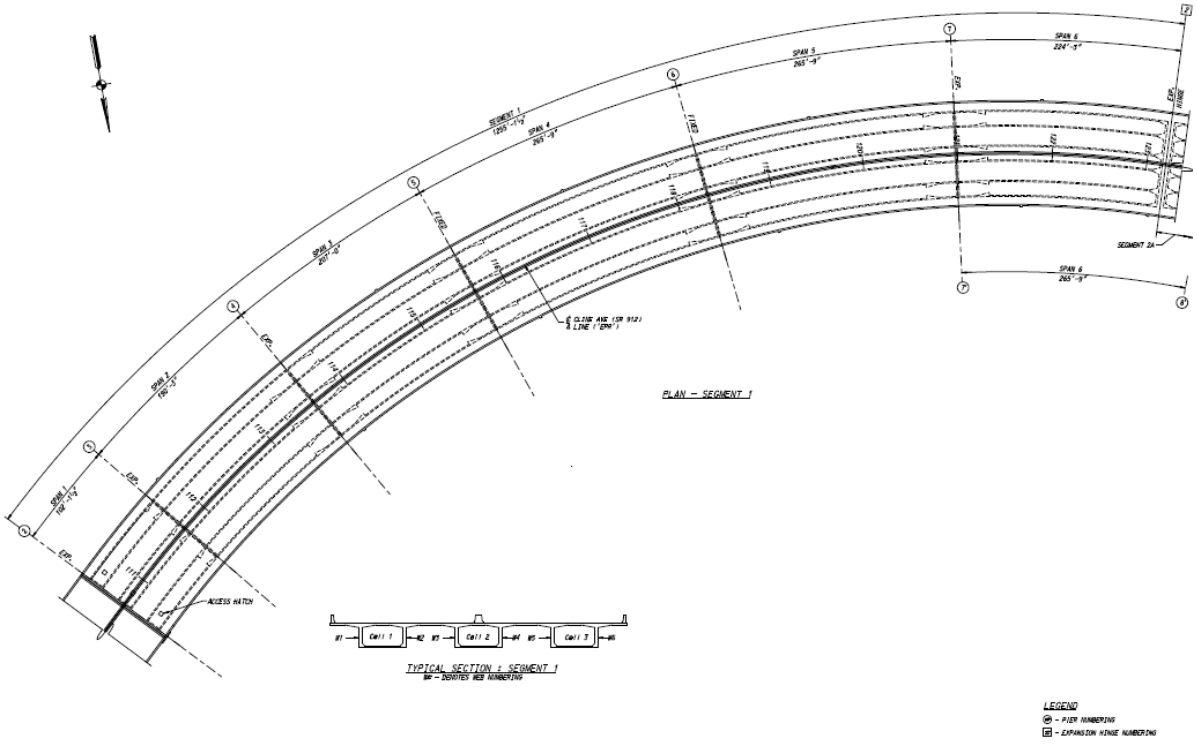


Figure 1.4 – Plan—Segment 2

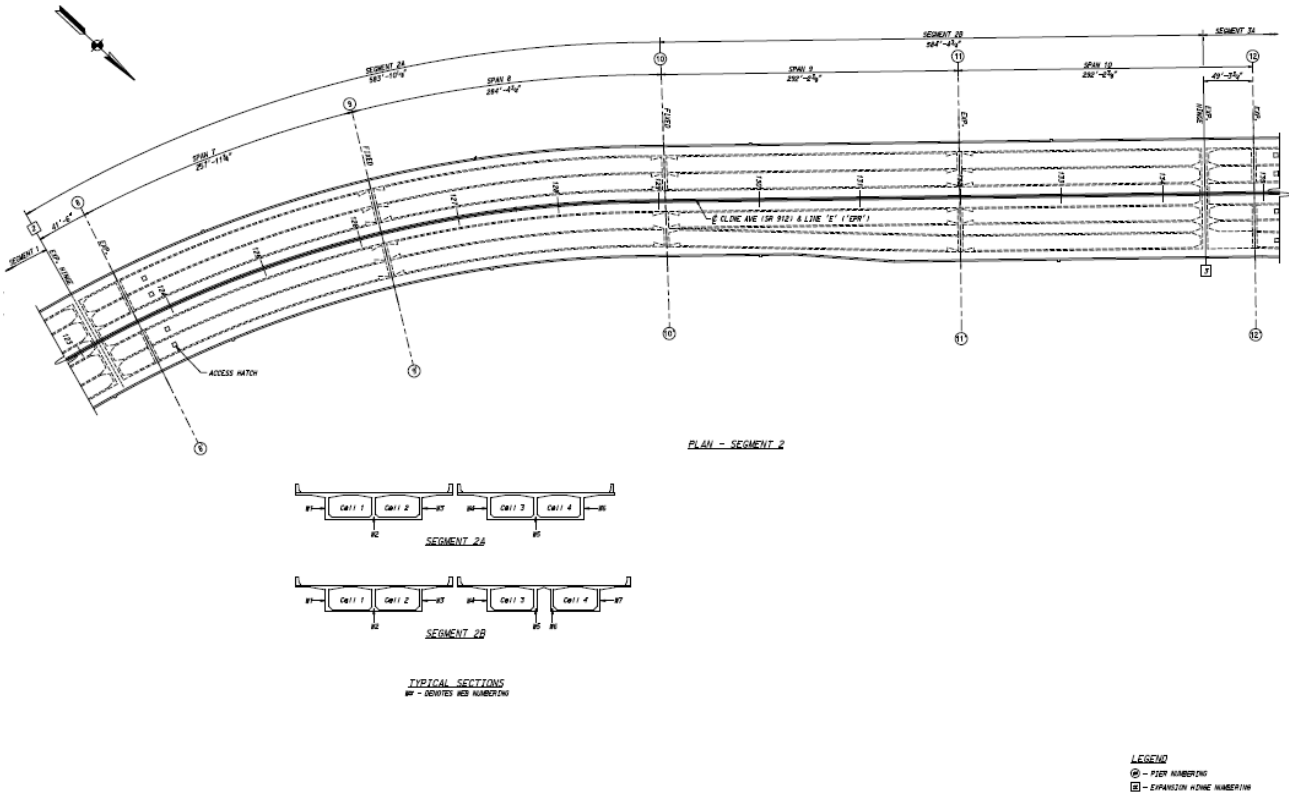


Figure 1.5 – Plan—Segment 3

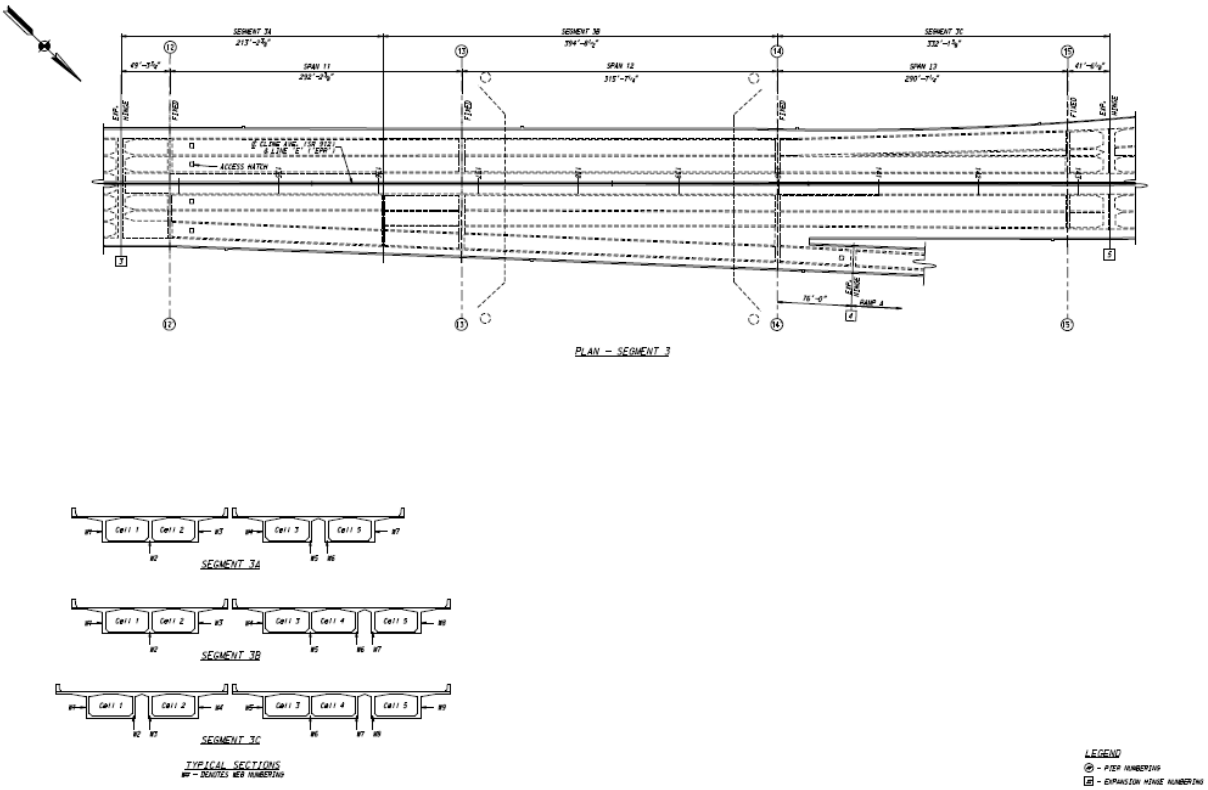


Figure 1.6 – Plan—Segment 4

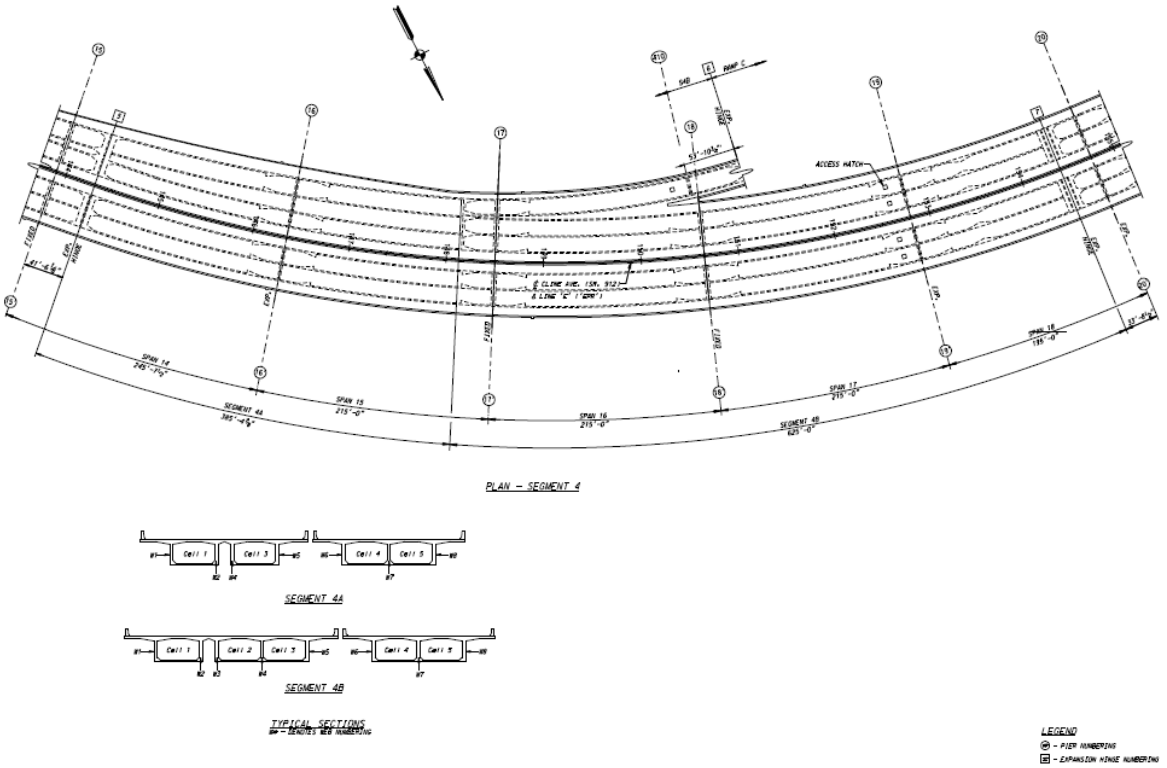


Figure 1.7 – Plan—Segment 5

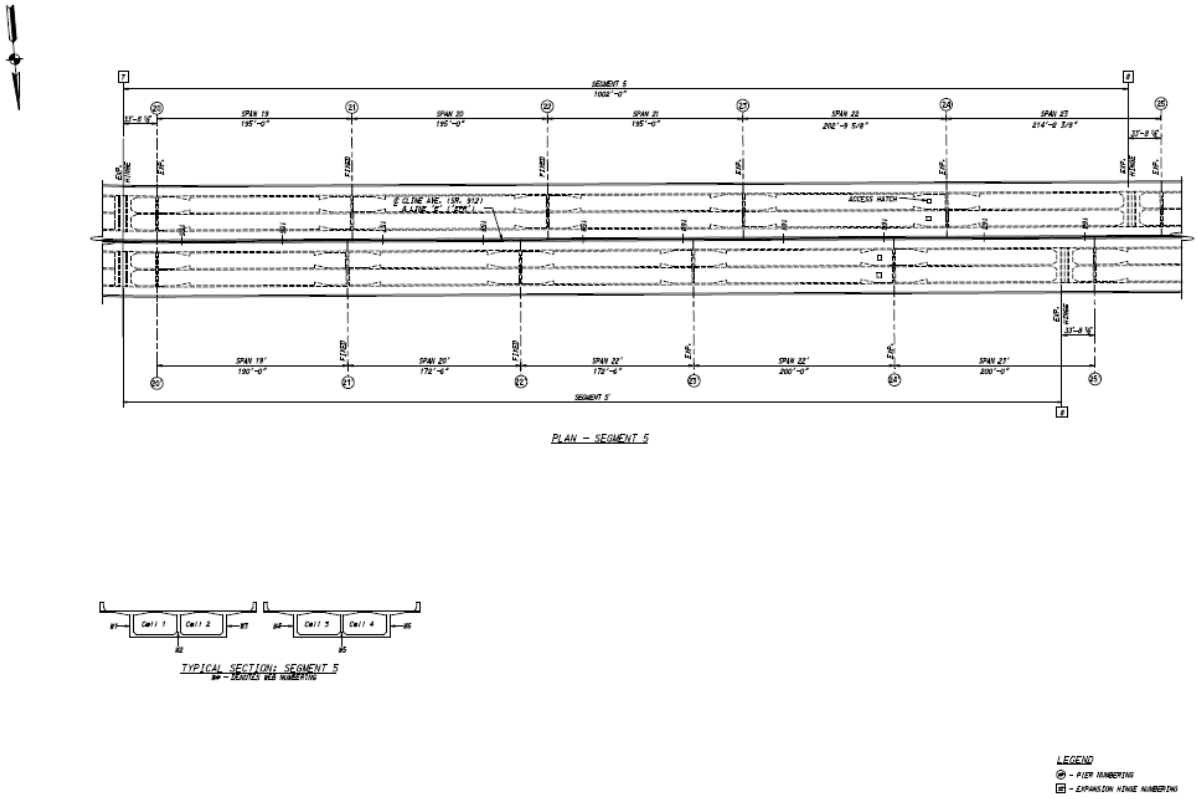


Figure 1.8 – Plan—Segment 6

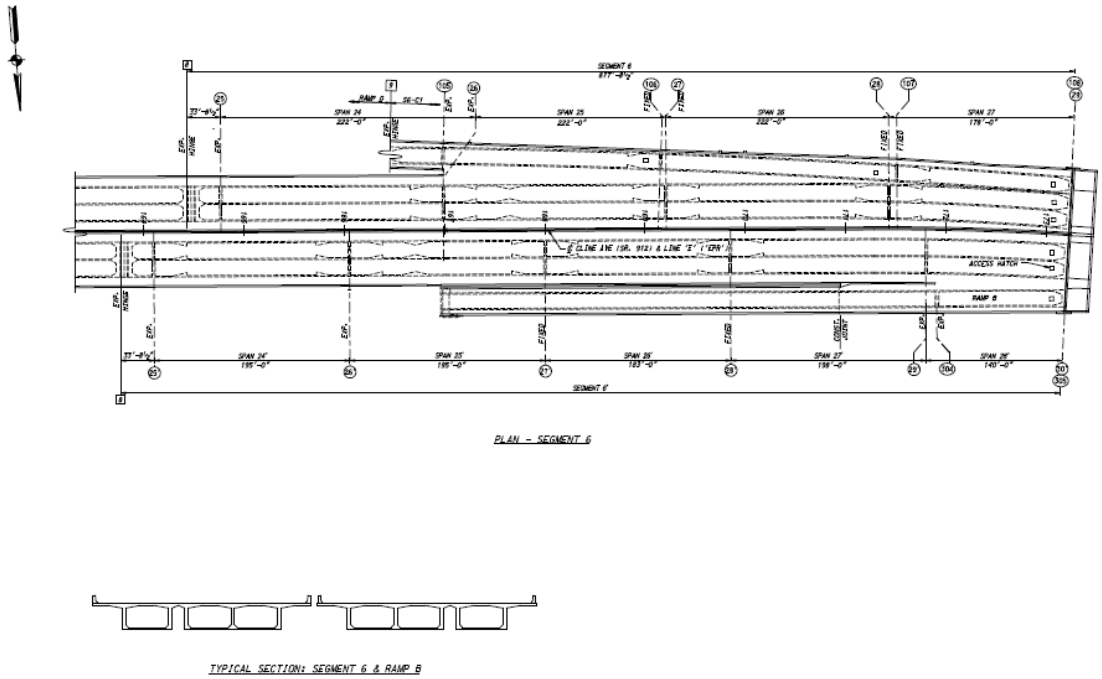


Figure 1.9 – Plan—Ramp A

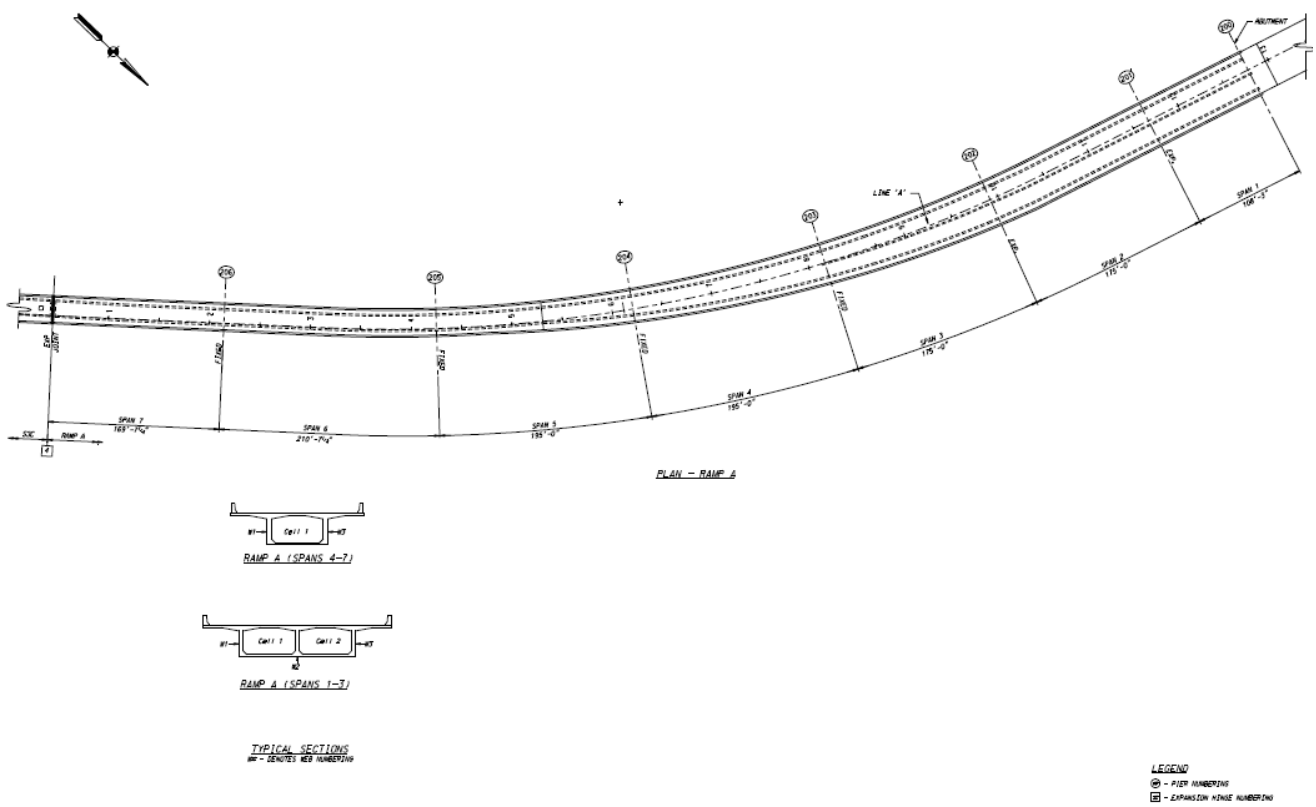


Figure 1.10 – Plan—Ramp B

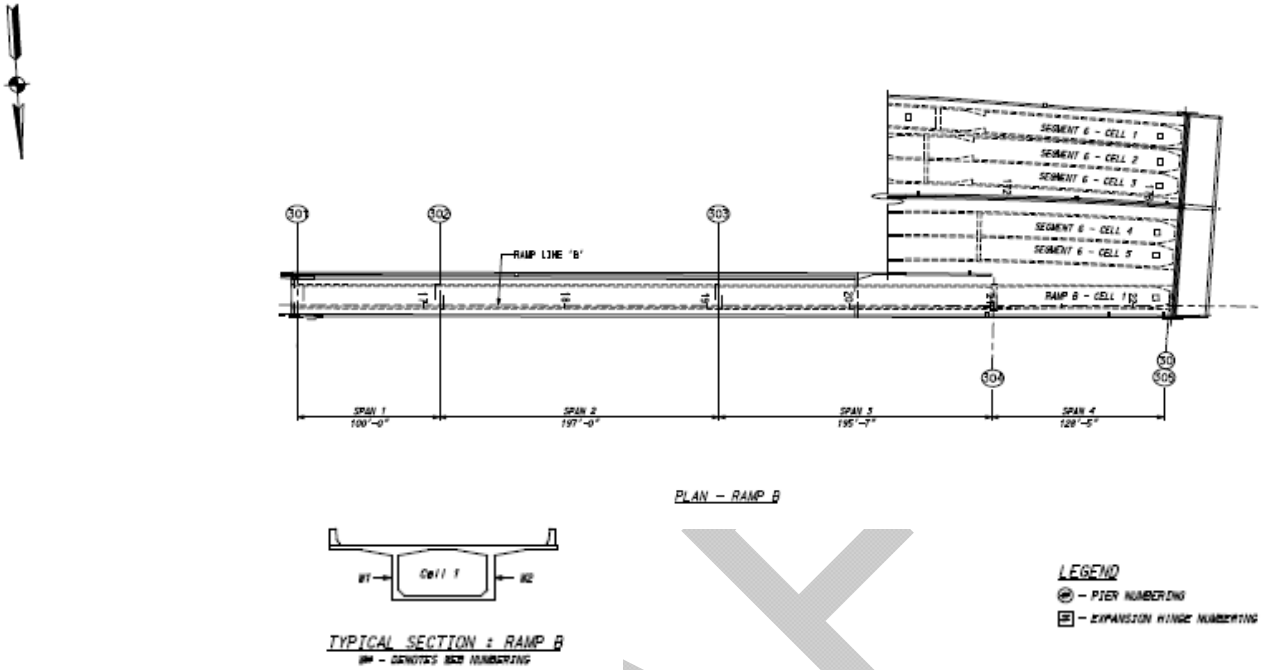


Figure 1.11 – Plan—Ramp C Units 2-5

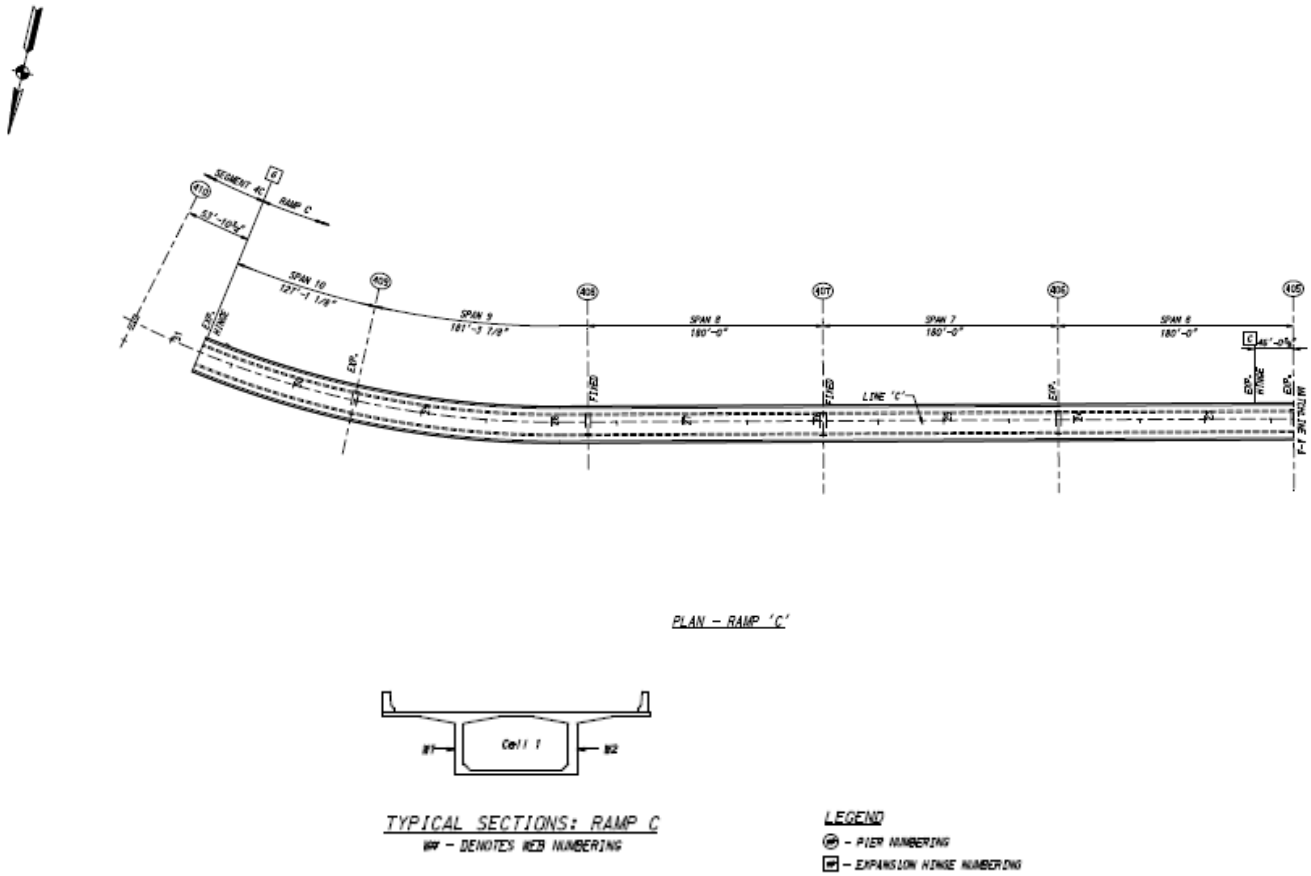


Figure 1.12 – Plan—Ramp C Units 1, 6-8

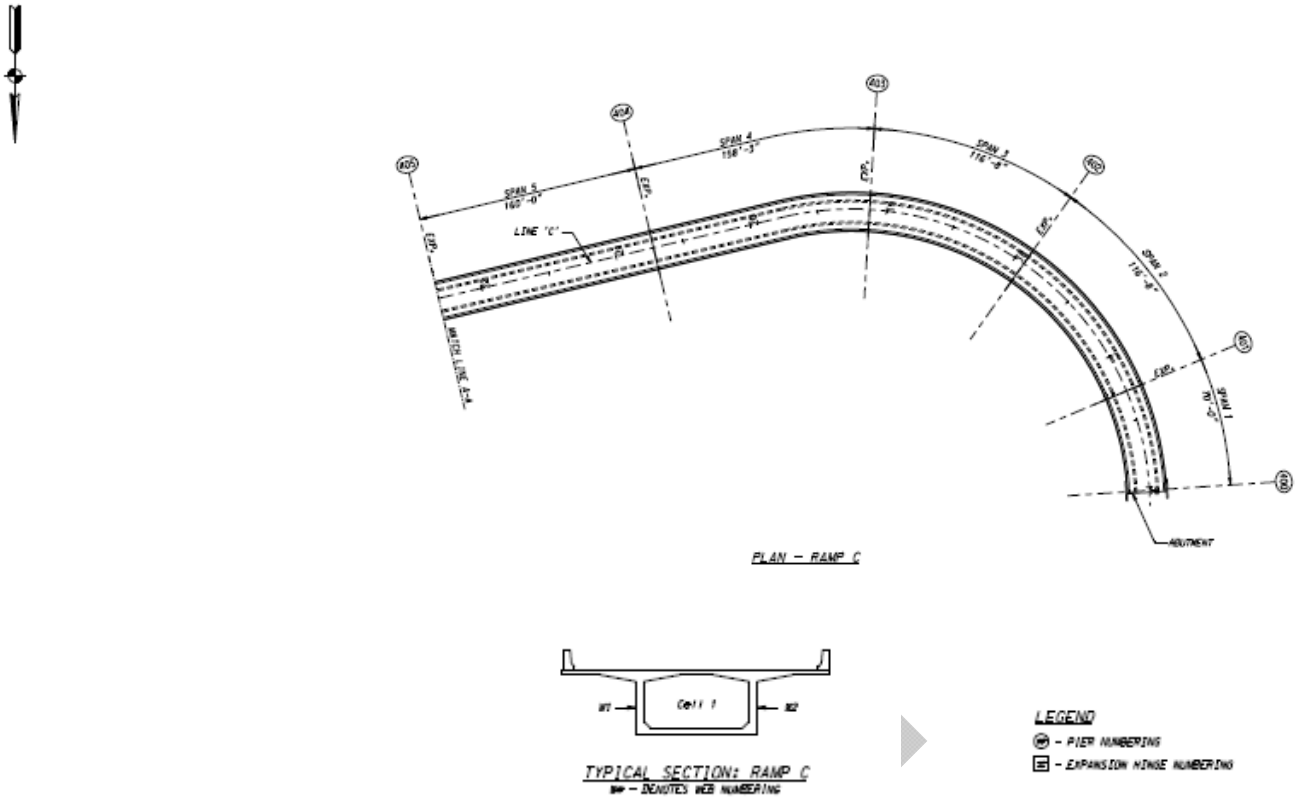
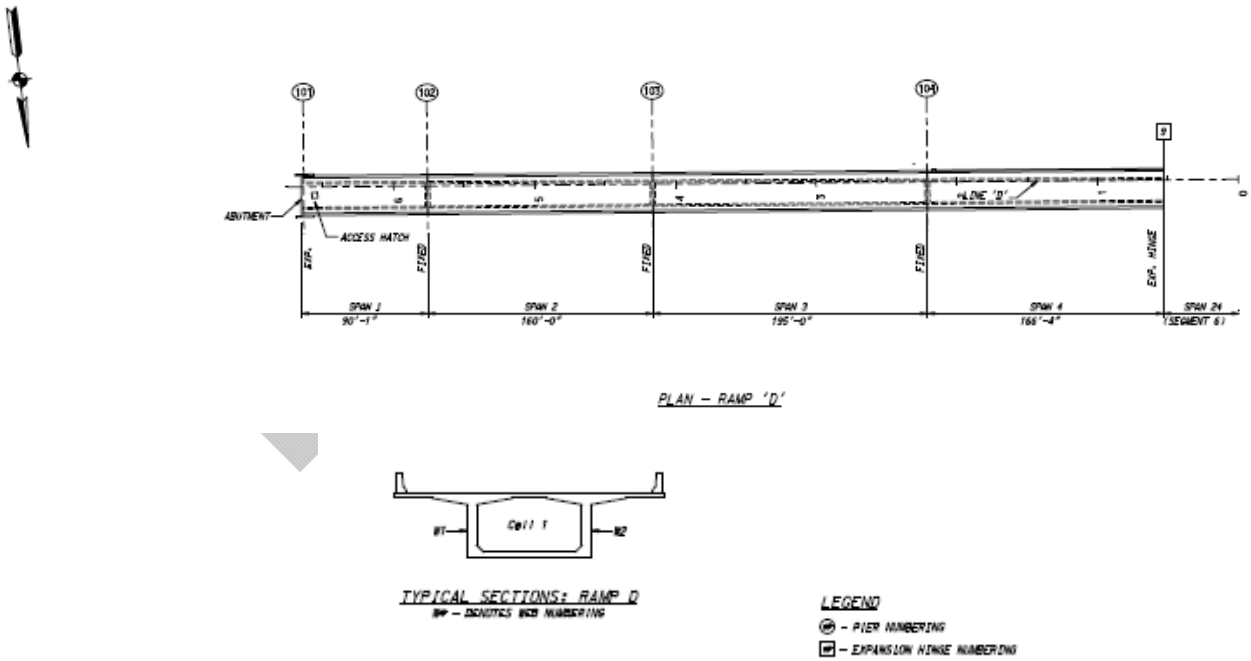


Figure 1.13 – Plan—Ramp D



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)

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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

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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

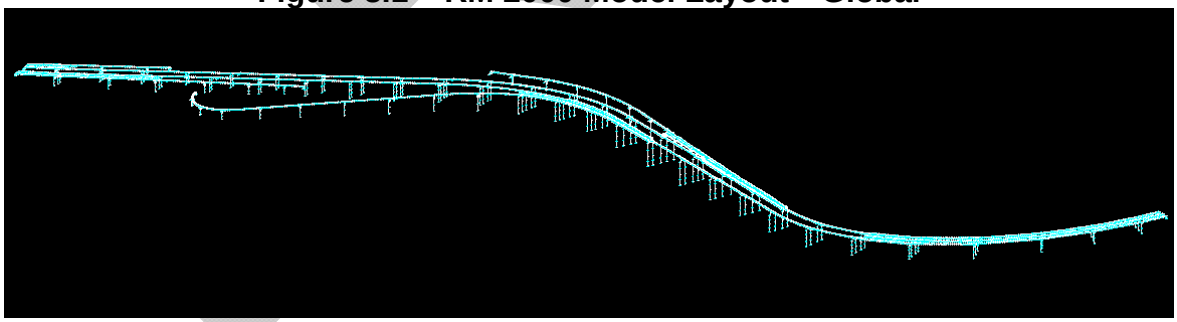

Figure 3.2 – RM 2000 Model Layout—Segment 1

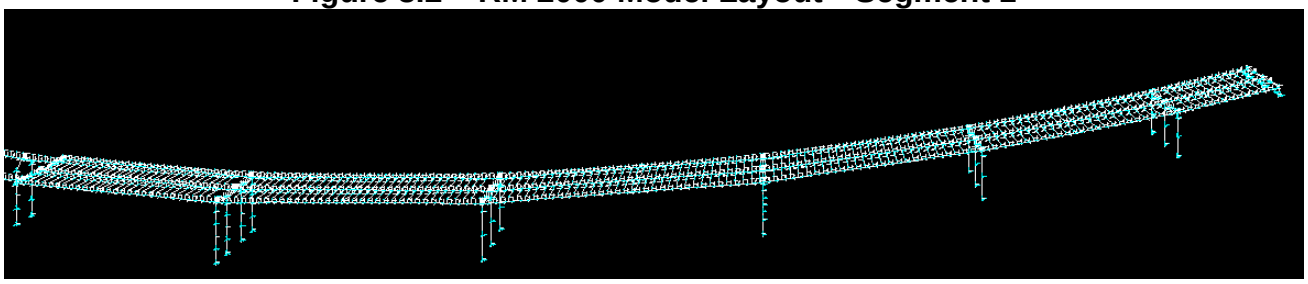

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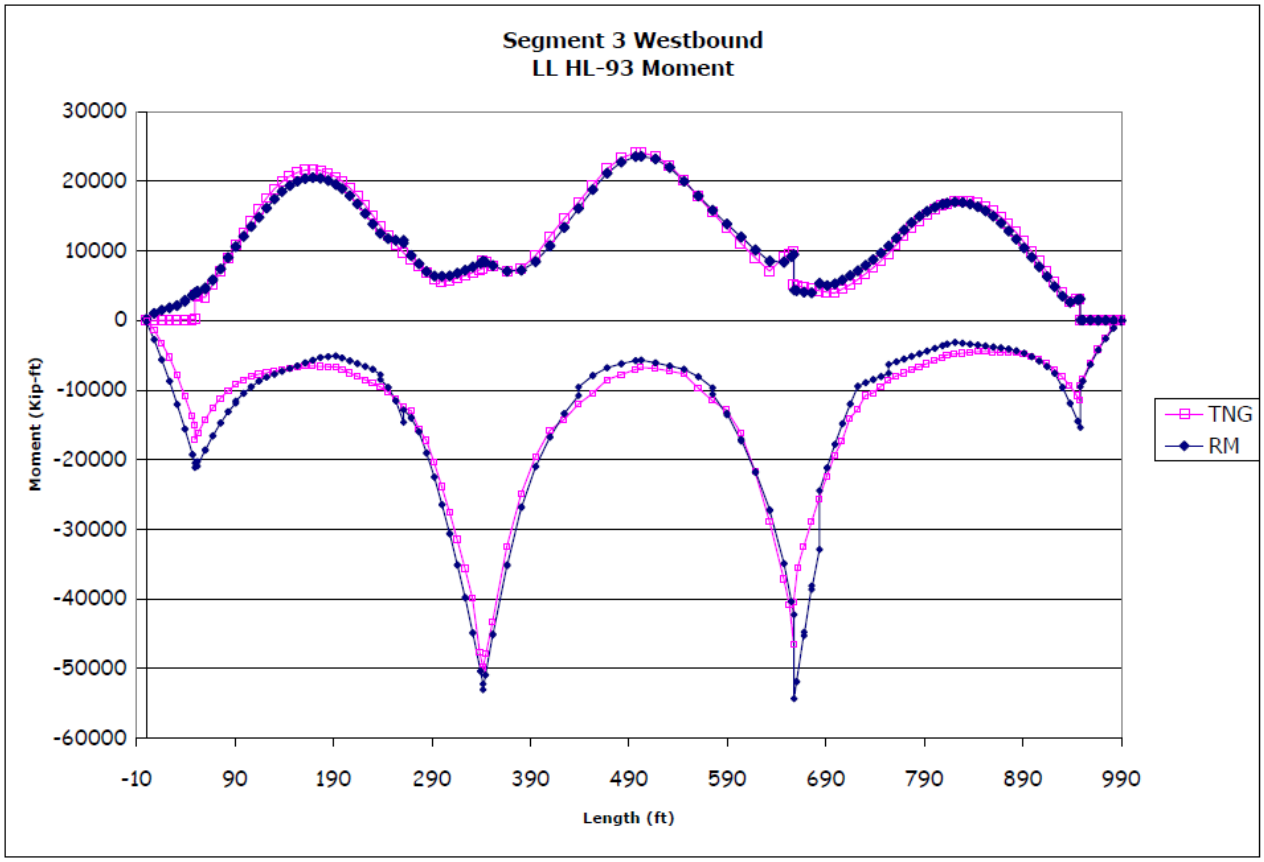
Figure 3.3 – RM 2000 versus Tango Live Load Comparison



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

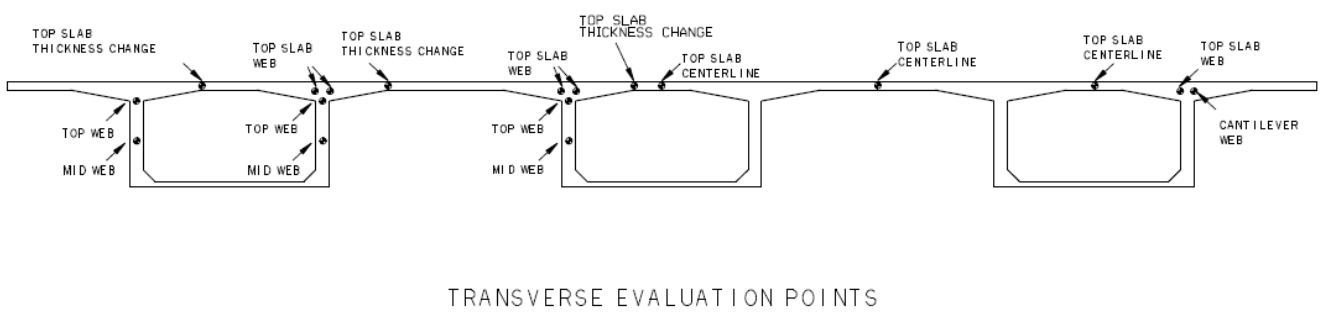


Figure 3.5 – Transverse Evaluation Points—Section IB

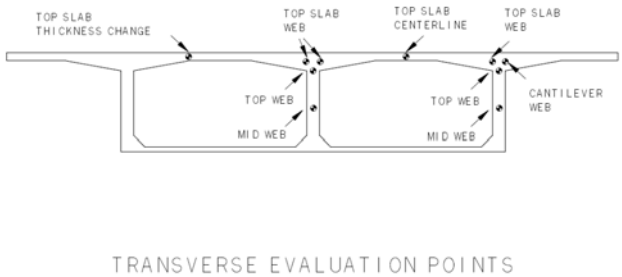


Figure 3.6 – Transverse Evaluation Points—Section IIA

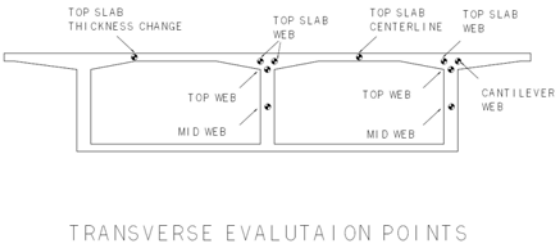


Figure 3.7 – Transverse Evaluation Points—Section IIB

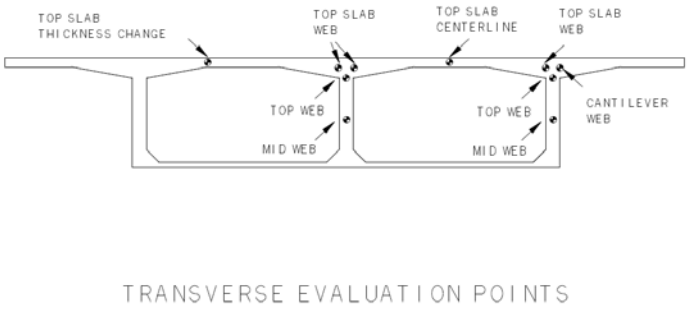


Figure 3.8 – Transverse Evaluation Points—Section IIIA

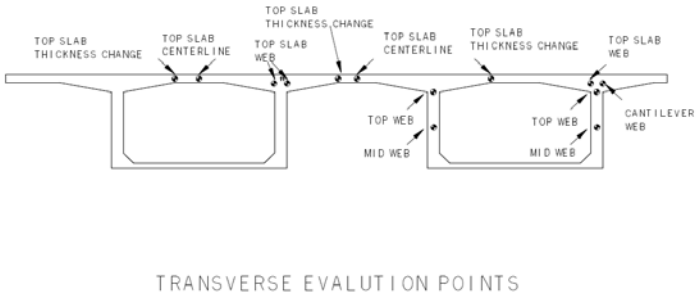


Figure 3.9 – Transverse Evaluation Points—Section IIIB

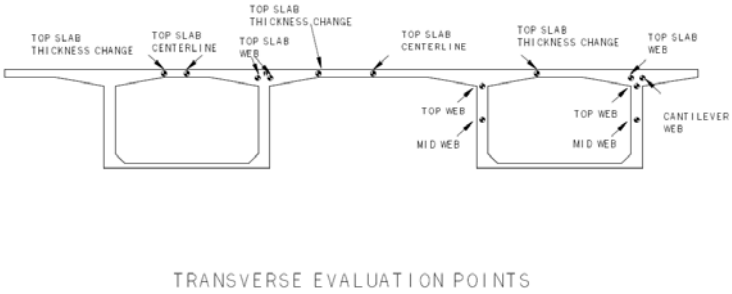


Figure 3.10 – Transverse Evaluation Points—Section IVA

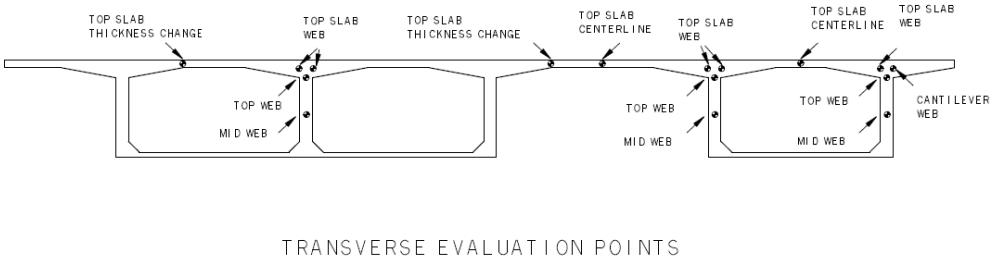


Figure 3.11 – Transverse Evaluation Points—Section VA

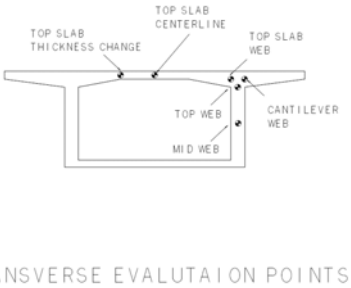
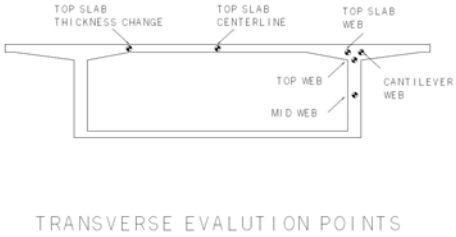


Figure 3.12 – Transverse Evaluation Points—Section VB



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

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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.

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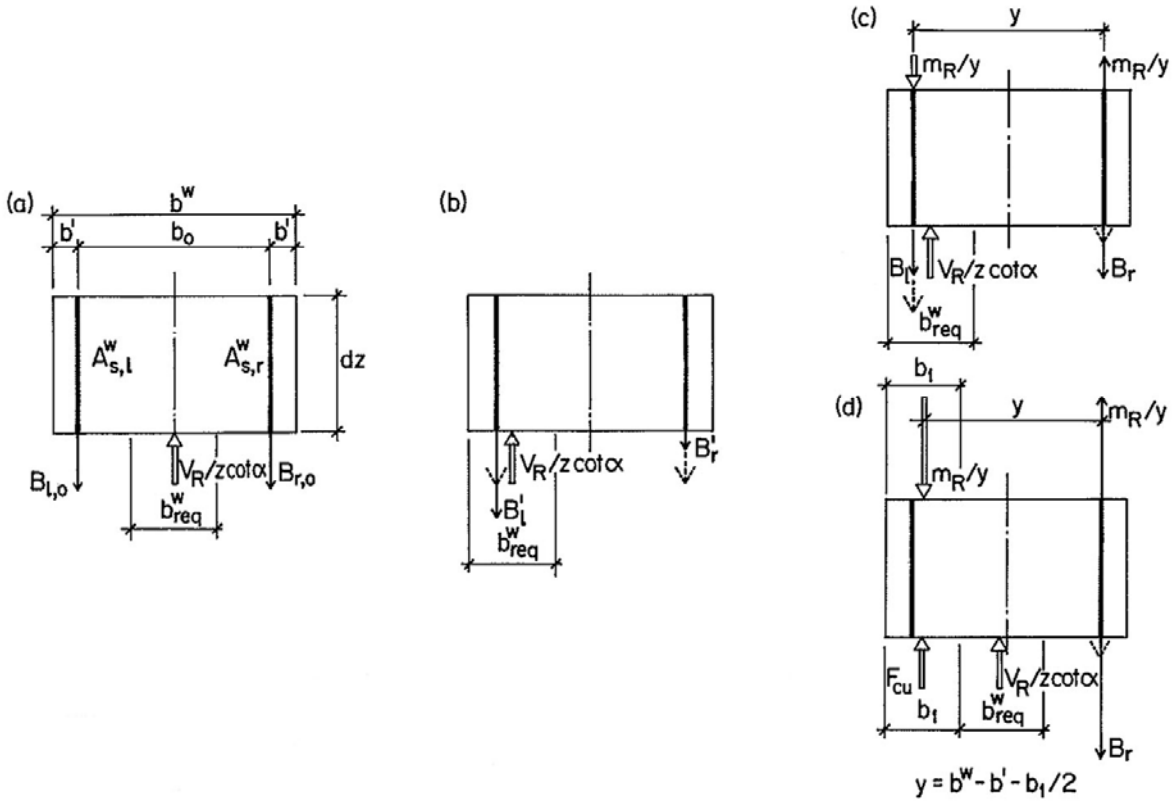
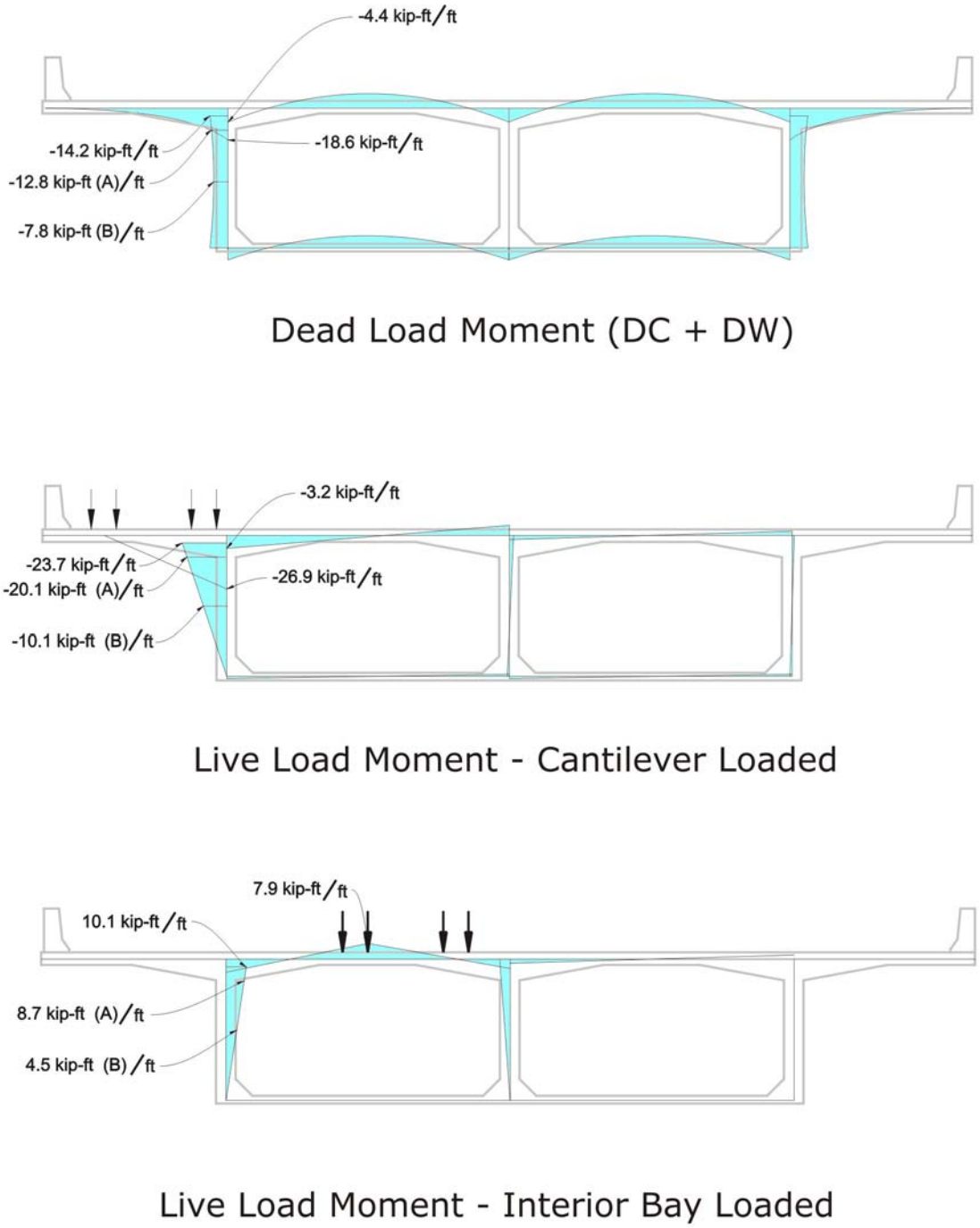
[3] Menn, C., Prestressed Concrete Bridges, Birkhauser, 1991 , pp 259-264.

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



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

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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.

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Table 4.1a – Operating Rating Factor Summary Comparisons for Web Shear and Transverse Web Bending

Loading Description	Operating Rating Factor	
	Web Shear	Transverse Web Bending
HL93 – AASHTO Lanes	0.64	0.64
HL93 – Striped Lanes	0.68	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:

- Do not allow any permit loads on the mainline bridge or ramps.
- Post the mainline bridge or ramps for reduced live load.
- Restrict traffic to striped lanes. 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.
- Continually monitor the bridge and ramps with a six month cycle inspection process.

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4.1 Rating Tables / Summary

Figure 4.1b Key Sheet—Segment 1 Girder 1

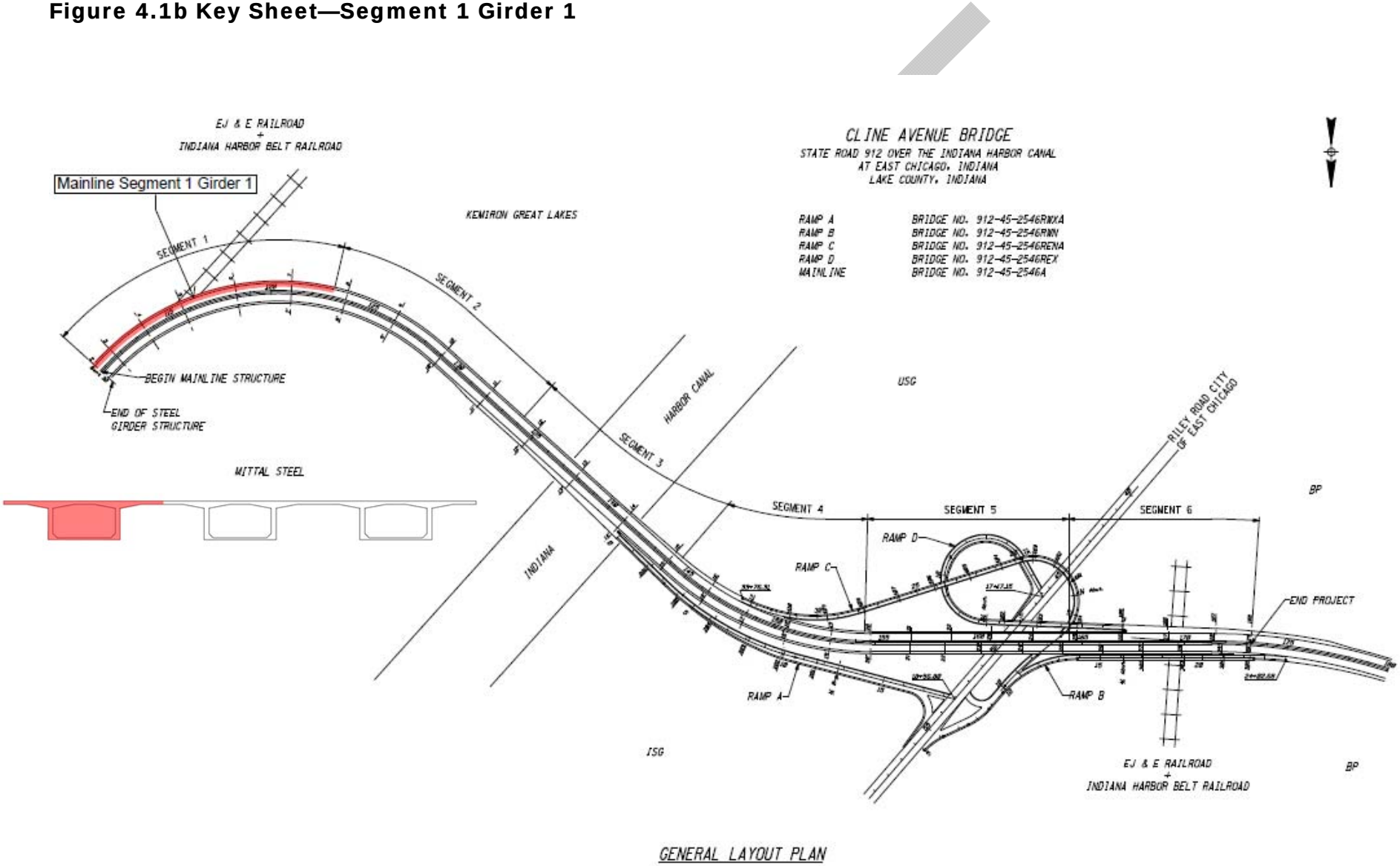

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Table 4.1c Rating Table—Segment 1 Girder 1

			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
Longitudinal	Factored	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
Longitudinal	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
Longitudinal	Service	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
Transverse	Factored	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
Transverse	Factored	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
Transverse	Factored	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)			26.28	26.28	33.96		

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

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Figure 4.2a Key Sheet—Segment 1 Girder 2

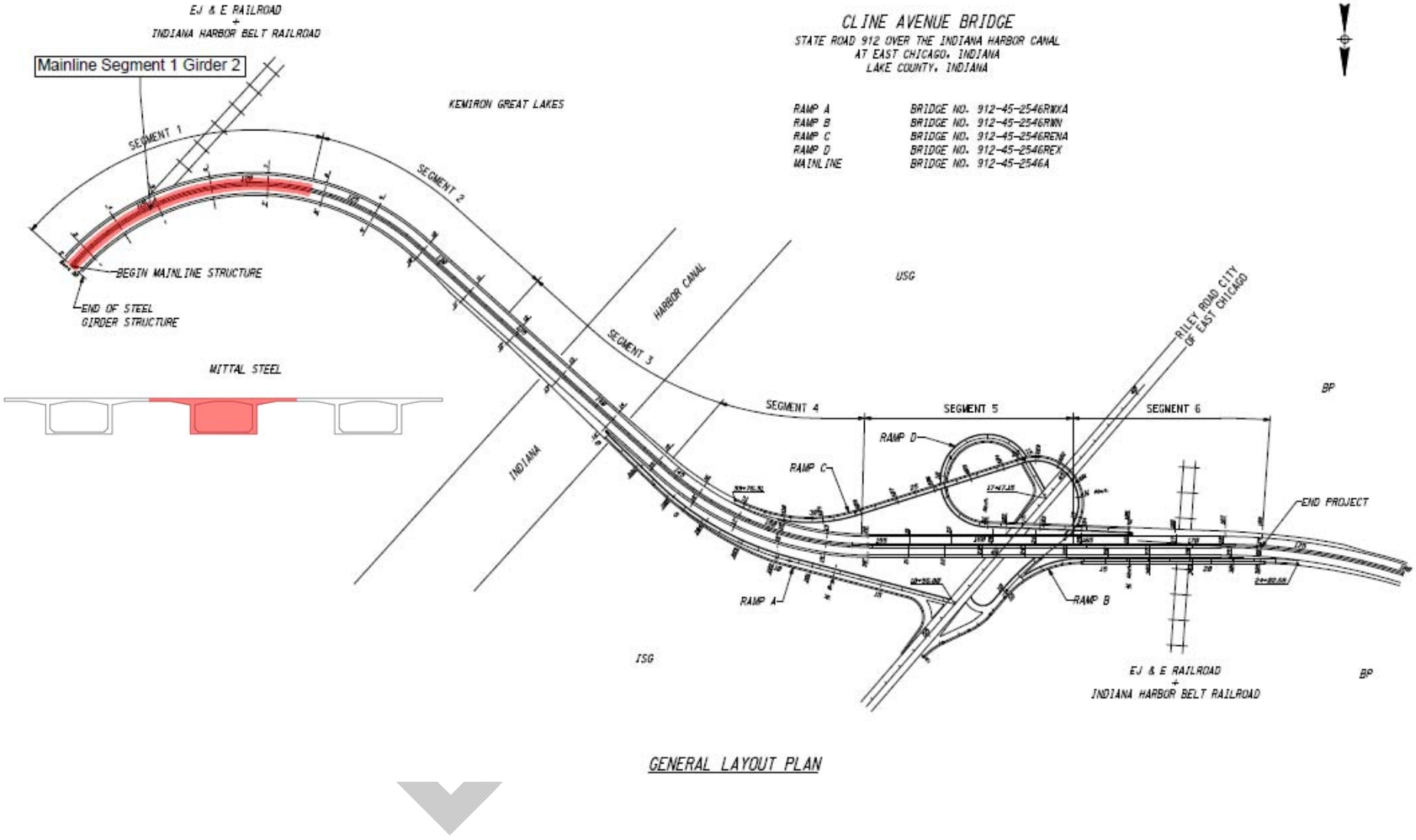

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Table 4.2b Rating Table—Segment 1 Girder 2

			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
Longitudinal	Factored	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
Longitudinal	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
Longitudinal	Service	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
Transverse	Factored	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
Transverse	Factored	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
Transverse	Factored	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)			26.28	26.28	33.96		

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

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Figure 4.3a Key Sheet—Segment 1 Girder 3

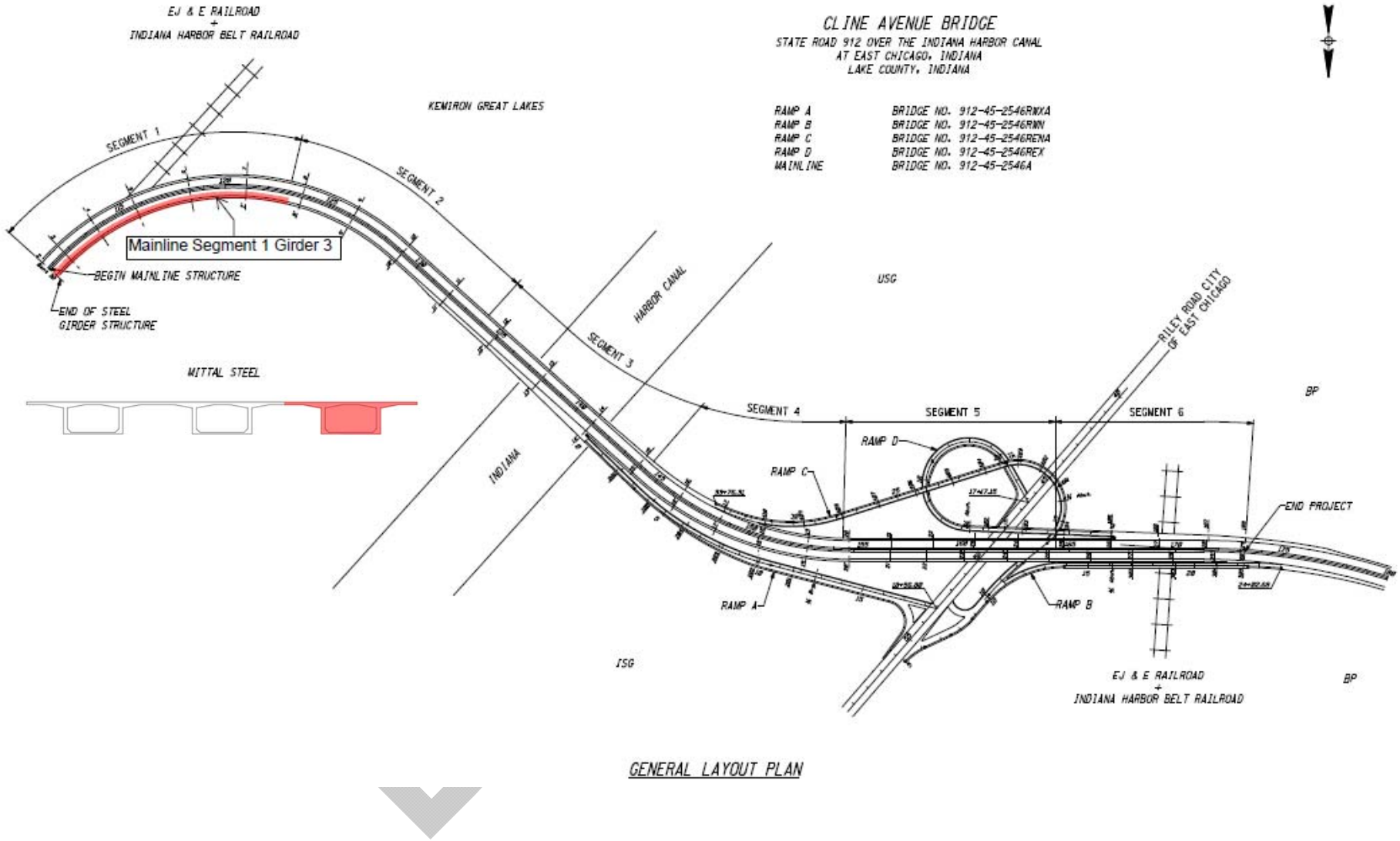

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Table 4.3b Rating Table—Segment 1 Girder 3

			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
Longitudinal	Factored	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
Longitudinal	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
Longitudinal	Service	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
Transverse	Factored	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
Transverse	Factored	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
Transverse	Factored	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)			26.28	26.28	33.96		

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

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Figure 4.4a Key Sheet—Segment 2 Eastbound

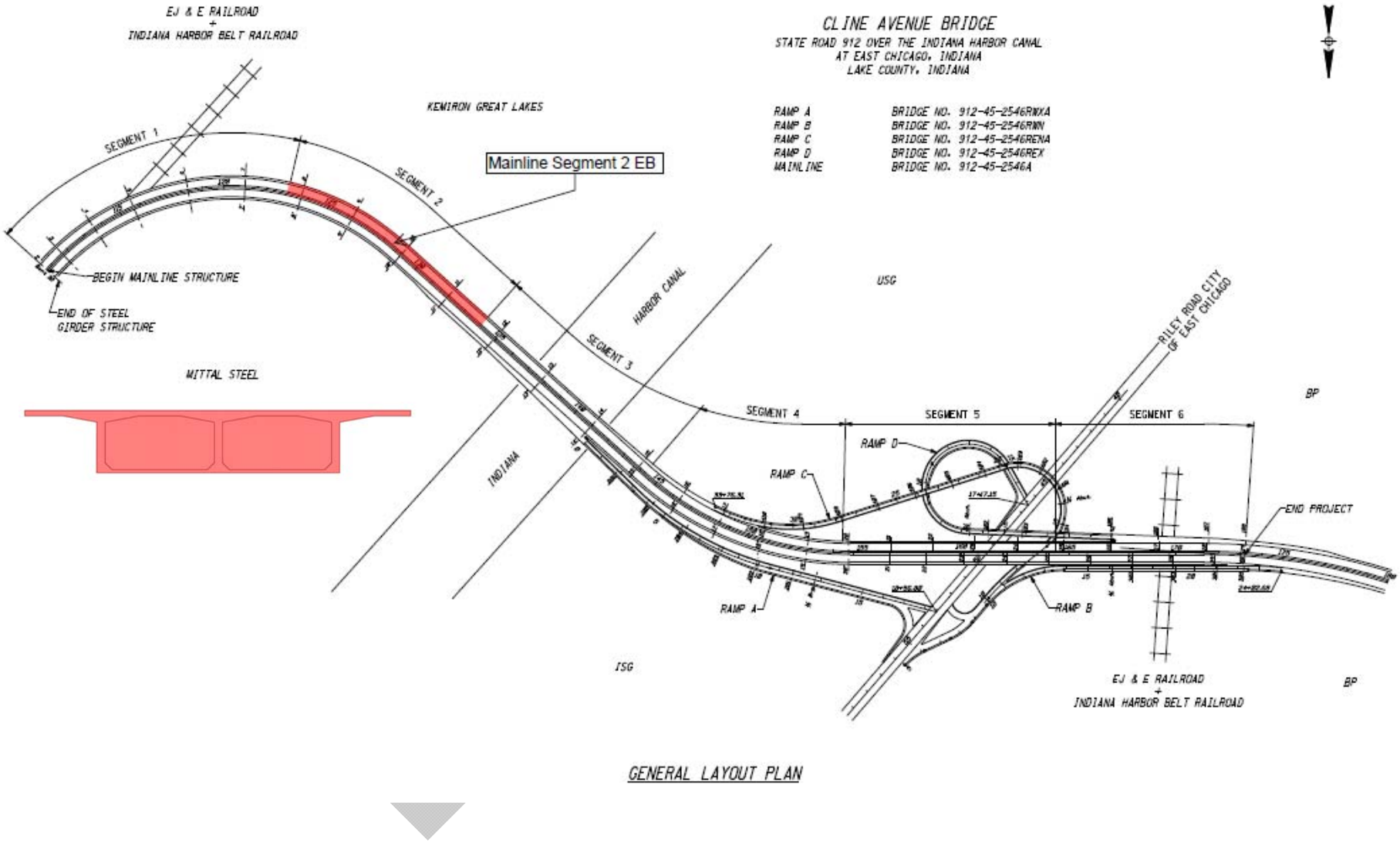

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Table 4.4b Rating Table—Segment 2 Eastbound

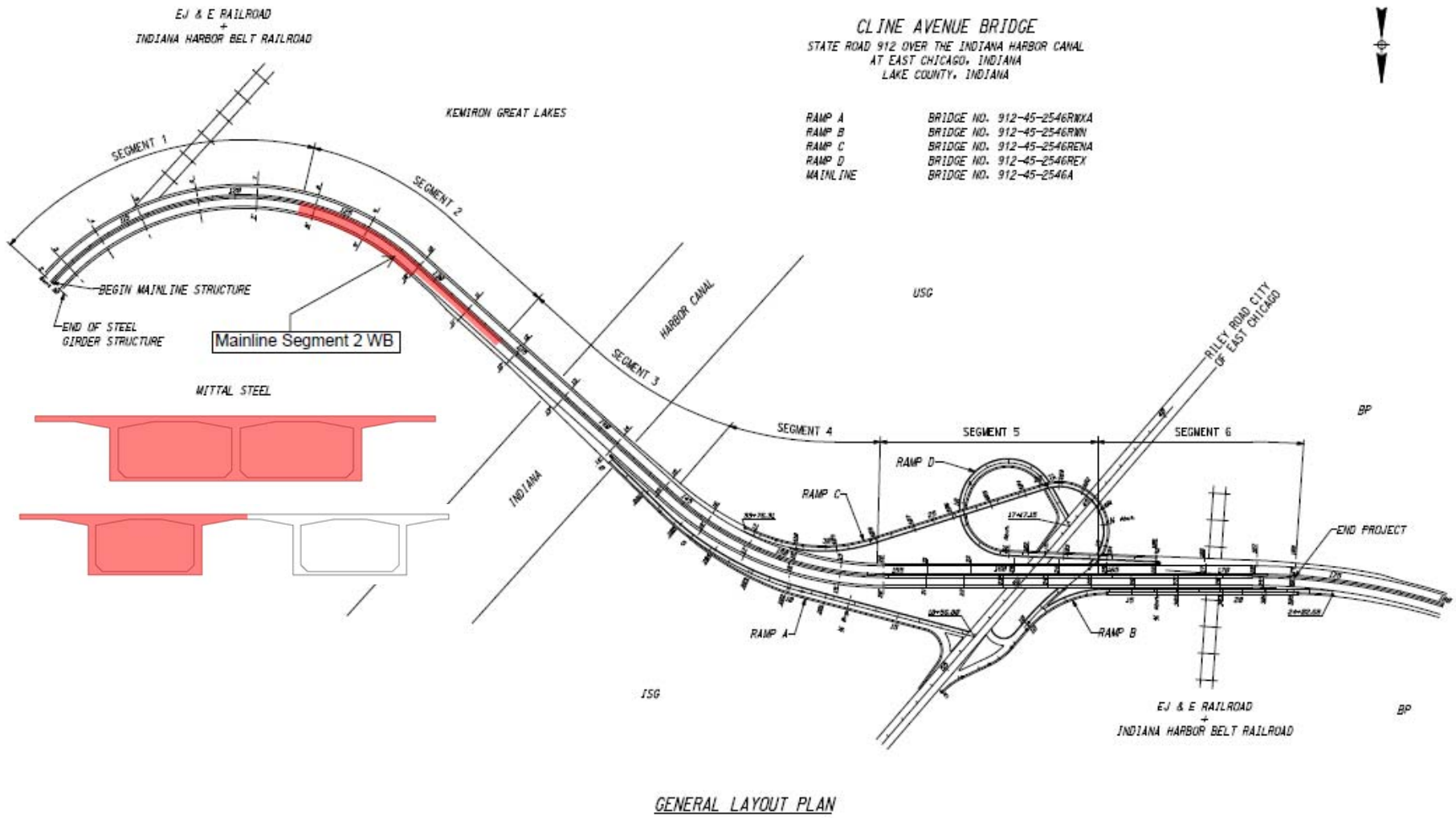
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.81	1.81	2.35	2.35	1.70	1.74	1.54	2.06	2.05	1.83	1.83	1.63	1.76	1.54
Longitudinal	Factored	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
Longitudinal	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
Longitudinal	Service	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
Transverse	Factored	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
Transverse	Factored	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
Transverse	Factored	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)			23.04	47.88	23.62		

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

1.2/34

Figure 4.5a Key Sheet—Segment 2 Westbound



1.2/35

Table 4.5b Rating Table—Segment 2 Westbound

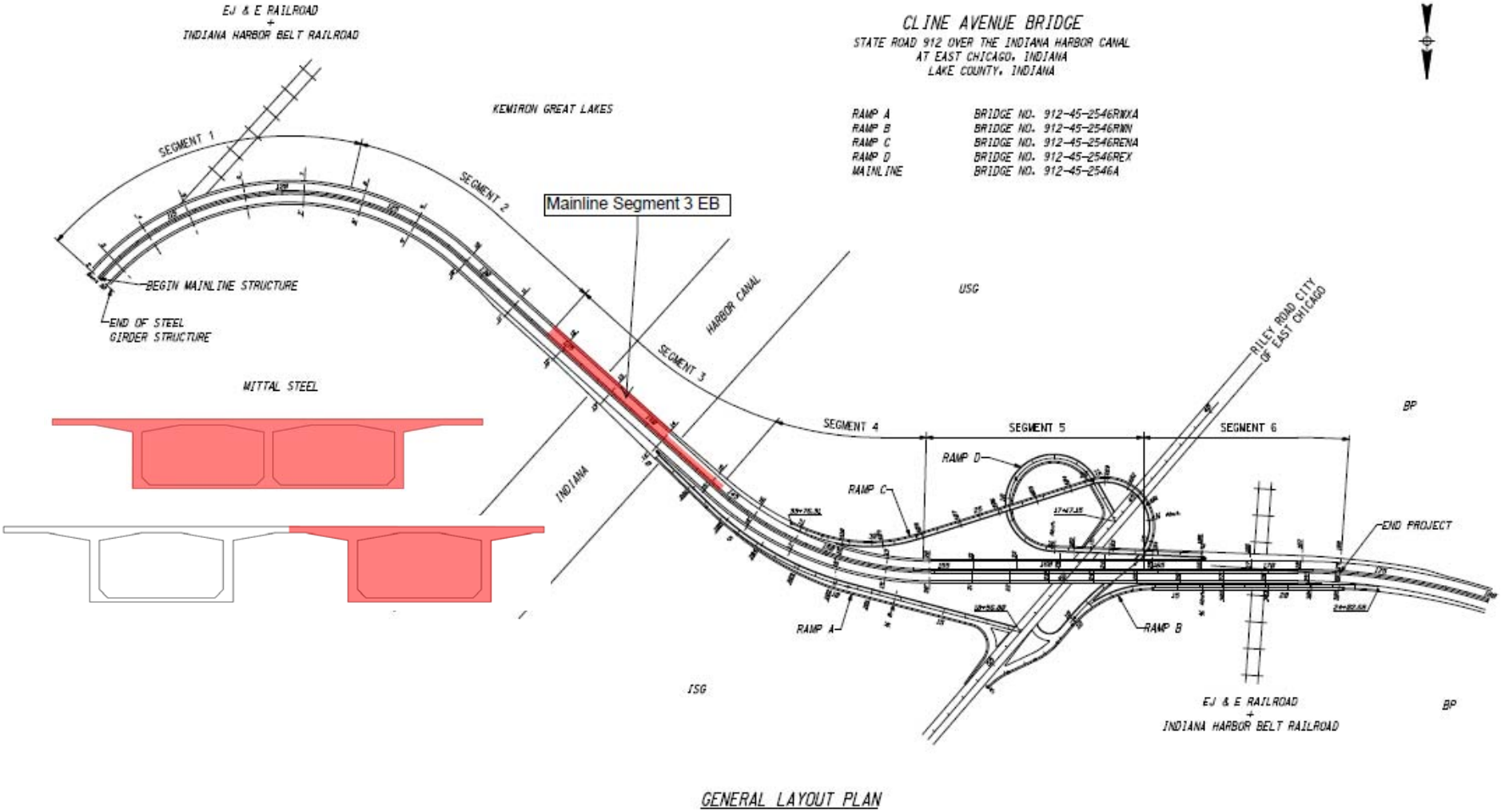
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.40	1.49	1.82	1.93	1.51	1.52	1.36	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)			23.04	41.40	23.62		

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

1.2/36

Figure 4.6a Key Sheet—Segment 3 Eastbound



1.2/37

Table 4.6b Rating Table—Segment 3 Eastbound

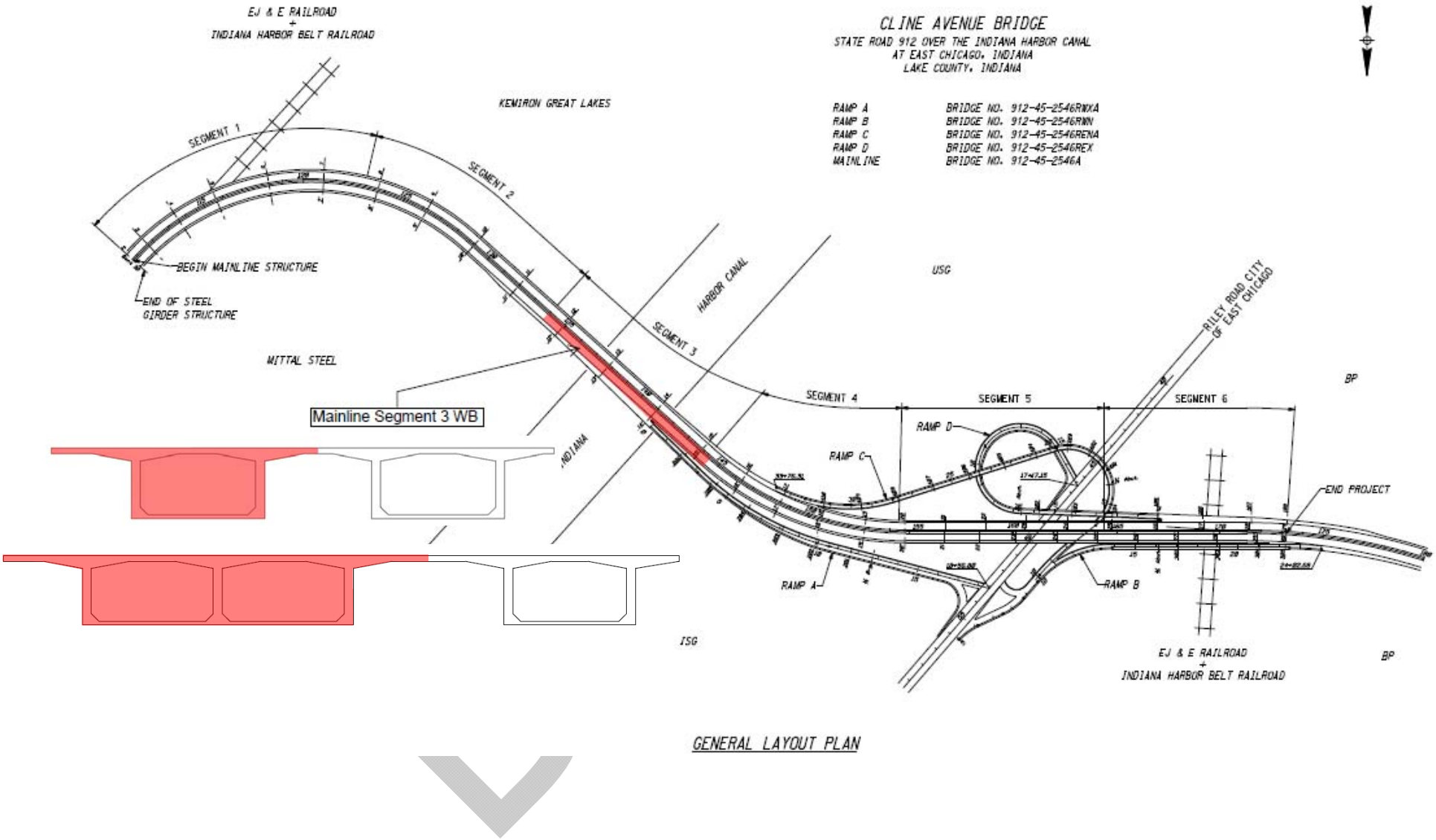
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.07	1.09	1.39	1.42	1.01	1.03	0.93	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)			23.04	39.60	23.62		

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

1.2/38

Figure 4.7a Key Sheet—Segment 3 Westbound



1.2/39

Table 4.7b Rating Table—Segment 3 Westbound

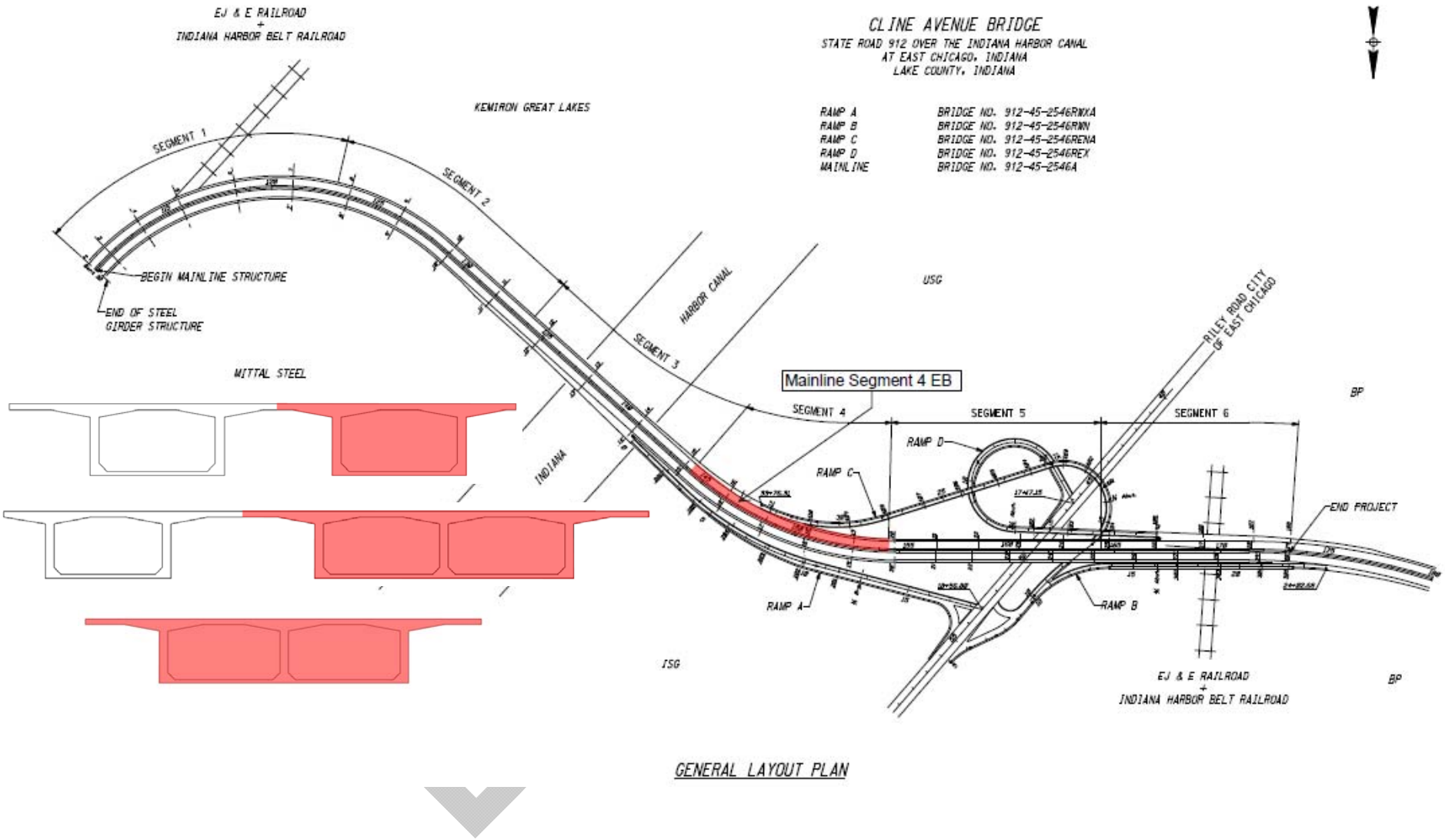
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	0.82	1.09	1.06	1.42	0.86	0.86	0.75	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)			23.04	25.20	21.63		

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

1.2/40

Figure 4.8a Key Sheet—Segment 4 Eastbound



1.2/41

Table 4.8b Rating Table—Segment 4 Eastbound

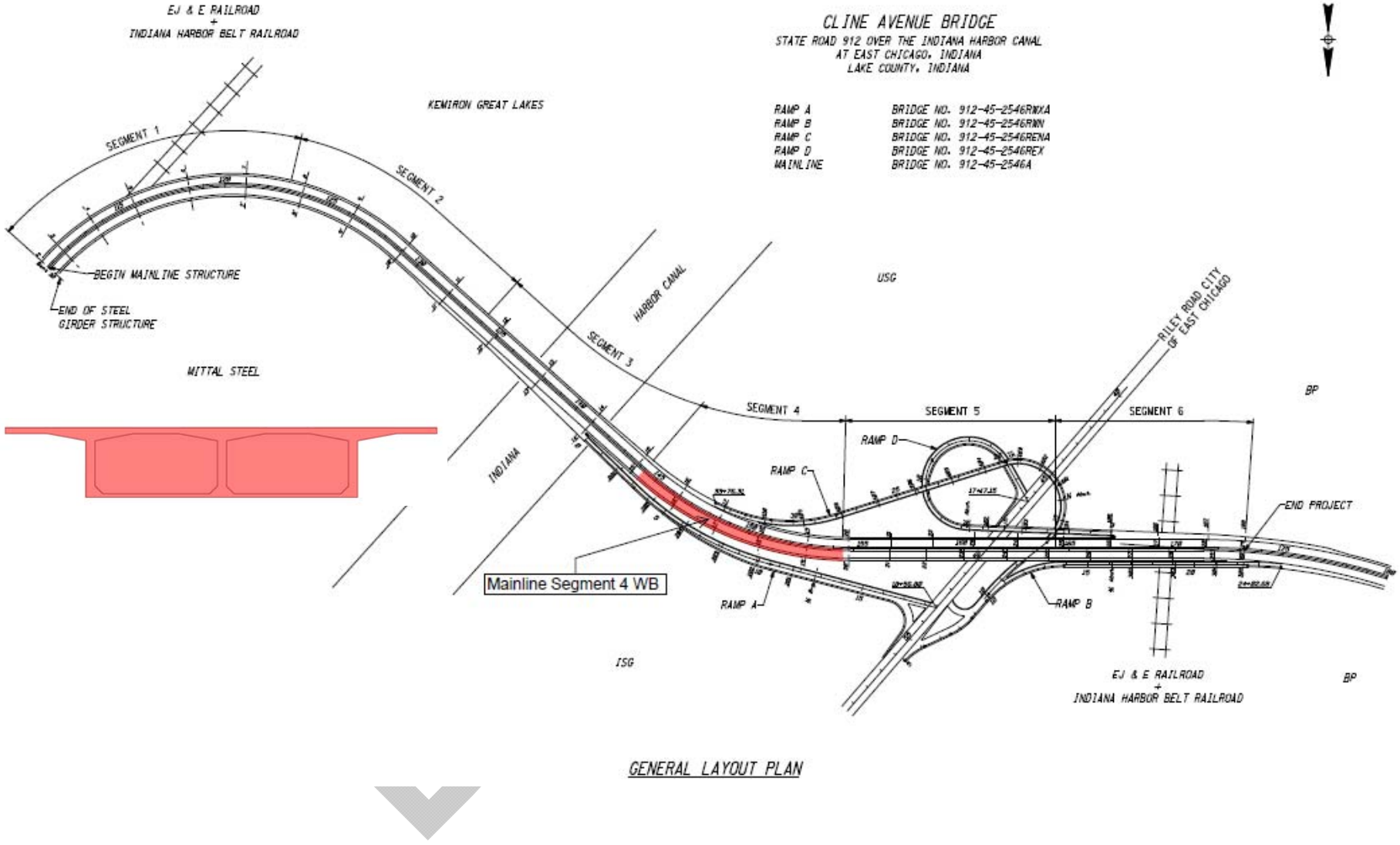
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.54	1.95	2.10	2.53	1.46	1.51	1.40	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)			23.04	25.20	23.62		

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

1.2/42

Figure 4.9a Key Sheet—Segment 4 Westbound



1.2/43

Table 4.9b Rating Table—Segment 4 Westbound

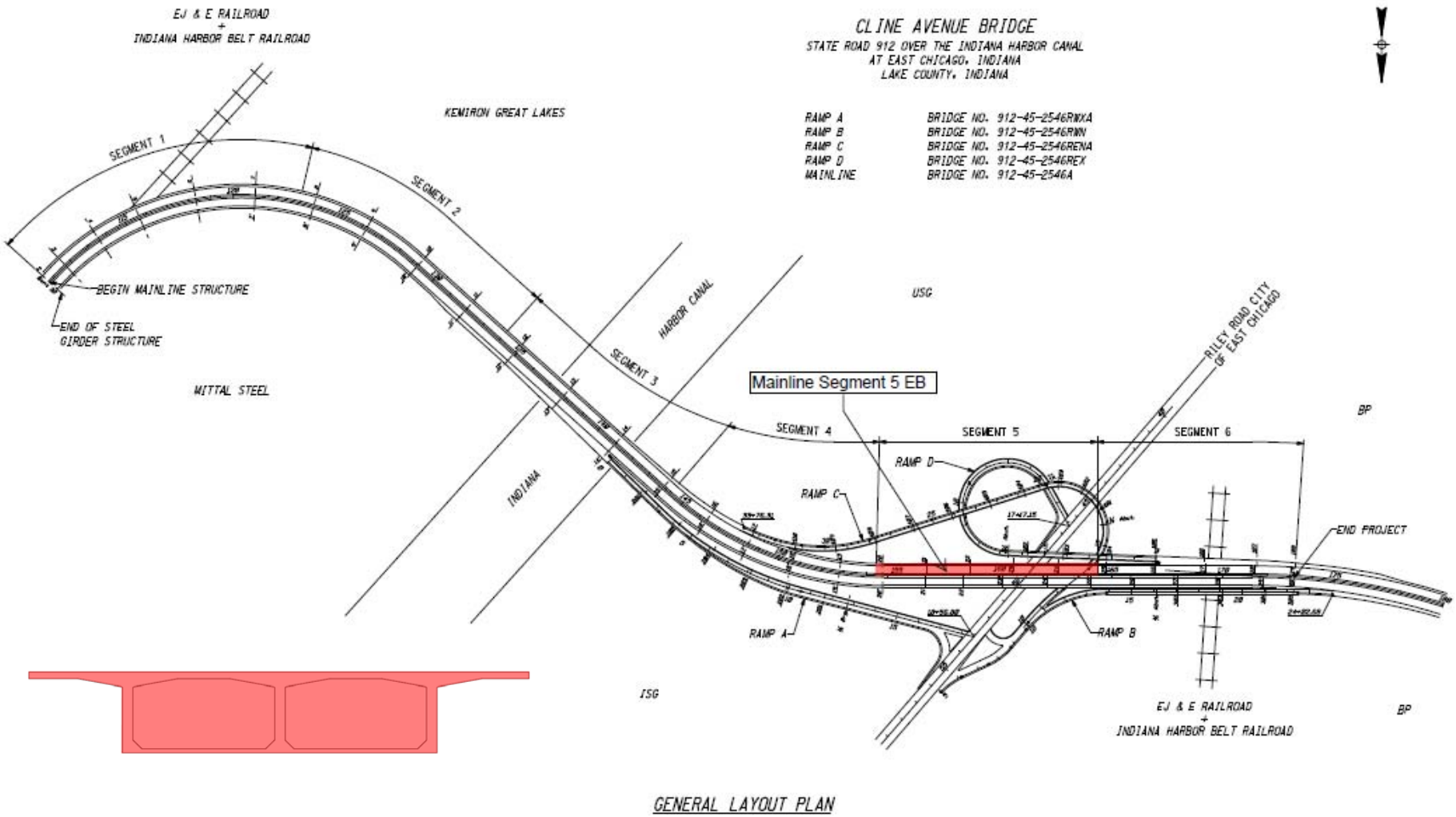
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.80	1.84	2.33	2.39	1.90	1.93	1.65	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)			23.04	48.24	23.62		

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

1.2/44

Figure 4.10a Key Sheet—Segment 5 Eastbound



1.2/45

Table 4.10b Rating Table—Segment 5 Eastbound

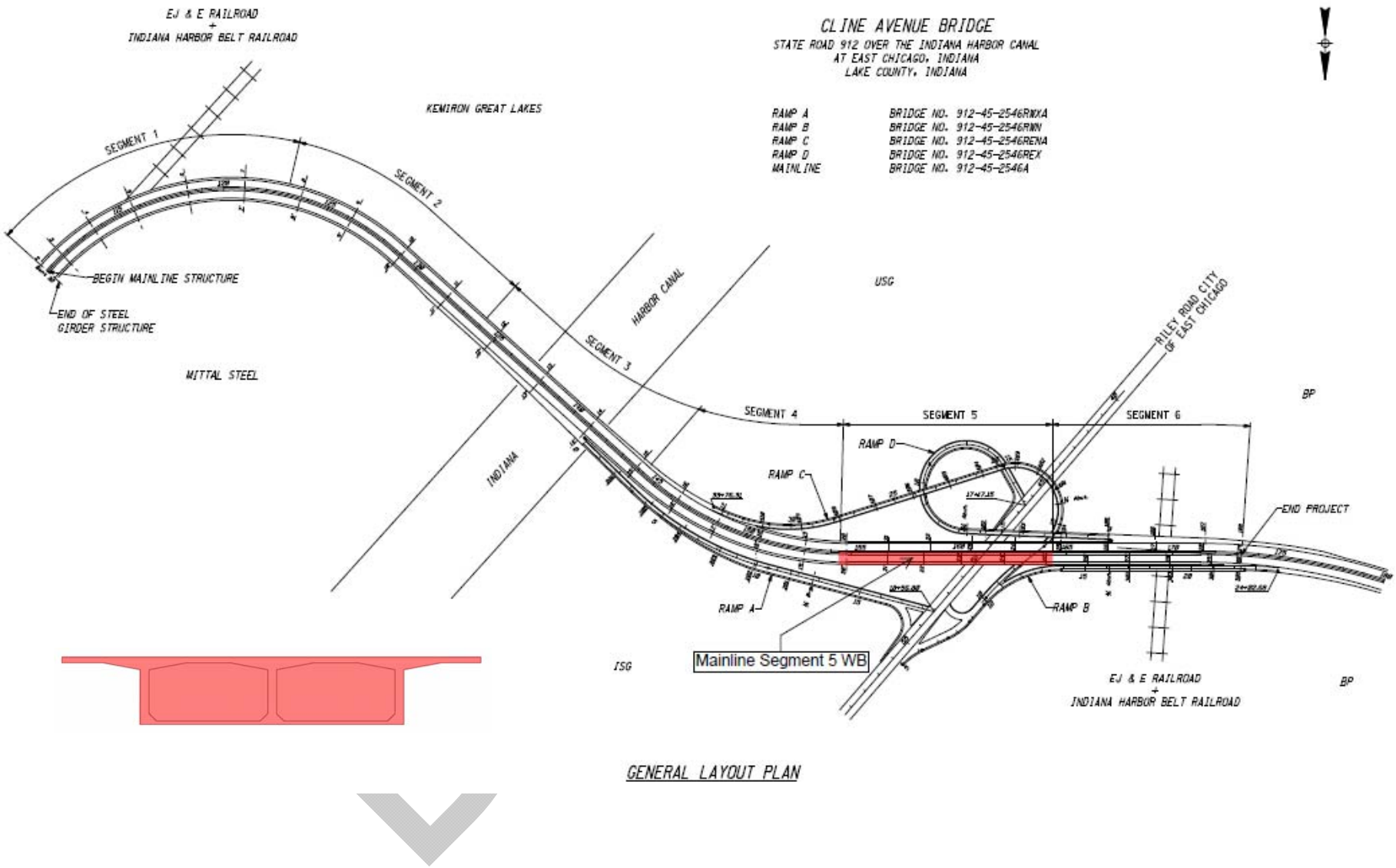
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.99	2.03	2.59	2.64	1.83	1.90	1.72	2.26	2.24	2.09	2.10	1.87	2.04	1.83
Longitudinal	Factored	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
Longitudinal	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
Longitudinal	Service	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
Transverse	Factored	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
Transverse	Factored	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
Transverse	Factored	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)			23.04	44.28	23.62		

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

1.2/46

Figure 4.11a Key Sheet—Segment 5 Westbound



1.2/47

Table 4.11b Rating Table—Segment 5 Westbound

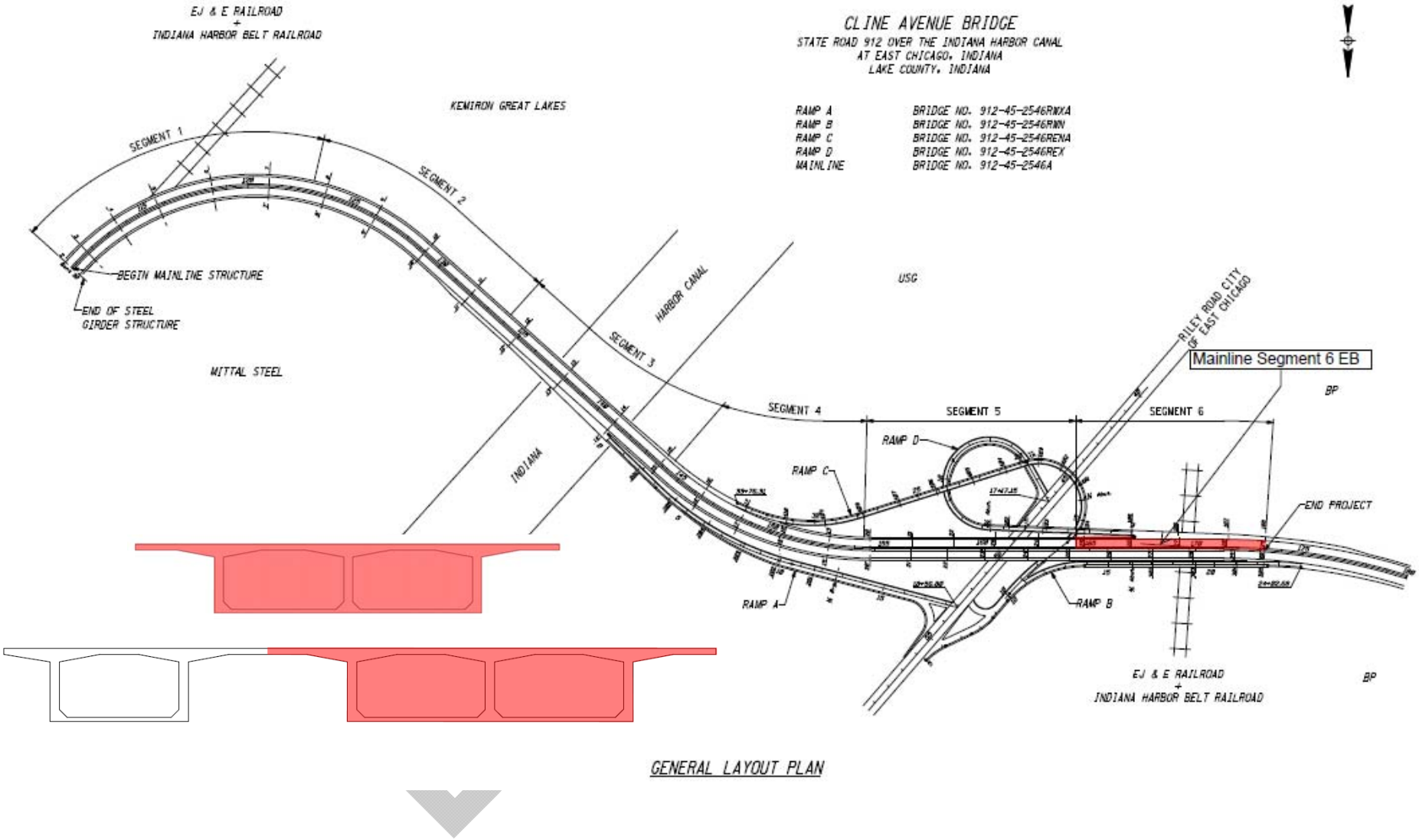
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.67	1.70	2.16	2.21	1.62	1.74	1.71	2.03	1.99	1.78	1.85	1.68	1.84	1.65
Longitudinal	Factored	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
Longitudinal	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
Longitudinal	Service	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
Transverse	Factored	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
Transverse	Factored	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
Transverse	Factored	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)			23.04	48.60	23.62		

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

1.2/48

Figure 4.12a Key Sheet—Segment 6 Eastbound



1.2/49

Table 4.12b Rating Table—Segment 6 Eastbound

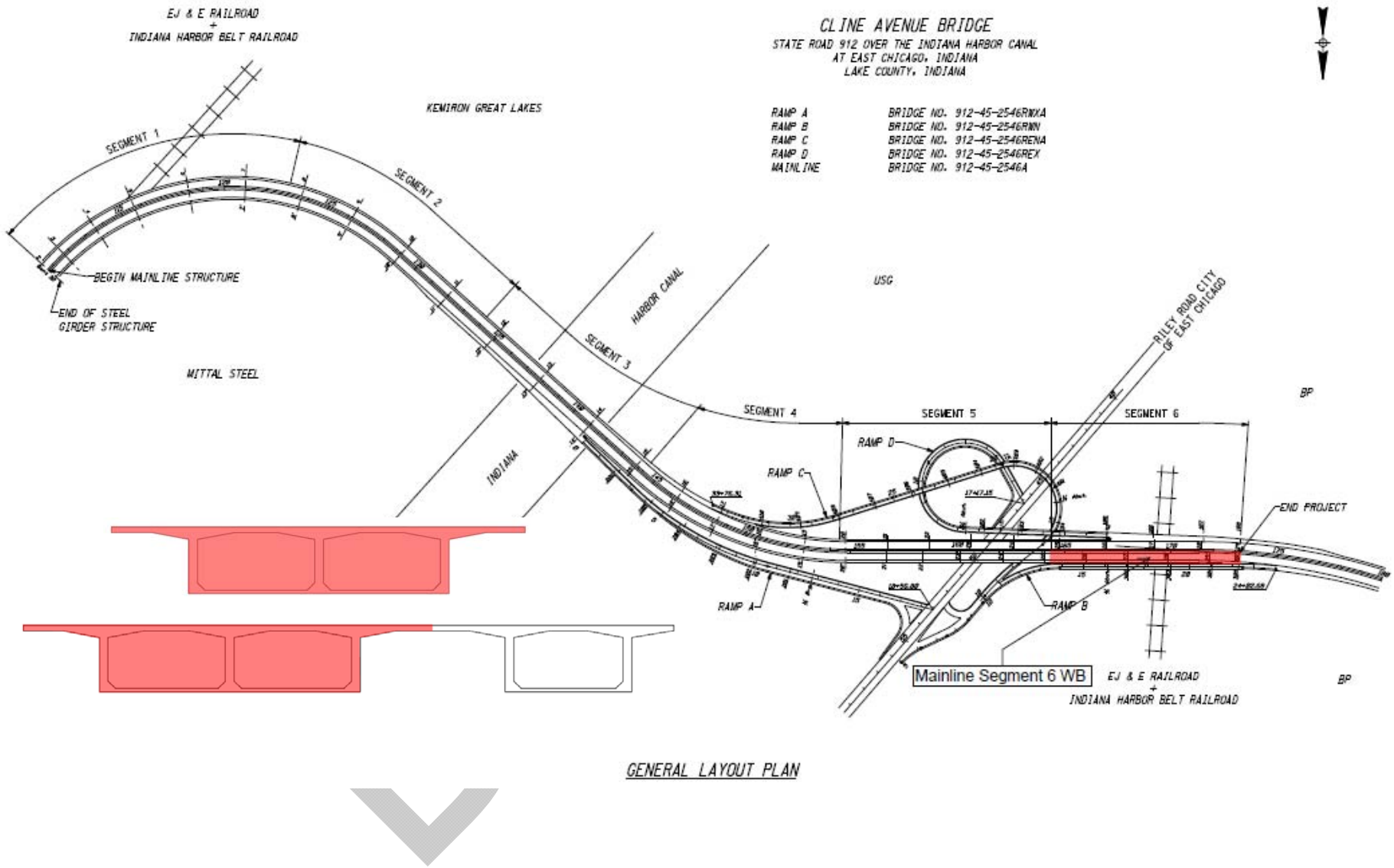
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.72	1.77	2.23	2.30	1.68	1.79	1.73	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)			23.04	25.20	23.62		

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

1.2/50

Figure 4.13a Key Sheet—Segment 6 Westbound



1.2/51

Table 4.13b Rating Table—Segment 6 Westbound

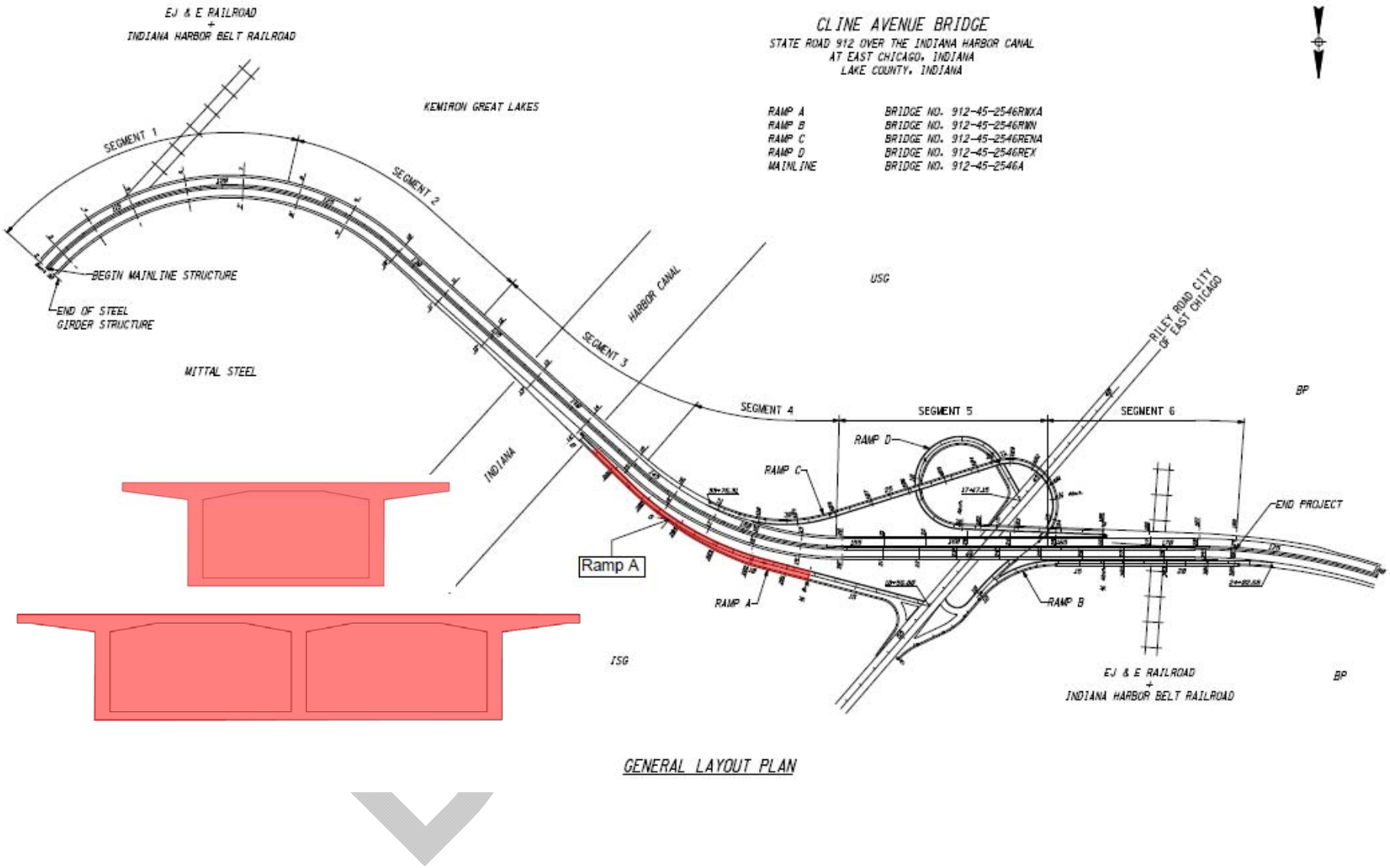
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.38	1.43	1.78	1.86	1.37	1.42	1.24	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)			23.04	25.20	23.62		

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

1.2/52

Figure 4.14a Key Sheet— Ramp A



1.2/53

Table 4.14b Rating Table—Ramp A

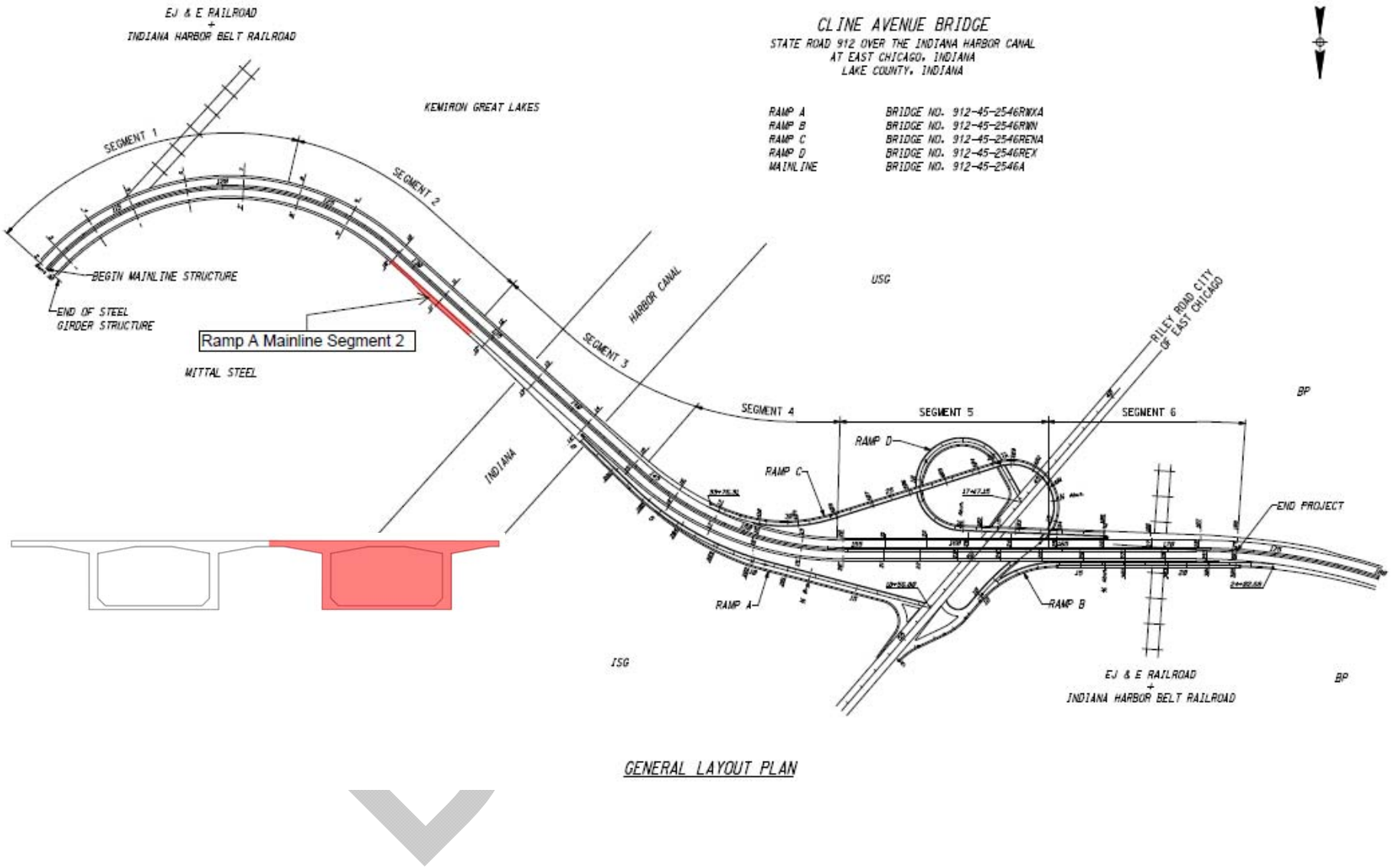
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.08	1.38	1.40	1.79	1.08	1.09	0.94	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)			35.64	35.64	42.31		

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

1.2/54

Figure 4.15a Key Sheet— Ramp A Mainline Segment 2



1.2/55

Table 4.15b Rating Table—Ramp A Mainline Segment 2

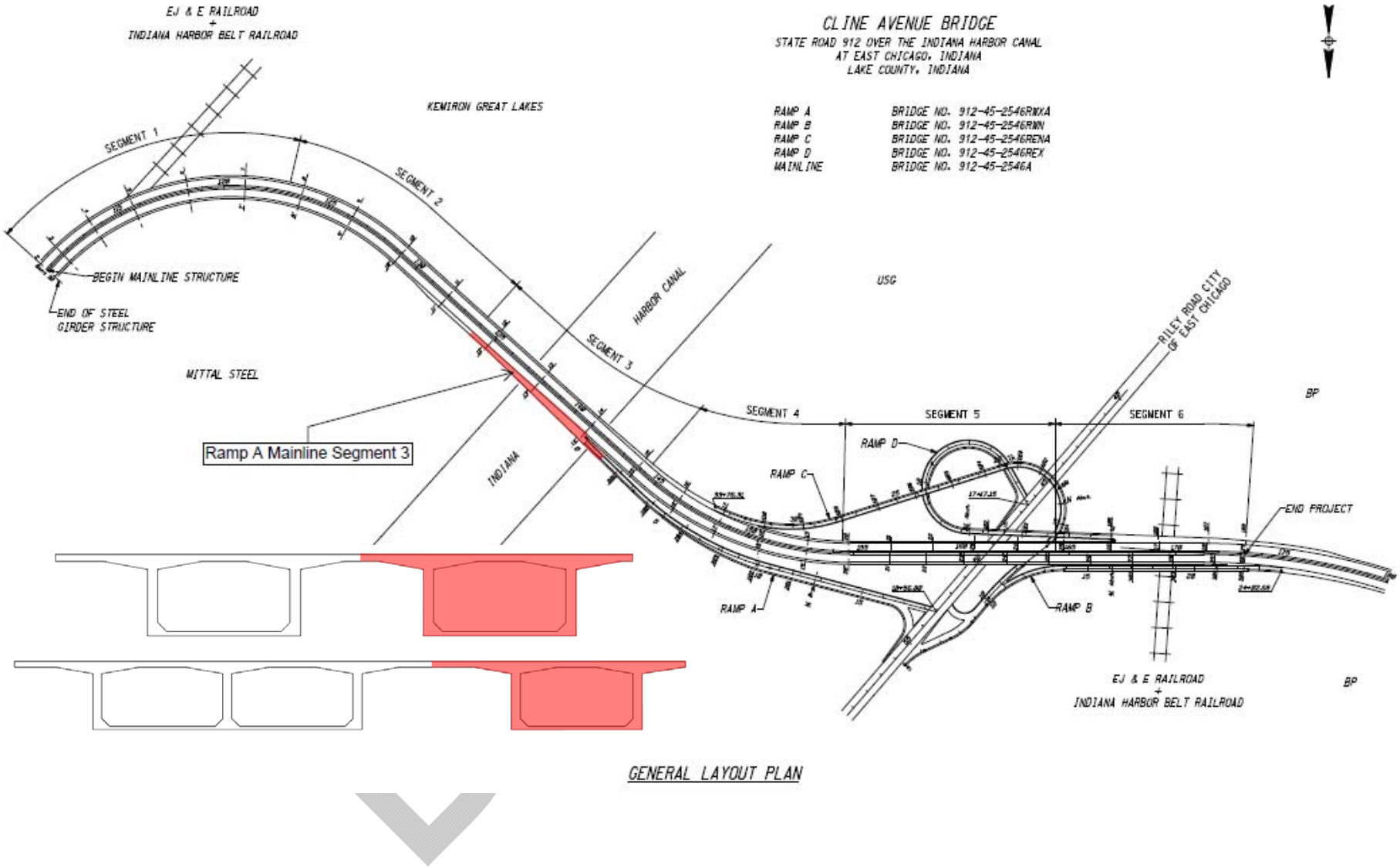
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.04	1.26	1.35	1.63	1.06	1.06	0.93	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)			34.92	46.44	36.10		

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

1.2/56

Figure 4.16a Key Sheet— Ramp A Mainline Segment 3



1.2/57

Table 4.16b Rating Table—Ramp A Mainline Segment 3

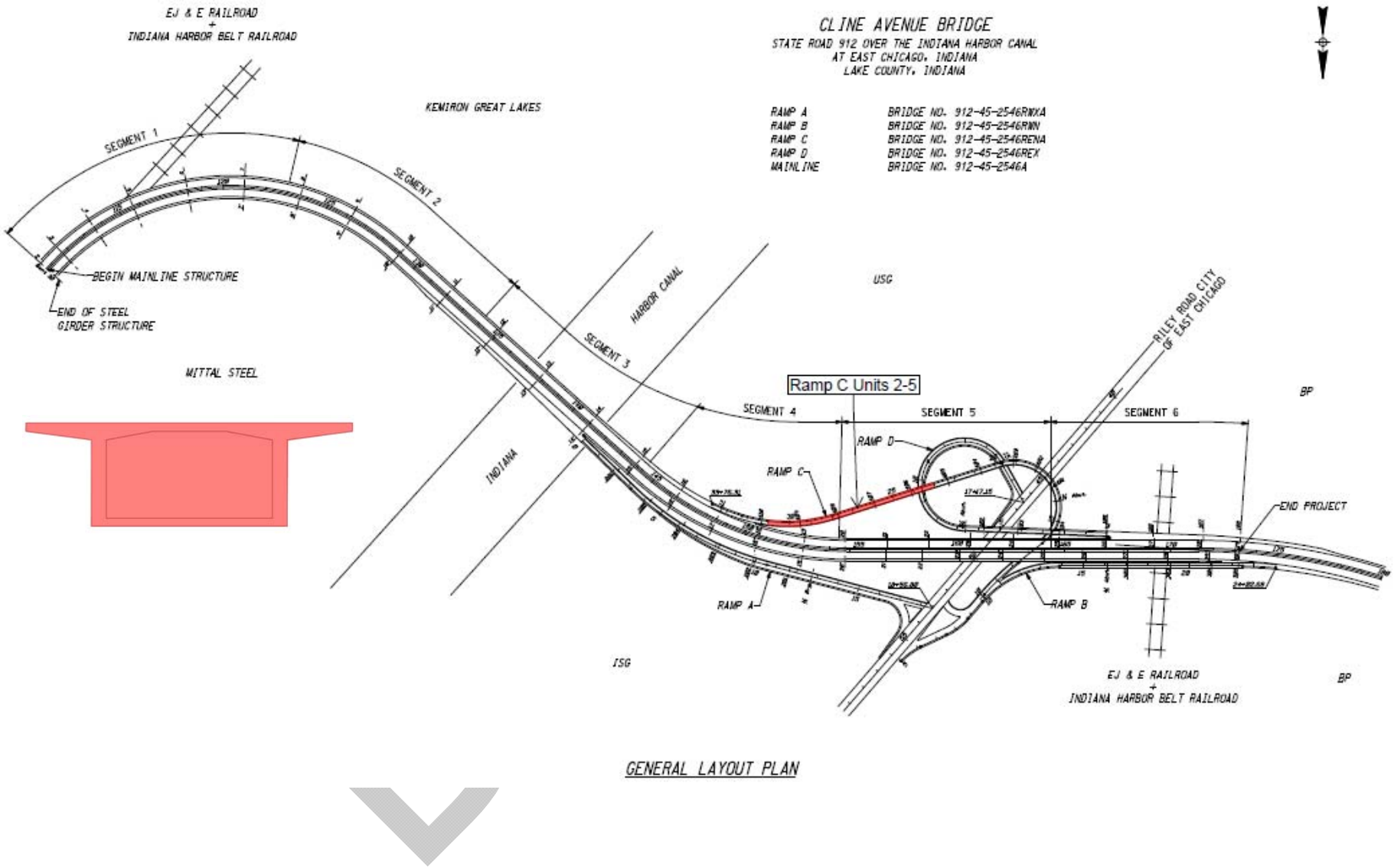
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	0.88	1.48	1.14	1.91	0.81	0.87	0.84	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)			34.92	39.96	36.10		

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

1.2/58

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



1.2/59

Table 4.17b Rating Table—Ramp C Units 2-5

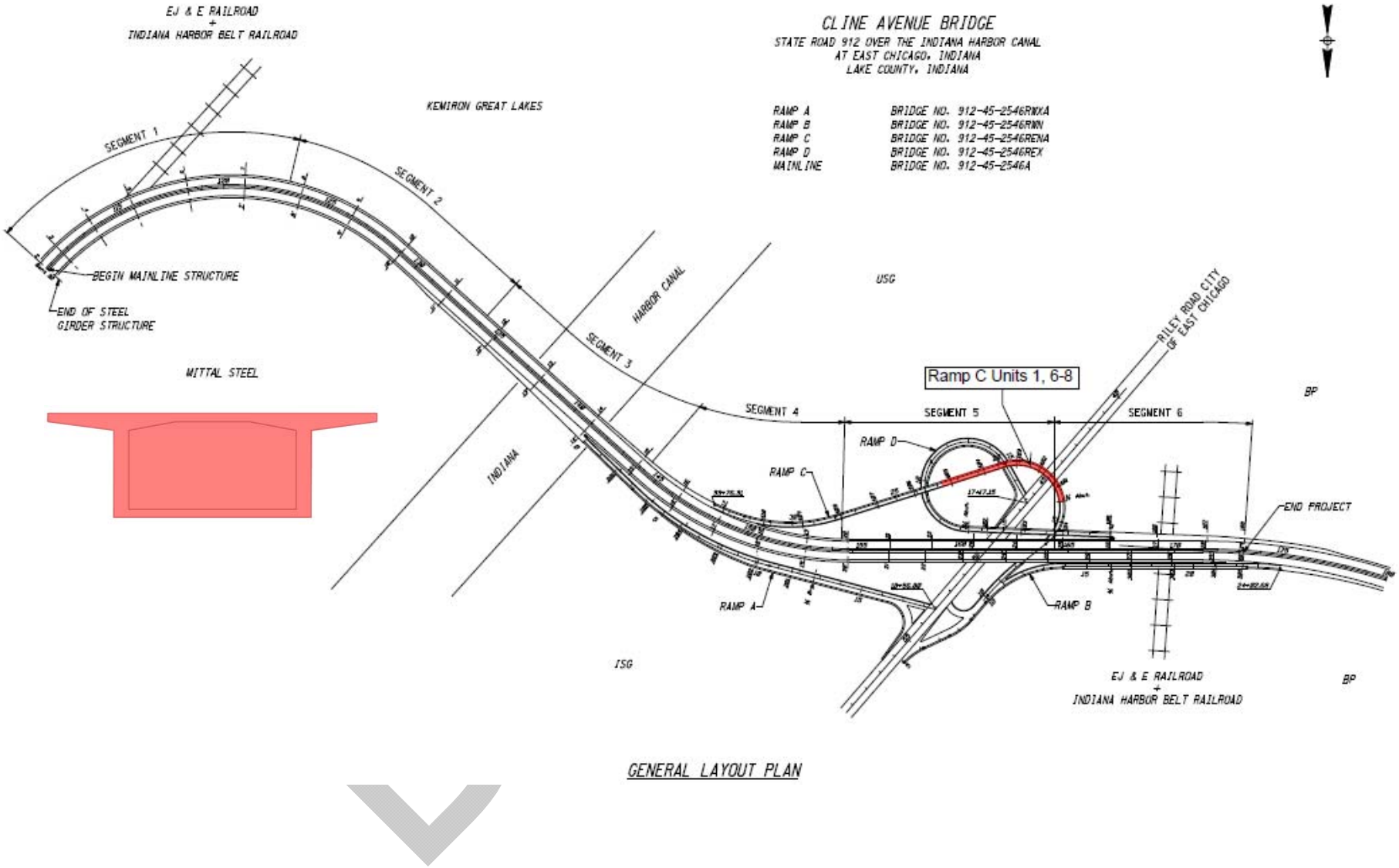
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.39	3.36	2.66	4.35	1.31	1.33	1.19	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)			50.04	50.04	58.92		

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

1.2/60

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



1.2/61

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

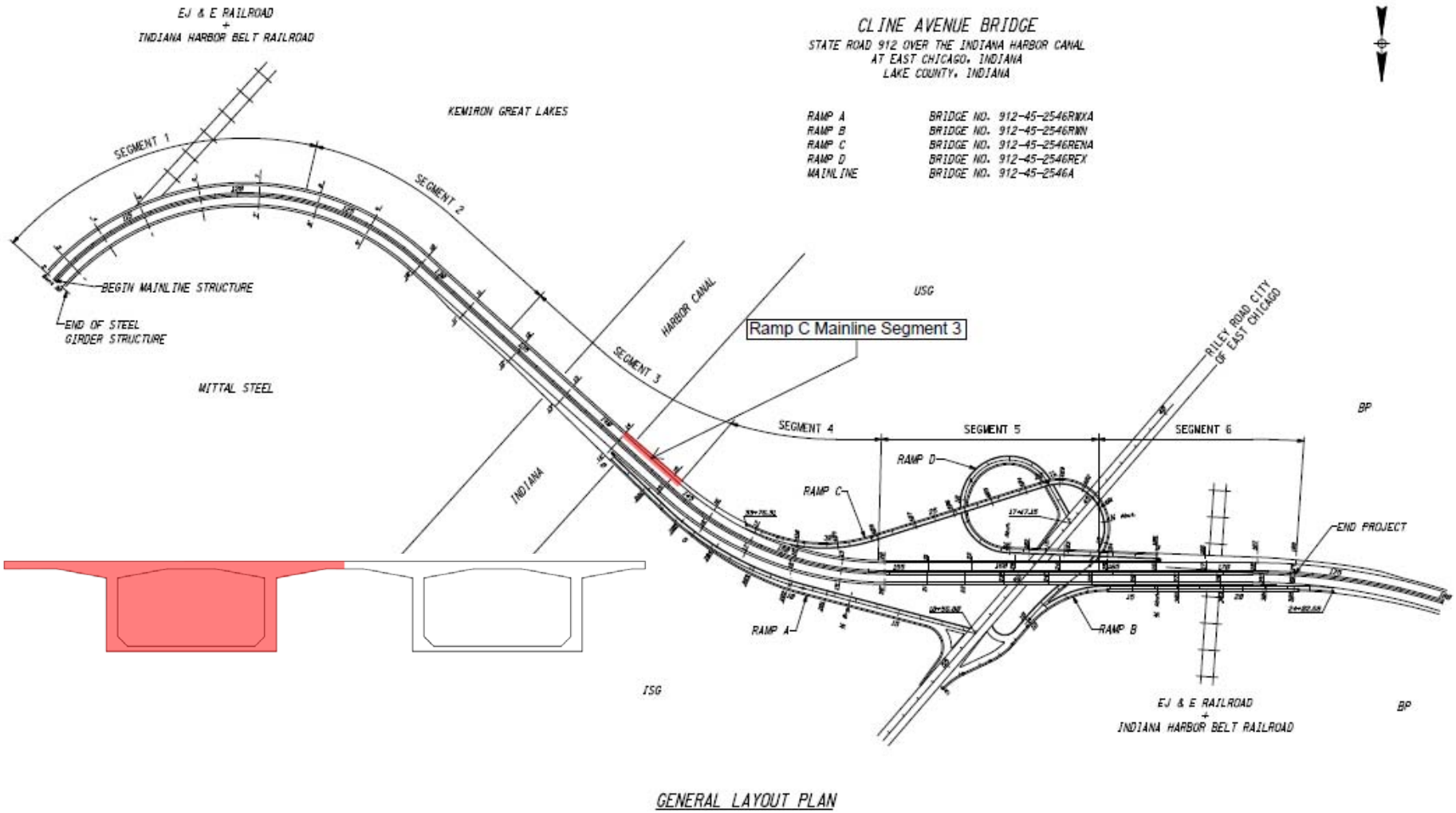
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.07	1.78	1.39	2.31	1.00	1.09	1.19	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)			50.04	50.04	44.34		

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

1.2/62

Figure 4.19a Key Sheet— Ramp C Mainline Segment 3



1.2/63

Table 4.19b Rating Table—Ramp C Mainline Segment 3

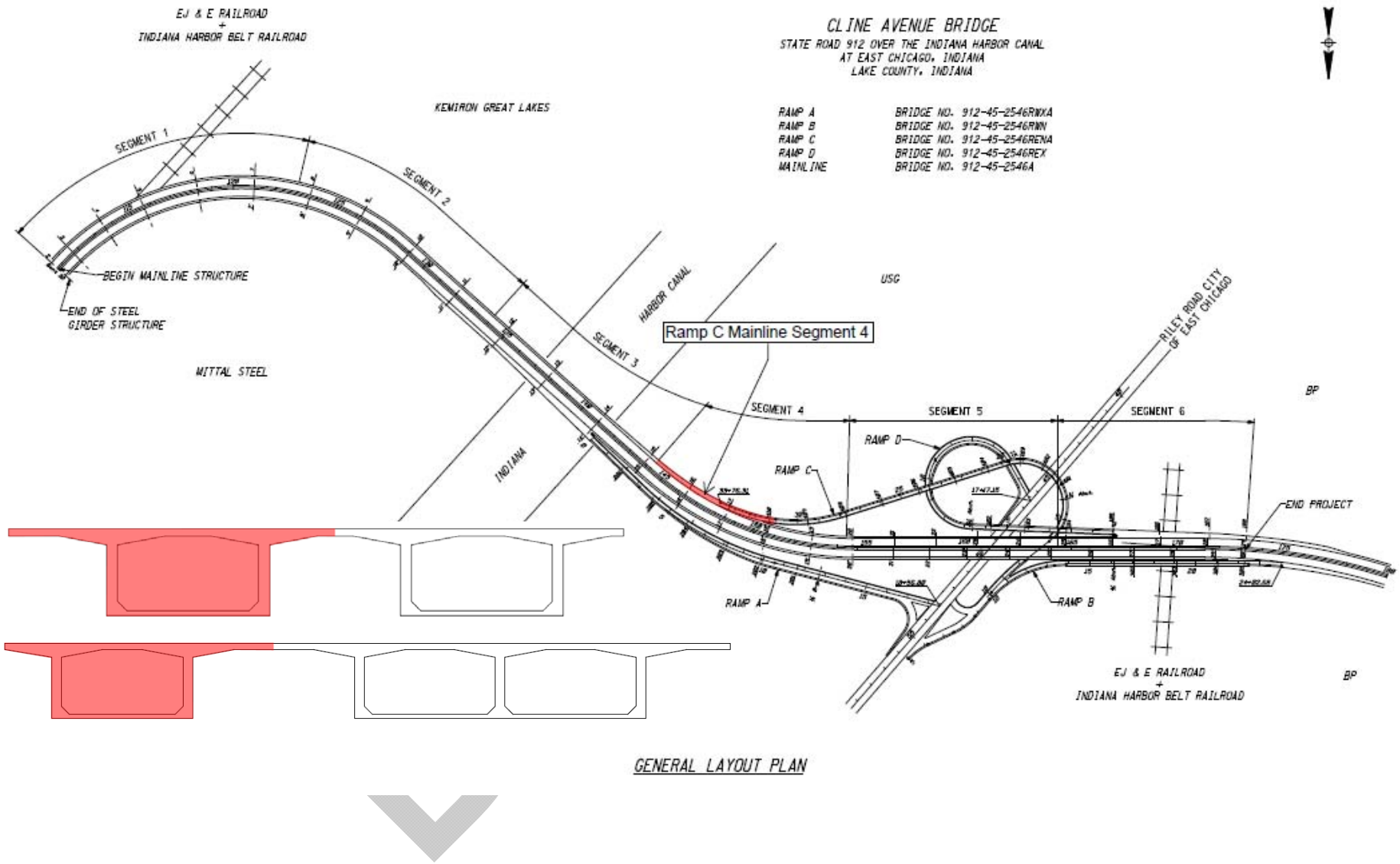
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	1.30	1.57	1.68	2.03	1.35	1.36	1.17	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)			34.92	73.08	36.10		

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

1.2/64

Figure 4.20a Key Sheet— Ramp C Mainline Segment 4



1.2/65

Table 4.20b Rating Table—Ramp C Mainline Segment 4

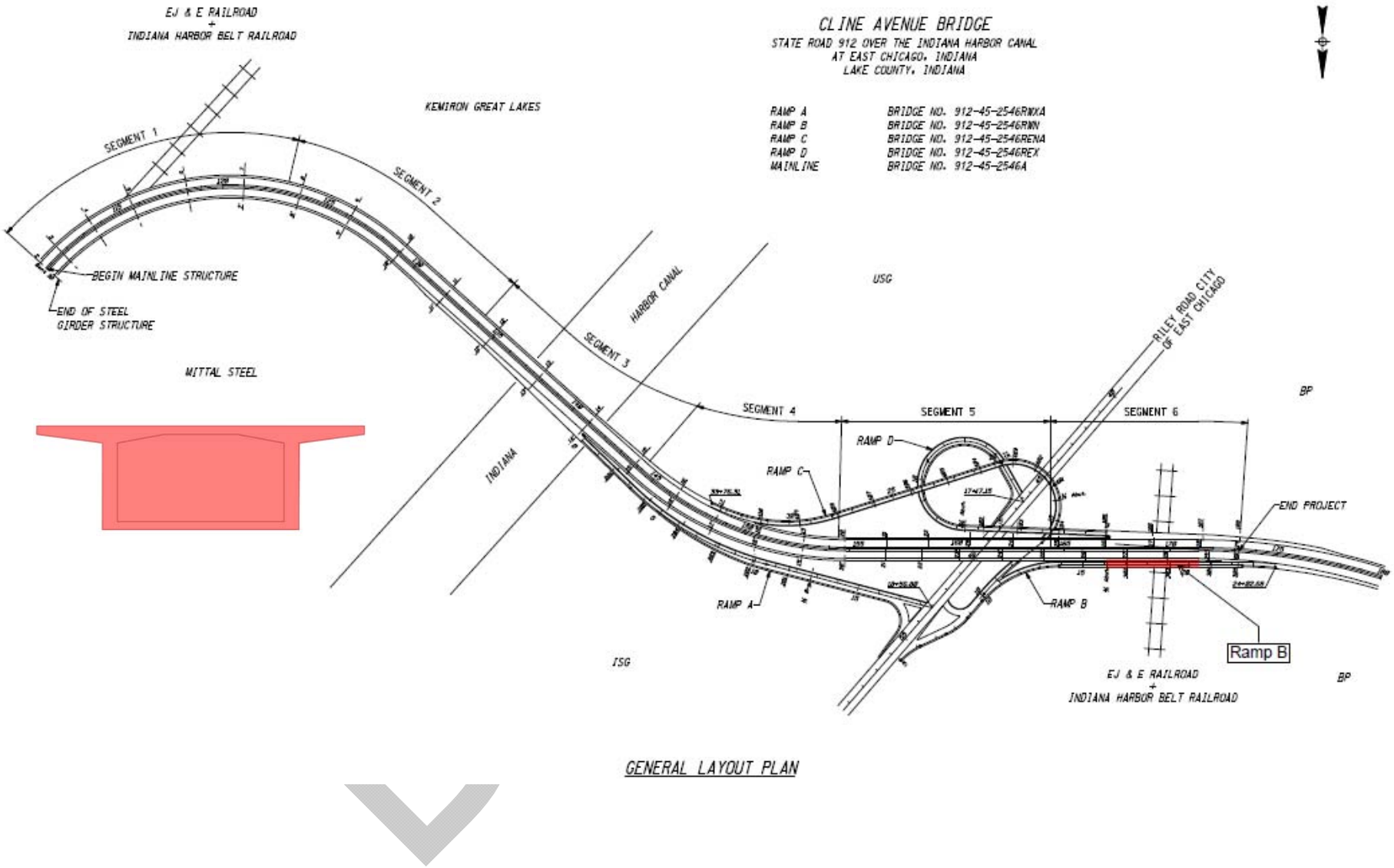
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	2.17	2.93	2.82	3.80	2.00	2.03	1.78	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)			29.52	29.52	36.10		

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

1.2/66

Figure 4.21a Key Sheet— Ramp B



1.2/67

Table 4.21b Rating Table—Ramp B

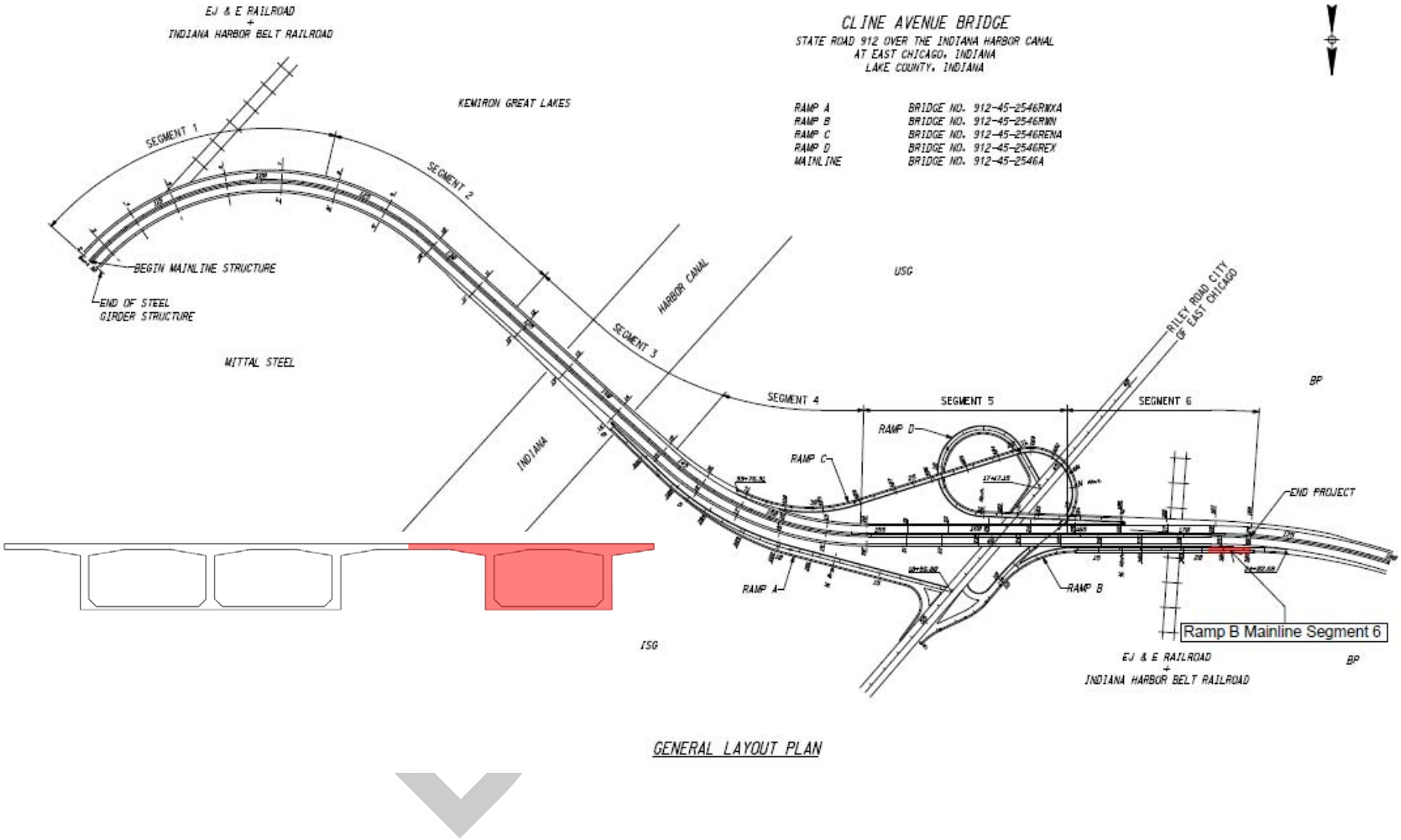
			Inventory		Operating											
			LRFR Design Loads		LRFR Design Loads		INDOT Additional Vehicles									
			HL-93		HL-93		Legal Loads			Permit Loads					Permit Superloads	
			Design	Striped	Design	Striped	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Factored	Flexure	2.08	3.46	2.69	4.48	1.92	2.00	1.85	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)			50.04	50.04	81.01		

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

1.2/68

Figure 4.22a Key Sheet— Ramp B Mainline Segment 6



1.2/69

Table 4.22b 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)			50.76	65.16	51.38		

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

1.2/70

Figure 4.23a Key Sheet— Ramp D

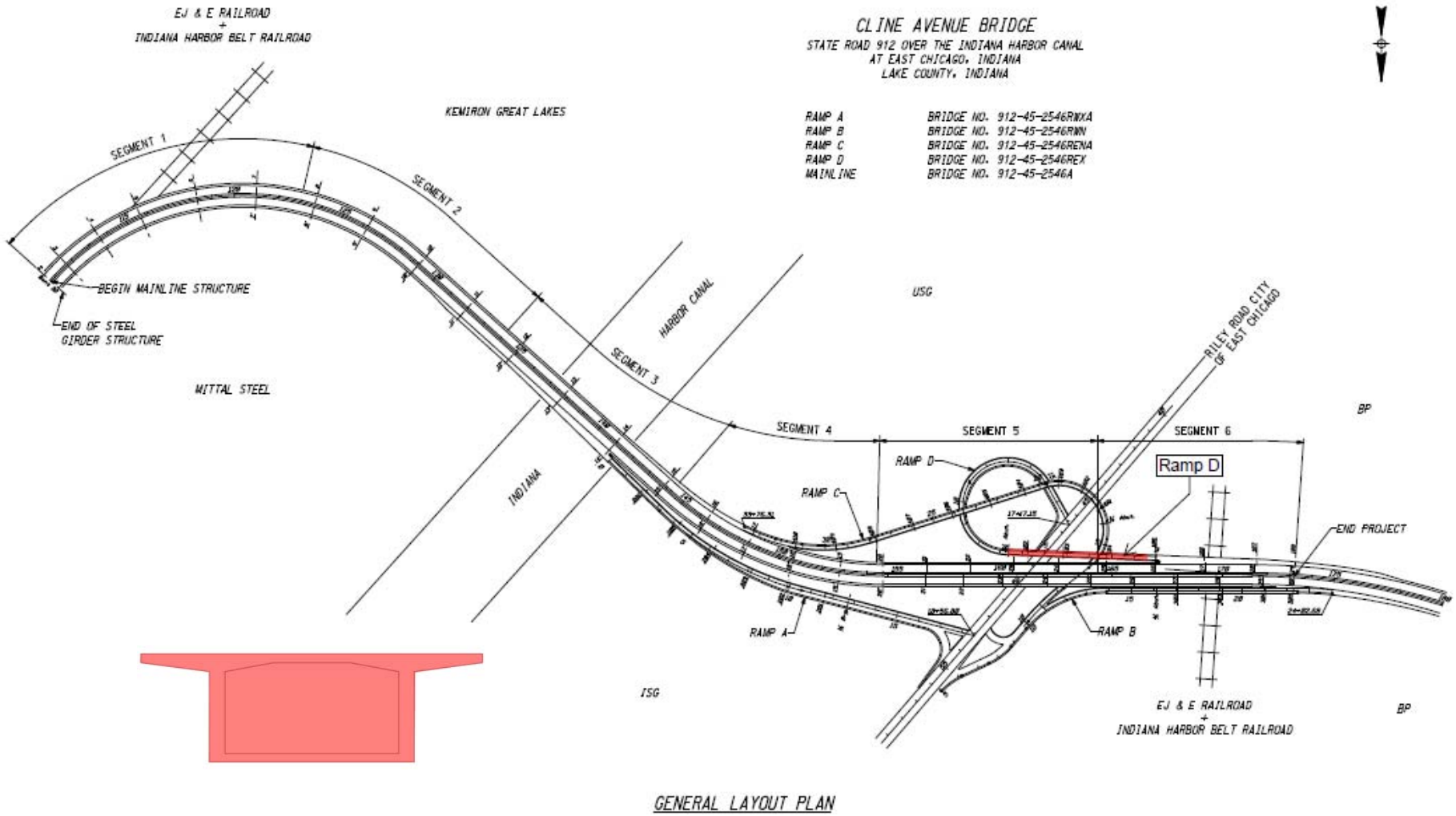


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Table 4.23b Rating Table—Ramp D

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

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

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Figure 4.24a Key Sheet— Ramp D Mainline Segment 6

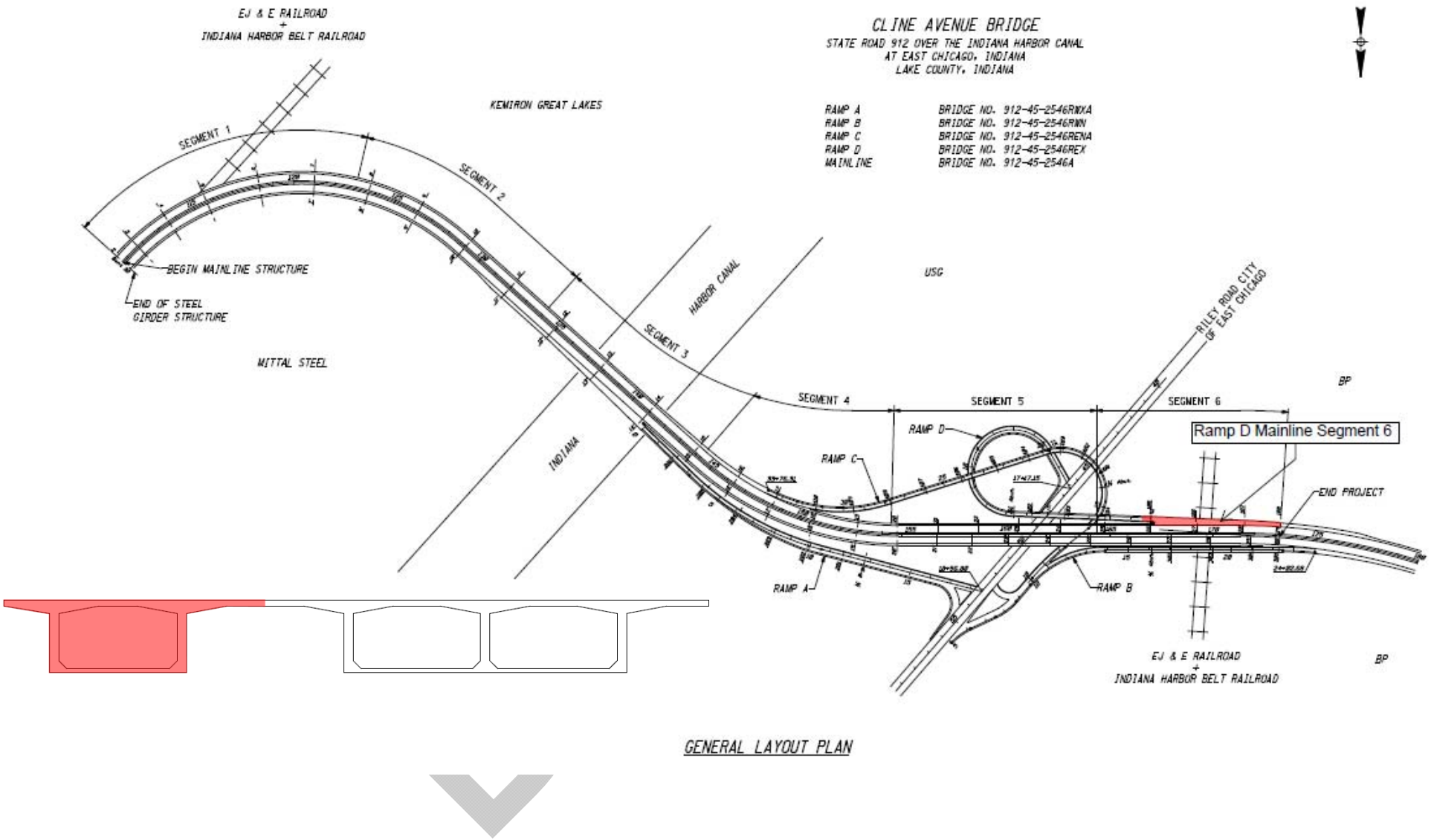

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Table 4.24b Rating Table—Ramp D Mainline Segment 6

			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)			41.04	53.64	51.38		

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

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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	2.45	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)			23.04	25.20	21.63		

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

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1.3 Design Criteria

Load Rating Analysis
Structural Load Rating Criteria

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

Prepared by:

URS

OCTOBER, 2009
Revision 3

REVISIONS

Project: Cline Avenue Bridge – Load Rating Analysis
SR 912 over Indiana Harbor Canal
East Chicago, Indiana

Document: Structural Load Rating Criteria

Revision	Date of Issue	Description
-	15 January 07	Draft Issue
-	20 February 07	Initial Issue
1	10 December 07	Added Legal Load and Permit Vehicles
2	04 March 09	Updated Criteria to Conform with Final Analysis of Pristine Structure
3	15 October 09	Updated for ITR Comments

Cline Avenue Bridge – Load Rating Analysis
Structural Load Rating Criteria

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5. SUMMARY

1. GENERAL REQUIREMENTS

1.1 Introduction

This Load Rating Criteria defines how the structural integrity of the bridge shall be evaluated for the effects of design vehicles. The live load effect is compared to the structural capacity available beyond dead load effects for the three following criteria:

1. Longitudinal Moment
2. Longitudinal Shear and Torsion
3. Transverse Moment

1.2 Codes, Standards and Specifications

1.2.1 AASHTO LRFD Bridge Design Specifications - Customary Metric Units, Fourth Edition, 2007.

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

1.2.3 AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges, Second Edition, 1999.

1.2.4 AASHTO Guide Specifications - Thermal Effects in Concrete Bridge Superstructures, 1989.

1.2.5 CEB/FIP Model Code for Concrete Structures, 1978 (for time dependent behavior of concrete - creep and shrinkage).

1.2.6 AASHTO/AWS Bridge Welding Code D1.5M/D1.5.

1.2.7 Indiana DOT Design Manual, updated September 7, 2005, including all design memorandums.

1.3 Units and Dimensions:

1.3.1 All dimensions shall be denoted in US Customary units

1.3.2 Structural proportions shall be considered from those dimensions shown on the as-built structural plans, except as noted otherwise. As-built plan dimensions are assumed horizontal and are for the structure at 60 degree F.

2. RATING SUMMARY

2.1 Introduction

The load rating analysis shall be performed to meet Indiana Department of Transportation requirements and shall also to serve as reference for the bridge load carrying capacities. The rating factors will be derived for the effects of design vehicles and also for the actual condition of the bridge including compensations for redundancy

and section loss. The initial load rating report summarizes the load rating analysis assuming the bridge is in pristine condition. Section losses related to the loss of reinforcement area or post-tensioning tendon area due to corrosion will be input based upon corrosion studies and recommendations will be the subject of further study.

Evaluations will be 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 "Guide Manual for Condition Evaluation for Load and Resistance Factor Rating (LRFR) of Highway Bridges" specification from 2003, with 2005 Interim Revisions, shall be used. The intent of LRFR is to provide the same methodology consistent with LRFD, but based on target reliabilities that are different from those used in the design. This document provides further guidance to the LRFR manual for segmental bridge types.

Comparisons of the structure deflected shape versus survey data are made in the inspection reports.

2.2 Inventory and Operating Rating Levels

The Inventory rating represents the load level at which a structure can be utilized for an indefinite period of time. This is also the design level. The Operating rating represents the absolute maximum permissible load level allowed on a bridge. Legal load trucks and permit load trucks are analyzed using this level. The Inventory and Operating ratings differ primarily by the use of different load factors at ultimate limits or different allowable stresses at service load limits. For service limit states in the longitudinal direction, the Operating rating is based on the number of loaded lanes per AASHTO LRFD.

To extend bridge durability, Inventory and Operating rating levels shall be checked for both Service and Strength Limit States. Table 2.2.1 and Table 2.2.2, respectively, show the allowable stresses and the load factors.

Five features of concrete segmental bridges are to be rated at both Inventory and Operating, as follows:

At Service Limit State
- Longitudinal Box Girder Flexure
- Principal Web Tension

At Strength Limit State
- Longitudinal Box Girder Flexure
- Transverse Top Slab and Web Flexure
- Web Shear
- Transverse Web Bending with Web Shear

Table 2.2.1 Allowable Service Stresses for Rating of Concrete Segmental Bridges

At the Service Limit State after Losses	Stress Limit Inventory	Stress Limit Operating
Compression (longitudinal or transverse)	0.60·f'c	0.60·f'c
Longitudinal Tensile Stress in Precompressed Tensile Zone with minimum bonded prestressing tendons or auxiliary reinforcement.	0.0948·√f'c (ksi) 3·√f'c (psi)	0.240·√f'c (ksi) 7.5·√f'c (psi)
Transverse distribution of reinforcement.	Not checked (Paragraph 6.5.4.1 - LRFR.)	
Principal Tensile Stresses at Neutral Axis in Webs (Service III)	0.110·√f'c (ksi) 3.5·√f'c (psi)	0.126·√f'c (ksi) 4·√f'c (psi)

Table 2.2.2 - LRFR Load Factors for Segmental Bridges for Cline Avenue Project

			LRFD Dead and Permanent Loads			LRFD Transient Loads					Inventory			Operating									
											LRFD Design Loads		No. of Ld. Lanes = No. of Design Lanes per LRFD	LRFD Design Loads	InDOT Legal Loads			InDOT Permit Loads						
			DC	DW	EL including PT Sec.	FR	TU [1], CR, SH	Inventory	Operating		HL-93 or Tandem	No. of Ld. Lanes = No. of Design Lanes per LRFD		HL-93 or Tandem	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
								TG																
Longitudinal	Strength I	$\gamma L =$	1.25	1.50	1.00	1.00	0.50	0.00	0.00	$\gamma L =$	1.75	X	X	1.35										
Longitudinal	Strength II	$\gamma L =$	1.25	1.50	1.00	1.00	0.50	0.00	0.00	$\gamma L =$		X	X		1.65 [3]			1.40 [4]						
Longitudinal	Service I	$\gamma L =$	1.00	1.00	1.00	1.00	1.00	0.50	0.00	$\gamma L =$	1.00	X	X	1.00	1.00			1.00						
Longitudinal	Service III	$\gamma L =$	1.00	1.00	1.00	1.00	1.00	0.50	0.00	$\gamma L =$	0.80	X	X	0.80 [2]	0.80 [2]			0.80 [2]						
Transverse	Strength I	$\gamma L =$	1.25	1.50	1.00	n/a	n/a	n/a		$\gamma L =$	1.75	X	X	1.35	1.65 [3]			1.40 [4]						

The appropriate summary rating factors shall be the lowest rating factor of load case (1)-(2) for Inventory and load case (3)-(4), (5), (8)-(10) for Operating per Table 2.2.3 as follows.

(1) TU considered for Service I and Service III Design Inventory Only (per Recommendations from FDOT Modifications to LRFR Table 6-1)
(2) Factor Based on Recommendations per FDOT Modifications to LRFR Table 6-1
(3) Based on AASHTO LRFR Table 6-5 with ADTT = 1000
(4) Based on AASHTO LRFR Table 6-5 with ADTT = 100

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Table 2.2.3 – Load Combinations for LRFR

				Inventory		Operating					
				LRFD Design Loads		LRFD Design Loads		InDOT Legal Loads	InDOT Permit Loads		
				HL-93 or Tandem		HL-93 or Tandem		R1, R2 or R3	R4, R5, S1 thru S5		
			Load Combination (LC) No.:	**#1**	**#2**	**#3**	**#4**	**#5**	**#8**	**#9**	**#10**
Longitudinal	All regions, all Spans.	HL93 Design Truck or Tandem plus 0.64 k/lf uniform lane load in All Load Lanes (except Permit Lane for LC #9)	LRFD 3.6.1.2 LRFR 6.4.3	X		X				X	
		InDOT Legal Loads - one R1, R2 or R3 in each load lane plus 0.64 k/lf uniform lane load simultaneously and not interrupted by space occupied by the trucks..	InDOT – Cline Ave.					X			
		One InDOT Permit Vehicle (R4, R5, S1 thru S5) in one load lane plus 0.64 k/lf uniform lane load simultaneously and not interrupted by the space occupied by the trucks. The remainder of loaded lanes contains the force extreme effect from HL-93, with the position of the permit load varying across the roadway width.	InDOT - Cline Ave. LRFR 6.4.5.4						X		
	Negative moment regions, all spans.	90% of Two HL93 Design Trucks in same lane spaced at 50 ft minimum plus 90% of 0.64 k/lf uniform lane load	LRFD 3.6.1.3.1		X		X				X
Transverse or Local Details	All regions, all Spans.	HL93 Design Truck or Tandem Only (one per lane) (no uniform lane load) in All Load Lanes (except Permit Lane for LC #9)	LRFD 3.6.1.2 LRFR 6.4.3	X		X				X	
		InDOT Legal Loads - one R1, R2 or R3 in each load	InDOT – Cline Ave.					X			
		One InDOT R4, R5, or S1 thru S5 Permit Vehicle in one load lane. The remainder of loaded lanes contains the force extreme effect from HL-93 (no uniform lane load), with the position of the permit load varying across the roadway width.	InDOT LRFR 6.4.5.4						X		

Notes:

Apply Dynamic Load Allowance, IM, of 33% to Vehicle and Axle Loads only

Permit Load Rating for mixed traffic is (#8 + #9) or (#8 + #10).

2.3 GENERAL LOAD RATING EQUATION

In accordance with AASHTO LRFR Equation 6-1, the general Load Rating Factor, RF, should be determined according to the formula:

$$RF = \frac{C - \gamma_{DC} DC - \gamma_{DW} DW \pm \gamma_{EL}(P + EL) - \gamma_{FR} FR - \gamma_{CR}(TU + CR + SH) - \gamma_{TG} TG}{\gamma_L (LL + IM)}$$

Where:

For Strength Limit States:

C = Capacity = $(\phi_c \times \phi_s \times \phi)$ Rn
ϕ_c = Condition Factor
ϕ_s = System Factor
ϕ = Strength Reduction Factor per LRFD
Rn = Nominal member resistance as inspected, measured and calculated according to formulae in LRFD

For Service Limit States:

C = f_R = Allowable stress at the Service Limit State (Table 2.2.1).

Allowable stress levels have been established in order to limit cracking and protect the integrity of corrosion protection afforded post-tensioning tendons.

Load Effects and Nomenclature per LRFD / LRFR:

DC = Dead load of structural components (includes barriers if accurately known).
DW = Dead load of permanent superimposed loads such as wearing surface and utilities (applies to barriers when weight is not accurately known).
P = Permanent effects other than dead load (LRFR), including prestress.
EL = Permanent effects of erection forces (e.g. from erection equipment, changes in statical scheme) and includes secondary effects of post-tensioning.
FR = Forces from fixed bearings, bearing friction or frame action, otherwise zero.
TU = Uniform temperature effects from fixed bearings or frame action, otherwise zero.
CR = Creep.
SH = Shrinkage.
TG = Thermal gradient.
LL = Live load.
IM = Dynamic Load Allowance (Impact).
γ_{DC} = Load factor for structural components.
γ_{DW} = Load factor for permanent superimposed dead loads.
γ_{EL} = Load factor for secondary PT effects and locked-in erection loads.
γ_{FR} = Load factor for bearing friction or frame action.
γ_{CR} = Load factor for uniform temperature, creep and shrinkage.
γ_{TG} = Load factor for thermal gradient.
γ_L = Live load factor.

Capacity factors (Condition, System) will not be used for Service Limit States.

2.4 Condition Factors (To be determined - Subject of further study):

The condition factor will be estimated from Table 2.4.1. These are the same condition factors indicated in LRFR Table 6.4.2.3-1. Condition factors used in the load rating analysis will be derived from the inspection report.

Table 2.4.1 - LRFR Condition Factors Related to NBI Rating

Structural Condition of Member	NBI Rating	Condition Factor (ϕ_c)
Good or Satisfactory	> 6	1.00
Fair	5	0.95
Poor	< 4	0.85

Section losses of reinforcing bars and post-tensioning shall be accounted for in the load rating analysis. Section losses used will be derived from the inspection report.

2.5 System Factors:

The System Factor *(ϕ_s)* is related to the degree of redundancy in the total structural system. In LRFR, bridge redundancy is defined as the capability of a structural system to carry loads after damage or failure of one or more of its members. LRFR recognizes that structural members of a bridge do not behave independently, but interact with one another to form one structural system.

The System Factor *(ϕ_s)* will be derived following the data presented in Table 2.5.1.

Table 2.5.1 - LRFR System Factors for Longitudinal Flexure (Strength Limits Only)

			System Factors			
Bridge Type	Span Type	# of Hinges to Failure	No. of Tendons per Web			
			1/web	2/web	3/web	4/web
Cast-In-Place	Interior Span	3	0.90	1.05	1.15	1.20
	End or Hinge Span	2	0.85	1.00	1.10	1.15
	Statically Determinate	1	n/a	0.90	1.00	1.10

The System Factor *(ϕ_s)* for transverse flexure shall be $\phi_s = 1.00$.

2.6 Reinforced Concrete Members:

Reinforced concrete members shall be evaluated by the strength design method and will not be checked for distribution of reinforcement (LRFR Article 6.5.4.1).

2.7 Local Details (To be determined - Subject of further study):

2.4.1 If local details such as diaphragms, anchorage zones, blisters, deviation saddles are showing signs of distress, they will be evaluated at the Strength I Limit State and will be given a capacity versus demand ratio.

2.4.2 Strut and Tie modeling shall comply with AASHTO LRFD Specifications Article 5.6.3 and will be used to evaluate local details.

2.8 Principal Tensile Stress – Service Limit State:

A check of the principal tensile stress verifies the adequacy of webs for longitudinal shear at service. The verification, made at the neutral axis, is the recommended minimum prescribed procedure, as follows:

Sections shall be considered only at locations greater than "H/2" from the edge of the bearing surface or face of diaphragm, where classical beam theory applies: i.e. away from discontinuity regions. In general, verification at the elevation of the neutral axis may be made without regard to any local transverse flexural stress in the web itself 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. However, should the neutral axis lie in a part of the web locally thickened by fillets, then the check should be made at the most critical elevation, taking into account any coexistent longitudinal flexural stress. Also, if the neutral axis (or critical elevation) lies within 1 duct diameter of the top or bottom of an internal, grouted duct, the web width for calculating stresses should be reduced by half the duct diameter.

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

Classical beam theory and Mohr's circle for stress shall be used to determine shear and principal tensile stresses. At the Service Limit State, the shear stress and Principal Tensile Stress shall be 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, $\gamma_L = 1.00$. The live load shall then be increased in magnitude so that the shear stress in the highest loaded web increases until the Principal Tensile Stress reaches its allowable maximum value (Table 2.2.1).

The Rating Factor at the Service Limit State is the ratio between the live load shear stress required to induce the maximum Principal Tensile Stress to that induced by a live load factor of 1.00.

2.9 Shear, Torsion, and Flexure for Negative Moment Regions – Ultimate Limit State:

Shear capacity shall be determined in accordance with the General Procedure outlined in the AASHTO LRFD Specifications Article 5.8.3.4.2.

2.10 Structural Steel Members: (Not Applicable)

2.11 Substructure Elements: (Will not be Load Rated)

2.11 Bearings: (Will not be Load Rated)

2.12 Expansion Joints: (Will not be Load Rated)

3. DESIGN LOADINGS

3.1 Dead Loads:

3.1.1	Post-tensioned Concrete	156 lbs/ft^3
3.1.2	Normal Weight Reinforced Concrete	150 lbs/ft^3
3.1.3	Structural Steel	490 lbs/ft^3
3.1.3	Overlay Wearing Surface	25 lbs/ft^2
3.1.4	Barrier, Traffic Railing	450 lbs/ft
3.1.5	Barrier, Median	530 lbs/ft
3.1.6	Soil, Compacted	125 lbs/ft^3
3.1.7	Bridge Supported Drainage Pipes	65 lbs/ft

3.2 Live Loads:

Apply LRFD live load HL93 Design Truck or Tandem plus 0.64 kip/ ft. uniform lane load. In addition, the following Legal Loads and Permit Loads shall be rated:

Per Figure 3.2.1 and 3.2.2, respectively:

R1 - Legal Load - Toll Road Loading No. 1 (W = 90 k)
R2 - Legal Load - Toll Road Loading No. 2 (W = 90 k)
R3 - Legal Load - Special Toll Road Truck (W = 126 k)
R4 - Permit Load - Michigan Truck Train No. 5 (W = 134 k)
R5 - Permit Load - Michigan Truck Train No. 8 (W = 134.2 k)

S1 - Permit Load - Special Truck 11 Axle Loading (W = 258 k)
S2 - Permit Load - Special Truck 13 Axle Loading (W = 267 k)
S3 - Permit Load - Special Truck 14 Axle Loading (W = 350 k)
S4 - Permit Load - Superload 19 Axle Loading (1) (W = 305 k)
S5 - Permit Load - Superload 19 Axle Loading (2) (W = 480 k)

For all legal and permit trucks include a 0.64 k/lf uniform lane load simultaneously and not interrupted by space occupied by the trucks. The transverse wheel spacing and tire contact area used in the load rating evaluation are shown in Figure 3.2.3.

The application and spacing of longitudinal lanes for the HL93 Design Load (Inventory and Operating), the Legal Loads (Operating), and the Permit Loads (Operating) are

shown in Figure 3.2.4. Further discussion of this topic is continued in Section 3.10 – Load Combinations.

3.3 Thermal Loads:

3.3.1	Mean Temperature:	+60 degree F
	Temperature Rise	+45 degree F
	Temperature Fall	-40 degree F
3.3.2	Coefficient of Thermal Expansion:	6.0×10^{-6} per degree F

3.3.3 Temperature Gradient (TG):

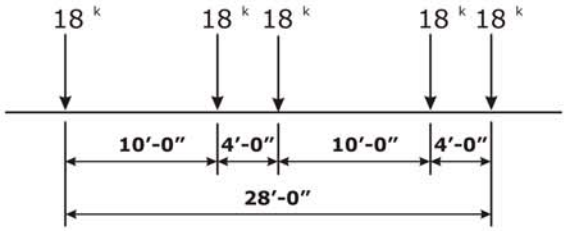
Thermal Forces (Longitudinal):

Non-Linear temperature gradient is based on LRFD Article 3.12.3, using a plain concrete surface for solar radiation Zone 3.

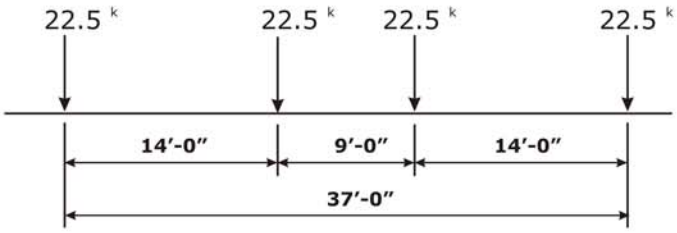
T1 = 41 Degree F and T2 = 11 Degree F
T3 is taken as 0 degree F

Thermal Forces (Transverse)- Not Considered:

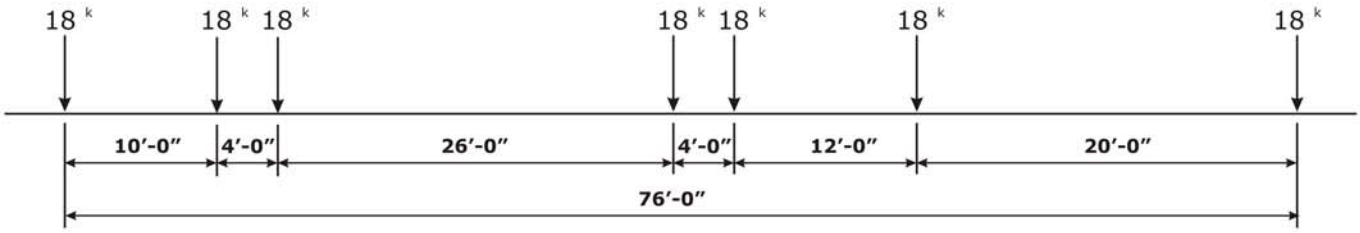
Figure 3.2.1 - InDOT Overload Legal Load and Permit Trucks (R1 thru R5) (Longitudinal Axle Loads and Spacing)



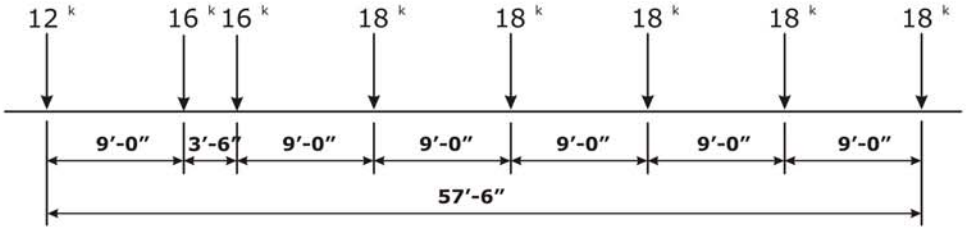
R1 - TOLL ROAD LOADING NO. 1 (W = 90 k)



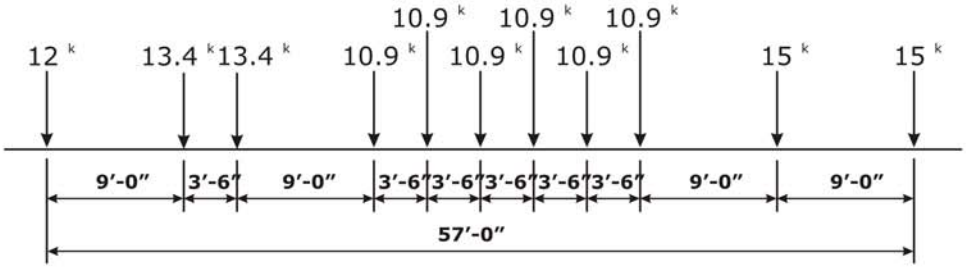
R2 - TOLL ROAD LOADING NO. 2 (W = 90 k)



R3 - SPECIAL TOLL ROAD TRUCK (W = 126 k)

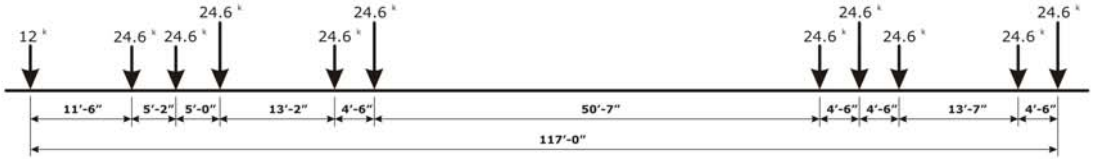


R4 - MICHIGAN TRUCK TRAIN NO. 5 (W = 134 k)

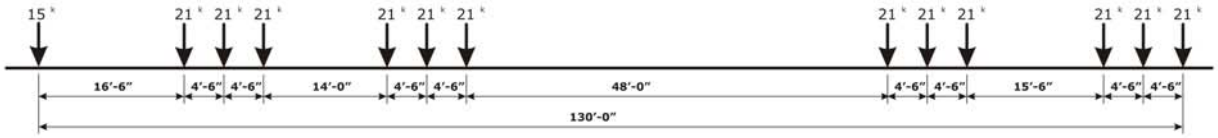


R5 - MICHIGAN TRUCK TRAIN NO. 8 (W = 134.2 k)

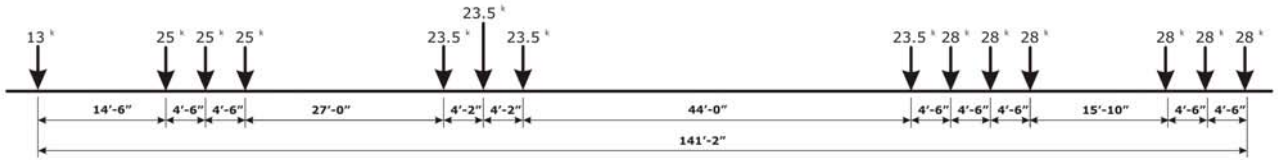
Figure 3.2.2 Special InDOT Permit Trucks (S1 thru S5) (Longitudinal Axle Loads and Spacing)



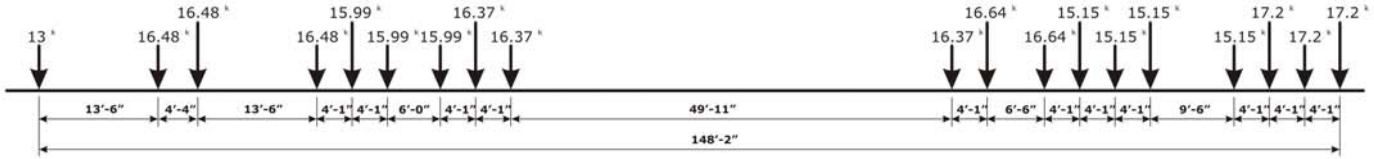
S1 - SPECIAL TRUCK 11 AXLE (W = 258 k)



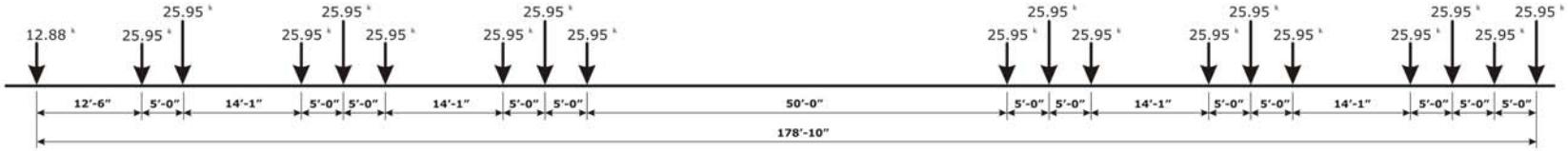
S2 - SPECIAL TRUCK 13 AXLE (W = 267 k)



S3 - SPECIAL TRUCK 14 AXLE (W = 350 k)



S4 - SUPERLOAD 19 AXLE (W = 305 k)



S5 - SUPERLOAD 19 AXLE (W =480 k)

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Figure 3.2.3 Wheel Spacing and Contact Tire Area (LRFD Section 3.6.1.2)

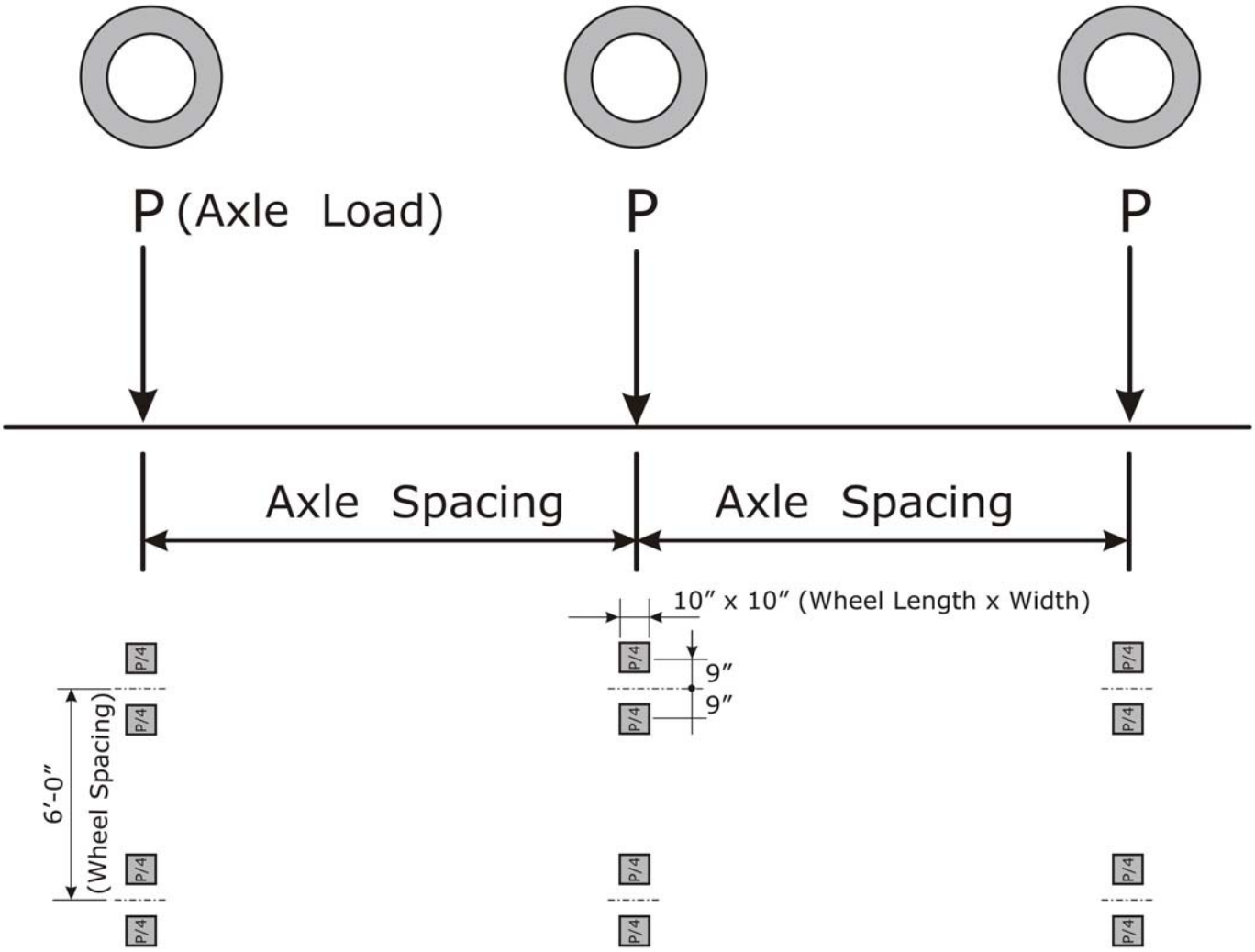
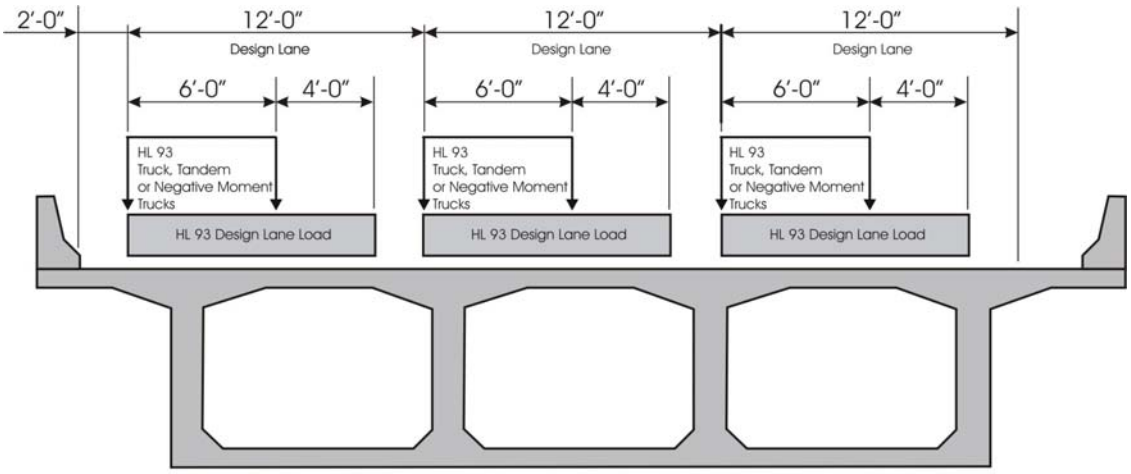
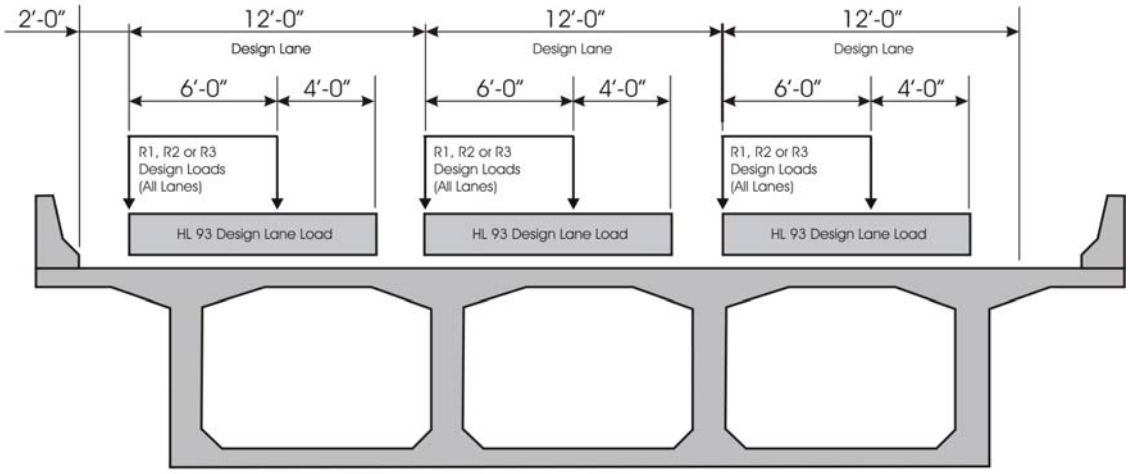


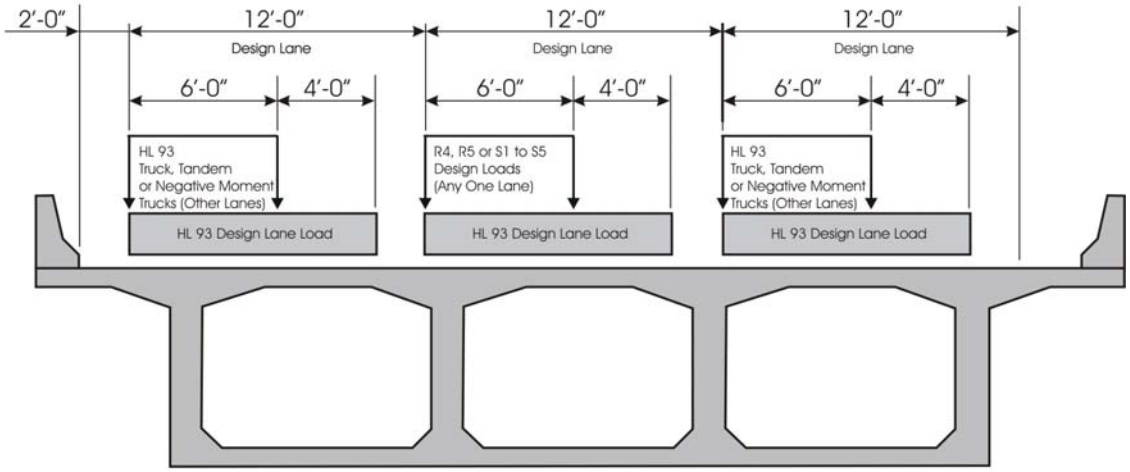
Figure 3.2.4 Application and Spacing for Design, Legal and Permit Loads



Operating and Inventory Ratings - Design Load (HL 93)



Operating Rating - InDOT Legal Loads R1, R2 and R3



Operating Rating - InDOT Permit Loads R4, R5 and S1 thru S5

3.4 Creep and Shrinkage:

3.4.1 Strains are calculated in accordance with CEB/FIP Model Code for Concrete Structures, 1978.

3.4.2 Relative Humidity: 74%

3.4.3 Permanent effects of creep and shrinkage shall be added to all AASHTO loading combinations with a load factor of 1.0.

3.5 Construction Equipment Loads and Locked-In Stresses:

Construction method and sequence shall be based on those shown on the design plans.

3.6 Wind Loads: (Not Considered in Load Rating)

3.7 Vessel Impact Loads: (Not Considered in Load Rating)

3.8 Seismic Loads: (Not Considered in Load Rating)

3.9 Differential Support Settlement: (Not Considered in Load Rating)

3.10 Load Combinations:

Load factors and load combinations for the Strength and Service Limit States should be made in accordance with Table 2.2.2, "Load Factors for Segmental Bridges". Table 2.2.2 is separated horizontally into longitudinal and transverse requirements and vertically into Inventory or Operating conditions. Load factors for permanent (e.g. dead) loads and transient (e.g. temperature) loads are provided. Note: Half thermal gradient (0.5TG) is used only for longitudinal Service Inventory conditions.

Altogether, load combinations (Table 2.2.3) are given for ten basic cases, labeled "#1" through "#10" (cases #6 and #7 omitted), which are necessary to satisfy InDOT and AASHTO LRFR. The first two (#1 through #2) are for Inventory (HL93 Design) conditions. Load cases#3 through #4 are for Operating conditions using HL93 Design loads. Load case #5 addresses InDOT Legal Load and load cases #8 through #10 Permit Load Vehicles which are combined with HL93.

STRENGTH I and II and SERVICE I and III conditions are applied as follows:

STRENGTH I - Apply to Inventory and Operating conditions for HL93 Design loads.

STRENGTH II – Applied only to InDOT Legal Loads and Permit Loads.

SERVICE I - Applies to longitudinal compression checks in prestressed components. Also applies to the concrete tensile checks in the transverse direction of post-tensioned decks. Since the Cline Avenue bridge decks are reinforced only with mild steel and do not utilize post-tensioning, Service I is not checked for the deck slabs.

SERVICE III- Applies to concrete longitudinal tension and concrete principal tension.

The following is a detailed checklist of the load applications, combinations and circumstances that will be necessary to satisfy the ratings performed for this project.

Inventory Rating - Design Load (HL93)

Transverse:

- Apply HL93 Design Truck or Tandem. *(Table 2.2.3, Load Combination #1)*
- Do not apply uniform lane load.
- Apply same axle loads in each lane.
- Apply Dynamic Load Allowance, IM = 1.33 on Design Truck or Tandem.
- For both Strength and Service Limit States, used number of load lanes per LRFD.
- Apply multi-presence factor: one lane, m =1.20; two lanes, m = 1.00; three, m = 0.85; four or more, m = 0.65. (Maximum value of m = 1.20 is the appropriate AASHTO LRFD/LRFR current criteria to allow for rogue vehicles).
- Place loads in full available width as necessary to create maximum effects
- Apply no Thermal Gradient transversely.
- For STRENGTH I Limit State use AASHTO design trucks with live load factor, γ_L = 1.75.

Longitudinal (see Figure 3.10.1):

- Apply HL93 Design Truck or Tandem, including 0.64 kip/ft uniform lane load. *(Table 2.2.3, Load Combination #1)*
- Apply same load in each lane.
- Apply Dynamic Load Allowance, IM = 1.33 on Design Truck or Tandem only.
- For both Strength and Service Limit States, use number of load lanes per LRFD.
- Apply multi-presence factor: one lane, m =1.2; two lanes, m = 1.00; three, m = 0.85; four or more, m = 0.65. (Maximum value of m = 1.20 is the appropriate AASHTO LRFD/LRFR current criteria for notional loads and rogue vehicles).
- For negative moment regions: Apply 90% of the effect of two HL93 Design Trucks spaced a minimum of 50 feet apart between the leading axle of one and the trailing axle of the other, plus 90% of uniform lane load.
- Place loads in full available width as necessary to create maximum effects
- For Thermal Gradient, apply 0.50TG with live load for Service but zero TG for Strength.
- Use SERVICE III Limit State with live load factor, γ_L = 0.80, used for Principal Tensile Stress check.
- For SERVICE III Limit State, limit concrete Longitudinal Flexure Tensile Stress to values in Table 2.2.1 as appropriate.
- For SERVICE III Limit State, limit Principal Tensile Stress at the neutral axis to $0.110\sqrt{fc}$ (psi).
- Use SERVICE I Limit State with live load factor, γ_L = 1.00 and limited concrete longitudinal flexural compressive stresses to values in Table 2.2.1.
- For STRENGTH I Limit State use AASHTO design trucks with live load factor. γ_L = 1.75.

Operating Rating - Design Load (HL93)

Transverse:

- Apply one HL93 Design Truck or Tandem per lane. *(Table 2.2.3, Load Combination #3)*

- Do not apply uniform lane load.
- Apply same axle loads in each lane.
- Apply Dynamic Load Allowance, IM = 1.33 on Design Truck or Tandem.
- For both Strength Limit States, use number of load lanes per LRFD.
- Apply multi-presence factor: one lane, m =1.20; two lanes, m = 1.00; three, m = 0.85; four or more, m = 0.65. (Maximum value of m = 1.20 is the appropriate AASHTO LRFD/LRFR current criteria to allow for rogue vehicles).
- Place loads in full available width as necessary to create maximum effects
- Do not apply Thermal Gradient transversely.
- For STRENGTH I Limit State use live load factor, γ_L = 1.35.

Longitudinal (see Figure 3.10.1):

- Apply HL93 Design Truck or Tandem, including 0.64 kip/ft uniform lane load. *(Table 2.2.3, Load Combination #3)*
- Apply same load in each lane.
- Apply Dynamic Load Allowance, IM = 1.33 on Design Truck or Tandem only.
- For the Strength Limit State, use number of load lanes per LRFD.
- For the Service Limit State , use number of load lanes per LRFD.
- Place loads in full available width as necessary to create maximum effects (for example, in shoulders).
- Multi-presence factor: HL93 Design Load (including uniform lane load) one lane, m=1.20; two lanes, m = 1.00; three, m = 0.85; four or more, m = 0.65. (The maximum value of 1.20 for one lane is necessary because the load is a notional load with a uniform lane load component).
- For negative moment regions, Apply 90% of the effect of two HL93 Design Trucks each spaced a minimum of 50 feet apart between the leading axle of one and the trailing axle of the other, plus 90% of 0.64 kip/LF uniform lane.
- Do not apply Thermal Gradient.
- Use SERVICE III Limit State with live load factor, γ_L = 0.80 and limit concrete principal tensile stresses to values in Table 2.2.1.
- Use SERVICE III Limit State with live load factor, γ_L = 0.80 and limit concrete longitudinal flexural tensile stress to values in Table 2.2.1.
- For STRENGTH I Limit State use live load factor, γ_L = 1.35.

Operating Rating – InDOT Legal Loads

Transverse:

- Apply InDOT Legal Load Trucks *R1, R2 and R3 (Table 2.2.3, Load Combination #5).*
- Do not apply any uniform lane load.
- Apply same axle loads in each lane using only one truck per lane (i.e. do not mix Trucks).
- Apply Dynamic Load Allowance, IM = 1.33 on Legal Load trucks only.
- For both Strength and Service Limit States, use number of load lanes per LRFD.
- Apply multi-presence factor: one lane, m =1.2; two lanes, m =1.0; three lanes, m = 0.85; four or more lanes, m= 0.65.
- Place loads in full available width as necessary to create maximum effects.
- Do not apply Thermal Gradient transversely.

- For STRENGTH II Limit State use InDOT R1, R2, or R3 Trucks with live load factor, γ_L

=1.65.

Longitudinal:

- Apply InDOT Legal Load Trucks (Trucks R1, R2, or R3) *(Table 2.2.3, Load Combination #5).*
- Apply same Truck load in each lane using only one truck per lane (i.e. do not mix Trucks).
- Apply 0.64 k/ft uniform lane load simultaneously with legal load trucks and not interrupted by space occupied by the trucks.
- Apply Dynamic Load Allowance, IM = 1.33 on Legal Load trucks only.
- For the Strength Limit States, use number of load lanes per LRFD.
- For Service Limit States, use number of load lanes per LRFD.
- Place loads in full available width as necessary to create maximum effects (for example, in shoulders).
- Use multi-presence factor: one lane, m = 1.20, two lanes, m = 1.00; three lanes, m = 0.85; four or more lanes, m= 0.65. (Maximum limit of 1.0 applies because loads are specific (defined) truck loads, not notional loads or rogue vehicles).
- Do not apply Thermal Gradient.
- Use SERVICE III Limit State with live load factor, γ_L = 0.80 and limit concrete longitudinal flexural tensile and principal tensile stresses to values in Table 2.2.1 as appropriate. (Note: use of γ_L = 0.80 is appropriate because reduced reliability for large boxes is attained through the use of the number of LRFD lanes. At Operating, although no increase in allowable tensile stress (i.e. zero) can be allowed in precast joints, an increase is allowed from 3 to 7.5√f'c (psi) in reinforced joints and the Principal Tensile Stress at the neutral axis is raised to 4√f'c (psi) to attain the benefit of reduced reliability per Table2.2.1)
- Use SERVICE I Limit State with live load factor, γL = 1.00 and limit concrete longitudinal flexural compressive stress to values in Table 2.2.1. (Note: γL = 1.00 AASHTO LRFR).

Operating Rating – InDOT Permit Loads

Transverse:

- Apply one InDOT Permit Vehicle (Trucks *R4, R5, or S1 thru S5*) in one load lane *(Table 2.2.3, load combination #8 or #9)*.
- Apply HL93 Design Truck or Tandem axles only in each of the other load lanes as necessary to create maximum effects *(Table 2.2.3, load combination #8 or #9)*.
- Do not apply any uniform lane load.
- Apply Dynamic Load Allowance, IM = 1.33 on Permit Vehicle, HL93 Design Truck or Tandem only.
- Do not mix Permit Loads with Legal Loads.
- For both Strength and Service Limit States, used number of load lanes per LRFD.
- Apply multi-presence factor: one and two lanes, m =1.0; three, m = 0.85; four or more, m = 0.65. (Maximum limit of 1.0 applies because this is a rating for specific (defined) axle loads, not notional loads or rogue vehicles).
- Place loads in full available width as necessary to create maximum effects.
- Do not apply Thermal Gradient transversely.
- A reduced Dynamic Load Allowance (IM) or live load factor (γL) may be considered only to avoid restrictions.

- For STRENGTH II Limit State use InDOT permit trucks with live load factor, γ_L = 1.40.

Longitudinal (see Figure 3.10.1):

- Apply one InDOT Permit Vehicle (Trucks *R4, R5, or S1 thru S5*) in one load lane *(Table 2.2.3 Load Combinations #8)*.
- Apply 0.64 k/ft uniform lane load simultaneously with Permit Vehicles and not interrupted by space occupied by the trucks.
- Apply HL93 Design Truck or Tandem, including 0.64 k/ft uniform lane in each of the other load lanes as necessary to create maximum effects. *(Table 2.2.3, Load Combination #9, combine #8 with #9)*.
- Alternatively, for negative moment regions: in conjunction with the Permit Vehicle in its lane, apply to the other lanes 90% of the effect of two HL93 Design Trucks each spaced a minimum of 50 feet apart between the leading axle of one and the trailing axle of the other, plus 90% of 0.64 kip/LF uniform lane load. *(Table 2.2.3, Load Combination #10, combine #8 with #10).*
- For the Strength Limit State for Permit Vehicles R4 and R5, use number of load lanes per LRFD.
- For the Strength Limit State for Permit Vehicles S1 thru S5, use number of load lanes per LRFD.
- For Service Limit States for all Permit Vehicles, use number of load lanes per LRFD.
- Place loads in full available width as necessary to create maximum effects (for example, in shoulders).
- Use multi-presence factor: one and two lanes, m = 1.00; three, m = 0.85; four or more, m = 0.65. (Maximum limit of 1.0 applies because loads are specific (defined) Permit loads, not notional loads or rogue vehicles).
- Dynamic Load Allowance, IM = 1.33 on Permit Vehicles, HL93 Design Truck or Tandem only.
- Do not apply Thermal Gradient for Strength Limit State.
- Use SERVICE III Limit State with live load factor, γ_L = 0.80 and limit concrete principal tensile stresses to values in Table 2.2.1.
- Use SERVICE III Limit State with live load factor, γL = 0.80 and limited concrete longitudinal flexural tensile stress to values in Table 2.2.1.
- For STRENGTH II Limit State, used live load factor, γL = 1.40.

4. MATERIALS

4.1 Concrete:

4.1.1 All concrete properties shall be in accordance with specified 28 day compressive strength (f'_c) as follows:

Element	f'_c
C.I.P. Box Girder Elements (Mainline)	5.0 ksi
C.I.P. Box Girder Elements (Ramps)	5.5 ksi

4.2 Reinforcing Steel:

4.2.1 Reinforcing steel is assumed to conform to ASTM A615, Grade 60 unless otherwise

required.

4.2.2 Minimum concrete cover for reinforcing steel:

a. Superstructure

Box Girders:	1-1/2 inch top of slab
	1 inch all other surfaces

b. Substructure

Columns and Pier Caps:	2 inch clear to spiral, ties or stirrups
Foundation Elements:	3 inch clear

4.3 Prestressing Steel

4.3.1 Prestressing Parameters for Strand:

All strands are assumed to conform to the requirements of ASTM A416 Grade 270 for low relaxation strands.

Post-Tensioning:

Material Properties / Parameters:	
Tensile Strength of Prestressing Strand: *(f_{pu})*	270 ksi
Yield Strength of Prestressing Strand: *(f_{py})*	243 ksi
Apparent modulus of elasticity:	28,500 ksi
Anchor Set:	3/8 in.
Friction Coefficient (μ):	
Internal tendons in metal ducts	0.25
Wobble Coefficient (k) (Internal Tendons):	0.0002/ft.
Allowable Stresses:	
Maximum jacking stress at anchorage:	0.80 f_{pu}
Maximum anchorage stress at anchorage immediately after anchorage:	0.70 f_{pu}
Max. anchorage stress at internal locations immediately after anchorage:	0.70 f_{pu}
Maximum jacking stress at anchorage:	0.80 f_{pu}

4.3.2 Prestressing Parameters for Bars:

Material Properties / Parameters:	
Tensile Strength of Prestressing Bars: *(f_{pu})*	150 ksi
Yield Strength of Prestressing Bars: *(f_{py})*	120 ksi
Modulus of Elasticity:	29,000 ksi
Maximum jacking stress:	0.80 f_{pu}
Maximum anchorage stress:	0.70 f_{pu}
Anchor Set:	1/16 in.
Friction Coefficient (μ):	0.30
Wobble Coefficient (k):	0.0002 / ft.
Allowable Stresses:	
Maximum jacking stress at anchorage:	0.80 f_{pu}
Maximum anchorage stress at anchorage	0.70 f_{pu}

immediately after anchorage:	
Max. anchorage stress at internal locations	0.70 f_{pu}
immediately after anchorage:	
Maximum jacking stress at anchorage:	0.80 f_{pu}

5. SUMMARY

Summary rating factors will be tabulated in the following table.

Table 5.1 - LRFR Rating Factors Summary Table

			Inventory			Operating										
			LRFD Design Loads		No. of Ld. Lanes = No. of Design Lanes per LRFD	LRFD Design Loads	InDOT Legal Loads			InDOT Permit Loads						
			HL-93 or Tandem	No. of Ld. Lanes = No. of Design Lanes per LRFD		HL-93 or Tandem	R1	R2	R3	R4	R5	S1	S2	S3	S4	S5
Longitudinal	Strength	Flexure	?	X	X	?	?	?	?	?	?	?	?	?	?	?
		Shear	?	X	X	?	?	?	?	?	?	?	?	?	?	?
	Service	Flexure	?	X	X	?	?	?	?	?	?	?	?	?	?	?
		Principle Stress	?	X	X	?	?	?	?	?	?	?	?	?	?	?
Transverse	Strength	Top Slab Centerline	?	X	X	?	?	?	?	?	?	?	?	?	?	?
		Top Slab Thickness Change	?			?	?	?	?	?	?	?	?	?	?	?
		Top Slab Webs & Cantilever	?			?	?	?	?	?	?	?	?	?	?	?
		Web Bending	?			?	?	?	?	?	?	?	?	?	?	?
Overall Minimum Rating Factor			?			?	?			?						

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1.4 Inspection Reports

BRIDGE INSPECTION REPORT

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

STATE OF INDIANA
DEPARTMENT OF TRANSPORTATION

OCTOBER 2006

URS

BRIDGE INSPECTION REPORT

CLINE AVENUE BRIDGE

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

MAINLINE	**BRIDGE NO. 912-45-2546A**
RAMP A	**BRIDGE NO. 912-45-2546RWXA**
RAMP B	**BRIDGE NO. 912-45-2546RWN**
RAMP C	**BRIDGE NO. 912-45-2546RENA**
RAMP D	**BRIDGE NO. 912-45-2546REX**

PREPARED FOR:

STATE OF INDIANA

DEPARTMENT OF TRANSPORTATION
OFFICE OF TECHNICAL SERVICES
BRIDGE INSPECTION SECTION

SEPTEMBER 2006

PREPARED BY:

URS

SENIOR INSPECTING ENGINEER — 10/20/2006 DATE
URS CORPORATION

FIELD INSPECTING ENGINEER — 10/20/2006 DATE
URS CORPORATION

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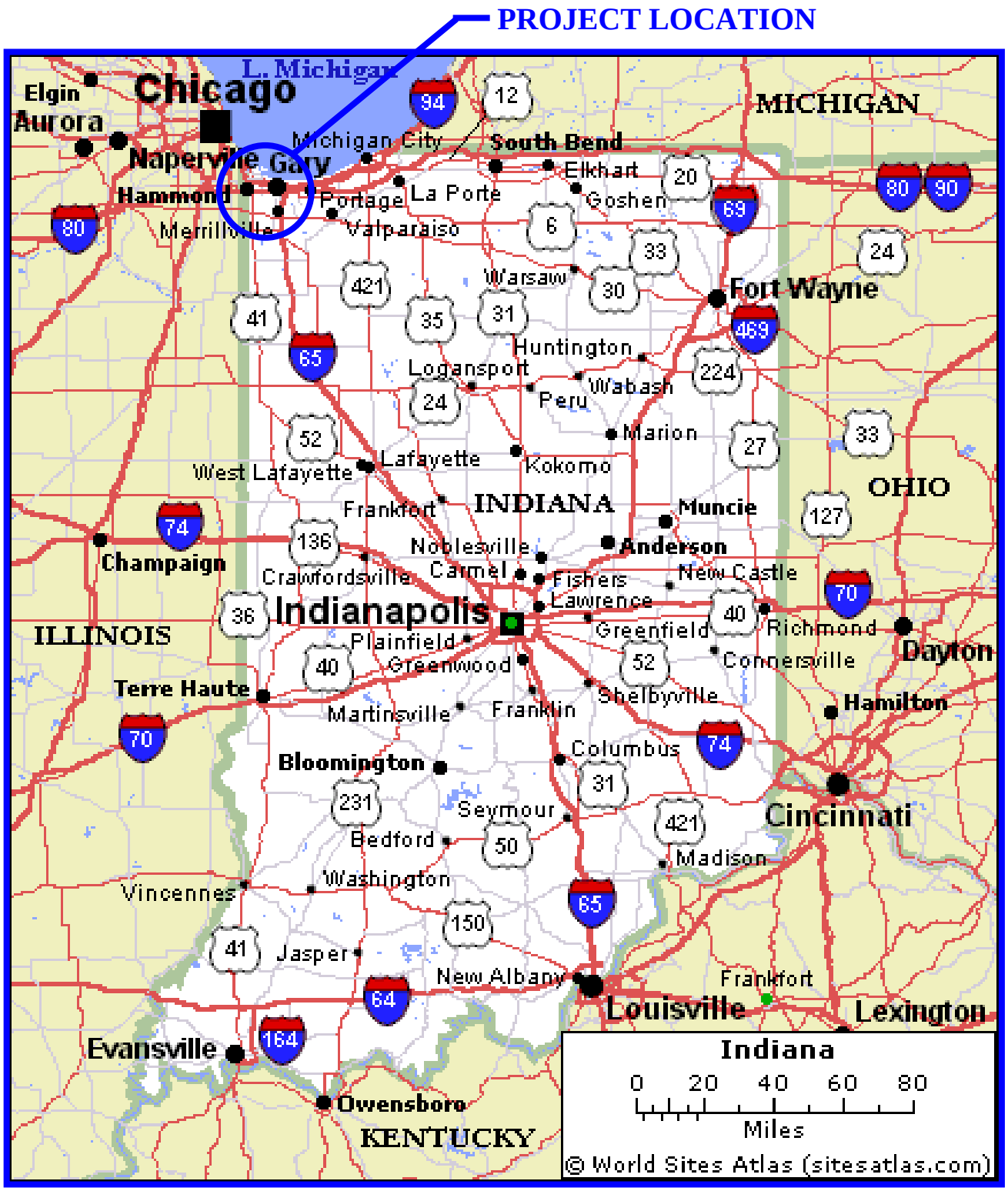
MISCELLANEOUS FILES

Folder 1 – "Hot-Spot" Crack and Substructure Photos
Folder 2 – Corrosion Testing Locations and Deck Photos
Folder 3 – General Photos, Confined Space Reports and VSL Daily Inspection Logs


PROJECT LOCATION
L. Michigan
Chicago
Elgin
Aurora
Naperville
Gary
Hammond
Merrillville
Michigan City
Portage
La Porte
Valparaiso
South Bend
Elkhart
Goshen
MICHIGAN
Warsaw
Fort Wayne
Huntington
Logansport
Wabash
Peru
Marion
Lafayette
West Lafayette
Kokomo
INDIANA
OHIO
Frankfort
Muncie
Anderson
Noblesville
Carmel
Fishers
Lawrence
New Castle
Crawfordsville
Champaign
Indianapolis
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Greenfield
Richmond
Dayton
Greenwood
Connersville
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Terre Haute
Martinsville
Franklin
Shelbyville
Hamilton
Columbus
Bloomington
Seymour
Cincinnati
Bedford
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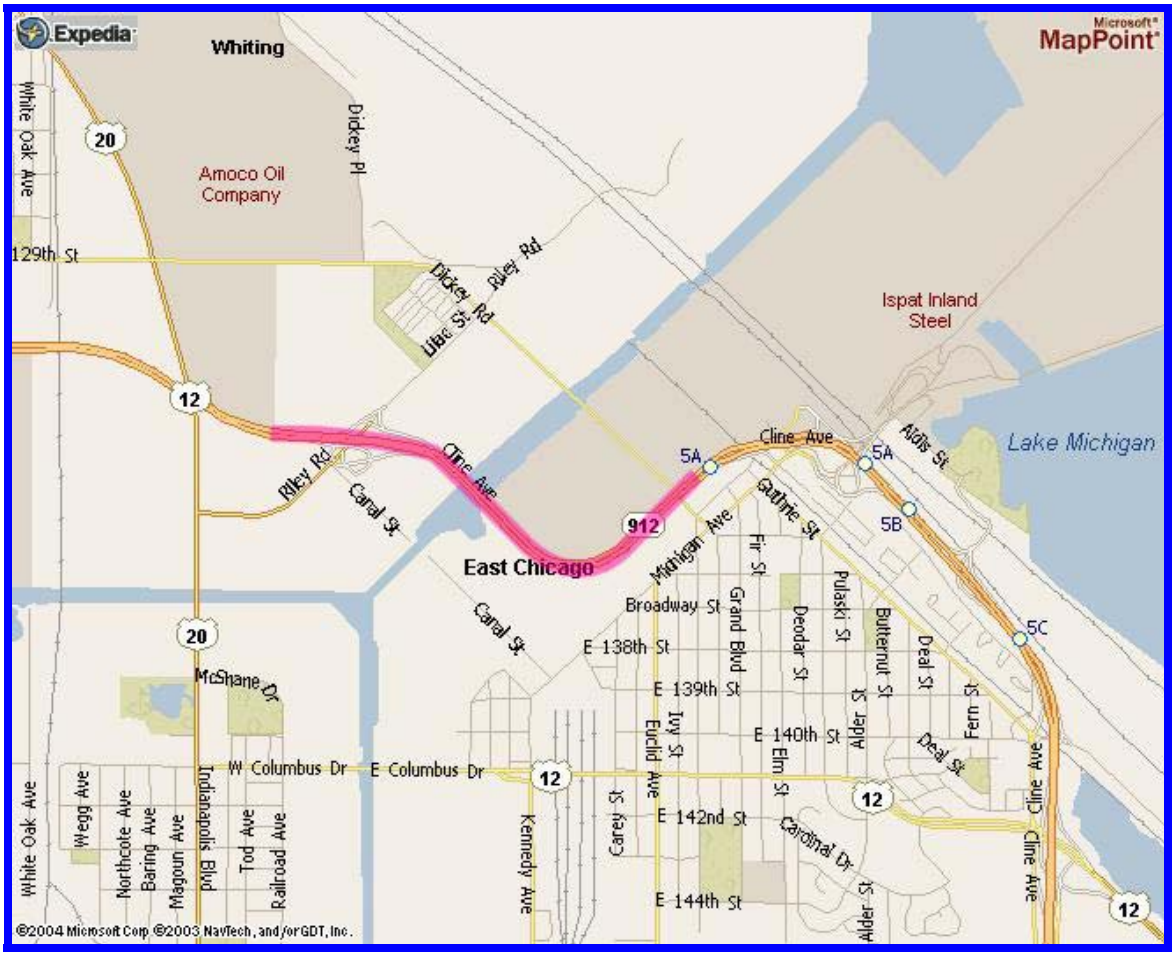
BRIDGE SITE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Aldis St
Guthrie St
Michigan Ave
Fir St
Broadway St
Grand Blvd
Deodar St
Pulaski St
Butternut St
Deal St
Fern St
E 138th St
E 139th St
E 140th St
E 142nd St
E 144th St
Ivy St
Euclid Ave
Elm St
Alder St
Carolina Dr
Carey St
Kennedy Ave
McShane Dr
W Columbus Dr
E Columbus Dr
Wegg Ave
Northcote Ave
Baring Ave
Magoun Ave
Indianapolis Blvd
Tod Ave
Railroad Ave
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5A
5B
5C
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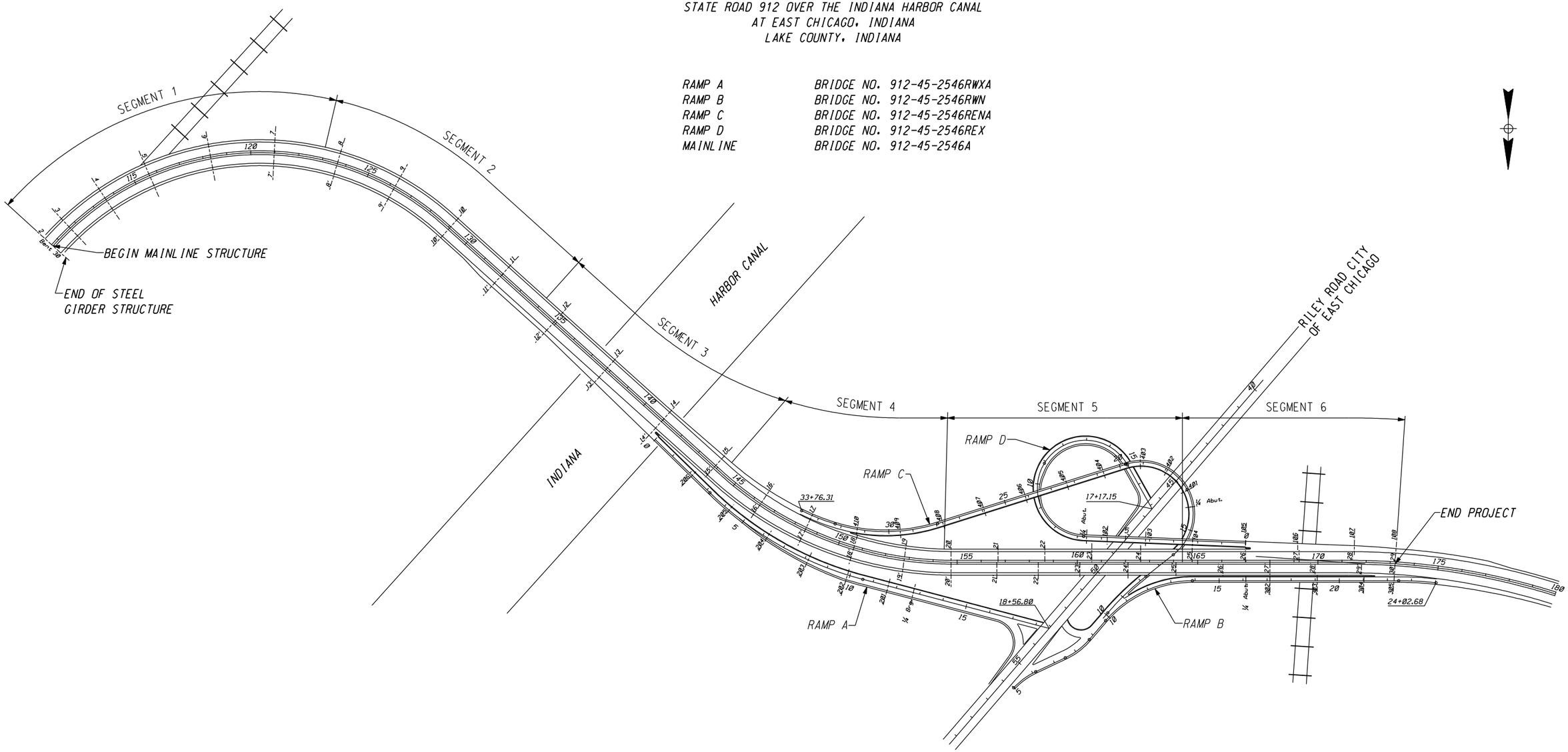
CLINE AVENUE BRIDGE

STATE ROAD 912 OVER THE INDIANA HARBOR CANAL
AT EAST CHICAGO, INDIANA
LAKE COUNTY, INDIANA

RAMP A	BRIDGE NO. 912-45-2546RWXA
RAMP B	BRIDGE NO. 912-45-2546RWN
RAMP C	BRIDGE NO. 912-45-2546RENA
RAMP D	BRIDGE NO. 912-45-2546REX
MAINLINE	BRIDGE NO. 912-45-2546A



GENERAL LAYOUT PLAN

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1.0 – INTRODUCTION

1.1 – GENERAL

In accordance with an agreement with the Indiana Department of Transportation, URS Corporation re-inspected the "Hot-Spot" locations and conducted localized testing and evaluation of areas that are of concern for the above referenced structures. The scope of the inspection is provided below.

URS subcontracted VStructural LLC (VSL) to open and close inspection holes, replace grout around tendons and provide post-tensioning expertise.

CTLGroup was subcontracted by VSL to map tendons at locations where corrosion testing was to be performed.

Intech Contracting, Inc. was subcontracted by URS to provide inspection access equipment, traffic control and other services needed to complete this project.

Russell Corrosion Consultants (RCC) was utilized by URS to provide corrosion analysis of the post-tensioning tendons and grout.

USI Consultants, Inc performed a deck elevation survey in accordance with their contractual agreement with URS.

This *Bridge Inspection Report*, prepared by URS adheres to the Scope of Work compiled by the Indiana Department of Transportation. This report includes all findings discovered during the field inspection.

1.2 – SCOPE OF WORK

- Prepare inspection drawings
- Perform (detailed) visual crack inspection
    - Re-inspect "Hot Spots" and document findings
    - Inspect exterior areas of superstructure on a limited basis
    - Document general condition of deck with photographs
    - Document obvious deficiencies in deck not found during 2004 inspection
    - Inspect areas where voids were found during the 2004 inspection
    - Inspect controlling locations as determined by 1999 and 2005 Load Ratings
    - Problem general deficiencies will be documented
    - Cracks not otherwise categorized will be documented
- Perform testing
    - Perform a walk through visual inspection to identify possible corrosion and document
    - Expose ducts in 20 locations throughout the structure
    - Expose some ducts in areas where previous inspections found voids
    - Expose couplers at 10 locations throughout the structure

    - Open ducts surrounding tendons to expose grout
    - Open coupler boots to expose grout around couplers
    - Perform in-situ testing at each location (temperature, humidity, PH level, etc.)
    - Remove grout to expose post-tensioning strands and couplers
    - Collect grout for laboratory testing
    - Corrosion test post-tensioning strands
    - Recover areas in accordance with approved guidelines
- Perform evaluations for testing
    - Review drawings and past reports
    - Compare current AASHTO specifications to AASHTO specifications at time of construction
    - Prepare work plan and relevant drawings for recording field data
    - Perform laboratory evaluation of samples
    - Develop specific inspection and testing plans for following inspections
- Perform detailed deck survey
- Inspect substructures and bearings
- Prepare analysis and reports
    - Structural analysis to be performed after findings evaluated from first inspection
    - Draft inspection report
        - Summary of inspection findings
        - Drawings of cracks, summary of cracks, description of other deterioration
        - Summary of deck elevation survey
        - Photographs
        - Summary of substructure and bearing inspection
        - Summary of confined space procedures
        - Recommendations for future inspections and testing
    - Final report and recommendations
        - Summary of quality control standards and procedures
        - Summary of inspection and testing findings
        - Discussion and summary of any structural analysis
        - Confined space entry requirements

2.0 – OVERVIEW

2.1 – PRE-INSPECTION MEETING

A pre-inspection meeting was held on Monday May 15, 2006. The meeting provided a forum to discuss and clarify the scope, schedule, safety concerns, goals and other pertinent aspects of the inspection by the stakeholders in this endeavor. Refer to Appendix A for the minutes of this meeting.

2.2 – INSPECTION PERSONNEL

The inspection was performed by URS Corporation with the assistance of several subconsultants/subcontractors. Primary inspection personnel consisted of:

2.2.1 – URS Corporation

- Dallas Montgomery, PE
  Qualified NBIS Team Leader who has completed NHI "Fracture Critical Inspection Techniques for Steel Bridges" course.
- Bill Curtis, PE
  Qualified NBIS Team Leader
- Craig Klusman, PE
  Qualified NBIS Team Leader who has completed NHI "Fracture Critical Inspection Techniques for Steel Bridges" course.
- Frank Sailer, PE
- Lewis Woodward

2.2.2 – Russell Corrosion Consultants (RCC)

- Siva Venugopalan
- David Dawson
- Zach Schley

2.2.3 – VStructural LLC (VSL)

- Bruce Osborn

2.3 – INSPECTION PERIOD

• URS inspection of the interior "Hot-Spot" cracks.	5/22/06 – 6/2/06
• URS inspection support and coordination	6/6/06 – 9/18/06
• URS inspection of the exterior "Hot-Spot" cracks.	7/24/06 – 7/25/06
• URS substructure/bearing inspection.	8/17/06, 8/30/06, 9/7/06
• Intech Contracting, Inc. support services.	5/22/06 – 7/6/06, 7/24/06 – 7/25/06
• USI Consultants, Inc. deck survey.	6/5/06 – 7/6/06

- VSL support services. 6/6/06 – 9/18/06
- RCC walkthrough and testing. 6/7/06 – 8/9/06
- CTLGroup tendon mapping. 6/22/06, 7/12/06 – 7/13/06

2.4 – INSPECTION EQUIPMENT AND TOOLS

The following equipment was utilized for checking the cracks:

- Air monitor
- Feeler gauges
- 25' tape
- Measuring wheel
- Flashlights
- Black markers
- Whisk broom

2.5 – SAFETY TRAINING

VSL conducted a 5 hour training program attended by all onsite personal. The training consisted of the proper procedures which would be followed when entering and exiting a confined space. The training also discussed proper fall protection and emergency exiting procedures necessary for confined space work. This training included some of the hazardous condition present around the work site due to the manufacturing facilities located around the structure. Further subjects on air monitoring and the equipment required were discussed and sample equipment was present for hands on training and sample testing.

Segments 2 and 3 are located on the property of Kemiron an industrial gas manufacturer. Prior to entering their property each individual was required to view a safety training video concerning possible hazards and safety precautions. Kemiron utilizes a siren to warn of gas leaks and wind socks to aide in determining at which designated location personnel should assemble if a leak occurs. Kemiron required that anyone entering their property carry a respirator as a safety precaution.

Segment 6 is located on the property of BP-Amoco. Prior to entering their property all inspection personnel was required to view a video concerning rules, regulations, hazards and safety precautions. After passing an exam about the contents of the video each individual was assigned a tag to be worn while on BP-Amoco's property.

2.6 – SAFETY CONSIDERATIONS

A VSL written Safety Plan was developed specific for the Cline Avenue project. It included Bridge access plans and the equipment required for the same. Confined space training procedures, instructions and directions for locating a medical facility are included as part of this plan. For additional information on VSL's Safety Plan see Appendix B.

URS Corporation developed a Safe Work Plan before mobilizing to the project site. This included essential information and guidelines, such as the location of the nearest hospital. Known hazards included traffic, confined space, use of aerial lifts, heat stress and hearing protection were also included in the URS Safe Work Plan.

The interior concrete box girder cells of the Cline Ave Bridge are considered a confined space, however the space is not permit required. All personnel were properly trained in confined space entry. Guidelines in the VSL Safety Plan and the URS Safe Work Plan were strictly followed. An air monitor was used to check the air quality before entering the space and while working inside. Confined space entry forms were completed daily.

2.7 – ACCESS EQUIPMENT AND PROCEDURES

A 120' manlift was used to gain access to Segments 2 and 3 while an 80' manlift was used to access Segments 1, 4, 5 and 6 and Ramp B. Safety harnesses were utilized to attach personnel to the manlift for the ascent and descent to each segment cell.

Manlift use with Safety Harness

Ramps A, C and D were accessed from the ground. A safety rail and steps were placed on the slopewalls for safety. A safety railing was placed around the access hatches for each cell.

Slopewall at Ramp A

Safety Railing at Cell Access Hatch

A Mark V Snooper was used to check the exterior cracks. Safety harnesses were utilized to attach personnel to the snooper.

2.8 – TRAFFIC MAINTENANCE

Lane closures only occurred during daylight hours. Only one lane was closed at a time. All work was done in accordance with the INDOT Work Zone Traffic Control Manual, 2006 Standard Specifications and September 2006 Standard Drawings.

Intech Contracting, Inc. performed all maintenance of traffic to allow the surveyor to determine elevations on the top deck of the mainline and ramp structures. In addition Intech Contracting, Inc. provided the Mark V Snooper. Lane closures were necessary to allow the surveyor to determine elevations on the top of the deck and for use of the Mark V Snooper for the exterior crack inspection.

INDOT LaPorte District closed a lane of traffic on Cline Ave to allow the coating of the borescope inspection deck holes from the 2004 inspection with an asphalt material. INDOT LaPorte District also closed a lane of traffic on SR 912 to allow a hole to be chipped into the deck for a visual inspection of a post-tensioning duct.

2.9 – QUALITY CONTROL STANDARDS AND PROCEDURES

The quality assurance program involves the proper functioning of many interrelated activities and extends to all personnel engaged in this project. A project quality assurance plan is a project specific plan that identifies the elements of the quality assurance program that are applicable to the project based upon the scope of services to be provided. It identifies a schedule of deliverables, planned independent technical reviews, and reviewers. URS Corporation has established a set of quality guidelines for this project. The quality assurance and quality control plan document followed for this project is included in Appendix C.

2.10 – CORROSION MECHANISM OF STEEL IN CONCRETE

Steel embedded in a good quality concrete is protected from corrosion by the formation of a passive film on the steel at its interface with the high pH concrete. This passive film can be compromised when chlorides contaminate the concrete at levels beyond defined acceptable threshold levels and disrupt the passive film. The passive film can also be compromised by the carbonation process where the carbon dioxide from the atmosphere reacts with alkaline hydroxide in the concrete to form calcium carbonate. This results in lowering of the pH and the dissolution of the passive film. In post-tensioned structures, there is a tendency for the bleed water and the fines to move ahead of the grout mass depending on the quality of the grout, pumping equipment, and procedures used during pumping operations. This can result in voids, grouts of low pH, thin coating of very porous grout on the strands that easily carbonate, and accumulation of hygroscopic material on the grout surface. These conditions can lead to increased corrosion, especially where there is a transition from low to high pH grout. Structures with significant changes in tendon profile and/or changes in cross section of the duct are more susceptible to this phenomenon of grout separation. If the strands are not completely covered

with a high pH grout, corrosion can occur even if chlorides are not present. The rate of corrosion depends on various factors. Thus, it is important to determine the rate of corrosion of the strands to estimate the remaining life.

In the US, commonly quoted threshold levels of chlorides for regular reinforced concrete structures range from 1 lb to 1.35 lb per cubic yard of concrete. Another commonly reported chloride threshold limit is 0.2% by weight of cement. American Association of State Highway Transportation Officials (AASHTO), American Concrete Institute (ACI 222)[1], and Post-tensioned Institute (PTI) limit the acid soluble chloride content to a maximum of 0.08% by weight of cement. Recent studies (Sagues et, al, 2005)[2] suggest that chloride threshold value for prestressed concrete structure should be adjusted down from 0.08%. Though these threshold limits are based on laboratory studies, the actual threshold value is a function of the structure, its exposure to environments, and its performance in the field.

The passive layer on steel breaks down somewhere between pH 10 and pH 11. Structural collapse of reinforced concrete structures due primarily to corrosion is rare since these structures show significant signs of deterioration prior to failure. The tendons in post-tensioned structures, however, are usually loaded to 50% or more of their ultimate tensile strength. Corrosion related failure can quickly overstress the remaining strands and can possibly lead to structural failure. Some of the well-known failures are:

- A post-tensioned concrete pedestrian bridge collapse in North Carolina;
- The Berlin Roof collapse;
- A post-tensioned concrete bridge collapse in Wales;
- A post-tensioned segmental bridge collapse in Great Britain.

It is, therefore, important to evaluate post-tensioned structures at the first sign of distress, i.e. structural cracks, spalls, delaminations, efflorescence, misalignments, or other similar issues. If the preliminary evaluation confirms the presence of these factors and they are spread throughout the structure, further evaluation should be performed to ensure that tendons are not compromised from carrying the load due to corrosion. The corrosion evaluation can also assist in identifying the time to rehabilitation and possible rehabilitation options.

2.11 – REPORTING PROCEDURE

The procedure and format for reporting the condition of this structure conforms to the *Scope of Work* and instructions provided by the Bridge Inspection Section of the Office of Technical Services.

1, 2 See Appendix E.9

3.0 – HISTORY

3.1 – BRIDGE HISTORY

3.1.1 – Design

The regulatory guidelines called for the Cline Avenue Bridge to have two separate designs, one being a steel alternate and the second being a steel and post-tensioned precast segmental concrete alternate. Both designs were advertised and let for bid in 1978, with the steel and concrete alternate receiving the lowest bid from Walsh Construction Company. The original steel and concrete alternate was designed by American Consulting Engineers; Reid, Quebe, Allison, Wilcox and Associates Inc.; and Beam, Longest and Neff, Inc. This design required the concrete box girders to be precast in segmental units, lifted into place, and then secured with tendons until the girder construction in the span was complete. Since the maximum height of the superstructure above the ground was less than 100 feet, Walsh Construction requested that they be allowed to cast-in-place the segmental concrete units of the girders instead of precasting them. They proposed to do this by using falsework to support the cast-in-place operation where the ground would allow and a moving Trauler Crane equipped with a slip form over those areas that could not support false work, such as the Indiana Harbor Canal area. They received permission from the Indiana State Highway Commission and the following delineates who performed the final design and at which location:

Cast-In-Place Segmental Concrete Main Spans (Redesign):
T.Y. Lin International
Reid, Quebe, Allison, Wilcox and Associates, Inc.

Cast-In-Place Segmental Concrete Four Approach Ramp Spans (Redesign):
Figg and Muller Engineers, Inc.
Beam, Longest and Neff, Inc.

Steel Girder Spans (Original Design):
American Consulting Engineering

The design and construction, for all portions of the structure, were to comply with the American Association of State Highway and Transportation Officials (AASHTO) 1977 Edition. The live load design was HS 20-44 including special toll road and military loading, the dead load design included 156 lbs/ft^3 for concrete and steel, 1 ½" modified P.C.C. overlay, 35 lbs/ft^3 for future wearing surface, curbs and barrier walls. Design speed was 50 mph, the 1977 design ADT was 32,900 vpd and the projected 1997 ADT was 56,100 vpd. The roadway deck, which is also the top flange of the post-tensioned concrete box girders, varies in thickness from 9 inches at the center of the box girder to 14 inches near the girder walls. Differential temperature allowance permits the top slab to be 18º F warmer or 9º F colder than the remaining portion of the structure. The prestressed steel for the post-tensioning of the segmental box girders was to be in accordance with ASTM Grade 270.

3.1.2 – Construction

Construction began in 1978 and was completed in 1985. Total construction cost for the main spans was approximately $54 million. For the four approach ramps and the Riley Road reconstruction, the cost was $18 million. Since the redesign of the concrete portion of the bridge from precast to cast-in-place did not occur until after the contract was awarded for the project, time was of the essence. As construction began on the substructure units and fabrication of the structural steel commenced the redesign of the concrete portion was started. Completion of the concrete redesign did not occur before some of the substructure units were ready for superstructure construction. In order to expedite the construction schedule, when portions of the concrete redesign became available, the design drawings were used for construction and fabrication. On April 15, 1982 a section of the falsework, which consisted of steel scaffolding and beams, supporting the superstructure of Ramp C collapsed causing 13 fatalities and delaying the project. The cause of the falsework collapse was failure of several of the temporary concrete footing supports. Once the failure occurred it overloaded the adjacent footing and scaffolding and caused them to fail in a domino like fashion.

3.2 – PAST INSPECTIONS

The following is a summary of past inspections that have been performed on the concrete mainline, four approach ramp bridges, and steel girder spans. Included is the date of the inspection, type of inspection and any significant findings.

Inspection Date	Inspection Type	Significant Findings
1/5/84	Initial Two Year Biennial INDOT	This was a walkover inspection of both the steel girder spans, post tension concrete box girder main spans and Ramps A, B, C and D. Construction on the project was still underway with respect to Riley Road, and Ramps B and D. The only significant find was vehicle damage to the outside barrier wall in the horizontal curve of Ramp C.
5/23/85	Central and District Office Personnel, INDOT	An inspection was conducted inside two of the steel box pier caps of the steel girder spaces. No problems encountered.
5/24/85	Central and District Office Personnel, INDOT	This inspection was for the columns of Pier 2 and the interior of the center concrete cell of spans A through G (spans 1 through 6) Segment 1. The only finding was a crack in the metal plate in the center column of Pier 2.

Inspection Date	Inspection Type	Significant Findings
1/4/88 - 1/5/88	Two Year Biennial INDOT	This appeared to be a walkover inspection of the steel girder spans, mainline concrete spans and Ramps A, B, C and D. The exterior of the structures were accessed by foot as well as the interior of Ramps A, C and D. Significant findings included cracking of the ceiling in all cell interiors, rapid deterioration of the drain system and numerous clogged inlets.
6/29/88 - 6/30/88	Central and District Office Personnel, INDOT	It appears this inspection included the use of a snooper to inspect the exterior of the steel girder bridge. No significant problems were encountered.
1/10/90	Two Year Biennial INDOT	The interiors and exteriors of Ramps A, B and C were inspected. Cracks in the ceiling near the cell centers with efflorescence showing. The outside barrier wall in the horizontal curve near the abutment of Ramp C had extensive vehicle damage.
6/10/93	Two Year Biennial INDOT	An inspection of the exteriors of the bridge with no equipment for access. The majority of the drains were clogged. The barrier wall, at several locations, exhibited vehicle impact. The sides of the concrete cells directly above Piers 10 and 15 have some light cracking.
6/10/94	Underwater Inspection Collins Engineering, Inc.	It included Piers 13, 13’, 14 and 14’. No significant deficiencies were found but some cracks were found in the crash walls of all the piers.
12/29/94	Two Year Biennial INDOT	This inspection was for the inside and outside of Ramps A, B, C and D and appears to have been done in the month of December in 1994. Light cracks in the concrete of the diaphragms, hinges, cell walls and ceiling. Numerous clogged drains. Spalls and patches in deck. Standing water in the interior of Ramp D.

Inspection Date	Inspection Type	Significant Findings
5/26/95 - 6/2/95	Concrete Cell Inspection INDOT	This inspection was for two of the concrete cells; Segment #1, North Box, interior; and Segment #5, South Box, interior and exterior. Both concrete cells were accessed by a snooper and bucket truck. A two-year biennial walkover inspection was conducted over the concrete portion of the mainline and ramp bridges.
5/24/95 - 6/29/95	Two Year Biennial INDOT	The problems that were found during the 1994 inspection were also evident during this inspection as well as the following items; The traveling public occasionally contacts the District office concerning the bridge falling down. This is believed to be due to the fact that the concrete fascia at the hinge appears to support the superstructure and it looks like it is allowing the bridge to fall. The fact that this is not what is happening and the structure is quite safe is not apparent to the casual observer. Some falsework from the concrete construction phase was left in place at some interior locations. Some tension cracks exist at the base of the columns at Pier 3. This is believed to have been caused by bearing failure at the time of construction. Several exterior cell walls of the superstructure over the piers exhibit cracks. Some of the substructure units have small to medium cracks and spalls throughout the structure.
11/14/96	Two Year Biennial INDOT	The conditions are similar to what was found during the 1994 two year biennial inspection except for the outside barrier wall at Ramp C which appears to have been repaired since the last inspection.

Inspection Date	Inspection Type	Significant Findings
8/3/97 - 8/28/97	Critical Elements BRW Hazelet and Erdal	The elements inspected were the post-tensioned concrete bridge spans of the mainline and the 4 approach ramps and the steel pier caps. Intermittent parallel cracks run along the centerline of the cells at most concrete girder locations. These cracks extend through the deck and efflorescence is seen on the underside of the deck. The majority of the deck inlets are plugged. Some end caps on drain pipes are broken allowing water and debris to drain into cell interiors. A section of drain pipe is broken in Ramp D. Concrete cracking is occurring in both the concrete webs in the shear zones and at the diaphragms in both the mainline and ramps. The mainline is exhibiting significantly more cracking than the ramp structures. There is cracking at the hinges that appear to be stress relief cracks and do not appear to be growing. Small spalled areas with exposed reinforcing steel exist at Piers 6, 203, 205 and 409. Pier 7 exhibits heavy spalling at the top 4 feet of the columns with deterioration up to 6” deep.
9/2/99	Two Year Biennial INDOT	Deck drains are clogged. There is deterioration in cells due to clogged drains. The top of the columns at Pier 7 are deteriorated. There is delamination of the Ramp A overlay. Cracking was observed at Piers 201, 202 and 303. A retaining bar has fallen off of the left bearing at Pier 301. The bottom of the box girder of Ramp D has minor collision damage in an area over Ramp C.

Inspection Date	Inspection Type	Significant Findings
11/15/00	Two Year Biennial INDOT	The deck underside shows cracking and efflorescence inside the cells and there is longitudinal cracking and spalling of the wearing surface. (Information derived from BRW, Hazelet & Erdal inspection report.) Interior drains are clogged and caps are blown off between Piers 12 and 13 of the mainline. Mainline superstructure cracks were checked at various piers and there was no growth from last measurement. The top of the columns at Pier 7 are spalling and have rust stains.
11/7/03	Two Year Biennial INDOT	Snooper was used to inspect diagonal cracks in web wall at Pier 7 (5/2/03). Professor Wang from the University of Illinois at Chicago and Mario Pasarel of Ken Herceg and Associates Inc. participated in the inspection. Professor Wang summarized diagonal cracks were likely caused from temperature differential from east side to west side of bridge. A snooper was used to inspect the exteriors of the ramps and no significant cracking was found.
2/20/04	Two Year Biennial INDOT	The underside of the deck inside the cells is exhibiting significant cracking, rust staining and efflorescence. A modular joint failure occurred on the east bound lanes near Pier 15. The modular joint near Pier 8 is starting to fail. Voids in post-tensioning ducts and strand corrosion noted (Information derived from Ken Herceg and Associates, Inc. inspection report).
2004	Post-Tensioned Conc. Spans Ken Herceg and Assoc., Inc.	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were inspected. High levels of localized corrosion in the post-tensioning system were found in the four ramp structures. Extensive cracking was found in diaphragms and web cracking in the shear zones in the mainline. Longitudinal cracking is occurring in the deck in both the mainline and the ramps. Voids were found at tendon couplers and at tendon high points.

Inspection Date	Inspection Type	Significant Findings
6/20/05 - 7/8/05	Post-Tensioned Conc. Spans Ken Herceg and Assoc., Inc.	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were re-inspected. The inspection did not uncover any significant changes in the bridge's condition that are cause for immediate concern. There are some cracks that have likely widened and lengthened since they were measured in 2004, however the majority of the findings are inconclusive due to the poor precision of the available crack measurement techniques. The top slab continues to deteriorate and two new top slab spalls were discovered that were previously identified as delaminations in the 2004 inspection.
4/4/06	Two Year Biennial INDOT	The problems found during previous inspections are also evident during this inspection with the following inclusions: the drainage system needs to be cleaned at the deck surface as well as at the outlets. It was noted that the six month inspection cycle is NOT being met. It was also noted that URS/VSL/RCC are doing a "hot-spot"/ corrosion inspection throughout the structure.

3.3 – ADDITIONAL POINTS OF INTEREST CONCERNING THE POST-TENSIONING SYSTEM

The following are points of interest which where not included in the original scope of work for this contract but are important factors affecting the health of the structure. The following information was acquired through a review of VSL's daily field report data sheets from the 2004 inspection of the Cline Ave structure. Further inspection of these locations did not take place during the current phase.

3.3.1 – Ramp "D" Bottom Slab Tendons

The following are copies of brief descriptions which were attached to VSL's daily field report from April 2, 2004:

3.3.1.1 – Ramp "D" North Bottom Slab Tendon

VSL began excavation of the north tendon in Ramp D at 7'-8" from face of blister. The de-bonding of concrete begins at 5'-9" from face of blister. VSL excavated top tendon for a total

length of 38'-11". The excavated area is on average 12" wide and 2 ½" to 3" deep. From the 7'-8" area to approximately the 28' area, there is no duct present. It appears that the duct has corroded away to nothing. The 4 exposed cables are rusted beyond the PCI journal's documentation with several wire breaks present from corrosion. From 28'-3" to approximately 36', the duct is very corroded and the four exposed cables are in the range of #3 to #4 on the PCI journal's documentation. At 38'-3", the duct approximately 6" prior has minimal corrosion and at 38'-3" the duct looks as good as the day it was installed. After inspecting tendon and measuring a severe rust stain on exterior of bridge, Herceg instructed VSL to expose total tendon at 13' range. VSL excavated total depth of bottom slab from 12'-9" to 13'-7" on north tendon.

Very bottom of tendon had approximately 1" wide strip of duct remaining with minimal corrosion on exterior of duct. Most of the cables on the lower section of tendon are in the range of #2 to #3 on the PCI journal's documentation of rust standards. There are a couple of cables at this area that range between #5 and #6 on the PCI journal's standards.

3.3.1.2 – Ramp "D" South Bottom Slab Tendon

VSL began excavation of south tendon in bottom slab of Ramp D at 7'-9" from the face of the blister. The de-bonding of concrete begins at 5'-11" from the face of the blister. VSL excavated top tendon for a total length of 26'-10". From the start of the excavation to approximately 16'-4" there are 4 cables exposed and no presence of duct. It appears that the duct has corroded away to nothing. The 4 exposed cables are way above the range of corrosion on the PCI journal's standards. There are numerous wire breaks due to corrosion in this length. From 16'-4" to 26'-10" there is still no presence of duct and one cable uncovered. This one cable has several more wire breaks in this area. After exposing this length of tendon and doing inspection, VSL was directed to do a full depth excavation on the south tendon, to coincide with a rust stain on the exterior of bottom deck, by Herceg. VSL did a full depth excavation from 13'-8" to 14'-6" from face of blister. At this point one cable is at a possible #6 on the PCI journal, with the remaining cables being above #8 on the PCI journal standards. At 38'-7" VSL drilled an inspection port on this tendon and found a layer of duct tape. Herceg instructed VSL to do excavation of this area. VSL did an excavation from 38'-6" from face of blister to 39'-8". Exposed duct tape, which was a coupled area. Duct appears to be as good as when installed. VSL cut duct open at this area and found grout to be solid, intact and in very good condition.

3.3.1.3 – VSL's Theory of the Deterioration Process in Ramp "D" Bottom Slab

It is a known fact that there was some minor cracking to the length of the de-bonded concrete on both bottom slab tendons. Sometime after this, the drain pipe from the top deck broke and drained into this area. The length of time this occurred is not certain. INDOT, on a routine inspection found approximately 12" to 14" of water in bottom slab blister area. They drilled a 1" drain at approximately 4' off south wall.

VSL theorizes that the water actually penetrated the small cracks and through the freeze and thaw processes, actually caused the de-bonding of the length of concrete. The reason the south tendon is a little worse then the north tendon is due to the location of the drain hole, which was drilled by INDOT. Due to the slope of the bridge, the drain hole drained the water off the north

tendon, while the south tendon remained under water until it evaporated. This extended time is not known, but the difference in the corrosion between north and south tendons are evident.

3.3.2 – Post-Tensioning Bars in Ramp "C"

Based on a review of VSL's daily field reports from the 2004 inspection (July 21/22, 2004) the post-tensioning bars used in Span 10 of Ramp "C" near the hinge are of concern. It was noted that the grout tubes at the PT bars were patched over during the original construction. During further investigation the patch material was removed and it was observed that the grout tubes were completely empty and appeared never to have been grouted during construction. In addition, the ends of the PT bars were never sealed or capped. VSL used a borescope to look at the bars through the grout ports. The length of the bar could not be scoped due to the space between the bars and ducts being less then ¼". It was noted that a total of 11 out of the 12 PT bars at this location were voided and heavily corroded. At the completion of the inspection in this area VSL indicated that they would be grouting the voided areas.

3.4 – PREVIOUS LOAD RATING ANALYSES

There have been two load rating analyses performed for the post-tensioned concrete box girder superstructure portions of the Cline Avenue Bridge and associated ramps. The first was done in 1999 by BRW Hazelet and Erdal. The second was done in 2005 by Ken Herceg and Associates, Inc.

3.4.1 – 1999 Analysis

The 1999 analysis was performed with a program that was developed in-house by BRW Hazelet and Erdal. An inventory rating was determined for HS20-44 and H20-44 vehicles. An operating level rating was determined for all trucks. The ratings were done in accordance with the AASHTO Manual for Condition Evaluation of Bridges 1994, including the 1995 and 1996 interim revisions. Ratings were provided for three different loading conditions:

Case 1: 1 ½" overlay, 35 lbs/ft^2 FWS, and W_c = 156 lbs/ft^3
Case 2: 1 ½" overlay, 0 lbs/ft^2 FWS, and W_c = 156 lbs/ft^3
Case 3: 1 ½" overlay, 0 lbs/ft^2 FWS, and W_c = 150 lbs/ft^3

The loads in Case 1 utilize values given on the design drawings. Case 2 was considered because at that time there was not a future wearing surface on the bridge. Case 3 was evaluated because the actual unit weight of concrete with steel in the structure is much closer to 150 lbs/ft^3 than 156 lbs/ft^3.

The lowest HS20 inventory rating factor for the existing loads with W_c = 150 lbs/ft^3 was 1.021. This rating factor being greater than one indicated the structural capacity was adequate for this case. For Case 1 eleven locations had a rating factor less than one. Eight of those locations were for shear capacity and three were for flexural capacity.

All of the rating factors for flexure were determined without considering the mild steel reinforcement in the slab. If this reinforcement is considered along with the prestressing steel the three flexural rating factors below one increase to more than one.

3.4.2 – 2005 Analysis

Conbox from Leap Software was used to complete the initial analyses in support of establishing Load Ratings. Rating factor's at both inventory and operating levels were determined using a program developed in-house by Ken Herceg and Associates. This program was developed based upon the AASHTO Manual for Condition Evaluation and Load and Resistance Factor Rating of Highway Bridges (LRFR) requirements.

The load rating analysis took into account dead loads, thermal effects, live loads and other permanent loads used in load ratings including the permanent secondary effects of post-tensioning tendons. Inspection findings from 2004 were incorporated into the load ratings through the use of condition factors. The global condition factors were based upon the NBI Superstructure Condition Rating and were derived from the AASHTO LRFR manual. The localized condition factors were developed with the aide of Florida DOT's (FDOT) Load Rating Post-Tensioned Concrete Segmental Concrete Bridges. The system factor was based upon the AASHTO LRFR manual with additional guidance from FDOT's Load Rating Post-Tensioned Concrete Segmental Bridges.

Rating factors were calculated based upon Strength and Service limit states. Additional parameters of the analysis are as follows:

- Ratings were developed for the HL-93 live loading at the LRFR Design Level.
- The number of lanes of Live Load used was the design number of lanes per the LRFR manual.
- No allowance for future wearing surface has been included.
- Ultimate flexural strength calculated using strain compatibility in lieu of the simplified rectangular distribution.
- Ultimate strengths and allowable stresses have been adjusted for identical structural deterioration thru the use of applicable Condition Factors.
- Ratings for global condition adjusted with applicable condition factors relating to NBIS item #59 rating (superstructure).
- Ratings for localized condition adjusted with applicable condition factors related to identified deterioration and/or corrosion.

Results of the load rating analysis found the controlling sections typically occur due to shear forces in the web immediately adjacent to the piers at the critical shear section (h/2 from face of support). Based on Rating Factors using the localized long-term condition factor all segments of the mainline and all four ramps exceed an Inventory Rating Factor = 1.0. Most noteworthy are Segment 4 and Ramp A where a Rating Factor of 1.0 and 1.01 indicates the structure's capacity nearly equals the load demands. Further review of the Operating Rating Factor finds all Rating Factors increased to more reasonable values with a minimum of 1.30 in Ramp A.

Integration of the inspection findings into the load rating analysis did not identify significant capacity reductions of the structure. Therefore, the mainline and ramp structures were found to have adequate capacity to carry all AASHTO legal loads and remain open to traffic without restrictive load postings at the time of this rating.

4.0 – FIELD INSPECTION, TESTING AND SURVEY

4.1 – URS TAMPA – "WALK-THROUGH" EVALUATION

Personnel from the URS Corporation – Tampa Office participated in the initial "walk-through" evaluation of the structure. The intent of the "walk-through" was to familiarize all participants with the structure and to begin to ascertain where corrosion testing should be considered. The URS Corporation – Tampa Office, having a large amount of experience with the design, inspection and rehabilitation of post-tensioned concrete bridge structures, prepared a report based upon this cursory visual inspection. The report addressed areas that are showing signs of distress, indicated possible rehabilitation scenarios and suggested an extensive structural analysis. The full report is included in Appendix D.

4.2 – MEASURING AND DOCUMENTING "HOT-SPOT" CRACKS

This re-inspection includes all the interior and exterior cracks from the 2004 inspection that met one of the following conditions:

- Greater than 1.0 mm in width
- "New" cracks (not recorded in 1997)
- Cracks with increased width versus the 1997 inspection
- Cracks with significant (>5–10%) increase in length versus the 1997 inspection

These cracks are considered "hot-spot" cracks. Each "hot-spot" crack is identified with a 4 character designation. The first character designates the segment or ramp where the crack is located and the remaining three characters are the numerical designation for the specific crack. (i.e. "B009" indicates a "hot-spot" crack in Ramp B that was the ninth crack to be numbered.)

The following procedure was used for each interior "hot-spot" crack. First, the crack width was determined by use of a feeler gauge. The ends of the crack were determined, a line was drawn at each end and the date of the marking was documented on the wall. The largest width of the crack was documented on the wall and dated. The location was written on the structure so it would be visible in the photographs. A picture was taken showing the crack and the written location indication. A sketch of the crack was made on standard forms, documenting the width and the distance from the start and end of the crack to a reference point (pier, bottom slab, top slab, web, or blister) and the length.

A similar procedure was used for exterior cracks; however the distance to the crack sometimes had to be estimated due to limited access from the snooper.

4.3 – LOAD RATING ANALYSES AND VOID LOCATIONS INSPECTION

Several locations were selected to receive an "arms-length" visual inspection based upon the 1999 and 2005 Load Rating Analyses. The locations selected were based upon the inventory ratings. The Case 3 loading condition (1 ½" overlay, 0 lbs/ft^2 FWS and Wc = 150 lbs/ft^3) from the 1999 analysis and the worst case condition (Design Number of Lanes or Actual Number of

Lanes, Original Design, Global Condition or Localized Condition) from the 2005 analysis were considered. Any locale with a rating factor below 1.5 was chosen for inspection. A total of 48 locations were selected for inspection.

During the 2004 inspection a number of grout voids were found within the tendon ducts and couplers. All void locations found were vacuum grouted in 2004. Each location received an "arms-length" visual inspection to determine if any structural deterioration had taken place. There are 113 void locations that were inspected.

Only the cell interiors at these locations were inspected. In each case the inspection was not limited to a specific point but encompassed the general area in the vicinity of the void or the low load rating. General deterioration was noted and if cracks were found the width was measured and documented as noted above.

4.4 – SUBSTRUCTURE AND BEARING INSPECTION

Each substructure unit was visually inspected. A manlift was utilized to do an "arms-length" visual inspection of select substructure units. Substructure unit, with bearings, accessible by manlift in Segments 2, 3, 4 and 5 and Ramps A and C received an "arms-length visual inspection. The remaining substructure units were inspected from the ground; binoculars were employed if there were any indications of deterioration or distress.

Bearings received an "arms-length" inspection at the locations where substructure units received close inspections.

4.5 – GROUND PENETRATING RADAR (GPR)

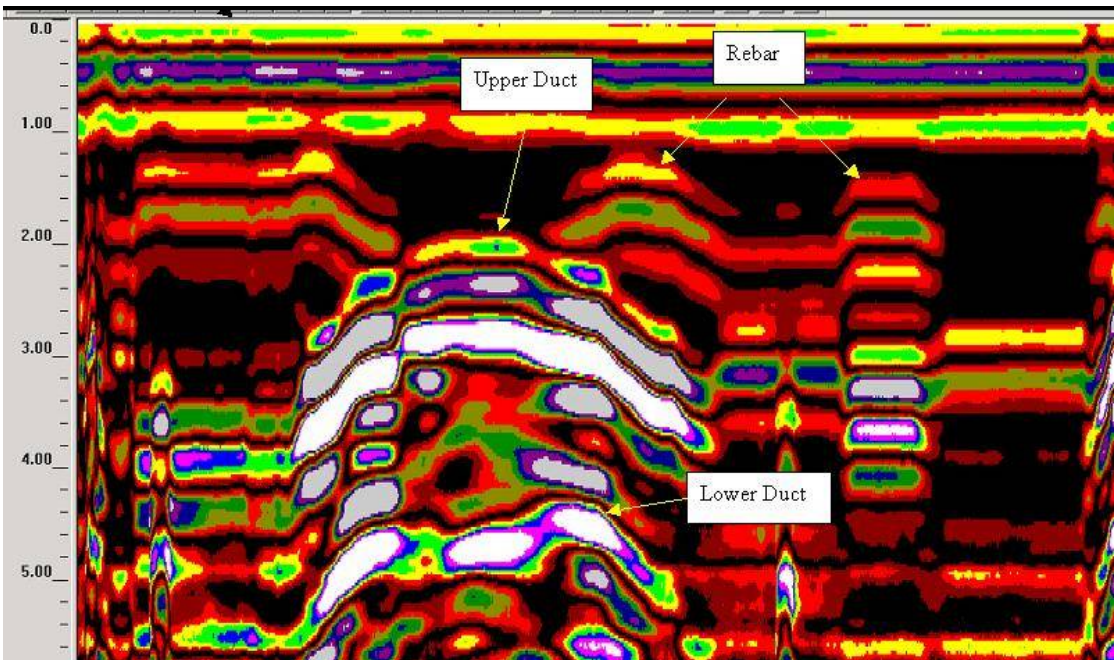
The Impulse Radar (Ground Penetrating Radar or GPR) technique was used to locate post-tensioned tendon ducts embedded in the walls and deck slab of the bridge. The method is fully described in the American Concrete Institute Report ACTI 228.2R-98, "*Nondestructive Test Methods for Evaluation of Concrete in Structures*". A brief description of the Impulse Radar test is as follows:

The impulse radar technique employs high-frequency electromagnetic energy waves for rapidly and continuously assessing a variety of characteristics of concrete structures. The principle of operation is based on reflection of electromagnetic waves from varying dielectric constant boundaries in the material being probed. The impulse radar equipment is self-contained, compact, and portable. The system consists of the main radar unit, antenna and transducer cable. All data is stored in the main radar unit, by means of a computer hard drive (ACI 228, 1998).

A single or double contacting transducer (antenna) transmits and receives radar signals. High frequency, short pulse electromagnetic energy is transmitted into the element under inspection (concrete, sub-base, etc). Each transmitted pulse travels through the material and is partially reflected when it encounters a change in dielectric constant. The receiving section of the transducer detects the reflected pulses. The location and depth of the dielectric constant boundary is evaluated by noting the transit time from start of pulse to reception of reflected

pulse. Boundary depth is proportional to transit time. Since concrete to air, water, metal and/or backfill interfaces are electronically detected by the instrument as dielectric constant boundaries; the impulse radar method is capable of assessing a variety of reinforced concrete, masonry and environmental characteristics.

Impulse radar has been successfully used to evaluate locations of embedded reinforcing, to distinguish between grouted and un-grouted cells in masonry block walls, to locate high moisture and chloride concentration in bridge decks, embedded foreign objects in concrete pavements, alignment of dowel bars in pavement, evaluation of element thickness, utility mapping, etc.



Sample Radar Image

4.6 – TENDON/COUPLER EXPOSURE AND RECOVERING PROCEDURES

4.6.1 – Determining Tendon/Coupler Locations

The tendon/coupler locations within the areas of the structures, selected by RCC, to be investigated were located with the use of Ground Penetrating Radar (provided by CTLGroup) and the design drawings. In addition, 1" drill hole test locations from the 2004 inspection were used as known locations of the tendons and provided the starting point for several test locations.

4.6.2 - Exposing Ducts and Tendons

Upon determining the exact location of the duct/coupler, the concrete was chipped away by use of a low impact (8.8 ft-lb) electric demolition hammer. During the chipping process a shop vacuum was utilized to minimize the amount of debris in the air. After RCC accepted that the hole size was adequate for their testing needs, the edges of the opening were saw cut and chipped to provide a uniform patch area. The amount of removal depended on the field conditions as the

area was exposed. Once the duct/coupler was exposed the duct/coupler boot was carefully cut through using a hand held electric cut-off wheel. The size and number of openings in the duct/coupler boot were dependent on the conditions at each location. In areas with minimal reinforcement one large "window" of the duct/coupler was removed, while in areas with more reinforcement several smaller "windows" would be removed.

4.6.3 – Removal of the Grout to Expose the Strands

Extreme care was taken when removing the grout from around the tendon in order to expose the strands for examination. A 2 pound mallet and a concrete chisel were used to remove large portions of grout while a screwdriver was used near the tendons for more precise chipping to prevent damage to the strands.

4.6.4 – Repair to the Duct/Coupler Boot

Repair of the duct/coupler boot was accomplished in one of two ways. When possible, the portion of the duct/coupler boot, which was removed to allow for testing, was reused to cover the opening. If the original duct/coupler boot was unable to be reused a piece of new metal duct was cut and formed to fit the window opening. With either method once the duct/coupler boot was placed, it was then sealed using an injectable epoxy, Hilti HY 150. As part of the closure, VSL inserts two grout tubes into the duct work, the exception being at locations where very small amounts of grout were removed. In these locations epoxy was used to fill the area created where the grout was removed. The grout tubes were used to later grout areas with large voids created during testing or voids which had been there since the original construction.

4.6.5 – Concrete Replacement

Once the duct/coupler boot was sealed and the grout tubes were in place and secured the concrete which was removed to expose the duct/coupler was replaced. Prior to the placement of the formwork, surface preparations including flushing of the opening to remove any loose debris were performed. Finally the formwork was secured to the surrounding areas closing and concealing the chipped areas and allowing for the placement of a standard bag mix concrete to be poured into the voided area.

4.6.6 – Vacuum/Pressure Grouting

When a sufficiently large area of grout had been removed, the void was filled with a grout material using vacuum and/or pressure grouting techniques. The grout material used was Sika Grout 300 PT. The grout mix was prepared per manufacturer recommendations. The combined techniques of both vacuum and pressure grouting allowed the grouting operation to be performed with one or two access holes into the void. The advantages of this combined technique include eliminating any potential air pockets in the void, evacuating any water that may be present in the void, and pre-determining the void volume.

4.6.7 – Top Deck Testing Locations

In addition to the test locations on the interiors of the cells, two test sites were located on the deck surface. It was thought that by exposing the tendons from the deck surface, the true high point of the tendons could be accessed as they crossed over the pier. Prior to chipping in these locations VSL expressed concern that if the perimeter of the patch were to leak over time, water and any associated deicing chemicals would have a direct path to the tendon. With VSL's concerns noted, one location on the deck surface was opened. The chosen location was that of a previous 1" diameter drill hole from the 2004 inspection that had been previously patched with epoxy. Centering the new opening over the previous test hole, a small area was chipped out to the top of the tendon. When an approximately 2" diameter portion of the tendon was exposed, corrosion was noted around the previous test location and chipping was halted. With direction from INDOT, no further chipping was done at this location and all other deck surface testing was abandoned. INDOT took the further step of having an asphaltic material placed over each of the test holes from the 2004 inspection.

Corrosion around 2004 test hole on the deck surface

Asphaltic Material, placed by INDOT, over 2004 test holes

4.7 – DECK SURVEY PROCEDURE

The theoretical horizontal alignment and vertical profile for the structure was laid-out with AutoCAD Land Development based on the available information from the design plans for the cast-in-place concrete alternate, and the original steel plate-girder bridge and roadway plans as designed. From the AutoCAD drawings, the bearing coordinates (northing and easting) at each Centerline Pier were calculated at the inside bottom face of the barrier walls (see reference drawings in Appendix F). The span lengths, based along the inside bottom of each barrier face, were then determined and subsequently divided into ten equal increments (see reference drawings in Appendix F). This information was provided to the Survey Crew for the purpose of determining the actual field elevations.

After establishing the horizontal and vertical control, the Survey Crew placed a fastener (nail) at the Centerline Pier locations using a Remington Powder Actuated Fastener Tool. The fastener was provided for the purpose of establishing the required survey points as well as for future reference for any additional deck surveys that might be required. The survey points to be recorded for each span were established by using a string line between centerline pier locations and dividing this distance into ten equal increments. Utilizing Real Time Kinematics (RTK) GPS, the deck elevations at the tenth points of each span were collected. Elevations were taken at both the left and right barrier (looking up-station) for the Eastbound Lanes of the Mainline, the Westbound Lanes of the Mainline, Ramp ‘A’, Ramp ‘B’, Ramp ‘C’, and Ramp ‘D’. These elevations were collected during the morning hours (before noon) and the corresponding air

temperature was recorded whenever a centerline pier location was shot. This temperature reading was assumed to be the air temperature for all the remaining shots in that particular span.

For the purpose of evaluating the effects of temperature on the structure, a second shot was taken at the pier centerlines, 0.3 point, 0.5 point, and 0.7 point of each span. These elevations were recorded during the afternoon hours (after noon). The corresponding air temperature was recorded whenever a centerline pier location was shot and likewise, this value was assumed to be the air temperature for the remainder of the span.

4.8 – CORROSION TESTING LOCATIONS

Drawing B-1 in Appendix E.1 shows the test locations where the corrosion evaluation was performed. A total of 28 locations were tested: 12 high points; 9 low points; and 7 couplers. A total of 22 different tendons were tested (some of the test locations were on the same tendon). Considering all tendons with couplers as one continuous tendon, the Cline Avenue Bridge has a total of 778 tendons. The number of tendons evaluated in this inspection is less than 3% of the total number of tendons. This evaluation did not include all potential problem locations within each tendon. The subsequent evaluations will expand on the previous evaluations to develop a comprehensive analysis of the condition of the tendons in this bridge with a goal towards identifying possible rehabilitation options.

Locations for corrosion evaluation were selected based on the following factors:

- Voids reported in 2004 inspections;
- Rust classification during the 2004 inspections;
- Abnormal conditions observed in 2004 inspections.

During the walk through, it was noted that most of the large cracks were in the top deck. Several locations where significant rusting, spalling of the underside of the deck, and significant loss of cross section of the reinforcement were noticed. At locations where no significant rusting was found, cracks with efflorescence were present indicating that water is penetrating through the full depth of the deck. This clearly indicates that salt from deicing is accumulating at the reinforcing steel and will definitely lead to increased spalling and delamination. Since the deck was not the part of this investigation, no evaluations were performed on the deck to determine the severity of corrosion or the viable life extension options. The deck should be included in the investigation to confirm that the deterioration is limited to areas near cracks.

At each location, evaluations to be performed include visual evaluation of the grout including color and consistency, visual condition of any exposed wires or strands including the degree of rusting and/or pitting, corrosion potential survey, corrosion rate, and pH of the grout at the surface and at strand depth. In addition, grout samples were taken to determine moisture content and chloride content. Additional samples were taken with wire impressions for petrographic examination.

Some changes were made in the field by INDOT due to field conditions (i.e. difficulty in accessing the tendons due to high density of reinforcement in front of the tendons). There are no couplers in Ramp B and therefore only low and high points were tested in Ramp B.

Table B-1 in Appendix E.1 show the locations originally selected by RCC. These locations were selected based on voids in the grout, rust classification, and any abnormal situation observed/recorded during the 2004 inspections. However, due to problems with substantial reinforcement in front of the tendon, some of the locations were moved in the field. Table B-2 in Appendix E.1 lists the exact locations where corrosion evaluations were performed. The high points and the low points listed in Table B-2 are not true high and low points. True high points can only be accessed from the deck. True low points can only be accessed from under the box. Two of the 30 locations were marked on the deck to test at the true high points. Those locations were eliminated by INDOT due to concerns regarding long term water and chloride ingress into the tendons. The true high point inspections should be included in future evaluations if possible.

4.9 – CORROSION TESTING FIELD EVALUATION

4.9.1 – Evaluations Performed

Once the test locations were identified, VSL exposed the metal ducts. RCC documented (with photos) the condition of the exposed metal duct and VSL then cut open the metal duct in the presence of RCC personnel. As soon as the metal duct was cut open, RCC documented the visual condition of any exposed wires/strands using the rust classification table and the pictures taken by Augusto Sason[3] during 1992. RCC also recorded the color and consistency of the grout. Grout samples were collected for moisture content tests while exposing the strands to establish a physical connection. This made sure that moisture samples were collected immediately after exposing the grout thus avoiding any contamination or evaporation. Temperature and humidity were measured at each test location prior to and at the end of testing. Connections to the tendons were established using vise grips to measure corrosion potential, corrosion rate, and cyclic polarization (pitting) measurements. At the conclusion of these electrochemical tests, grout samples were obtained for chloride and petrographic examination. The measurement of pH was performed on freshly exposed grout thus eliminating any carbonation effects. The rust deposits (if any) on the exposed strands were classified according to Table 1 in Section 4.9.2 of this report. Appendix E.7 includes a detailed discussion of the data at each location.

4.9.2 – Corrosion Classification

In order to facilitate comparison, RCC proposed to follow the classifications included in the 2004 HERCEG report with two additional classifications to clarify whether the wire break is corrosion or stress related. This would have allowed INDOT to compare our data with the past reports. Table 1 below provides a comparison of corrosion classifications from PTI, HERCEG, and originally proposed by RCC.

3 See Appendix E.9

Class	PTI Specification	HERCEG	RCC
1	No visible rust.	New condition, clean, and shiny.	New condition, clean, and shiny.
2	Light surface rust.	Sporadic light surface rust.	Sporadic light surface rust.
3	Surface rust with pits underneath (pit size not more than 0.002 inch in diameter or length).	Light surface rust.	Light surface rust.
4	Same as Class 3 except pits exceed 0.002 inch in diameter or length.	Moderate surface rust.	Moderate surface rust.
5	Large oxidized areas, with flakes developing in the corrosion affected zones, loss of steel section noticeable to the unaided eye.	Heavy surface rust with onset of light surface pitting.	Heavy surface rust with onset of light surface pitting.
6	Heavy oxidation on most or all of the exposed surface areas, with strong flaking and pit formation.	Heavy surface rust & moderate surface pitting.	Heavy surface rust & moderate surface pitting.
7	None	Heavy surface rust & heavy surface pitting.	Heavy surface rust & heavy surface pitting.
8	None	Individual wires broken & splayed.	Broken wires with necking.
9	None	None	Broken wires without necking.
10	None	None	Corroded wire with significant section loss.

Table 1: Comparison of Corrosion Classification

However, after discussions with INDOT and at the direction of INDOT, RCC adopted PTI classification but added four additional rust classifications to better document the corrosion condition of tendons in the existing structure. Table 2 below was used to classify the level of corrosion on exposed wires or strands.

Class	Description
1	No visible rust.
2	Light surface rust.
3	Surface rust with pits underneath (pit size not more than 0.002 inch* diameter or length).
4	Same as Class 3 except pits exceed 0.002 inch* diameter or length.
5	Large oxidized areas, with flakes developing in the corrosion affected zones, loss of steel section noticeable to the unaided eye.
6	Heavy oxidation on most or all of the exposed surface areas, with strong flaking and pit formation.
7	Heavy surface rust & heavy surface pitting.
8	Broken wires with necking.
9	Broken wires without necking.
10	Corroded wire with significant section loss.

Table 2: Corrosion Classification for SR-912 Cline Avenue Bridge

* Based on visual inspection only (and not actual measurement of pits in the field)

4.9.3 – Visual Condition of the Exposed Wires or Strands

Once the metal duct was cut open, RCC visually evaluated the exposed grouted tendon. Visible wires or strands were examined for corrosion and were graded in accordance with the classifications in Table 2. Table C-1 in Appendix E.3 summarizes the data. Corrosion classification of the visible wire/strand ranged from 2 (light surface rust) to 4 (surface rust with pits). Once the testing at each location was completed, grout was removed to expose the strands underneath. The corrosion on the strands previously embedded in grout was also classified according to criteria in Table 2. The corrosion classification of the exposed wires/strands ranged from 2 (light surface rust) to 4 (surface rust with pits). The data are summarized in Table C-1. The corrosion classification of the visible strands was either higher or the same as that of the corrosion classification of the exposed strands. Two of the test locations had one broken wire. These wires may have broken during initial stressing or at some later time. The wires at those two locations did not break due to corrosion.

4.9.4 – Moisture Content

The moisture content of grout samples was determined per ASTM C566[4]. Grout samples were obtained as soon as the metal duct was cut open. The samples were weighed immediately in the field and recorded. The sample was then packed in a zip lock bag and transported to the laboratory. In the laboratory, the samples were dried until there was no change in weight. The moisture content in percent was calculated as follows:

4 See Appendix E.9

[(Mass of sample in the field - Mass of dry sample)/(Mass of dry sample)] X 100

Table C-2 in Appendix E.3 summarizes the results of the moisture content of grout samples. Moisture content of grout samples varies from a low of 10.61% to a high of 28.92%. The average moisture content was 21%. This is within the range of normally expected values thus indicating that the grout is not dry and that the corrosion of strands will occur under suitable conditions. The moisture content in Ramp D was less than the overall average moisture content, but the grout samples still had adequate moisture to support corrosion.

4.9.5 – Temperature and Humidity

The ambient temperature and humidity (inside the box) was measured at each test location before and after testing. Table C-3 in Appendix E.3 summarizes the data for each test location. Significant variation in temperature (70^0F to 94^0F) and humidity (49% to 70%) was recorded during the test period. This structure is expected to experience condensation a significant number (possibly in thousands) of times throughout its life. Condensation can result in corrosion of strands at locations where there are voids or carbonated grouts. Based on our current inspection of SR-912, there are a number of locations (particularly at couplers and high points) where voids and carbonated grouts were found. Corrosion of the strand will occur at those locations when liquid is available through condensation. It is difficult to quantify the remaining life of the tendons if the primary deterioration mechanism is condensation related, since it depends on the time of wetting, and the frequency at which condensation occurs.

4.9.6 – Chloride Content

Grout samples from test locations were sealed in a zip lock bag at the site and transported to the laboratory. The chloride content of the grout samples was determined based on AASHTO T260. Table C-4 in Appendix E.3 summarizes the chloride content values. The chloride content ranged from a low of 0.0029% to a high of 0.0363% by weight of cement. None of the samples had chloride content above the threshold value of 0.08%.

4.9.7 – Alkalinity of the Grout

Grout, when mixed and pumped correctly, is alkaline in nature (i.e. pH between 12.5 and 13). If the grout surrounding the tendon is low in pH, it will result in corrosion of the tendon. The rate of corrosion and time-to-failure of wires depends on the availability of moisture and oxygen at these sites. Thus, it is important to measure the alkalinity of the grout around the strands. Alkalinity of the grout was measured immediately after it was exposed. An indicator spray was used in the field. The solution reacts with the concrete and changes color indicating the pH of the grout.

Table C-5 in Appendix E.3 summarizes the alkalinity of grout. The pH at the strand level was 11 or above at all locations except one, where it varied from 9 to 13 along the strand. Typically, passive film breakdown occurs somewhere between pH 10 and 11. Some grout mixes are dark in color making it difficult to see the color change. Since several locations indicate a pH of 11 at

the strand level, it is quite likely that some of those locations may be experiencing loss of passive film and therefore the corrosion of strands.

4.9.8 – Corrosion Potential

The corrosion potential of a metal in concrete is measured using a standard reference electrode. Most field engineers use a copper/copper sulfate ($Cu/CuSO_4$) reference electrode because it is rugged and stable. In high chloride environments or where high chlorides may exist, a silver/silver chloride (Ag/AgCl) reference is used to avoid errors in measurements due to backflow of chloride solution into the reference electrode. The corrosion potential is measured and interpreted according to ASTM C876-91 (1999), "Standard Test Method for Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete." The criteria (based on copper/copper sulfate reference) for evaluating potential are as follows:

- If potentials are more negative than -350 millivolts to $Cu/CuSO_4$, there is a 90% probability that active corrosion is occurring.
- If potentials are in a range from -200 to -350 millivolts to $Cu/CuSO_4$, corrosion activity is uncertain.
- If potentials are more positive than -200 millivolts to $Cu/CuSO_4$, there is a 90% probability that no active corrosion is occurring.

Because the 2004 HERCEG report identified high levels of chlorides in the grout, testing was conducted with a silver/silver chloride (Ag/AgCl) reference electrode to assure accurate field data. The conversion factor for the model reference electrode used, as recommended by the manufacturer, is 110 millivolts. The above criteria were therefore adjusted as follows:

- If potentials are more negative than -240 millivolts to Ag/AgCl, there is a 90% probability that active corrosion is occurring.
- If potentials are in a range from -90 to -240 millivolts to Ag/AgCl, corrosion activity is uncertain.
- If potentials are more positive than -90 millivolts to Ag/AgCl, there is a 90% probability that no active corrosion is occurring.

Potential measurements were conducted with a high (200 megohms) impedance voltmeter that was placed in contact with the grout on a sponge wetted with distilled water. A high impedance voltmeter is required to assure that errors due to contact resistance are not introduced in the measurement. Distilled water was utilized to prevent introduction of contaminates to the surface of the grout.

Table C-6 in Appendix E.3 shows the potential values that were obtained at the test locations. The potential varies from a low of -276 mV Ag/AgCl (90% probability of active corrosion) to a high of -40 mV Ag/AgCl (90% probability of no active corrosion). However, the potential values only provide the probability of active corrosion. Corrosion rate measurements are necessary to determine the significance of any corrosion activity that is present on embedded steel.

4.9.9 – Corrosion Rate Measurements

4.9.9.1 – Background

Corrosion normally occurs at a rate determined by equilibrium between opposing electrochemical reactions. The first is the anodic reaction, in which a metal is oxidized, releasing electrons into the metal. The other is the cathodic reaction, in which a solution species (often 0_2 or H^+) is reduced, removing electrons from the metal. When these two reactions are in equilibrium, the flow of electrons from each reaction is balanced, and no net electron flow (electronic current) occurs. The two reactions can take place on one metal or on two dissimilar metals (or metal sites) that are electrically connected.

FIGURE 1

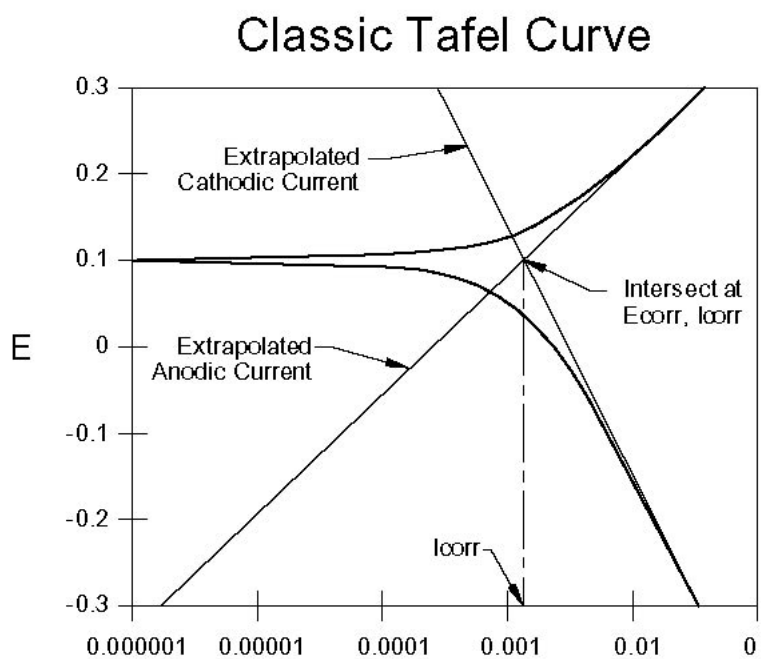


Figure 1, above, shows that when diagramming this corrosion process, the vertical axis is potential and the horizontal axis is the logarithm of the absolute current. Corrosion rate measurements were performed with Gamry CMS 100 equipment. The corrosion rate, as shown in Figure 1, starts at a point where the current is high and the measured potential is very low. The curve moves upward and to the left with increasing potential and decreasing current. The curve will then turn sharply and level out (horizontally) until it reaches a point where the current is equal to zero. The measured potential at that point is called Ecorr (Corrosion Potential). The curve drawn from the bottom right of the graph to the left is the cathodic reaction. The electrochemical experiment continues with the anodic reaction. The current is increased and the potential continues to rise with the curve moving to the upper right portion of the plot. Straight lines are drawn along the anodic and cathodic curves approximating the straight portions of the

curves before they bend towards Ecorr. These two lines will intersect and a straight line is drawn down to the current axis. This point is called Icorr and is the corrosion current of the measurement.

This is a simplified description of the typical corrosion rate curve. Actual experiments will frequently not appear as smooth as the above description. However, the definition of Ecorr and Icorr come directly from the graphing process described above.

The corrosion rate testing that was performed with the Gamry CMS 100 equipment was in accordance with ASTM Standard G5-94, "Standard Reference Test Method for Making Potentiostatic and Potentiodynamic Anodic Polarization Measurements".

The Gamry CMS 100 allows experienced operators to vary the evaluation techniques to assure the most accurate and reliable test data. All aspects of the measurements can be modified to suit the exact field conditions encountered.

The Gamry CMS 100 equipment is contained within a portable computer that requires external AC power to operate. The AC power can be provided by a generator, or a DC to AC power inverter that is connected to a twelve volt DC battery.

4.9.9.2 – Polarization Resistance Experiment

The polarization resistance technique is used to obtain a rapid estimate of the corrosion rate of a metal in a solution. Cell current readings are taken during a very short, slow sweep of the potential. The sweep is typically from -20 to +20 mV relative to Eoc. Over this range, the current versus voltage curve is roughly linear.

The graphical output of the experiment is a plot of log current versus potential. Analysis of the curve can often yield the following types of information:

- Corrosion potential;
- Corrosion current and corrosion rate.

The polarization resistance analysis is used to relatively quickly obtain corrosion rates from polarization resistance experiment data. Two points are selected to incorporate the most linear section of the data on either the cathodic or anodic curves and a straight line is drawn between those points. Icorr is determined by the intersection of this line with Ecorr. The corrosion rate curves from the polarization resistance experiment with the Gamry CMS 100 equipment are included in Appendix D. Testing was conducted with a temporary counter electrode that was placed on a sponge wetted with distilled water on the surface of the grout. Significant cracks in the grout can cause uneven data plots due to the direct contact of the wetting agent (distilled water) with the structure being tested. The polarization resistance technique provides a direct measurement of actual corrosion rate which is more reliable than the analysis of potential data alone.

The corrosion rate data for SR-912 Cline Avenue Bridge are summarized in Table C-7 in Appendix E.3. The corrosion rate varied from 0.131 mpy (insignificant) to 3.068 mpy (severe). Only one (3.5%) of 28 tendons tested indicated severe corrosion and 6 of the 28 tendons (21.5%) indicate a high rate of corrosion. However, a majority (71%, 5 out of 7) of the strands tested at the couplers indicate a high to severe rate of corrosion. Excluding the coupler data, less than 10% of high and low point test locations have high corrosion rate. It should be noted that only a small number of locations with potential problems were tested. Typically, high points and changes in cross sections are the locations where separation of grout has been an issue in the past. Because a high percentage of the tested couplers had elevated corrosion rates, the number of couplers should be increased in the next evaluation.

The corrosion rate values indicate the corrosion rate at the time of measurement. Projections of remaining life assume that the corrosion rate will remain constant during that period. If conditions change, the corrosion rate can change with a subsequent impact on the remaining life of the structure.

4.9.9.3 – Corrosion Rate Criteria

Electrochemical techniques are powerful non-destructive tools for evaluating corrosion activity on steel embedded in concrete/grout. The primary difficulty with the technology is that the experiments and analysis of data require extensive experience in order that the data are not misinterpreted. The use of corrosion rate data in conjunction with potential data provides a more meaningful evaluation than can be provided with only corrosion rate data or potentials alone.

The evaluation criteria for the corrosion rate data obtained at the SR-912 Cline Avenue Bridge are shown in Table 3 below.

Corrosion Rate (CR) Mils per Year	**Corrosion Activity**
CR < 0.25	Insignificant
0.25 < CR < 0.50	Minor
0.50 < CR < 1.0	Moderate
1.0 < CR < 3.0	High
CR > 3.0	Severe

Table 3 - Corrosion Rate Evaluation Criteria (SR-912 Cline Avenue Bridge)
mils = one thousand of an inch

The above criteria are based on the time required to corrode 50% of the cross section of the outer wires (of diameter 0.167-inch) in a strand. Thus, a strand experiencing severe corrosion can lose 50% of the cross section of the outer wires in about 8 years. The above criteria are based solely on corrosion. However, the response of the structure to such a section loss depends on a number of other factors and is best addressed by structural engineers. The years to corrode 50% cross-section of a 0.167-inch wire at different corrosion rates are:

- Corrosion rate of 0.25 mpy, 100 years;
- Corrosion rate of 0.50 mpy, 50 years;
- Corrosion rate of 1.0 mpy, 25 years;
- Corrosion rate of 3.0 mpy, 8.3 years;
- Corrosion rate greater than 3.0 mpy, less than 8.3 years.

4.9.9.4 – Cyclic Polarization Experiment

The cyclic polarization technique is normally used to qualitatively evaluate a metal's tendency to pit in a corrosive environment. The experiment is based on a slow linear sweep of the potential of a metal. The initial sweep is towards anodic potentials. When the measured current reaches a specified level, the sweep direction is reversed and a cathodic sweep occurs. The graphical output of the experiment is a plot of log current versus potential. Both forward and reverse sweeps are shown on one plot. Significant hysteresis between the sweeps is an indication of pit formation. The actual parameters utilized for the experiment must be modified to suit the structure being tested and the exact field conditions encountered. The Gamry CMS 100 cyclic polarization scans are included in Appendix E.5.

The applicable Standard is ASTM G61, "Standard Test Method for Conducting Cyclic Potentiodynamic Polarization Measurements for Localized Corrosion Susceptibility of Iron-, Nickel-, and Cobalt-Based Alloys." Since the SR-912 Cline Avenue Bridge is a post-tensioned structure, a modified ASTM G61 method was used in this structure. The potential sweep was limited to Ecorr -0.2 volt to Ecorr +0.2 volt instead of the usual Ecorr -0.5 volt to Ecorr +1.5 volt. Based on these plots, the strands (at test locations) exhibit uniform corrosion at 8 locations, mild pitting at 19 locations, and moderate pitting at 1 location. Table C-7 in Appendix E.3 shows the data at each location. The cyclic polarization plots for each location are included in Appendix E.5.

4.9.10 – Petrographic Examination

4.9.10.1 – Background

The contractor usually follows the project specification for mixing and pumping grout into the duct. Current specifications reflect the industry knowledge developed over the last decade. Prior to 2000, specifications were not clear in terms of the required grout properties, the pumping operations, or the vent requirements to achieve the best result. Some of the earlier specifications allowed the use of expansive admixtures to eliminate voids around the tendon. Some of these admixtures reacted with high pH grout and formed gas that resulted in reducing the pH of the grout. Also, higher pumping pressure allowed separation of fines and bleed water from the grout mass, which then accumulated at the far end. Sometimes the variation in the quality of the grout can be observed visually. At other times, microscopic evaluation allows one to identify the presence of admixtures, separation of grout (if any), water/cement ratio, presence of any hygroscopic materials or salts, and other contaminants. The results of the petrographic examination assist in identifying factors that contribute to corrosion of strands in post-tensioned structures.

4.9.10.2 – Samples Selected for Examination

Samples were selected for petrographic examination based on visual condition of the strand at that location, visual evaluation of the grout, corrosion rate of the strands, and the moisture content of the grout. The following samples were selected for petrographic examination:

- S3B-S12-C3-W5 Low Point - Void channel with exposed strands (visible corrosion on strands). Corrosion rate was at the lower end of the range (0.340 mpy), corrosion classification was 2, and moisture content was 28.92%.
- RA-S4-U4-C1-W2-T43 Coupler - Significant corrosion was observed on the strands, corrosion rate was at the higher end of the range (2.13 to 2.22 mpy), corrosion classification was 4, and moisture content was 19.20%.
- RB-S4-U1-C1-W2-T11 High Point - No visible corrosion on strand, ion rate is at the lower to middle end of the range (0.74 to 0.78 mpy), corrosion classification was 2, and moisture content was 19.25%.
- RC-S2-U8-C1-W1-T1 Coupler - White chalky material at the top, Voids at the top with visible corrosion on strands, corrosion rate was at the higher end of the range (2.2 to 2.3 mpy), corrosion classification was 2, and moisture content was 23.13%.
- RD-S2-U3-C1-W2-T10 Coupler - Pitting type corrosion on strands, corrosion rate was at the higher end (3 mpy), corrosion classification was 2, and moisture content was 17.40%.

Grout samples from the above locations were obtained by RCC and provided to Lankard Materials Laboratory, Inc. for petrographic examination. The report of the petrographic examination is included in Appendix E.8. A summary of the results of the petrographic examination is located in Section 5.7.1.

4.10 – COMPARISON OF AASHTO SPECIFICATIONS

There have been significant changes to the grouting specification since the early 1980s. Most highway projects use AASHTO specification. Since 2001, Post-Tensioning Institute (PTI) has issued its own specification. Most of the changes to the grout properties were due to Florida's experience with corrosion and subsequent failure of tendons in several of the post-tensioned bridges. Table 4 below summarizes the changes in the specifications.

AASHTO Specification (1977 - 1983)	**AASHTO Specification (2006)**	**AASHTO (1999) Segmental Concrete Bridge Guide Specification with 2003 Interim (refers to PTI Guide Specification)**
Admixtures in grout: Admixtures containing chlorides in excess of 0.5% by weight of admixture (assuming 1 lb. Of admixture per sack of cement) is not allowed; Aluminum powder and other gas evolving material may be	Admixtures in grout: Total chlorides shall not exceed 0.08% by weight of cementitious material; Grout shall contain no aluminum powder or gas generating system that produces hydrogen, carbon dioxide, or oxygen. Other admixtures as specified in	Total chlorides shall not exceed 0.08% by weight of cementitious material; Grout shall contain no aluminum powder or gas generating system that produces hydrogen, carbon dioxide, or oxygen; For inert gas forming admixtures, the level of vertical height change

AASHTO Specification (1977 - 1983)	**AASHTO Specification (2006)**	**AASHTO (1999) Segmental Concrete Bridge Guide Specification with 2003 Interim (refers to PTI Guide Specification)**
used to obtain 5 to 10 percent expansion.	10.9.3.1.	shall be no greater 2.0% up to 3 hours (ASTM C940); Other admixtures as specified in Table 3-1.
The water content of the wet grout (for Type I and II cement) shall not exceed a water-cement ratio of 0.45.	The water content of the wet grout shall not exceed a water-cement ratio of 0.45.	The water content of the wet grout shall not exceed a water-cement ratio of 0.45.
All ducts shall have grout opening at both ends. High point vents shall be installed on draped tendons. Low point vents shall be installed if the tendon is grouted in a freezing climate.	All ducts for continuous structures shall have vents at both high and low points (unless the profile changes are small as in continuous slabs) and at additional locations as specified in the contract documents.	Vents shall be placed at: anchorage, high points (when profile change is more than 20 in.), all low points (free draining), inlet at the lowest point, and at major changes in the cross-section of the duct. Vents at high points shall be fixed vertically to assure they are higher than the top of the trumpet or crown of the duct.
The grouting equipment shall include a mixer capable of continuous mechanical mixing.	The grouting equipment for Type B grout material shall include a high-speed shear mixer capable of continuous mechanical mixing.	The grouting equipment shall include a mixer capable of continuous mechanical mixing. Use of compressed air to aid in the pumping of grout shall not be allowed.
Grout shall be allowed to flow from the first vent after the inlet pipe until any residual water or air has been removed. No experience requirement for personnel performing grouting operation.	Grout should be injected from low points pumping towards the high-point vent. Grouting operation shall be carried out by personnel with at least 3 years of experience on projects of similar type and magnitude.	Grout should be injected from low points pumping towards the high-point vent. Grouting operation shall be carried out by personnel with at least 3 years of experience on projects of similar type and magnitude.
The pumping pressure at the tendon inlet shall not exceed 250 psi.	The pumping pressure at the injection vent should not exceed 150 psi. Normal operations shall be performed at approximately 75 psi.	The pumping pressure at the injection vent should not exceed 145 psi for internal polyethylene, external HDPE, or oval or flat steel ducts; or 245 psi for internal circular steel ducts. Normal operations shall be performed at approximately 75 psi.
No specific testing is required for grout material. The pumpability of the grout may be determined by the	No testing is required for grout class C. Grout testing is required for grout class A, B, and D (see section 10.9.3.2 - grout properties) and shall	No testing is required for grout class C. Grout testing is required for grout class A, B, and D and shall meet the following

AASHTO Specification (1977 - 1983)	**AASHTO Specification (2006)**	**AASHTO (1999) Segmental Concrete Bridge Guide Specification with 2003 Interim (refers to PTI Guide Specification)**
Engineer in accordance with U.S. Corps of Engineers Method CRD-C79. When this method is used, the efflux time of the grout immediately after mixing shall not be less than 11 seconds.	meet the following properties: Section 10.9.3.2 Grout Physical properties: Total chloride ions - Max. 0.08% by weight of cementitious material; Fine aggregates - Max size No. 50 sieve or less; Volume change (28 d) - 0 to 0.3% at 24 hours and 28 days; Expansion - 2.0% or less for up to 3 hours; Compressive strength (28 d) - 6000 psi or greater; Initial set - min 3 hours, max - 12 hours; Fluidity test - 11 seconds The measured grout efflux time shall not be faster than: 9 to 20 seconds - immediately after mixing, 30 seconds - 30 minutes after mixing; Bleeding at 3 hours - 0.0% max; Permeability (28 d) - max 2500 coulombs at 30 volts for 6 hours.	properties: Grout Physical properties: Total chloride ions - Max. 0.08% by weight of Portland cement; Volume change (28 d) - 0 to 0.1% at 24 hours and 0.2% at 28 days; Expansion - 2.0% or less for up to 3 hours; Compressive strength - Min. 3000 psi @ 7 days and 5000 psi @ 28 days; Initial set - min 3 hours, max - 12 hours; Fluidity test - 11 seconds The measured grout efflux time shall not be faster than: 11 to 30 seconds - immediately after mixing non-thixotropic and 5 to 30 seconds for thixotropic grouts, 30 seconds - 30 minutes after mixing; Bleeding at 3 hours - 0.0% max; Permeability (28 d) - max 2500 coulombs at 30 volts for 6 hours.
None specified.	Post-grouting inspection: All anchorages and high point vents shall be drilled and probed 48 hours after grouting, until the Engineer is assured that no bleed water or settlement voids exist.	None Specified.

Table 4: Comparison of Grout Properties - Then and Now

4.11 – REVIEW OF 2004 HERCEG REPORT

Review of the 2004 evaluation report by HERCEG indicated that several grout and concrete samples were obtained from SR-912 and tested for chloride content. Appendix E.2 includes 3 pages of test results from the HERCEG report. It identifies a total of 13 grout samples (#1 through #13) and 12 core samples (#1 through #3, and #8 through #16). The grout and core samples were tested between April 21, 2004 and June 4, 2004. Eight out of thirteen grout samples had a chloride content of 0.08% or higher (62% of all grout samples). Since the majority of the grout samples had chloride levels greater than what is required for corrosion, it is important to identify the exact locations of these samples. Since the HERCEG report did not indicate the exact location of the grout samples, RCC personnel visited the INDOT office to review the daily field report in an effort to identify the exact locations of these grout samples.

Table 5 below lists the locations where grout or core samples were taken (based on VSL field report).

Type of Sample	Sample Location	Date Reported
Grout	Ramp C, Span 2, Unit 8, Web 1, Tendon 1, between Piers 401 & 402	May 21, 2004
Grout	Ramp C, Span 2, Unit 8, Web 1, Tendon 2, between Piers 401 & 402	May 21, 2004
Grout	Ramp C, Span 2, Unit 8, Web 2, Tendon 1, between Piers 401 & 402	May 24, 2004
Grout	S3A-S11-C1-W1, between Piers 12 and 13	April 21, 2004
Grout Sample #1	S3A-S11-C3-W5 low point	October 1, 2004
Grout Sample #2	S3A-S11-C3-W5 low point, 25 Feet from Sample #1	October 1, 2004
Grout sample #3	S3A-S11-C3-W5 low point, different tendon than Sample #1 and #2	October 1, 2004
Grout	S4-S18-C2-W4, between Piers 19 and 20 but closer to Pier 20	August 10, 2004
Grout	S4-S18-C4-W7, between Pier 19 and Expansion Joint 7	June 10, 2004
Grout	S4-S18-C4-W7, between Pier 19 and Expansion Joint 7	June 10, 2004
Grout	S5-S22-C1-W2	April 9, 2004
Grout	S6-S25-C3-W5 bottom slab between Piers 26 and 27	October 4, 2004
Grout	S6-S25-C3-W5 bottom slab between Piers 26 and 27	October 4, 2004
Core	S5-S22-C1-W1	April 9, 2004
Core	S5-S22-C1-W1	April 9, 2004
Core	Ramp A, bottom slab of Span 1 near Abutment 200	April 9, 2004
Core	Ramp A	April 9, 2004
Core	Segment 5, Span 22	April 8, 2004
Cores (four in all)	Bottom slab	April 9, 2004
Cores (two for compressive strength)	Segment 1, Web 1, Span 3/4	May 6, 2004
Cores (two for compressive strength)	Segment 2, Web 1, Span 7/8 on deck?	May 6, 2004
Core	S2A-S7-W6, between Piers 8 and 9	April 27, 2004
Cores (two for compressive strength)	S3A-S11-C5, bottom slab between Piers 12 and 13	May 6, 2004
Two cores	S5-S22-C1, bottom slab	April 9, 2004
Core	S6-S26-W8, on deck?	May 6, 2004

Type of Sample	Sample Location	Date Reported
Core	S6-S26-W8, on deck?	May 6, 2004
Core	S6-S26-W8, on deck?	May 6, 2004

Table 5: Grout and Core Sample Locations as Reported in 2004 HERCEG Report

Table 5 identifies 13 grout samples. Eight of the 13 samples were taken after the chloride tests were completed (i.e. after June 4, 2004). It is not clear whether the grout samples taken after June 4, 2004 were tested for chloride content. Further, we still cannot determine the correlation between the grout sample number in the chloride report presented by CTLGroup (see Appendix E.2) and the grout sample locations mentioned in the field report. We have requested information from HERCEG through URS to help correlate and identify the exact location of these grout samples so that future evaluations can include the same locations.

5.0 –SIGNIFICANT FINDINGS

5.1 – DISCUSSION OF THEORETICAL VS ACTUAL DECK SURVEY RESULTS

Several geometry conflicts and omissions were noted when the bridge plans for the as-built cast-in-place concrete alternate were compared with the roadway plans for the project. For layout purposes, the original roadway plans were considered to govern except for instances when it was obvious that changes had been made when the alternate plans were developed.

A comparison of the results shows a fairly accurate correlation between the theoretical and surveyed elevations. The exception appears to occur in areas of super-elevation transition along Line 'E' (mainline) where there is a significant difference between results. Without having final as-built deck elevations for comparison, it is difficult to determine if these differences are a result of field changes or subsequent deflections or a combination of both. For these reasons, the deck survey should be used primarily as a baseline for comparison with any future inspection surveys. See Appendix F for survey results comparisons.

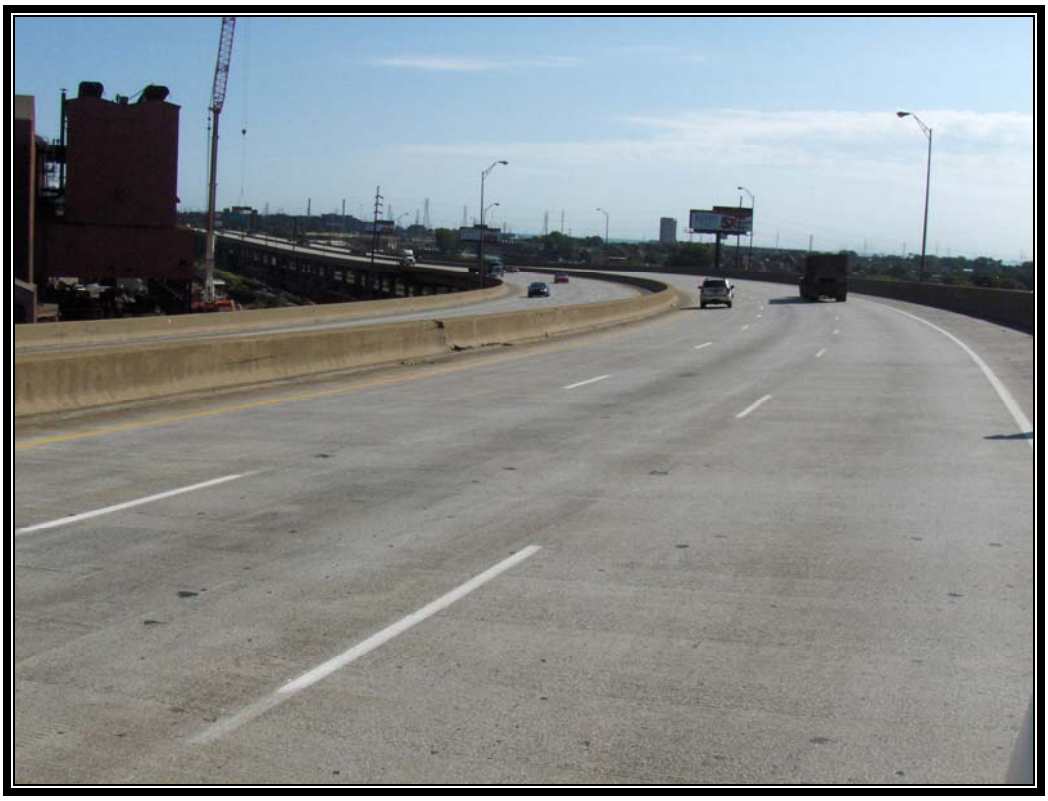
5.2 – DECK CONDITION

The top and bottom of the deck was visually inspected. There is extensive cracking on the top and bottom of the deck. There is also delaminated concrete, spalling, efflorescence, exposed and corroding re-steel and water seepage on the underside of the deck.

Underside of Deck in Center of Cell

The vast majority of the deterioration seen on the underside of the deck is located longitudinally along the centerline of each cell. Transverse effects such as loading creep and shrinkage, and temperature may cause these longitudinal cracks.

From the visual inspection it does not appear that there has been significant advancement of the deterioration of the top of the deck since the 2004 inspection. There is not any significant spalling or areas of patching evident on the deck topside.



Top of Deck Eastbound

The deterioration of the bottom of the deck does appear to have advanced as evidenced by the additional spalling, re-bar exposure and delaminations.

5.3 – 'HOT-SPOT' CRACKS

A total of 303 cracks were previously identified as "hot spot" locations. The width, length, and location of each of these cracks were documented along with a general sketch. These cracks are located throughout the structure, as shown in Table 6 below. *Please note that the exterior cracks inspected were considered "Hot-Spot" cracks and the findings are included in the "Hot-Spot" crack table.*

Segment 1	56
Segment 2	19
Segment 3	99
Segment 4	43
Segment 5	28
Segment 6	34
Ramp A	2
Ramp B	9
Ramp C	7
Ramp D	6
TOTAL	303

Table 6: Number of "hot-spot" cracks per segment or ramp

According to each crack's location on the structure and orientation, these "hot spot" cracks are classified under one of the following categories:

Diaphragm cracks	DP	192
Hinge cracks	HG	23
Web cracks located near a tendon anchorage zone	WA	44
Web cracks possibly due to indirect support	WI	7
Web cracks shear orientated	WS	24
Web cracks following tendon profile	WT	8
Unclassified		5
TOTAL		303

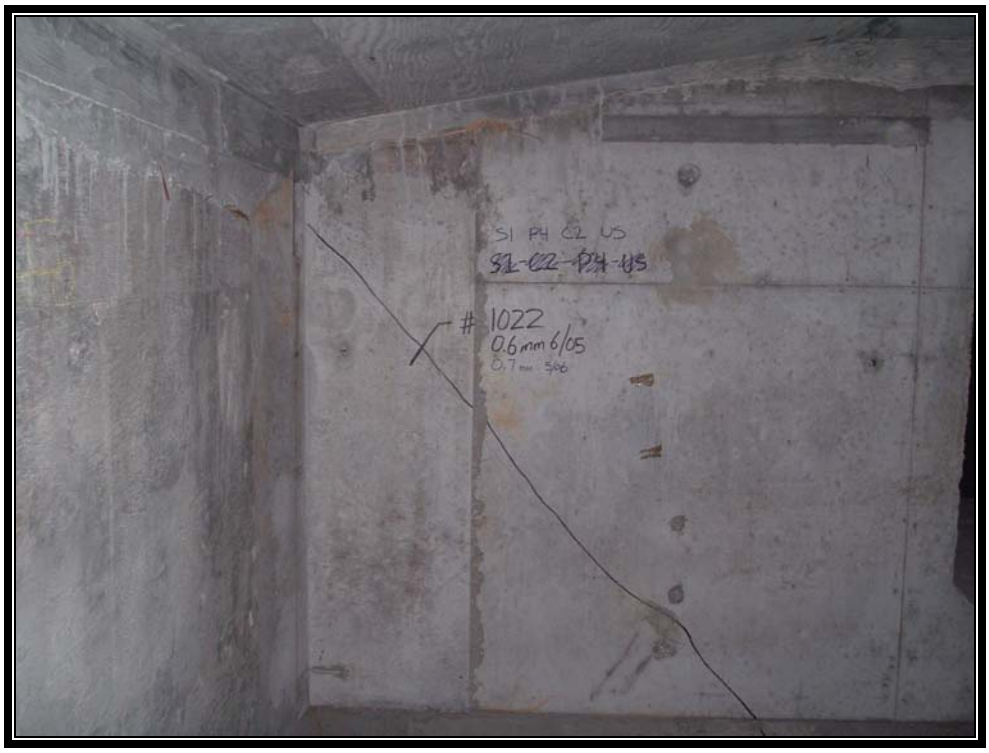
Table 7: Number of cracks per classification

The following section provides a brief description and photograph of each type of crack. A comparison of the data between the current and previous inspections follows. The complete detailed list of the findings and a plan view drawing detailing the locations of the cracks is provided in Appendix G. *The electronic file of the "Hot-Spot" crack table in Appendix G has links for the photograph and sketch for each crack.*

5.3.1 – Diaphragm Cracks (DP)

Diaphragm cracking is found throughout the mainline segments of the Cline Ave Bridge. Full depth diaphragms approximately four feet wide are located inside the cells at each pier locations. In addition, transition diaphragms are located where the structure transitions either the number or arrangement of the cells. Exterior diaphragms are located at pier locations in Segment 1.

Typically, the diaphragm cracks are orientated at approximately 45 degrees, originating near the bottom slab at the center of the diaphragm and terminating at the corner between the diaphragm and web. At many locations, the cracks run thru the access holes. Some of these cracks extend into either the top slab, bottom slab, and/or the web.



Typical orientation of diaphragm cracking (Crack #1022 shown)

5.3.2 – Hinge Cracking (HG)

This category includes all cracking that occurs near hinges in the SR912 structure. These cracks are found in the web, bottom slab, top slab, or backwall at or near a hinge location. Hinges are located between the segment-to-segment connections or segment-to-ramp connections in the structure.

Cracking at the hinge between Segment 3 and Ramp A is of particular concern, because it is shear orientated.

Hinge cracking between Segment 3 and Ramp A

5.3.3 – Web Cracks Located Near a Tendon Anchorage Zone (WA)

This type of cracking is found in the structure near the end of tendon anchorage zone. Typically, these anchorages are found in blisters, which is a widening of the web or bottom slab in which the tendon anchorages are located. This type of cracking is typically found at the end or sides of the blisters or in the adjacent webs.

In Segment 3, the cracking generally occurs in the web above the web blisters. Typically, this type of cracking commences near the bottom slab or blister, extends towards the middle of the span and terminates near the top slab.

Typical cracking at end of web blister anchorage zone (Crack #1061)

Typical cracking in web above blister anchorage zone (Crack #3022)

5.3.4 – Web Cracks Possibly Due to Indirect Support (WI)

This type of crack is located in the web adjacent to diaphragm locations where the bearing is not located directly underneath the web (indirect support). This type of cracking is detected on the exterior of the cells in Segment 1. A total of 7 cracks were found at Piers 5, 6, and 7.

Exterior web cracking possibly due to indirect support (Segment 1, Pier 7).

5.3.5 – Web Cracks Shear Orientated (WS)

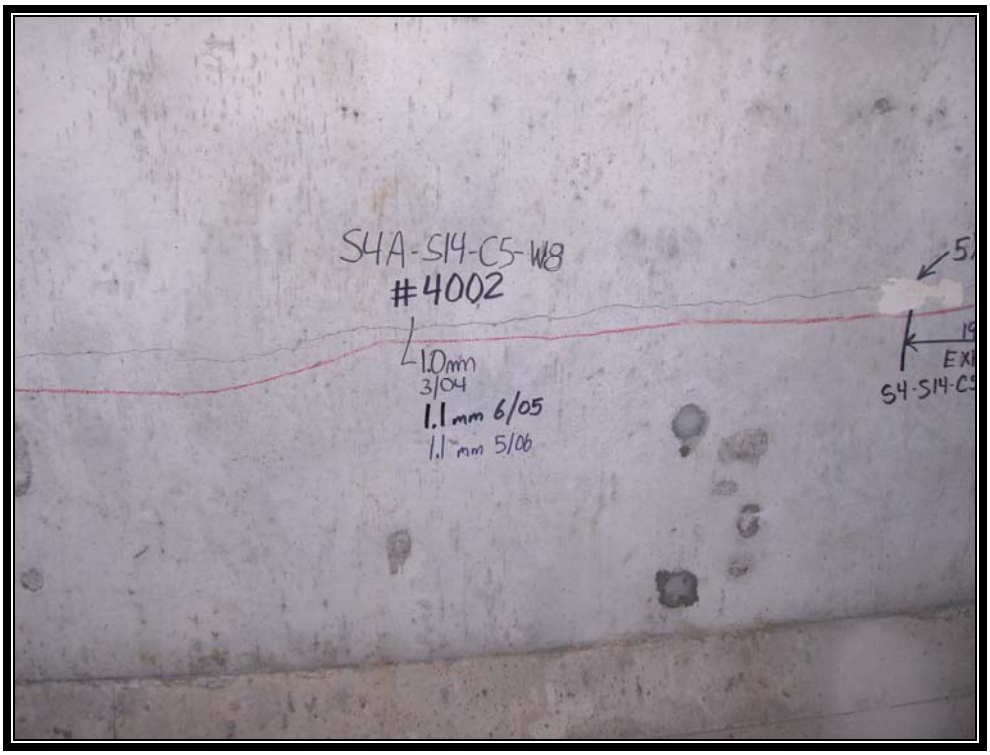
Shear cracks generally are located in the webs near the piers and are inclined at an approximate 45-degree angle. This type of cracking was found on both interior and exterior web faces of the Cline Ave Bridge.

Typical shear orientated crack on interior face (Crack #5020)

In the SR912 bridge shear orientated "hot-spot" cracks most often occur in the cantilever spans, namely in Spans 10, 13 (Cell 5), and 14 of Segment 3, and in Span 18 of Segment 5. However, shear orientated cracking is also concentrated near Pier 13 in Span 11 of Segment 3, where a transition is made from 2 to 3 cells.

5.3.6 – Web – Tensile Stress (TS)

Tensile stress cracks are longitudinal cracks that follow the general path of an internal prestressing tendon. These cracks may be horizontal, straight, or have slight curvature.



Typical web tensile stress crack (Crack #4002)

This type of cracking is prevalent throughout the structure; however the majority of these cracks are not classified as “hot-spots”. The eight “hot-spot” cracks are located in Segments 2, 4, and 5.

5.3.7 – Data Comparison by Segment/Ramp

Approximately 29% of the “hot-spot” cracks show an increase in crack width since the March 2004 inspection. Figure 2 illustrates the number of cracks per segment/ramp with an increase in width since the March 2004 inspection or the July 2005 inspection.

Figure 3 illustrates the percent increase in average crack width since the March 2004 and July 2005 inspections. Only “hot-spot” cracks having data from both inspections were included in the calculations.

Segment 1 is showing substantially more activity (14% increase in average crack width) than the remainder of the bridge (5.4% average for all “hot-spot” cracks), since the March 2004 inspection.

Since only approximately a third of the “hot-spot” cracks have accurate data from the August 1997 inspection, this inspection was not included in the data analysis. Previous reports have shown that crack growth has occurred between the August 1997 inspection and the March 2004 inspection. Data from the August 1997 inspection is provided on the crack summary sheets shown in Appendix G.

As this inspection is helping to develop "baseline" information, comparison of the length of the cracks has not been evaluated in this report. The exact parameters used for calculating diaphragm crack lengths are unclear from previous inspections (e.g., when considering diaphragm cracking which propagates into the web, previous inspections may have only included the crack length on the diaphragm itself, however the total crack length should also include the crack length on the adjacent web). During this inspection, the crack limits have accurately been placed on the wall so that future crack growth can easily be determined.

5.3.8 – Data Comparison by Crack Classification

Diaphragm cracks (DP) and web cracks near tendon anchorages (WA) are showing the most crack activity since the March 2004 inspection. Figure 4 illustrates the number of cracks per crack classification with an increase in width since the March 2004 inspection.

Figure 5 illustrates the percent increase in average crack width since the March 2004 and July 2005 inspections. Only "hot-spot" cracks having data from both inspections were included in the calculations. Diaphragm cracks (DP) have the most amount of growth of the 6 categories (almost 7% in average crack width). Web cracking due to indirect support (WI), typically exterior cracks, have shown no increase in width from the March 2004 inspection.

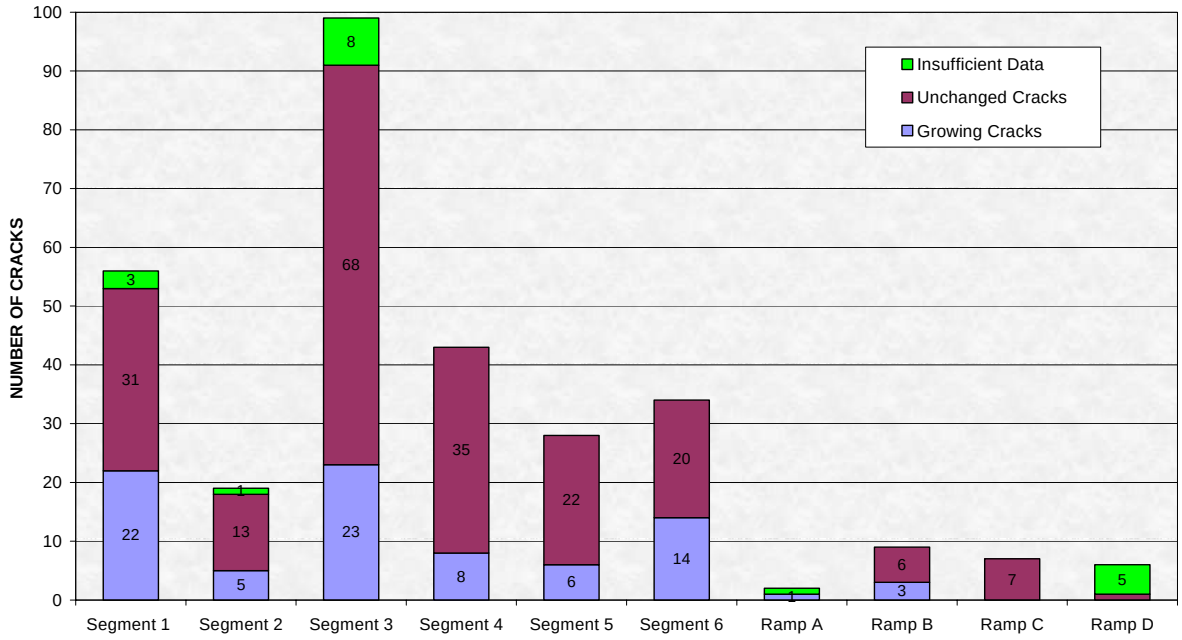


Figure 2: Crack activity since March 2004

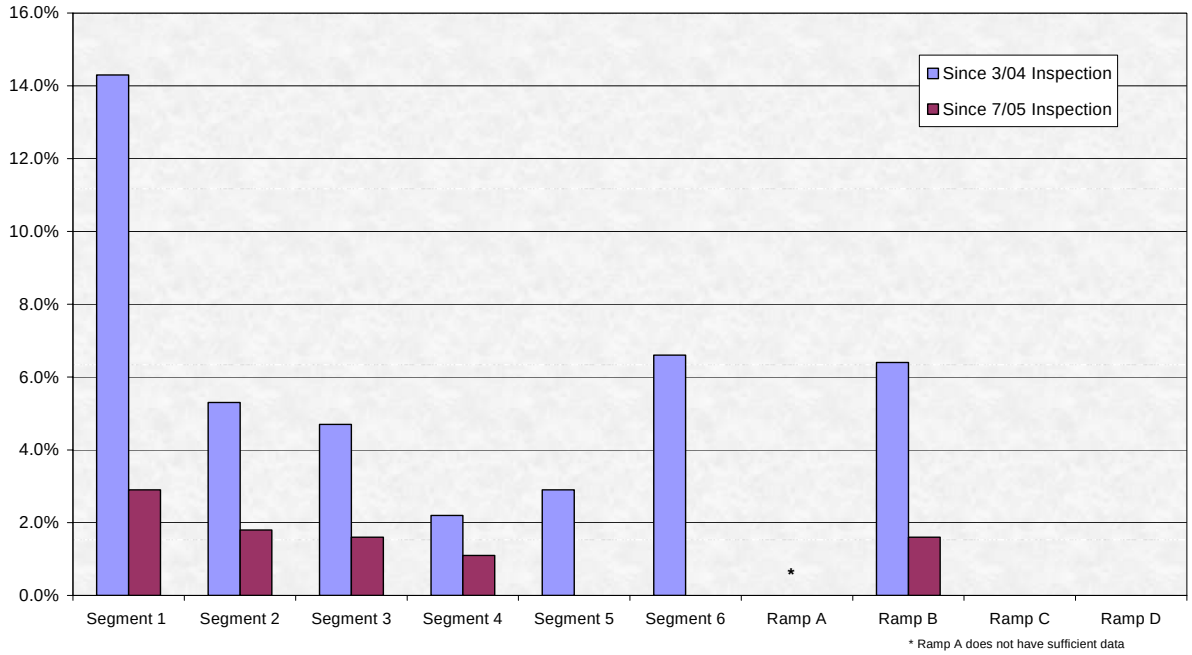


Figure 3: Average percent increase in crack width

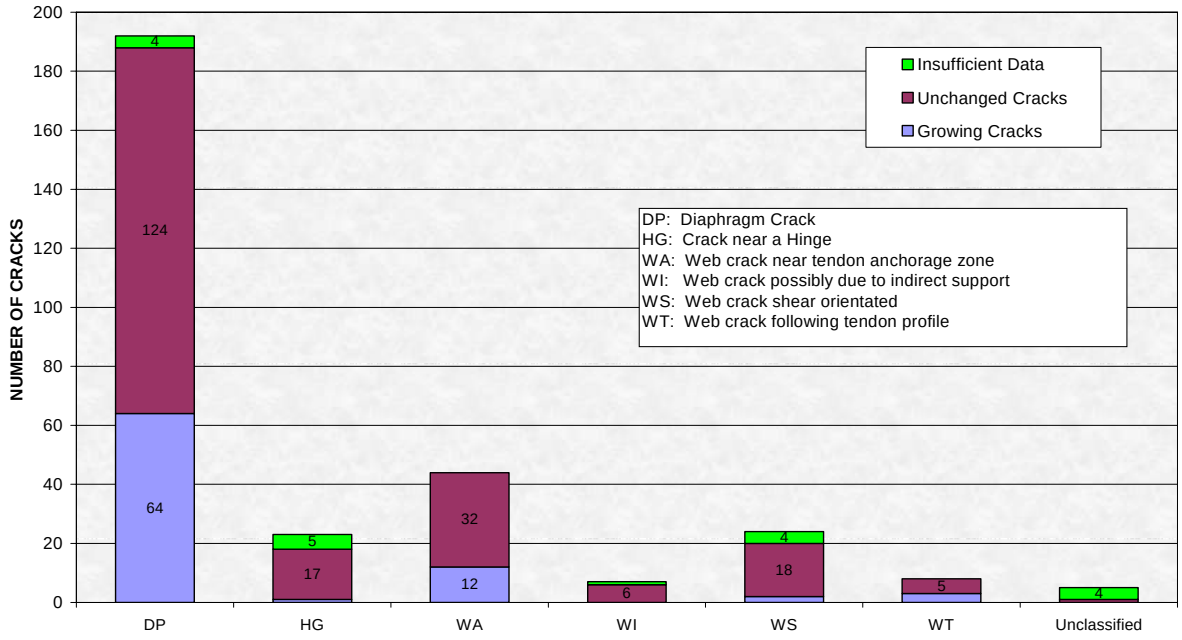


Figure 4: Crack activity since March 2004

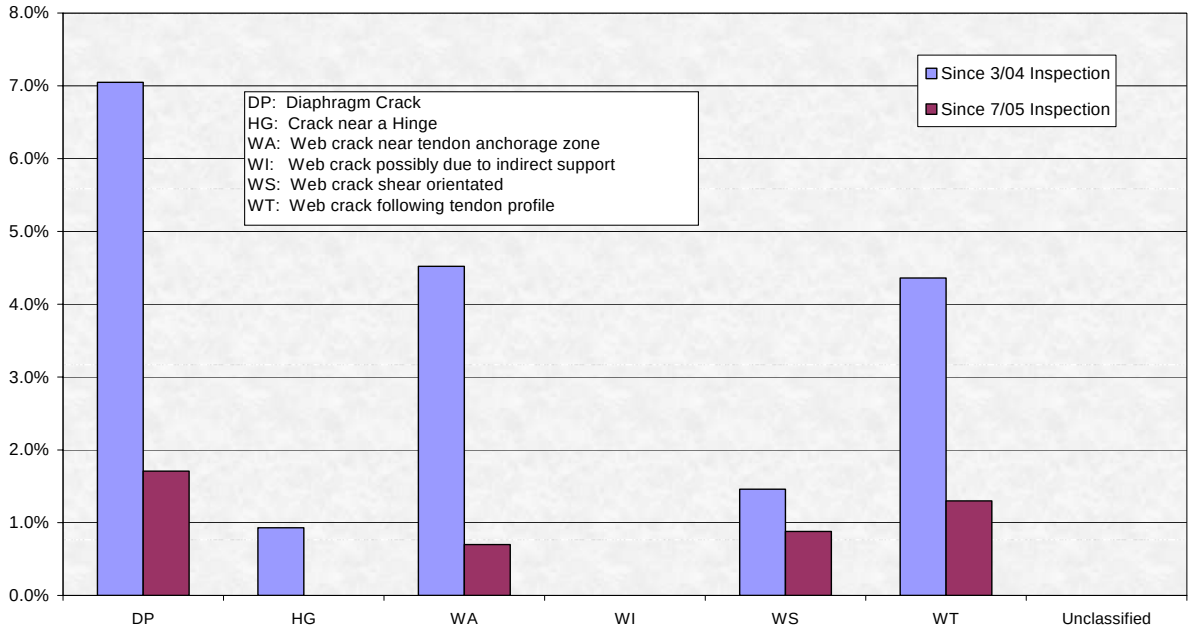


Figure 5: Average percent increase in crack width

5.4 – BEARINGS CONDITIONS

The bearings that were visually inspected appear to be in good condition. The pot bearings and the neoprene bearings are functioning as designed.

Neoprene Bearing at Pier 202

Pot Bearing at Pier 19

A guide bar at one of the pot bearings at Pier 20 has fallen off. The absence of the guide bar has not affected the functionality of the pot bearing. See Appendix H for a summary of the bearing inspection.

5.5 – SUBSTRUCTURE CONDITIONS

The substructure units are in good condition with minor cracking and spalling with some exceptions.

The condition of Piers 7 and 7' continues to deteriorate. The deterioration is limited to the top 4' or 5' of the columns. Column 1 (columns are numbered left to right facing up station) has rebar exposure on two faces, spalling on three faces and cracking and delaminations on all four faces. Column 2 has rebar exposure on three faces and spalling, cracking and delaminations on all four faces. Column 3 has spalling, rebar exposure, cracking and delaminations on all faces. Column 4 has spalling, cracking, rebar exposure and delaminations on all faces. In addition at Column 4 there is cracking and spalling that runs parallel to the bearing faces and is in very close proximity to the faces of the bearing.

East Face of Column 4 at Pier 7

There are a number of hammerhead piers which have what appears to be shear cracking. In many cases the cracks begin at the inside face of the bearings and extends down towards the junction of the hammerhead cap and the stem.

Pier 303 East Face

The affected hammerhead piers are as follows: 105, 201, 202, 205, 303, 405 and 408. These piers are all located on ramp structures. The piers that are exhibiting the shear cracking of the hammerhead cap are not showing any other signs of distress. See Appendix H for a summary of the substructure inspection. *The electronic file of the substructure inspection in Appendix H has links for the photographs of the substructure units inspected.*

5.6 – CONDITIONS OF 2004 TENDON VOID AND LOW LOAD RATING LOCATIONS

There was one crack found in the vicinity of a void. It had a width of 0.4 mm and was found in Segment 4.

The following table delineates categories for the 48 locations inspected that had load ratings below 1.5:

	Total Locations	Locations w/Cracks	Locations w/Multiple Cracks	Locations w/Single Cracks	Locations w/"Hot-Spot" Cracks	Locations w/Hairline Cracks Only
Load Rating (Shear) 1.5>*X*	37	13 (35%)	8 (22%)	5 (14%)	6 (16%)	3 (8%)
Load Rating (Flexure) 1.5>*X*	11	4 (36%)	4 (36%)	0 (0%)	2 (18%)	0 (0%)
Load Rating (Shear) 1.5>*X*>1.25	11	2 (18%)	2 (18%)	0 (0%)	1 (9%)	0 (0%)
Load Rating (Flexure) 1.5>*X*>1.25	10	4 (40%)	4 (40%)	0 (0%)	2 (20%)	0 (0%)
Load Rating (Shear) 1.25>*X*	26	11 (42%)	6 (23%)	5 (19%)	5 (19%)	3 (12%)
Load Rating (Flexure) 1.25>*X*	1	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 8: Load Rating Inspection Categorization

See Appendix I for a summary of findings at the 2004 tendon voids and low load rating locations.

5.7 – CORROSION INSPECTION FINDINGS

Two major changes (among others) incorporated into the AASHTO grouting specification since 1980 are the elimination of gas forming admixtures and the establishment of a maximum pumping pressure of 150 psi (see Table 4 in Section 4.10 for a full comparison).

The 2004 HERCEG report identified 13 grout samples and 12 core samples that were tested for chloride content. Eight of the 13 grout samples had a chloride content of 0.08% or higher. The

locations where high chloride content exists should be identified so future testing can be performed at some of those locations. The location information has been requested from HERCEG through URS so that we can correlate and identify locations for future inspections.

Tendon wires/strands were examined for corrosion and classified in accordance with criteria included in this report. The corrosion on the wires/strands ranged from 2 (light surface rust) to 4 (surface rust with pits). The level of corrosion was the same or higher for wires/strands that were not embedded in grout as for wires that were embedded. Two of the test locations had a broken wire one was in the mainline and the other was in Ramp D. These wire breaks are stress related and not due to corrosion.

The potential ranged from -276 mV Ag/AgCl (90% probability of active corrosion) to -40 mV Ag/AgCl (90% probability of no active corrosion). A silver/silver chloride (Ag/AgCl) reference electrode was utilized to assure accurate data due to the presence of suspected elevated chloride concentrations. The potential values only indicate the probability of active corrosion. Corrosion rate measurements are necessary to determine the significance of any corrosion activity that is present on embedded steel. The use of potential data in conjunction with corrosion rate data provides a more meaningful evaluation than can be provided with only potentials or corrosion rate data alone.

The rate of corrosion at the test locations ranged from 0.127 mpy (insignificant) to 3.138 mpy (severe). 75% of the test locations had insignificant, minor, or moderate rates of corrosion. 21.4% of the test locations had high rates of corrosion and 3.6% of the test locations had severe rates of corrosion. 71% of the test locations at couplers had high or severe corrosion rates. Only 9.5% of the other (non-coupler) test locations had high rates of corrosion. Future evaluations of these structures should include a higher percentage of couplers than were included as part of this evaluation. Cyclic polarization testing determined that the type of corrosion at the test locations ranged from uniform corrosion to moderate pitting with the majority (68%) of the locations experiencing mild pitting corrosion. Pitting corrosion can lead to wire breaks significantly sooner (two to four times faster) than uniform corrosion.

5.7.1 – Petrographic Examination Summary and Conclusions

The weight of the grout samples range from 5 to 24 grams. The grout sampling sites chosen for the Lankard Materials Laboratory, Inc. (LML) study represent sites in the bridges where RCC measured "high" corrosion rates at three sites (RA-S4-U4-C1-W2-T43 Coupler, RC-S2-U8-C1-W1-T1 Coupler, and RD-S2-U3-C1-W2-T10 Coupler); a "low to moderate" corrosion rate at one site (RB-S4-U1-C1-W2-T11 High Point); and a "low" corrosion rate at one site (S3B-S12-C3-W5 Low Point). The sampling sites represent one "high-point", one "low-point", and three coupler sites.

Most of the surfaces on the grout samples are fracture surfaces. All of the grout samples have one surface that was in contact with prestressing wires in service. The artifact of this contact is an imprint of the wires on the grout.

The primary focus of the LML study is on features of the grouts that would be expected to have some effect on the corrosion of the prestressing elements (including the ducts) in service. It is acknowledged that the small grout samples examined here represent a tiny fraction of the grout that is in place in the structures. Despite this, the observations and conclusions of the petrographic analysis can be viewed in a global context with respect to what has influenced the corrosion activity in the SR-912 structures.

5.7.1.1 – Characterization of the Grout

- The grout is a simple mixture of Portland cement and water.
- The water-cement ratio (w/c) of the grout samples ranges from 0.35 to 0.49, with an average value of 0.40.
- The grout is not air-entrained. The entrapped air content is low, ranging from 0.3 percent to 3.2 percent. The average air content is 1.9 percent. No air entraining admixture or air-inducing shrinkage compensating additive was used in the grout.
- The SSD density of the grout samples (which correlates with the unit weight of the fresh grout) ranges from 112.9 lb/ft^3 to 124.5 lb/ft^3, with an average value of 119.8 lb/ft^3.
- The water absorption value of the grout samples ranges from 21.2 percent to 32.3 percent, with an average of 25.6 percent.
- The permeable void volume for the grout samples ranges from 34.8 percent to 45.7 percent, with an average value of 39.4 percent.
- The factors affecting the variability in w/c, absorption, porosity, and density of the grout samples are discussed in detail in the Lankard Materials Laboratory, Inc. report included in Appendix E.8.

5.7.1.2 – The Primary Grout-Related Factor Affecting the Corrosion Issue

- It is assumed that corroding elements in the bridge structures include both the prestressing tendons and the tendon ducts.
- Under ideal conditions in service the duct is completely surrounded on the exterior surfaces by Portland cement concrete and on the interior surfaces by complete coverage of the Portland cement grout. Under ideal conditions in service the prestressing tendons are completely embedded in the Portland cement grout. These ideal conditions were not consistently realized in the present case. It is understood that borescope sightings revealed the presence of voids in the ducts where both the interior duct wall and portions of the prestressing wires were revealed.
- At least some of the voids in the ducts can be attributed to the occurrence of bleeding in the grout. Bleeding involves the downward segregation of solid particles under the force of gravity in a fluid cementitious system. Bleeding is influenced by the water content of the grout and by the duration of the open-time of the grout.
- The average water-cement ratio (w/c) of the grout samples examined here (0.40) is not abnormally high for a grout of this era. However, it is now recognized that anti-bleeding additives are necessary if the complete elimination of bleeding is desired. Most proprietary commercial grouts now contain such an additive.
- It is this feature of the grout (bleeding) that is judged to have had the greatest effect on the formation of voids in the ducts. Where the duct walls and prestressing elements lost

contact with the hardened grout material (with a pH of 13.5) the steel was not protected from corrosion. It is very likely that it is this corrosion activity that has caused the greatest amount of corrosion-related distress in the bridges.

5.7.1.3 – Other Grout-Related Factors Affecting the Corrosion Issue

- Several other features of the grout samples examined here could have led to an increased potential for corrosion activity in the prestressing elements. They include: 1) cracking in the grout; 2) the presence of voids at the interface between the grout and the prestressing wires; and 3) carbonation of the grout in contact with the prestressing wires.
- Cracking in the grout was observed in two of the five samples. The two samples are Grout Sample 1 (S3B-S12-C3-W5) and Grout Sample 4 (RC-S2-U8-C1-W1-T1). However, it is also possible that some of the fracture surfaces that represent the exterior surfaces of the other three grout samples were also pre-existing fractures. Fractures within the grout in service represent potential conduits for air and moisture to the prestressing wires.
- Voids at the interface between the grout and the prestressing wires were seen in all five of the grout samples examined. The presences of voids represent small sites where the wires are not protected by contact with the high pH of the grout.
- Most of the material comprising the five grout samples shows the high pH level (13.5) expected for a Portland cement-based material. However, four of the five grout samples showed a reduced pH level on the grout in contact with the prestressing wire (relative to the expected value of 13.5 for a Portland cement-based material). It can not be said with certainty that the reduced pH levels at these sites represent the condition of the grout in service.

The probability that cracking, voids, and carbonation has not had a significant effect on the corrosion of the prestressing wires in these grout samples is based on the conclusion reached from the petrographic examination that the corrosion products present on the wire imprints do not represent the reaction products of in-situ corrosion. There is compelling evidence to indicate that the corrosion products observed on these grout samples were present on the prestressing

5.7.1.3 – Other Grout-Related Factors Affecting the Corrosion Issue (con't)

wires prior to the placement of the grout. This issue is discussed in detail in the Lankard Materials Laboratory, Inc. report included in Appendix E.8.

6.0 – CONCLUSIONS AND RECOMMENDATIONS

6.1 – CORROSION CONSULTANT CONCLUSIONS

6.1.1 – Mainline Corrosion Activity

Relatively minor corrosion has occurred at the majority of the test locations along the main bridge structure. The majority of the test locations have experienced Class 2 (minor) corrosion. The Class 2 corrosion was typically discoloration of the wires or a thin layer of surface rusting. One location had Class 3 corrosion (surface corrosion with minor pitting) and another location had Class 4 corrosion (surface corrosion with pitting). There was one broken wire at one location (Class 9), but there was no evidence of necking or loss of section on the wire due to corrosion.

Corrosion rate data indicated minor corrosion activity at most test locations with moderate corrosion activity indicated at one location. A high level of corrosion activity was indicated at one location.

The pH of the grout was generally between 11 and 13 at strand depth which would support passivation of the wires. There was only one location where the pH at strand depth was below 11 and only minor corrosion was indicated at that location.

6.1.2 – Ramp "A" Corrosion Activity

Relatively minor corrosion has occurred at three of the five test locations along Ramp A. The three locations were the high and low test point locations. The Class 2 corrosion at these three locations was typically discoloration of the wires or a thin layer of surface rusting. The two coupler test locations along Ramp A had evidence of slightly higher levels of corrosion that ranged from Class 2 to Class 4.

Corrosion rate data indicated minor corrosion activity at the three high/low test locations. Corrosion rate data indicated moderate corrosion activity at one of the couplers and a high level of corrosion activity at the other coupler.

The pH of the grout was generally between 11 and 13 at strand depth which would support passivation of the wires.

6.1.3 – Ramp "B" Corrosion Activity

Relatively minor corrosion has occurred at the three test locations along Ramp B. The three locations were the high and low test point locations. The Class 2 corrosion at these locations was typically discoloration of the wires or a thin layer of surface rusting.

Corrosion rate data indicated minor corrosion activity at the three test locations.

The pH of the grout was 11 at strand depth which would support passivation of the wires.

6.1.4 – Ramp "C" Corrosion Activity

Relatively minor corrosion has occurred at the majority of the test locations along Ramp C. The majority of the test locations have experienced Class 2 (minor) corrosion. The Class 2 corrosion was typically discoloration of the wires or a thin layer of surface rusting. Only one location had Class 3 corrosion.

Corrosion rate data indicated minor corrosion activity at one test location, moderate corrosion activity at two locations, and a high level of corrosion activity at three locations. Two of the three locations with high measured corrosion rates were at couplers where the configuration of the couplers may have resulted in data anomalies. The issue at the couplers will be addressed by modifying the test procedures during future testing to determine if the test parameters need revision.

The pH of the grout was generally between 11 to 13 at strand depth which would support passivation of the wires.

6.1.5 – Ramp "D" Corrosion Activity

Relatively minor corrosion has occurred at the majority of the test locations along Ramp D. The majority of the test locations have experienced Class 2 (minor) corrosion. The Class 2 corrosion was typically discoloration of the wires or a thin layer of surface rusting. One location had Class 3 corrosion. There was one broken wire at one location (Class 9), but there was no evidence of necking or loss of section on the wire due to corrosion.

Corrosion rate data indicated minor corrosion activity at the three high/low test locations, a high level of corrosion activity at one coupler test location, and a severe level of corrosion activity at another coupler test location.

The pH of the grout was generally between 11 to 13 at strand depth which would support passivation of the wires.

6.1.6 – Alkalinity of Grout

The pH of the grout at strand level was 11 or above at all test locations on the main bridge structure and the ramps except one, where it varied from 9 to 13. Several locations had a measured pH of 11 at the strand level. It is possible that some of those locations may contain isolated areas where the pH is below 11. If so, the passivating film may be compromised and localized corrosion could occur.

6.1.7 – Moisture of Grout

The moisture content of grout samples extracted from the main bridge structure and the ramps ranged from 10.61% to 28.92% which indicates that there is sufficient moisture in the grout to support corrosion of the tendons.

6.1.8 – Environmental Conditions

Significant variations in temperature (70°F to 94°F) and humidity (49% to 70%) were recorded in the main bridge and ramp structures during the test period. Given the wide variations in temperature and humidity that were measured, condensation can be expected to occur within the main bridge and ramp structures. Condensation can result in corrosion of strands at locations where there are voids or carbonated grouts within the ducts assuming that the moisture can penetrate the ducts. There are a number of locations along the main bridge and ramp structures (particularly at couplers and high points) where voids were found. Corrosion can occur on the tendons at those locations when moisture is available.

6.2 – CORROSION CONSULTANT RECOMMENDATIONS

6.2.1 – Overall Corrosion Activity

Measured corrosion rates on the main bridge and ramp structures ranged from 0.127 mpy (minor corrosion) to 3.138 mpy (severe corrosion). The majority (75%) of the test locations had either minor or moderate rates of corrosion. Six (21.4%) of the test locations had high rates of corrosion and one (3.6%) test location had a severe rate of corrosion.

The test locations with high or severe rates of corrosion were generally at couplers. 71% of the couplers that were tested had high or severe corrosion rates. Only 9.5% of the other (non-coupler) test locations had high rates of corrosion. Future evaluations of these structures should include a higher percentage of couplers than were included as part of this evaluation.

Analyses of data at individual test locations indicated that some of the high measured corrosion rates at the couplers may be due to an assumed surface area that was smaller than the surface area that was actually influenced by the testing. Future evaluations at couplers should determine the actual number of strands that are influenced by the corrosion rate testing to verify that corrosion rate data are representative of the specific couplers.

6.2.2 – Significant Findings of the Petrographic Examination

The following summarizes the findings of the petrographic examinations. The report from Lankard Materials Laboratory, Inc. is included in Appendix E.8.

- The grout is a simple mixture of Portland cement and water with a water-cement ratio (w/c) ranging from 0.35 to 0.49 with an average value of 0.40. The grout is not air-entrained. The entrapped air content is low, ranging from 0.3 percent to 3.2 percent with an average air content of 1.9 percent. No air entraining admixture or air-inducing shrinkage compensating additive was used in the grout. The SSD density of the grout samples (which correlates with the unit weight of the fresh grout) ranges from 112.9 lb/ft^3 to 124.5 lb/ft^3 with an average value of 119.8 lb/ft^3. The water absorption value of the grout samples ranges from 21.2 percent to 32.3 percent, with an average of 25.6 percent. The permeable void volume for the grout samples ranges from 34.8 percent to 45.7 percent, with an average value of 39.4 percent.

- At least some of the voids observed in the ducts can be attributed to the occurrence of bleeding in the grout. Bleeding involves the downward segregation of solid particles under the force of gravity in a fluid cementitious system. Bleeding is influenced by the water content of the grout and by the duration of the open-time of the grout. The average water-cement ratio (w/c) of the grout samples examined here (0.40) is not abnormally high for a grout of this era. However, it is now recognized that anti-bleeding additives are necessary if the complete elimination of bleeding is desired. Most proprietary commercial grouts now contain such an additive. Bleeding has the greatest effect on the formation of voids in the ducts. Where the duct walls and prestressing elements lost contact with the hardened grout material (with a pH of 13.5) the steel was not protected from corrosion. It is very likely that it is this corrosion activity that has caused the greatest amount of corrosion-related distress in the bridges.

- Cracking in the grout was observed in two of the five samples. However, it is also possible that some of the fracture surfaces that represent the exterior surfaces of the other three grout samples were also pre-existing fractures. Fractures within the grout in service represent potential conduits for air and moisture to the prestressing wires.

- Voids at the interface between the grout and the prestressing wires were seen in all five of the grout samples examined. The presence of voids represents small sites where the wires are not protected by contact with the high pH of the grout.

- Most of the material comprising the five grout samples shows the high pH level (13.5) expected for a Portland cement-based material. However, four of the five grout samples showed a reduced pH level on the grout in contact with the prestressing wire (relative to the expected value of 13.5 for a Portland cement-based material). It can not be said with certainty that the reduced pH levels at these sites represent the condition of the grout in service.

- The probability that cracking, voids, and carbonation has not had a significant effect on the corrosion of the prestressing wires in these grout samples is based on the conclusion reached from the petrographic examination that the corrosion products present on the wire imprints do not represent the reaction products of in-situ corrosion. It appears that the corrosion products observed on the grout samples were present on the prestressing wires prior to the placement of the grout. The conclusion that the corrosion products on the grout samples were present prior to the placement of the grout is further supported by the potential data which indicated a low probability of active corrosion even where corrosion was visually present on the tendons.

6.2.3 – Future Corrosion Activity

The rate of corrosion can be expected to increase in the future as the structures experience cycles of significant temperature variations and the application of deicing salt.

6.2.4 – Deck Corrosion

During the evaluation, several large cracks were observed in the deck where there was evidence of corrosion and spalled concrete. There were also crack locations in the deck where corrosion was not apparent, but there was evidence of moisture penetration. The evaluation of the deck was not part of the evaluation that is the subject of this report. However, consideration should be given to expanding the scope of services for future evaluations to include evaluation of the deck in the areas of significant cracking/spalling to determine the extent and severity of corrosion activity.

6.2.5 – Coupler Evaluation

Future evaluations should include a higher percentage of test locations at couplers due to the higher corrosion rates that were measured at those locations during this evaluation. (Note: Analyses of data at individual test locations indicated that some of the high measured corrosion rates at the couplers may be due to an assumed surface area that was smaller than the surface area that was actually influenced by the testing. Future evaluations at couplers should determine the actual number of strands that are influenced by the corrosion rate testing to verify that corrosion rate data are representative of the specific couplers.)

6.2.6 – Chloride Evaluation

Identify the locations where high chlorides were measured, as discussed in the 2004 HERCEG Report, on these structures so that additional testing can be performed during the next evaluation to confirm the test results.

6.2.7 – Wire Evaluation

Samples of broken wires should be collected and evaluated to determine the cause of the breaks and whether they failed during initial stressing or due to fatigue.

6.2.8 – Deck Evaluation

Perform a corrosion evaluation of the deck in the areas with significant cracking and/or delamination to determine the extent and severity of corrosion activity.

6.3 – URS RECOMMENDATIONS

6.3.1 – “Hot-Spot” Cracks

The five bridges are all showing continual degradation throughout each structure, from the substructure to the roadway deck. The “Hot Spot” cracks continue to grow wider and longer, at a steady rate. The deck cracking and subsequent flow of salt and water from the roadway deck is alarming and requires a methodology of inspection that better determines the quantitative deterioration. It is recommended that the inspection of the “Hot Spot” cracks be performed every 12 months and that a protocol is developed for assessing the deterioration and chloride

content in the roadway deck every 12 months. This would allow an alternating pattern of "Hot Spot" crack inspection and deck condition inspection. It is recommended that the corrosion consultant be consulted to aide in the deck condition assessment.

6.3.2 – Roadway Deck

There were borescope borings performed on the roadway deck in 2004. It is strongly suspected that water and chloride ions are flowing down between the epoxy filler core and the concrete deck to the reinforcing steel at these locations. It is recommended that protocols and methodology be developed to determine the amount of infiltration and corrosion.

6.3.3 – Tendon/Coupler Testing

A portion of the 28 locations selected for corrosion testing of the steel tendons were areas where voids were found during the 2004 inspection. It was discovered that the tendons at the void locations have a higher amount of corrosion than areas tested without voids. During the next six month inspection it is recommended that a majority of the testing locations be at void locations. Employing the baseline data on the corrosion of the tested tendons it is recommend that these tendons be retested. Then a comparison could be made of the corrosion rate of the tendons prior to the voids being and after the voids had been filled.

6.3.4 – Load Rating Analysis

It is recommended that since baseline data has been acquired that a load rating analysis be initiated during the next inspection cycle. The inspection, corrosion testing and load rating analysis interrelate. The field inspection and testing provides information employed in the load rating process and the load rating process will aide in guiding the inspection and testing to more applicable locations.

6.3.5 – Hinges

The hinges show an accelerated rate of deterioration compared to the remainder of the structure. This is probably due to the myriad of forces acting on them and weathering accessing into the interior areas from the deck above and the exterior sides. A more complete inspection of the hinges is recommended both internally and externally.

6.3.6 – Rehabilitation

These structures are scheduled for rehabilitation in 2009. This is a logical step since the inspection, testing and analyses that are being performed will aide in determining the rehabilitation required. The inspection process is at an early stage and as this process progresses there will be a more complete understanding of the structures condition. It is apparent at the current time that there are two items that do require attention. They are the rehabilitation of the upper portion of the columns at Piers 7 and 7' and the rehabilitation of the roadway deck where chloride ions and water continue to degrade the reinforcing steel. If a load analysis determines there are structural deficiencies causing the "hot-spot" cracking then rehabilitation to correct these deficiencies will be recommended.

The Appendices of this Report

Are not Included

In the Calculation Book

BRIDGE INSPECTION REPORT
PHASE 2

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

STATE OF INDIANA
DEPARTMENT OF TRANSPORTATION

APRIL 2007

URS

BRIDGE INSPECTION REPORT
PHASE 2

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

MAINLINE	**BRIDGE NO. 912-45-2546A**
RAMP A	**BRIDGE NO. 912-45-2546RWXA**
RAMP B	**BRIDGE NO. 912-45-2546RWN**
RAMP C	**BRIDGE NO. 912-45-2546RENA**
RAMP D	**BRIDGE NO. 912-45-2546REX**

PREPARED FOR:

STATE OF INDIANA

DEPARTMENT OF TRANSPORTATION
OFFICE OF TECHNICAL SERVICES
BRIDGE INSPECTION SECTION

APRIL 2007

PREPARED BY:

URS

SENIOR INSPECTING ENGINEER — 4/20/2007 DATE
URS CORPORATION

LEAD FIELD INSPECTING ENGINEER — 4/20/2007 DATE
URS CORPORATION

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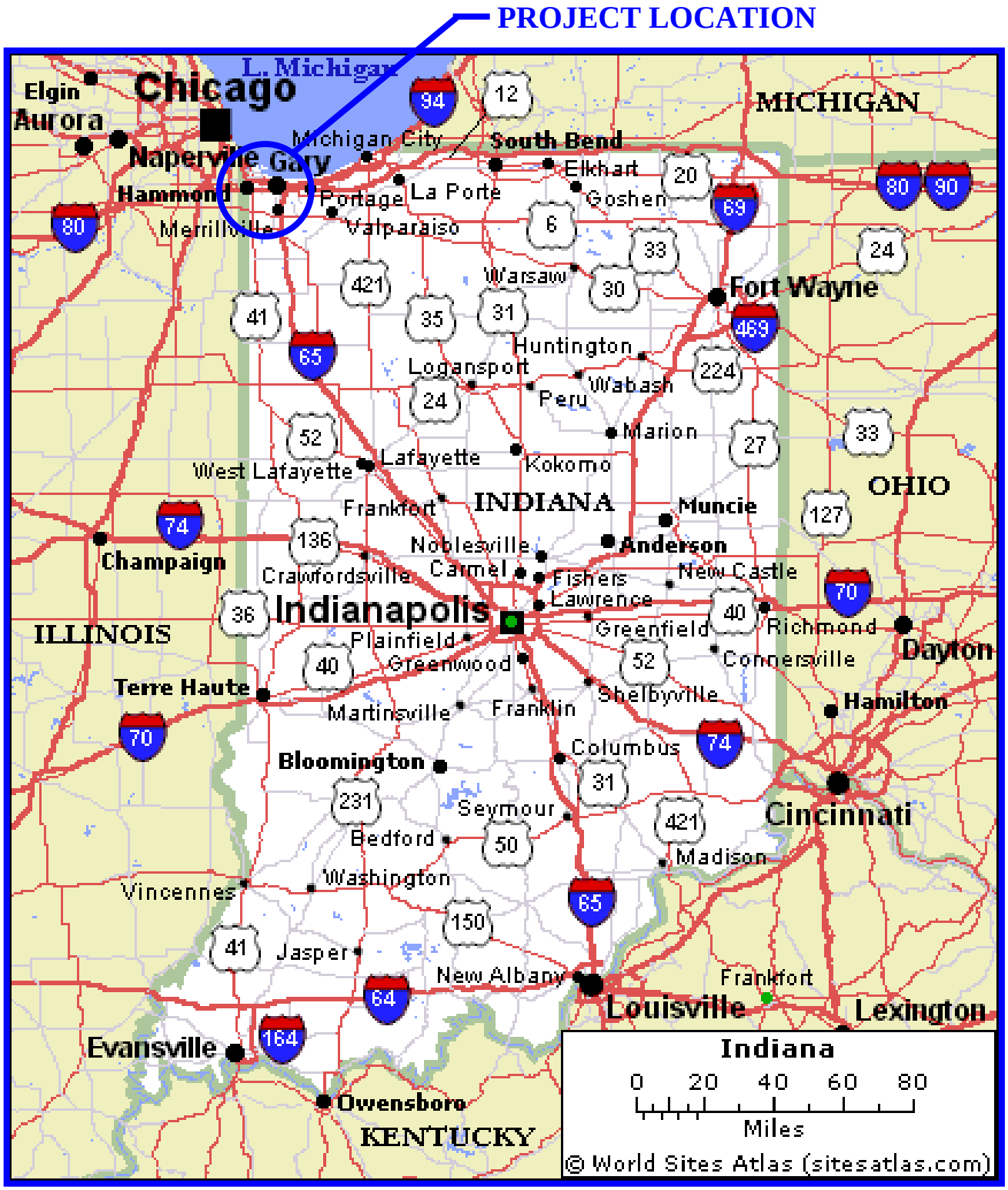
MISCELLANEOUS FILES

Folder 1 - Hot-Spot Crack, Corrosion Testing Locations & VSL Daily Inspection Logs

DISCLAIMER

This inspection report is based on data and conditions that are generally applicable as of April 2007 and the conclusions and recommendations herein are therefore applicable only to that timeframe. This report should not be used as the sole basis for final design, construction or remedial action, or as a basis for major capital decisions. Further studies including a complete load rating analysis, testing of the top deck, hinge inspection and additional post-tensioning system testing should be performed prior to such decisions.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Hammond
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Michigan City
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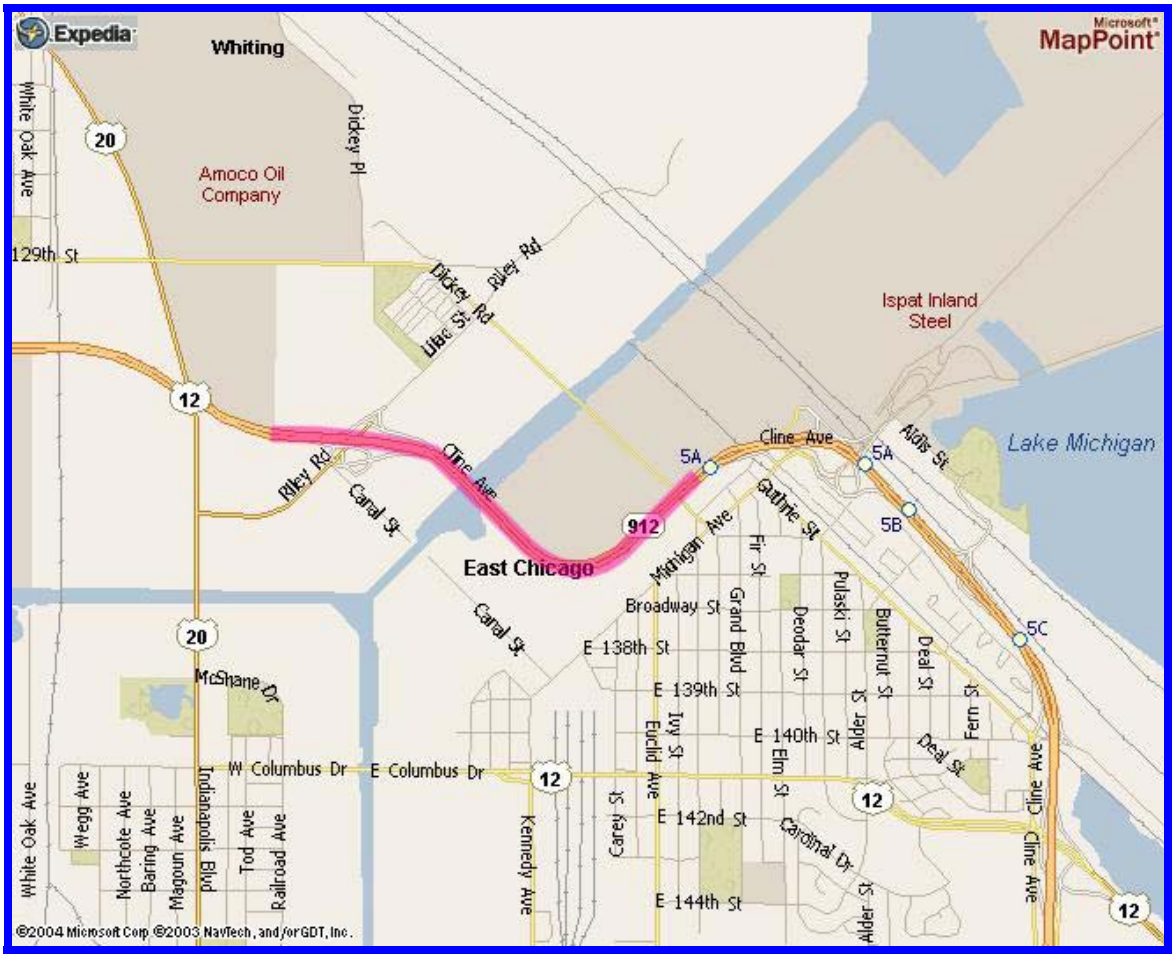
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Canal St
Michigan Ave
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Broadway St
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E 142nd St
E 144th St
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Fir St
Deodar St
Pulaski St
Butternut St
Deal St
Fern St
Alder St
Elm St
Ivy St
Euclid Ave
Carey St
Kennedy Ave
Cardinal Dr
W Columbus Dr
E Columbus Dr
McShane Dr
White Oak Ave
Wegg Ave
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Railroad Ave
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5B
5C
20
12
912
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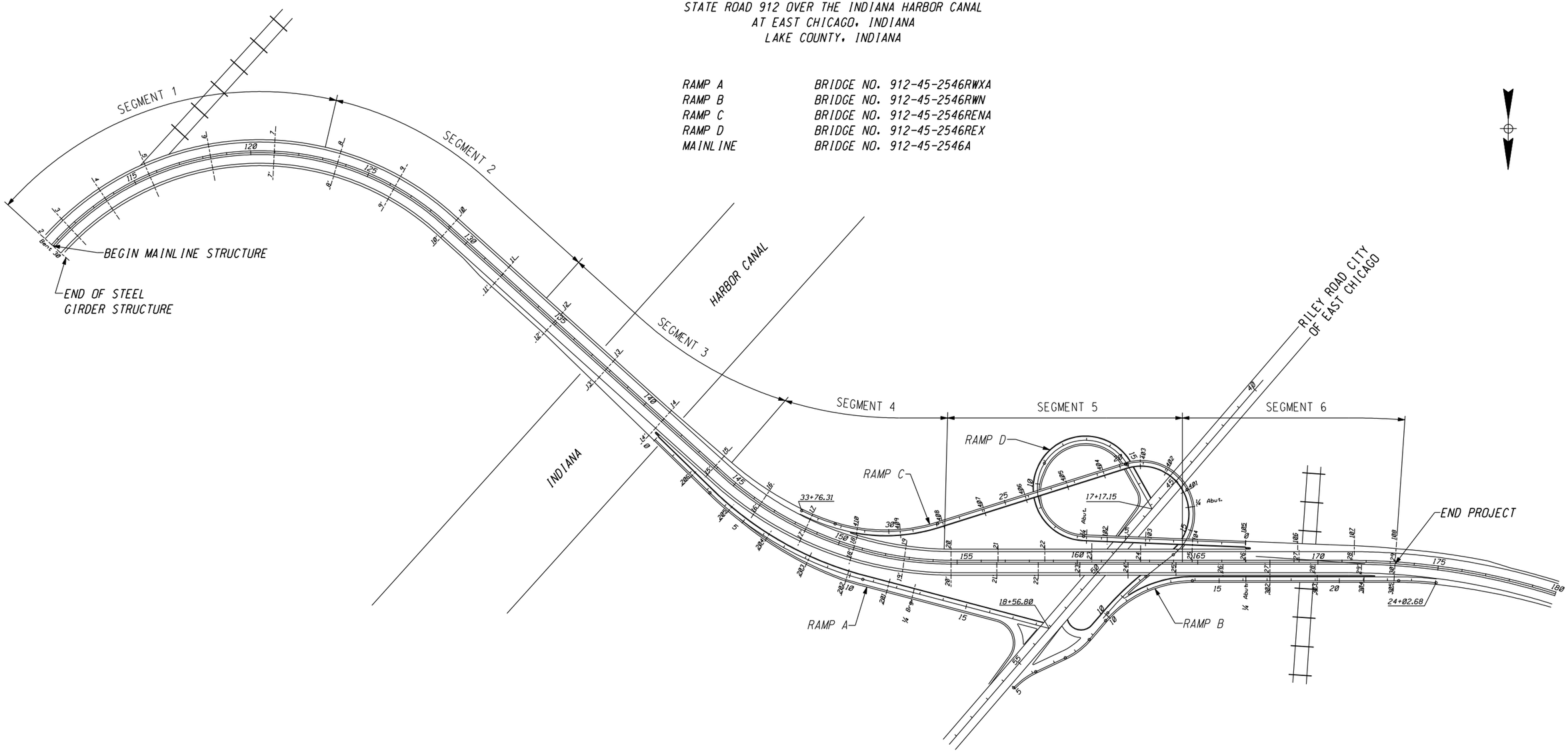
CLINE AVENUE BRIDGE

STATE ROAD 912 OVER THE INDIANA HARBOR CANAL
AT EAST CHICAGO, INDIANA
LAKE COUNTY, INDIANA

RAMP A	BRIDGE NO. 912-45-2546RWXA
RAMP B	BRIDGE NO. 912-45-2546RWN
RAMP C	BRIDGE NO. 912-45-2546RENA
RAMP D	BRIDGE NO. 912-45-2546REX
MAINLINE	BRIDGE NO. 912-45-2546A



GENERAL LAYOUT PLAN

1.0 – INTRODUCTION

1.1 – GENERAL

In accordance with an agreement with the Indiana Department of Transportation, URS Corporation re-inspected the "Hot-Spot" locations and conducted localized testing and evaluation of areas that are of concern for the above referenced structures during the Phase 2 inspection. The scope of the inspection is provided below.

- URS subcontracted VStructural LLC (VSL) to open and close inspection holes, replace grout around tendons and provide post-tensioning expertise.
    - CTLGroup was subcontracted by VSL to map tendons at locations where corrosion testing was to be performed.
- Siva Corrosion Services (SCS) was utilized by URS to provide corrosion analysis of the post-tensioning tendons and grout.

This *Bridge Inspection Report*, prepared by URS adheres to the Scope of Work as amended by the pre-inspection meeting held on Thursday November 16, 2006. This report includes all findings discovered during the field inspection.

1.2 – SCOPE OF WORK

- Prepare inspection drawings
- Perform (detailed) visual crack inspection
    - Re-inspect "Hot Spots" and document findings (Ramps A, C & D / Segments 4, 5 and 6 only)
    - Document general condition of underside of top deck
    - General deficiencies will be documented (underside of top deck)
- Perform testing
    - Perform a walk through visual inspection to identify possible corrosion and document
    - Expose ducts at high points at 4 locations in Segments 4, 5 and 6 as well as one location in Ramps A, C, and D (15 total)
    - Expose couplers at 6 locations in Segments 4 and 6 as well as one location in Ramps A, C, and D (15 total)
    - Open ducts surrounding tendons to expose grout
    - Open coupler boots to expose grout around couplers
    - Perform in-situ testing at each location (temperature, humidity, PH level, etc.)
    - Remove grout to expose post-tensioning strands and couplers
    - Collect grout for laboratory testing
    - Corrosion test post-tensioning strands
    - Recover areas in accordance with approved guidelines

- Perform evaluations for testing
    - Prepare work plan and relevant drawings for recorded field data
    - Perform laboratory evaluation of samples
    - Develop specific inspection and testing plans for following inspections
- Prepare analysis and reports
    - Structural analysis to be started (with the ramps first followed by the mainline structure) concurrently with Phase 2 inspection and include findings evaluated from the Phase 1 inspection
    - Draft inspection report
        - Summary of inspection findings
        - Drawings of cracks, summary of cracks, description of other deterioration
        - Photographs
        - Summary of confined space procedures
        - Recommendations for future inspections and testing
    - Final report and recommendations
        - Summary of quality control standards and procedures
        - Summary of inspection and testing findings
        - Discussion and summary of any structural analysis
        - Confined space entry requirements

2.0 – OVERVIEW

2.1 – PRE-INSPECTION MEETING

A pre-inspection meeting was held on Thursday November 16, 2006. The meeting provided a forum to discuss and clarify the scope, schedule, safety concerns, goals and other pertinent aspects of the inspection by the stakeholders in this endeavor. The original scope of work was amended to focus the inspection on trouble areas identified from the Phase 1 inspection. It was also determined, by focusing the inspection to the west side of the canal for this phase, savings could be realized with a reduction in the time required for moving equipment and personnel. Refer to Appendix A for the minutes of this meeting.

2.2 – INSPECTION PERSONNEL

The inspection was performed by URS Corporation with the assistance of several subconsultants/subcontractors. Primary inspection personnel consisted of:

2.2.1 – URS Corporation

- Dallas Montgomery, PE
  Qualified NBIS Team Leader who has completed NHI "Fracture Critical Inspection Techniques for Steel Bridges" course.
- Bill Curtis, PE
  Qualified NBIS Team Leader
- Frank Sailer, PE

2.2.2 – Siva Corrosion Services (SCS)

- Siva Venugopalan
- Joe Kish

2.2.3 – VStructural LLC (VSL)

- Bruce Osborn
- Alex Davenport
- Frank King

2.3 – INSPECTION PERIOD

• URS inspection of interior "Hot-Spot" cracks	11/30/06-12/1/06, 1/4/07-1/5/07, 1/8/07-1/9/07
• URS inspection support and coordination	11/30/06 – 2/13/07
• VSL support services	11/30/06 – 2/13/07
• SCS walkthrough and testing	12/18/06-12/21/06, 1/15/07-1/19/07, 1/29/07-2/1/07
• CTLGroup tendon mapping	12/8/06, 1/9/07

2.4 – INSPECTION EQUIPMENT AND TOOLS

The following equipment was utilized for the visual inspections:

- Air monitor
- Feeler gauges
- 25' tape
- Measuring wheel
- Flashlights
- Black markers
- Whisk broom

2.5 – SAFETY TRAINING

VSL conducted a 5 hour training program attended by all onsite personal prior to the Phase 1 inspection. The training consisted of the proper procedures which would be followed when entering and exiting a confined space. The training also discussed proper fall protection and emergency exiting procedures necessary for confined space work. This training included some of the hazardous condition present around the work site due to the manufacturing facilities located around the structure. Further subjects on air monitoring and the equipment required were discussed and sample equipment was present for hands on training and sample testing.

Segments 2 and 3 are located on the property of Kemiron an industrial gas manufacturer. Prior to entering their property each individual was required to view a safety training video concerning possible hazards and safety precautions. Kemiron utilizes a siren to warn of gas leaks and wind socks to aide in determining at which designated location personnel should assemble if a leak occurs. Kemiron required that anyone entering their property carry a respirator as a safety precaution.

Segment 6 is located on the property of BP-Amoco. Prior to entering their property all inspection personnel was required to view a video concerning rules, regulations, hazards and safety precautions. After passing an exam about the contents of the video each individual was assigned a tag to be worn while on BP-Amoco's property.

2.6 – SAFETY CONSIDERATIONS

A VSL written Safety Plan was developed specific for the Cline Avenue project. It included Bridge access plans and the equipment required for the same. Confined space training procedures, instructions and directions for locating a medical facility are included as part of this plan. For additional information on VSL's Safety Plan see Appendix B.

URS Corporation developed a Safe Work Plan before mobilizing to the project site. This included essential information and guidelines, such as the location of the nearest hospital. Known hazards included traffic, confined space, use of aerial lifts, heat stress and hearing protection were also included in the URS Safe Work Plan.

The interior concrete box girder cells of the Cline Ave Bridge are considered a confined space, however the space is not permit required. All personnel were properly trained in confined space entry. Guidelines in the VSL Safety Plan and the URS Safe Work Plan were strictly followed. An air monitor was used to check the air quality before entering the space and while working inside. Confined space entry forms were completed daily.

2.7 – ACCESS EQUIPMENT AND PROCEDURES

A 120' manlift was used to gain access to Segments 4 and 5 while a 50' scissor lift was used to access Segment 6. Safety harnesses were utilized to attach personnel to the manlift for the ascent and descent to each segment cell.

Manlift use with Safety Harness

Ramps A, C and D were accessed from the ground. A safety rail and steps were placed on the slopewalls for safety. A safety railing was placed around the access hatches for each cell.

Slopewall at Ramp A

Safety Railing at Cell Access Hatch

2.8 – QUALITY CONTROL STANDARDS AND PROCEDURES

The quality assurance program involves the proper functioning of many interrelated activities and extends to all personnel engaged in this project. A project quality assurance plan is a project specific plan that identifies the elements of the quality assurance program that are applicable to the project based upon the scope of services to be provided. It identifies a schedule of deliverables, planned independent technical reviews, and reviewers. URS Corporation has established a set of quality guidelines for this project. The quality assurance and quality control plan document followed for this project is included in Appendix C.

2.9 – CORROSION MECHANISM OF STEEL IN CONCRETE

Normally steel embedded in a good quality concrete is protected from corrosion by the formation of a passive film on the steel at its interface with the high pH concrete. This passive film can be compromised when chlorides contaminate the concrete at levels beyond defined acceptable threshold levels and disrupt the passive film. The passive film can also be compromised by the carbonation process where the carbon dioxide from the atmosphere reacts with alkaline hydroxide in the concrete to form calcium carbonate. This results in lowering of the pH and the dissolution of the passive film. In post-tensioned structures, there is a tendency for the bleed water and the fines to move ahead of the grout mass depending on the quality of the grout, pumping equipment, and procedures used during pumping operations. This can result in voids, grouts of low pH, thin coating of very porous grout on the strands that easily carbonate, and accumulation of hygroscopic material on the grout surface. These conditions can lead to increased corrosion, especially where there is a transition from low to high pH grout. Structures with significant changes in tendon profile and/or changes in cross section of the duct are more susceptible to this phenomenon of grout separation. If the strands are not completely covered with a high pH grout, corrosion can occur even if chlorides are not present. The rate of corrosion depends on various factors. Thus, it is important to determine the rate of corrosion of the strands to estimate the remaining life.

In the US, commonly quoted threshold levels of chlorides for regular reinforced concrete structures range from 1 lb to 1.35 lb per cubic yard of concrete. Another commonly reported chloride threshold limit is 0.2% by weight of cement. American Association of State Highway Transportation Officials (AASHTO), American Concrete Institute (ACI 222), and Post-tensioned Institute (PTI) limit the acid soluble chloride content to a maximum of 0.08% by weight of cement. Recent studies (Sagues, 2005) suggest that chloride threshold value for prestressed concrete structure should be adjusted down from 0.08%. Though these threshold limits are based on laboratory studies, the actual threshold value is a function of the structure, its exposure to environments, and its performance in the field.

The passive layer on steel breaks down somewhere between pH 10 and pH 11. Structural collapse of reinforced concrete structures due primarily to corrosion is rare since these structures show significant signs of deterioration prior to failure. The tendons in post-tensioned structures, however, are usually loaded to 50% or more of their ultimate tensile strength. Corrosion related failure can quickly overstress the remaining strands and can possibly lead to structural failure. Some of the well-known failures are:

- A post-tensioned concrete pedestrian bridge collapse in North Carolina;
- The Berlin Roof collapse;
- A post-tensioned concrete bridge collapse in Wales;
- A post-tensioned segmental bridge Ynys-y-Gwas in Great Britain.

It is, therefore, important to evaluate post-tensioned structures at the first sign of distress, i.e. structural cracks, spalls, delaminations, efflorescence, misalignments, or other similar issues. If the preliminary evaluation confirms the presence of these factors and they are spread throughout the structure, further evaluation should be performed to ensure that tendons are not compromised from carrying the load due to corrosion. The corrosion evaluation can also assist in identifying the time to rehabilitation and possible rehabilitation options.

2.10 – REPORTING PROCEDURE

The procedure and format for reporting the condition of this structure conforms to the *Scope of Work as amended by the pre-inspection meeting held on Thursday November 16, 2006* and instructions provided by the Bridge Inspection Section of the Office of Technical Services.

3.0 – HISTORY

3.1 – BRIDGE HISTORY

3.1.1 – Design

The regulatory guidelines called for the Cline Avenue Bridge to have two separate designs, one being a steel alternate and the second being a steel and post-tensioned precast segmental concrete alternate. Both designs were advertised and let for bid in 1978, with the steel and concrete alternate receiving the lowest bid from Walsh Construction Company. The original steel and concrete alternate was designed by American Consulting Engineers; Reid, Quebe, Allison, Wilcox and Associates Inc.; and Beam, Longest and Neff, Inc. This design required the concrete box girders to be precast in segmental units, lifted into place, and then secured with tendons until the girder construction in the span was complete. Since the maximum height of the superstructure above the ground was less than 100 feet, Walsh Construction requested that they be allowed to cast-in-place the segmental concrete units of the girders instead of precasting them. They proposed to do this by using falsework to support the cast-in-place operation where the ground would allow and a moving Trauler Crane equipped with a slip form over those areas that could not support false work, such as the Indiana Harbor Canal area. They received permission from the Indiana State Highway Commission and the following delineates who performed the final design and at which location:

Cast-In-Place Segmental Concrete Main Spans (Redesign):
T.Y. Lin International
Reid, Quebe, Allison, Wilcox and Associates, Inc.

Cast-In-Place Segmental Concrete Four Approach Ramp Spans (Redesign):
Figg and Muller Engineers, Inc.
Beam, Longest and Neff, Inc.

Steel Girder Spans (Original Design):
American Consulting Engineering

The design and construction, for all portions of the structure, were to comply with the American Association of State Highway and Transportation Officials (AASHTO) 1977 Edition. The live load design was HS 20-44 including special toll road and military loading, the dead load design included 156 lbs/ft^3 for concrete and steel, 1 ½" modified P.C.C. overlay, 35 lbs/ft^3 for future wearing surface, curbs and barrier walls. Design speed was 50 mph, the 1977 design ADT was 32,900 vpd and the projected 1997 ADT was 56,100 vpd. The roadway deck, which is also the top flange of the post-tensioned concrete box girders, varies in thickness from 9 inches at the center of the box girder to 14 inches near the girder walls. Differential temperature allowance permits the top slab to be 18º F warmer or 9º F colder than the remaining portion of the structure. The prestressed steel for the post-tensioning of the segmental box girders was to be in accordance with ASTM Grade 270.

3.1.2 – Construction

Construction began in 1978 and was completed in 1985. Total construction cost for the main spans was approximately $54 million. For the four approach ramps and the Riley Road reconstruction, the cost was $18 million. Since the redesign of the concrete portion of the bridge from precast to cast-in-place did not occur until after the contract was awarded for the project, time was of the essence. As construction began on the substructure units and fabrication of the structural steel commenced the redesign of the concrete portion was started. Completion of the concrete redesign did not occur before some of the substructure units were ready for superstructure construction. In order to expedite the construction schedule, when portions of the concrete redesign became available, the design drawings were used for construction and fabrication. On April 15, 1982 a section of the falsework, which consisted of steel scaffolding and beams, supporting the superstructure of Ramp C collapsed causing 13 fatalities and delaying the project. The cause of the falsework collapse was failure of several of the temporary concrete footing supports. Once the failure occurred it overloaded the adjacent footing and scaffolding and caused them to fail in a domino like fashion.

3.2 – PAST INSPECTIONS

The following is a summary of past inspections that have been performed on the concrete mainline, four approach ramp bridges, and steel girder spans. Included is the date of the inspection, type of inspection and any significant findings.

Inspection Date	Inspection Type	Significant Findings
1/5/84	Initial Two Year Biennial INDOT	This was a walkover inspection of both the steel girder spans, post tension concrete box girder main spans and Ramps A, B, C and D. Construction on the project was still underway with respect to Riley Road, and Ramps B and D. The only significant find was vehicle damage to the outside barrier wall in the horizontal curve of Ramp C.
5/23/85	Central and District Office Personnel, INDOT	An inspection was conducted inside two of the steel box pier caps of the steel girder spaces. No problems encountered.
5/24/85	Central and District Office Personnel, INDOT	This inspection was for the columns of Pier 2 and the interior of the center concrete cell of spans A through G (spans 1 through 6) Segment 1. The only finding was a crack in the metal plate in the center column of Pier 2.

Inspection Date	Inspection Type	Significant Findings
1/4/88 - 1/5/88	Two Year Biennial INDOT	This appeared to be a walkover inspection of the steel girder spans, mainline concrete spans and Ramps A, B, C and D. The exterior of the structures were accessed by foot as well as the interior of Ramps A, C and D. Significant findings included cracking of the ceiling in all cell interiors, rapid deterioration of the drain system and numerous clogged inlets.
6/29/88 - 6/30/88	Central and District Office Personnel, INDOT	It appears this inspection included the use of a snooper to inspect the exterior of the steel girder bridge. No significant problems were encountered.
1/10/90	Two Year Biennial INDOT	The interiors and exteriors of Ramps A, B and C were inspected. Cracks in the ceiling near the cell centers with efflorescence showing. The outside barrier wall in the horizontal curve near the abutment of Ramp C had extensive vehicle damage.
6/10/93	Two Year Biennial INDOT	An inspection of the exteriors of the bridge with no equipment for access. The majority of the drains were clogged. The barrier wall, at several locations, exhibited vehicle impact. The sides of the concrete cells directly above Piers 10 and 15 have some light cracking.
6/10/94	Underwater Inspection Collins Engineering, Inc.	It included Piers 13, 13’, 14 and 14’. No significant deficiencies were found but some cracks were found in the crash walls of all the piers.
12/29/94	Two Year Biennial INDOT	This inspection was for the inside and outside of Ramps A, B, C and D and appears to have been done in the month of December in 1994. Light cracks in the concrete of the diaphragms, hinges, cell walls and ceiling. Numerous clogged drains. Spalls and patches in deck. Standing water in the interior of Ramp D.

Inspection Date	Inspection Type	Significant Findings
5/26/95 - 6/2/95	Concrete Cell Inspection INDOT	This inspection was for two of the concrete cells; Segment #1, North Box, interior; and Segment #5, South Box, interior and exterior. Both concrete cells were accessed by a snooper and bucket truck. A two-year biennial walkover inspection was conducted over the concrete portion of the mainline and ramp bridges.
5/24/95 - 6/29/95	Two Year Biennial INDOT	The problems that were found during the 1994 inspection were also evident during this inspection as well as the following items; The traveling public occasionally contacts the District office concerning the bridge falling down. This is believed to be due to the fact that the concrete fascia at the hinge appears to support the superstructure and it looks like it is allowing the bridge to fall. The fact that this is not what is happening and the structure is quite safe is not apparent to the casual observer. Some falsework from the concrete construction phase was left in place at some interior locations. Some tension cracks exist at the base of the columns at Pier 3. This is believed to have been caused by bearing failure at the time of construction. Several exterior cell walls of the superstructure over the piers exhibit cracks. Some of the substructure units have small to medium cracks and spalls throughout the structure.
11/14/96	Two Year Biennial INDOT	The conditions are similar to what was found during the 1994 two year biennial inspection except for the outside barrier wall at Ramp C which appears to have been repaired since the last inspection.

Inspection Date	Inspection Type	Significant Findings
8/3/97 - 8/28/97	Critical Elements BRW Hazelet and Erdal	The elements inspected were the post-tensioned concrete bridge spans of the mainline and the 4 approach ramps and the steel pier caps. Intermittent parallel cracks run along the centerline of the cells at most concrete girder locations. These cracks extend through the deck and efflorescence is seen on the underside of the deck. The majority of the deck inlets are plugged. Some end caps on drain pipes are broken allowing water and debris to drain into cell interiors. A section of drain pipe is broken in Ramp D. Concrete cracking is occurring in both the concrete webs in the shear zones and at the diaphragms in both the mainline and ramps. The mainline is exhibiting significantly more cracking than the ramp structures. There is cracking at the hinges that appear to be stress relief cracks and do not appear to be growing. Small spalled areas with exposed reinforcing steel exist at Piers 6, 203, 205 and 409. Pier 7 exhibits heavy spalling at the top 4 feet of the columns with deterioration up to 6” deep.
9/2/99	Two Year Biennial INDOT	Deck drains are clogged. There is deterioration in cells due to clogged drains. The top of the columns at Pier 7 are deteriorated. There is delamination of the Ramp A overlay. Cracking was observed at Piers 201, 202 and 303. A retaining bar has fallen off of the left bearing at Pier 301. The bottom of the box girder of Ramp D has minor collision damage in an area over Ramp C.

Inspection Date	Inspection Type	Significant Findings
11/15/00	Two Year Biennial INDOT	The deck underside shows cracking and efflorescence inside the cells and there is longitudinal cracking and spalling of the wearing surface. (Information derived from BRW, Hazelet & Erdal inspection report.) Interior drains are clogged and caps are blown off between Piers 12 and 13 of the mainline. Mainline superstructure cracks were checked at various piers and there was no growth from last measurement. The top of the columns at Pier 7 are spalling and have rust stains.
11/7/03	Two Year Biennial INDOT	Snooper was used to inspect diagonal cracks in web wall at Pier 7 (5/2/03). Professor Wang from the University of Illinois at Chicago and Mario Pasarel of Ken Herceg and Associates Inc. participated in the inspection. Professor Wang summarized diagonal cracks were likely caused from temperature differential from east side to west side of bridge. A snooper was used to inspect the exteriors of the ramps and no significant cracking was found.
2/20/04	Two Year Biennial INDOT	The underside of the deck inside the cells is exhibiting significant cracking, rust staining and efflorescence. A modular joint failure occurred on the east bound lanes near Pier 15. The modular joint near Pier 8 is starting to fail. Voids in post-tensioning ducts and strand corrosion noted (Information derived from Ken Herceg and Associates, Inc. inspection report).
2004	Post-Tensioned Conc. Spans Ken Herceg and Assoc., Inc.	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were inspected. High levels of localized corrosion in the post-tensioning system were found in the four ramp structures. Extensive cracking was found in diaphragms and web cracking in the shear zones in the mainline. Longitudinal cracking is occurring in the deck in both the mainline and the ramps. Voids were found at tendon couplers and at tendon high points.

Inspection Date	Inspection Type	Significant Findings
6/20/05 - 7/8/05	Post-Tension Conc. Spans Ken Herceg and Assoc., Inc.	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were re-inspected. The inspection did not uncover any significant changes in the bridge's condition that are cause for immediate concern. There are some cracks that have likely widened and lengthened since they were measured in 2004, however the majority of the findings are inconclusive due to the poor precision of the available crack measurement techniques. The top slab continues to deteriorate and two new top slab spalls were discovered that were previously identified as delaminations in the 2004 inspection.
4/4/06	Two Year Biennial INDOT	The problems found during previous inspections are also evident during this inspection with the following inclusions: the drainage system needs to be cleaned at the deck surface as well as at the outlets. It was noted that the six month inspection cycle is NOT being met. It was also noted that URS/VSL/SCS are doing a "hot-spot"/ corrosion inspection throughout the structure.
5/22/06 - 9/18/06	Phase 1 Hot Spot Inspection Post-Tension Conc. Spans URS Corporation	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were re-inspected. The inspection did not uncover any significant changes in the bridge's condition that are cause for immediate concern. The "hot-spot" cracks have grown as compared to the 2004 measurements. Approximately 29% of the cracks are showing an increase in width. In addition to the crack inspection, 28 locations throughout the mainline and ramp structures were chipped open to expose the PT tendons for corrosion testing. The test results showed a higher rate of corrosion in the ramp structures then in the mainline structure, especially at the coupler locations. This was the 1st inspection of 6 using this approach.

3.3 – ADDITIONAL POINTS OF INTEREST CONCERNING THE POST-TENSIONING SYSTEM

The following are points of interest which where not included in the original scope of work for this contract but are important factors affecting the health of the structure. The following information was acquired through a review of VSL's daily field report data sheets from the 2004 inspection of the Cline Ave structure. Further inspection of these locations did not take place during the current phase.

3.3.1 – Ramp "D" Bottom Slab Tendons

The following are copies of brief descriptions which were attached to VSL's daily field report from April 2, 2004:

3.3.1.1 – Ramp "D" North Bottom Slab Tendon

VSL began excavation of the north tendon in Ramp D at 7'-8" from face of blister. The de-bonding of concrete begins at 5'-9" from face of blister. VSL excavated top tendon for a total length of 38'-11". The excavated area is on average 12" wide and 2 ½" to 3" deep. From the 7'-8" area to approximately the 28' area, there is no duct present. It appears that the duct has corroded away to nothing. The 4 exposed cables are rusted beyond the PCI journal's documentation with several wire breaks present from corrosion. From 28'-3" to approximately 36', the duct is very corroded and the four exposed cables are in the range of #3 to #4 on the PCI journal's documentation. At 38'-3", the duct approximately 6" prior has minimal corrosion and at 38'-3" the duct looks as good as the day it was installed. After inspecting tendon and measuring a severe rust stain on exterior of bridge, Herceg instructed VSL to expose total tendon at 13' range. VSL excavated total depth of bottom slab from 12'-9" to 13'-7" on north tendon.

Very bottom of tendon had approximately 1" wide strip of duct remaining with minimal corrosion on exterior of duct. Most of the cables on the lower section of tendon are in the range of #2 to #3 on the PCI journal's documentation of rust standards. There are a couple of cables at this area that range between #5 and #6 on the PCI journal's standards.

3.3.1.2 – Ramp "D" South Bottom Slab Tendon

VSL began excavation of south tendon in bottom slab of Ramp D at 7'-9" from the face of the blister. The de-bonding of concrete begins at 5'-11" from the face of the blister. VSL excavated top tendon for a total length of 26'-10". From the start of the excavation to approximately 16'-4" there are 4 cables exposed and no presence of duct. It appears that the duct has corroded away to nothing. The 4 exposed cables are way above the range of corrosion on the PCI journal's standards. There are numerous wire breaks due to corrosion in this length. From 16'-4" to 26'-10" there is still no presence of duct and one cable uncovered. This one cable has several more wire breaks in this area. After exposing this length of tendon and doing inspection, VSL was directed to do a full depth excavation on the south tendon, to coincide with a rust stain on the exterior of bottom deck, by Herceg. VSL did a full depth excavation from 13'-8" to 14'-6" from face of blister. At this point one cable is at a possible #6 on the PCI journal, with the remaining

cables being above #8 on the PCI journal standards. At 38'-7" VSL drilled an inspection port on this tendon and found a layer of duct tape. Herceg instructed VSL to do excavation of this area. VSL did an excavation from 38'-6" from face of blister to 39'-8". Exposed duct tape, which was a coupled area. Duct appears to be as good as when installed. VSL cut duct open at this area and found grout to be solid, intact and in very good condition.

3.3.1.3 – VSL's Theory of the Deterioration Process in Ramp "D" Bottom Slab

It is a known fact that there was some minor cracking to the length of the de-bonded concrete on both bottom slab tendons. Sometime after this, the drain pipe from the top deck broke and drained into this area. The length of time this occurred is not certain. INDOT, on a routine inspection found approximately 12" to 14" of water in bottom slab blister area. They drilled a 1" drain hole approximately 4' off south wall.

VSL theorizes that the water actually penetrated the small cracks and through the freeze and thaw processes, actually caused the de-bonding of the length of concrete. The reason the south tendon is a little worse then the north tendon is due to the location of the drain hole, which was drilled by INDOT. Due to the slope of the bridge, the drain hole drained the water off the north tendon, while the south tendon remained under water until it evaporated. This extended time is not known, but the difference in the corrosion between north and south tendons are evident.

3.3.2 – Post-Tensioning Bars in Ramp "C"

Based on a review of VSL's daily field reports from the 2004 inspection (July 21/22, 2004) the post-tensioning bars used in Span 10 of Ramp "C" near the hinge are of concern. It was noted that the grout tubes at the PT bars were patched over during the original construction. During further investigation the patch material was removed and it was observed that the grout tubes were completely empty and appeared never to have been grouted during construction. In addition, the ends of the PT bars were never sealed or capped. VSL used a borescope to look at the bars through the grout ports. The length of the bar could not be scoped due to the space between the bars and ducts being less then ¼". It was noted that a total of 11 out of the 12 PT bars at this location were voided and heavily corroded. At the completion of the inspection in this area VSL indicated that they would be grouting the voided areas.

3.4 – PREVIOUS LOAD RATING ANALYSES

There have been two load rating analyses performed for the post-tensioned concrete box girder superstructure portions of the Cline Avenue Bridge and associated ramps. The first was done in 1999 by BRW Hazelet and Erdal. The second was done in 2005 by Ken Herceg and Associates, Inc.

3.4.1 – 1999 Analysis

The 1999 analysis was performed with a program that was developed in-house by BRW Hazelet and Erdal. An inventory rating was determined for HS20-44 and H20-44 vehicles. An operating level rating was determined for all trucks. The ratings were done in accordance with the

AASHTO Manual for Condition Evaluation of Bridges 1994, including the 1995 and 1996 interim revisions. Ratings were provided for three different loading conditions:

Case 1: 1 ½" overlay, 35 lbs/ft^2 FWS, and W_c = 156 lbs/ft^3
Case 2: 1 ½" overlay, 0 lbs/ft^2 FWS, and W_c = 156 lbs/ft^3
Case 3: 1 ½" overlay, 0 lbs/ft^2 FWS, and W_c = 150 lbs/ft^3

The loads in Case 1 utilize values given on the design drawings. Case 2 was considered because at that time there was not a future wearing surface on the bridge. Case 3 was evaluated because the actual unit weight of concrete with steel in the structure is much closer to 150 lbs/ft^3 than 156 lbs/ft^3.

The lowest HS20 inventory rating factor for the existing loads with W_c = 150 lbs/ft^3 was 1.021. This rating factor being greater than one indicated the structural capacity was adequate for this case. For Case 1 eleven locations had a rating factor less than one. Eight of those locations were for shear capacity and three were for flexural capacity.

All of the rating factors for flexure were determined without considering the mild steel reinforcement in the slab. If this reinforcement is considered along with the prestressing steel the three flexural rating factors below one increase to more than one.

3.4.2 – 2005 Analysis

Conbox from Leap Software was used to complete the initial analyses in support of establishing Load Ratings. Rating factor's at both inventory and operating levels were determined using a program developed in-house by Ken Herceg and Associates. This program was developed based upon the AASHTO Manual for Condition Evaluation and Load and Resistance Factor Rating of Highway Bridges (LRFR) requirements.

The load rating analysis took into account dead loads, thermal effects, live loads and other permanent loads used in load ratings including the permanent secondary effects of post-tensioning tendons. Inspection findings from 2004 were incorporated into the load ratings through the use of condition factors. The global condition factors were based upon the NBI Superstructure Condition Rating and were derived from the AASHTO LRFR manual. The localized condition factors were developed with the aide of Florida DOT's (FDOT) Load Rating Post-Tensioned Concrete Segmental Concrete Bridges. The system factor was based upon the AASHTO LRFR manual with additional guidance from FDOT's Load Rating Post-Tensioned Concrete Segmental Bridges.

Rating factors were calculated based upon Strength and Service limit states. Additional parameters of the analysis are as follows:

- Ratings were developed for the HL-93 live loading at the LRFR Design Level.
- The number of lanes of Live Load used was the design number of lanes per the LRFR manual.
- No allowance for future wearing surface has been included.

- Ultimate flexural strength calculated using strain compatibility in lieu of the simplified rectangular distribution.
- Ultimate strengths and allowable stresses have been adjusted for identical structural deterioration thru the use of applicable Condition Factors.
- Ratings for global condition adjusted with applicable condition factors relating to NBIS item #59 rating (superstructure).
- Ratings for localized condition adjusted with applicable condition factors related to identified deterioration and/or corrosion.

Results of the load rating analysis found the controlling sections typically occur due to shear forces in the web immediately adjacent to the piers at the critical shear section (h/2 from face of support). Based on Rating Factors using the localized long-term condition factor all segments of the mainline and all four ramps exceed an Inventory Rating Factor = 1.0. Most noteworthy are Segment 4 and Ramp A where a Rating Factor of 1.0 and 1.01 indicates the structure's capacity nearly equals the load demands. Further review of the Operating Rating Factor finds all Rating Factors increased to more reasonable values with a minimum of 1.30 in Ramp A.

Integration of the inspection findings into the load rating analysis did not identify significant capacity reductions of the structure. Therefore, the mainline and ramp structures were found to have adequate capacity to carry all AASHTO legal loads and remain open to traffic without restrictive load postings at the time of this rating.

4.0 – FIELD INSPECTION AND TESTING

4.1 – MEASURING AND DOCUMENTING "HOT-SPOT" CRACKS

This re-inspection includes all the interior cracks in Ramps A, C and D and Segments 4, 5 and 6 from the 2004 inspection that met one of the following conditions:

- Greater than 1.0 mm in width
- "New" cracks (not recorded in 1997)
- Cracks with increased width versus the 1997 inspection
- Cracks with significant (>5–10%) increase in length versus the 1997 inspection

These cracks are considered "hot-spot" cracks. Each "hot-spot" crack is identified with a 4 character designation. The first character designates the segment or ramp where the crack is located and the remaining three characters are the numerical designation for the specific crack. (i.e. "B009" indicates a "hot-spot" crack in Ramp B that was the ninth crack to be numbered.)

Each of these cracks was re-inspected. The crack width was checked with a feeler gauge. The ends of the crack were checked against the existing end marks to determine if they had lengthened. The largest width of the crack was documented on the wall and dated. A picture was taken showing the crack and the written documentation on the wall.

4.2 – GROUND PENETRATING RADAR (GPR)

The Impulse Radar (Ground Penetrating Radar or GPR) technique was used to locate post-tensioned tendon ducts embedded in the walls and deck slab of the bridge. The method is fully described in the American Concrete Institute Report ACTI 228.2R-98, "*Nondestructive Test Methods for Evaluation of Concrete in Structures*". A brief description of the Impulse Radar test is as follows:

The impulse radar technique employs high-frequency electromagnetic energy waves for rapidly and continuously assessing a variety of characteristics of concrete structures. The principle of operation is based on reflection of electromagnetic waves from varying dielectric constant boundaries in the material being probed. The impulse radar equipment is self-contained, compact, and portable. The system consists of the main radar unit, antenna and transducer cable. All data is stored in the main radar unit, by means of a computer hard drive (ACI 228, 1998).

A single or double contacting transducer (antenna) transmits and receives radar signals. High frequency, short pulse electromagnetic energy is transmitted into the element under inspection (concrete, sub-base, etc). Each transmitted pulse travels through the material and is partially reflected when it encounters a change in dielectric constant. The receiving section of the transducer detects the reflected pulses. The location and depth of the dielectric constant boundary is evaluated by noting the transit time from start of pulse to reception of reflected pulse. Boundary depth is proportional to transit time. Since concrete to air, water, metal and/or backfill interfaces are electronically detected by the instrument as dielectric constant boundaries;

the impulse radar method is capable of assessing a variety of reinforced concrete, masonry and environmental characteristics.

Impulse radar has been successfully used to evaluate locations of embedded reinforcing, to distinguish between grouted and un-grouted cells in masonry block walls, to locate high moisture and chloride concentration in bridge decks, embedded foreign objects in concrete pavements, alignment of dowel bars in pavement, evaluation of element thickness, utility mapping, etc.

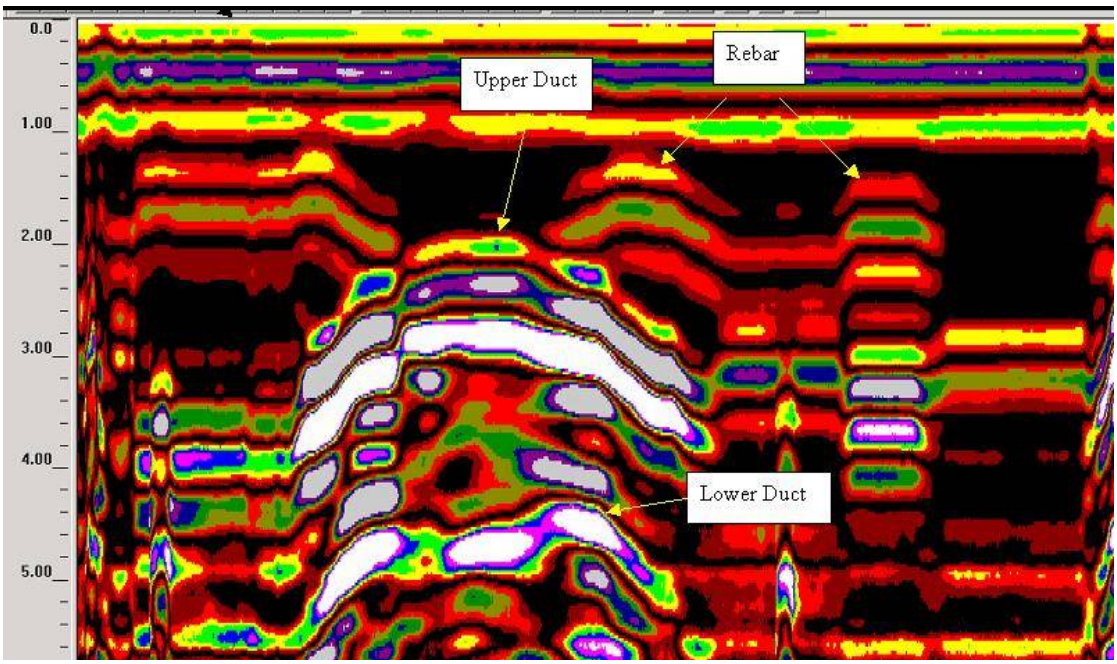


Figure 4.2-1 Sample Radar Image

4.3 – TENDON/COUPLER EXPOSURE AND RECOVERING PROCEDURES

4.3.1 – Determining Tendon/Coupler Locations

The tendon/coupler locations within the areas of the structures, selected by SCS, to be investigated were located with the use of Ground Penetrating Radar (provided by CTLGroup) and the design drawings. In addition, 1" drill hole test locations from the 2004 inspection were used as known locations of the couplers and provided the starting point for several test locations.

4.3.2 - Exposing Ducts and Tendons

Upon determining the exact location of the duct/coupler, the concrete was chipped away by use of a low impact (8.8 ft-lb) electric demolition hammer. During the chipping process a shop vacuum was utilized to minimize the amount of debris in the air. After SCS accepted that the hole size was adequate for their testing needs, the edges of the opening were saw cut and chipped to provide a uniform patch area. The amount of removal depended on the field conditions as the area was exposed. Once the duct/coupler was exposed, the duct/coupler boot was carefully cut through using a hand held electric cut-off wheel. The size and number of openings in the

duct/coupler boot were dependent on the conditions at each location. In areas with minimal reinforcement one large "window" of the duct/coupler was removed, while in areas with more reinforcement several smaller "windows" would be removed.

4.3.3 – Removal of the Grout to Expose the Strands

Extreme care was taken when removing the grout from around the tendon in order to expose the strands for examination. A 2 pound mallet and concrete chisel were used to remove large portions of grout while a screwdriver was used near the tendons for more precise chipping to prevent damage to the strands.

4.3.4 – Repair to the Duct/Coupler Boot

Repair of the duct/coupler boot was accomplished in one of two ways. When possible, the portion of the duct/coupler boot, which was removed to allow for testing, was reused to cover the opening. If the original duct/coupler boot was unable to be reused a piece of new metal duct was cut and formed to fit the window opening. With either method once the duct/coupler boot was placed, it was then sealed using an injectable epoxy, Hilti HY 150. As part of the closure, VSL inserts two grout tubes into the duct work, the exception being at locations where very small amounts of grout were removed. In these locations epoxy was used to fill the area created where the grout was removed. The grout tubes will be used to later grout areas with large voids created during testing or voids which had been there since the original construction.

4.3.5 – Concrete Replacement

Once the duct/coupler boot was sealed and the grout tubes were in place and secured the concrete which was removed to expose the duct/coupler was replaced. Prior to the placement of the formwork, surface preparations including flushing of the opening to remove any loose debris were performed. Finally the formwork was secured to the surrounding areas closing and concealing the chipped areas and allowing for the placement of a standard bag mix concrete to be poured into the voided area.

4.3.6 – Vacuum/Pressure Grouting

Due to the extremely cold weather that was present during the Phase 2 inspection there was concern about the water in the grout mix freezing. Various methods were considered for heating the inside of the boxes at grout placement areas but no method appeared to have an adequate probability for success. If the water in the grout mix freezes, multiple problems can occur; 1) when the water thaws it can separate from the grout mix, run along the tendons until it evaporates and could cause corrosion, 2) the hydration process will not properly occur reducing the overall strength of the grout. It was decided, with the approval of INDOT, that the ends of the grout tubes would be capped and all grouting will occur in the spring during the Phase 3 inspection.

4.4 – CORROSION EVALUATIONS

The original scope identified a minimum of one highpoint, one low point, and two couplers for inspection and evaluation in each of the five bridges. Ten additional locations were to be selected based on the field conditions. The Phase 1 corrosion testing identified couplers and high points as more of a concern than the low points. Therefore, the corrosion testing in Phase 2 focused on couplers and high points.

The test locations in this phase were located in one half of the mainline (Segment 4 through 6) and were further restricted to the coupler area to primarily reduce the cost of equipment and downtime. It was agreed that the test locations would be distributed throughout the structure in future evaluations to obtain a better representation of tendon condition overall.

Field testing at each location included excavation to expose the tendon/coupler, visual evaluation of the grout including color and consistency, visual evaluation of any exposed wires or strands including the degree of rusting and/or pitting, corrosion potential survey, corrosion rate determinations, and measurement of grout pH at the surface and at strand depth. In addition, grout samples were taken to determine moisture and chloride content. Additional samples were taken with wire impressions for petrographic analysis. Data for each location are discussed in detail in Appendix E-5.

4.5 – CORROSION TESTING LOCATIONS

Drawing E-1 in Appendix E-1 identifies test locations where corrosion evaluations were performed. Table E-1-1 in Appendix E-1 lists the locations where corrosion testing was performed. However, the high points listed in Table E-1-1 are not true high points. True high points can only be accessed from the deck.

A total of 30 locations on 19 different tendons were tested: 15 high points and 15 couplers (some locations were on the same tendon). Considering all tendons with couplers as one continuous tendon, the Cline Avenue Bridge has a total of 778 tendons. Consequently, the number of tendons evaluated in this inspection was less than 3% of all the tendons; and so it must be assumed that this evaluation did not include all potential problem locations within each tendon. The subsequent evaluations will build from the previous evaluations to create a better picture of the condition of the tendons in this bridge with a goal towards identifying all possible rehabilitation options.

Locations for corrosion evaluation were selected based on the following factors:

- Cracks on the web;
- Spall or delamination;
- Efflorescence on the web;
- Voids reported in 2004 inspections.

It was noted that most of the large cracks (URS, 2006) were in the top deck. Several locations where significant rusting, spalling of the underside of the deck, and significant loss of cross

section of the reinforcement were noticed. At locations where no significant rusting was found, cracks with efflorescence were present indicating that water is penetrating through the full depth of the deck. This clearly indicates that salt from deicing is accumulating at the reinforcing steel and will definitely lead to increased spalling and delamination. Corrosion evaluation in Phase 3 will focus on quantifying the severity of corrosion of the deck (both top and bottom) and identification of all viable life extension options.

4.6 – CORROSION TESTING FIELD EVALUATION

4.6.1 – Evaluations Performed

Once the test locations were identified, VSL opened these locations to expose the metal duct. After Siva Corrosion Services, Inc. (SCS) documented, with photos, the condition of the exposed metal duct, VSL cut open the metal duct in the presence of SCS personnel. As soon as the metal duct was cut out, SCS documented the visual condition of any exposed wires/strands using the rust classification table and the pictures by Augusto Sason. SCS also recorded the color and consistency of the grout. Grout samples were collected while exposing the strands to establish a physical connection. The moisture samples were collected immediately after exposing the grout thus avoiding any contamination or evaporation. Temperature and humidity were measured at each test location prior to and at the end of testing. Connections to the tendons were established using vice grips to perform corrosion potential and corrosion rate tests. At the conclusion of these electrochemical tests, grout samples were obtained for chloride and petrographic analysis. The measurement of pH was performed on freshly exposed grout thus eliminating any atmospheric carbonation effects. The rust deposits, if any, on the exposed strands were classified according to Table 4.6.2-2. Detailed information regarding data obtained at each location is provided in Appendix E-5.

4.6.2 – Corrosion Classification

The following table provides a comparison of rust classifications from PTI, HERCEG, and SCS:

Class	PTI Specification	HERCEG	SCS
1	No visible rust.	New condition, clean, and shiny.	New condition, clean, and shiny.
2	Light surface rust.	Sporadic light surface rust.	Sporadic light surface rust.
3	Surface rust with pits underneath (pit size not more than 0.002in diameter or length).	Light surface rust.	Light surface rust.
4	Same as Class 3 except pits exceed 0.002 in diameter or length.	Moderate surface rust.	Moderate surface rust.
5	Large oxidized areas, with flakes developing in the corrosion affected	Heavy surface rust with onset of light surface pitting.	Heavy surface rust with onset of light surface pitting.

Class	PTI Specification	HERCEG	SCS
	zones, loss of steel section noticeable to the unaided eye.		
6	Heavy oxidation on most or all of the exposed surface areas, with strong flaking and pit formation.	Heavy surface rust & moderate surface pitting.	Heavy surface rust & moderate surface pitting.
7	-	Heavy surface rust & heavy surface pitting.	Heavy surface rust & heavy surface pitting.
8	-	Individual wires broken & splayed.	Broken wires with necking.
9	-	-	Broken wires without necking.
10	-	-	Corroded wire with significant section loss.

Table 4.6.2-1 – Comparison of Rust Classifications

SCS adopted PTI classifications but added four additional rust classifications to better document the corrosion condition of tendons in the existing structure. Table 4.6.2-2 was used to classify the rust level on exposed wires or strands.

Class	Description
1	No visible rust.
2	Light surface rust.
3	Surface rust with pits underneath (pit size not more than 0.002in* diameter or length).
4	Same as Class 3 except pits exceed 0.002in* diameter or length.
5	Large oxidized areas, with flakes developing in the corrosion affected zones, loss of steel section noticeable to the unaided eye.
6	Heavy oxidation on most or all of the exposed surface areas, with strong flaking and pit formation.
7	Heavy surface rust & heavy surface pitting.
8	Broken wires with necking.
9	Broken wires without necking.
10	Corroded wire with significant section loss.

*Based on visual inspection only and not actual measurement of pits in the field.

Table 4.6.2-2 - Rust Classification for SR912-Cline Avenue Bridge

4.6.3 – Visual Condition of the Exposed Wires or Strands

Once the metal duct was opened, SCS visually evaluated the exposed grouted tendon. All visible wires or strands were examined for corrosion condition, and the rust was classified based on Table 4.6.2-2. Table E-2-1 in Appendix E-2 summarizes the data and shows that the rust classification ranged from 2 (light surface rust) to 4 (surface rust with pits).

4.6.4 – Moisture Content

The moisture content of grout samples was determined per ASTM C566. Grout samples were obtained as soon as the metal duct was cut out. The moisture samples were weighed immediately in the field and the actual weight of the sample was recorded. They were then packaged in zip lock bags and transported to the laboratory. In the laboratory, the samples were dried in the oven until there was no change in weight. The moisture content was calculated as follows:

(Mass of sample in the field – Mass of dry sample) / (Mass of dry sample) * 100

Table E-2-2 in Appendix E-2 summarizes the results of the moisture content of the grout samples and shows that this varied from 20 to 36% with an average of 29%. This is within the range of normally expected values, thus indicating that the grout is not dry and that the corrosion of strands will occur under suitable conditions.

4.6.5 – Temperature and Humidity

The ambient temperature and humidity inside the box was measured at each test location before and after testing. Table E-2-3 in Appendix E-2 summarizes the results for each test location and shows that temperature and relative humidity ranged from 14 to 47F and 42 to 86%, respectively, during the winter months and from 70 to 94F and 49 to 70%, respectively, during the summer. Thus, this structure is expected to routinely experience condensation throughout its life. Condensation can result in corrosion of strands at locations where there are voids or carbonated grout. Based on our current inspection of SR912, there are a number of locations (particularly at couplers and high points) where voids and carbonated grout were found. Corrosion of strands will occur at these locations when moisture is available through condensation. However, it is difficult to quantify remaining life if the primary deterioration mechanism is condensation related, since this depends on time of wetting and the number of times that condensation occurs.

4.6.6 – Chloride Content

Grout samples taken from test locations were also sealed in a zip lock bag at the site and transported to the laboratory. The chloride content of the grout sample was determined based on AASHTO T260. Table E-2-4 in Appendix E-2 summarizes the chloride content values and shows that these ranged from a low of 0.0051% to a high of 0.0127% by weight of cement.

4.6.7 – Alkalinity of the Grout

Grout, when mixed and pumped correctly, is alkaline with pH between 12.5 and 13.0. If the grout surrounding the tendon is low in pH, corrosion of the tendon may result. The rate of corrosion and time-to-failure of wires depends on the availability of moisture and oxygen at these sites. Thus, it is important to measure the alkalinity of the grout around the strands. Alkalinity of the grout was measured immediately after it was exposed. An indicator spray was used in the field. The solution reacts with the concrete and changes color indicating the pH of the grout.

Table E-2-5 in Appendix E-2 summarizes the grout alkalinity determinations and shows that this was 11 or above at all locations except one, where it varied from 9 to 11 along the strand. At coupler locations, several strands had a thin layer of carbonated or partially carbonated grout. In some cases, new uncarbonated grout was found on top of the old (carbonated) grout. Some grout mixes are dark in color making it difficult to see the color change of the indicator solution. Since several locations indicated a pH of 11 at the strand level, loss of passivity and, therefore, corrosion of strands may be ongoing here. Petrographic examination will be performed on five grout samples to identify any contaminants that may affect the alkalinity of the grout.

4.6.8 – Corrosion Potential

The corrosion potential of a metal in concrete is measured using a standard reference electrode. Most field engineers use Copper-Copper Sulfate Reference Electrode (CSE) since it is rugged and stable. In high chloride solutions such as seawater, a Silver-Silver Chloride Reference is used to avoid errors in measurements due to backflow of chloride solution into the reference electrode. The corrosion potential is measured and interpreted according to ASTM C876, "Standard Test Method for Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete." The criteria (based on CSE) for evaluating corrosion potentials are as follows:

- Corrosion potential > -200mV = 90% probability of no active corrosion.
- Corrosion potential between -200mV and –350mV = Corrosion condition is uncertain.
- Corrosion potential < -350mV = 90% probability of active corrosion.

Potential measurements were conducted with a high (200 meg ohms) impedance voltmeter. The Copper-Copper Sulfate Reference Electrode (CSE) was placed in contact with the grout on a sponge wetted with distilled water. A high impedance voltmeter is used to assure that errors such as contact resistance are not introduced in the measurement. Distilled water was used to wet the electrode tip to prevent introducing contaminants to the surface of the grout.

Table E-2-6 in Appendix E-2 summarizes the corrosion potential values at different locations. The corrosion potential varied from a low of -263 mV CSE (may or may not have active corrosion), to a high of -104 mV CSE (90% probability of no active corrosion). One must keep in mind that corrosion potential only refers to the probability of corrosion. There are situations (such as continuously wet surface, saturated concrete, or carbonated concrete) when the measured corrosion potential may not reflect the actual corrosion activity of the steel embedded in concrete. It is important to measure the corrosion rate in addition to corrosion potential to understand the true corrosion state of the embedded steel.

4.6.9 – Corrosion Rate or Polarization Resistance Test

The purpose of corrosion rate tests is to determine the rate of corrosion of strands embedded in grout. Normally, a 3" by 7" probe is used in the field. However, in this case the strands were encased in grout inside a 4" diameter metal duct. Due to limitations in the surface area available for corrosion rate tests, a smaller 2.5" by 2.75" probe was designed and fabricated for this project.

In this test, a small voltage is impressed and the corresponding current reading is recorded. This is a computerized procedure so that voltage sweeps are at a constant rate thus eliminating any operator error. Gamry Reference 600 device was used to perform corrosion rate tests on this structure. The potential sweep is typically from 20 mV to -20mV relative to the free corrosion potential.

The output of this test is a plot of log current (x-axis) versus potential (y-axis). A 10mV region at the corrosion potential (Ecorr - 5mV to Ecorr + 5mV) was used to calculate the corrosion rate. The computer calculates the corrosion rate using a procedure called least square fit. At each test location, corrosion rate measurements were repeated until two successive readings were within 10% of each other. The system was allowed to depolarize between tests prior to starting the next test (typically about 5 minutes).

The corrosion rate data for SR 912 Cline Avenue Bridge are summarized in Table E-2-7 in Appendix E-2. The criteria used to interpret the corrosion rate data is presented in Table 4.6.10-1. The overall corrosion rate varied from as low as 0.01mpy (low) to as high as 1.9 mpy (high). Only 7 out of 30 tendons (23%) indicated a high (> 1mpy) corrosion rate. The Phase 2 inspection test sites were located in one half of the bridge (Segment 4 through 6). We do not have any data from segment 1. There is very minimal data from Segment 2 and 3. It is our recommendation to distribute the test locations in Segment 1, 2, and 3 during Phase 4 and in Segment 4, 5, and 6 in Phase 5.

The overall average corrosion rate was 0.7mpy. The overall average of all corrosion rate values indicates that the structure is experiencing corrosion at a moderate rate. The average corrosion rate of couplers alone was 1.0mpy (high). Corrosion rate of couplers varied from 0.2mpy (low) to 1.9mpy (high). Further, 46%, (7 out of 15) of the couplers indicated a high corrosion rate.

The average corrosion rate of high points is 0.4mpy (low). Corrosion rate of high points varies from 0.01mpy (low) to 0.9mpy (moderate). Since this structure is expected to experience temperature variations and deicing salt applications, it is likely that corrosion rate will continue to rise in the future.

The Gamry Reference 600 corrosion rate graphs are included in Appendix E-3. The corrosion rate values presented here indicate the corrosion rate at the time of measurement. It is important to keep in mind that any projections of remaining life assume that this corrosion rate will remain constant during that period. If corrosion rate changes, this will alter the remaining life.

4.6.10 – Corrosion Rate Criteria

Electrochemical techniques are powerful non-destructive tools to determine the corrosion state of steel embedded in concrete/grout. The primary challenge with this technology is that it requires extensive experience in the field of corrosion of steel in concrete so that the data is not misinterpreted. For example, it is well known that corrosion potential alone can be misleading. Also, behavior of steel in concrete/grout (and therefore the corrosion mechanism) is very

different from its behavior in soil or water. The interpretation of data and the conclusions derived from such analysis will also differ.

Corrosion Rate (CR) Mils* per Year	Corrosion Activity
CR < 0.5	Low
0.5 < CR < 1.0	Moderate
1.0 < CR < 3.0	High
CR > 3.0	Severe

*Mils - one thousands of an inch.

Table 4.6.10-1 – Corrosion Rate Evaluation Criteria (SR912 Cline Avenue Bridge)

The above criteria are based on the time required to corrode 50% of the cross section of the outer wires (of diameter 0.167-inch) in a strand. Thus, a strand experiencing severe corrosion can lose 50% of the cross section of the outer wires in about 8 years. The above criteria are based solely on corrosion. However, the response of the structure to such a section loss depends on a number of other factors and is best addressed by structural engineers. The years to corrode 50% cross-section of a 0.167-inch wire at different corrosion rates are:

- Corrosion rate of 0.5mpy, 50 years;
- Corrosion rate of 1.0 mpy, 25 years;
- Corrosion rate of 3.0 mpy, 8.3 years;
- Corrosion rate > 3.0 mpy, < 8.3 years.

4.6.11 – Petrographic Analysis

The contractor usually follows the project specification for mixing and pumping grout into the duct. Current specifications reflect the industry knowledge developed over the last decade. Prior to 2000, specifications were not clear in terms of the required grout properties, the pumping operations, or the vent requirements to achieve satisfactory result. Some of the earlier specifications allowed the use of expansive admixtures to eliminate voids around the tendon. Some of these admixtures reacted with high pH grout and formed gas that resulted in reducing the pH of the grout. Also, higher pumping pressure allowed separation of fines and bleed water from the grout mass, which then accumulated at the far end. Sometimes the variation in the quality of the grout can be observed visually. At other times, microscopic evaluation allows one to identify the presence of admixtures, separation of grout (if any), water/cement ratio, presence of any hygroscopic materials or salts, and other contaminants. The results of the petrographic examination assist in identifying factors that contribute to corrosion of strands in post-tensioned structures.

Samples were selected for petrographic analysis based on visual condition of the strand at that location, visual evaluation of the grout, corrosion rate of the strands, and the moisture content of the grout. The following samples were selected for petrographic analysis:

- S4B-S18-C2-W3 Coupler – Identified as sample A in Petrographic report - Rust stain observed on the strand, corrosion rate was high (1.9mpy), corrosion classification was 4, and moisture content was 24%.
- S4B-S17-C3-W5 High Point – Identified as sample B in Petrographic report - Void channel with three exposed wires (visible corrosion on strands). Corrosion rate was moderate (0.8mpy), corrosion classification was 2 to 3, and moisture content was 30%.

- S6-S25-C2-W3 Coupler – Identified as sample C in Petrographic report - Void at the top, white chalky material (carbonated) at the top, corrosion stain on strand impression, corrosion rate was moderate (0.95mpy), corrosion classification was 3, and moisture content was 29%.

- S6-S25-C3-W5 Coupler – Identified as sample D in Petrographic report - Void at the top, white chalky material ¼" deep (carbonated) at the top, corrosion stain on strand impression, corrosion rate was high (1.3mpy), corrosion classification was 3, and moisture content was 29%.

- S6-S25-C5-W8 Coupler – Identified as sample E and F in Petrographic report - Void at the top, white chalky material (carbonated) at the top, White shiny particles noticed on the grout surface, corrosion stain on strand impression, corrosion rate was moderate (0.8mpy), corrosion classification was 2, and moisture content was 33%.

The report from the pertographer is included in Appendix E-6. A summary of the petrographer's findings is included in Section 5.3.2.

4.7 – VOID FORMATION IN TENDONS NEAR HIGH POINTS

Prior specifications called for the use of a single grout vent at each high point location along a tendons profile. As grout is pumped, in one direction, through the tendon it moves as a solid column along the uphill slopes of the duct, but can exceed the pumping rate in downhill portions of the duct. Hence, it will fill the descending portion of the duct from the next low point, moving backwards uphill. As the grout continues to fill the duct, now from both sides, an air pocket on the downstream side of the profile is pushed back uphill to the high point. Prior to its potential release, the vent was typically blocked by the approaching grout column, as shown in Figure 4.6-1.

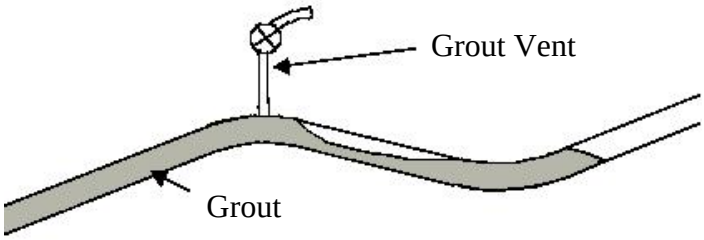


Figure 4.6-1

Current specifications call for an additional grout vent 3’ to 6’ beyond the profile crest in the direction of the grout flow. This additional vent provides the needed clearance from the high point vent for the release of the air pocket, as shown in Figure 4.6-2.

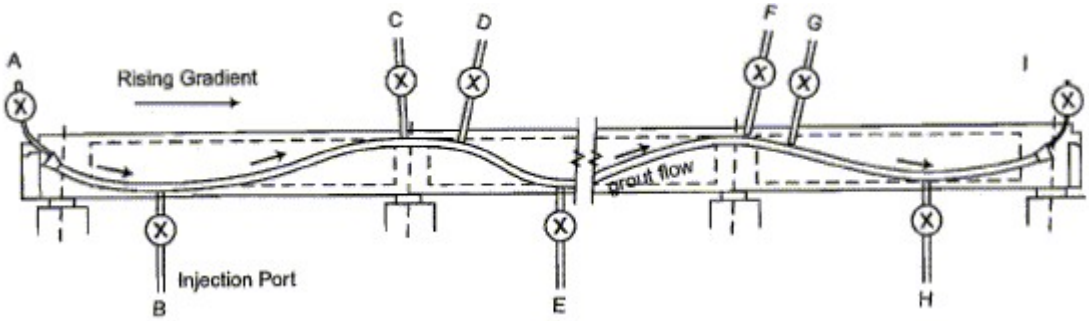
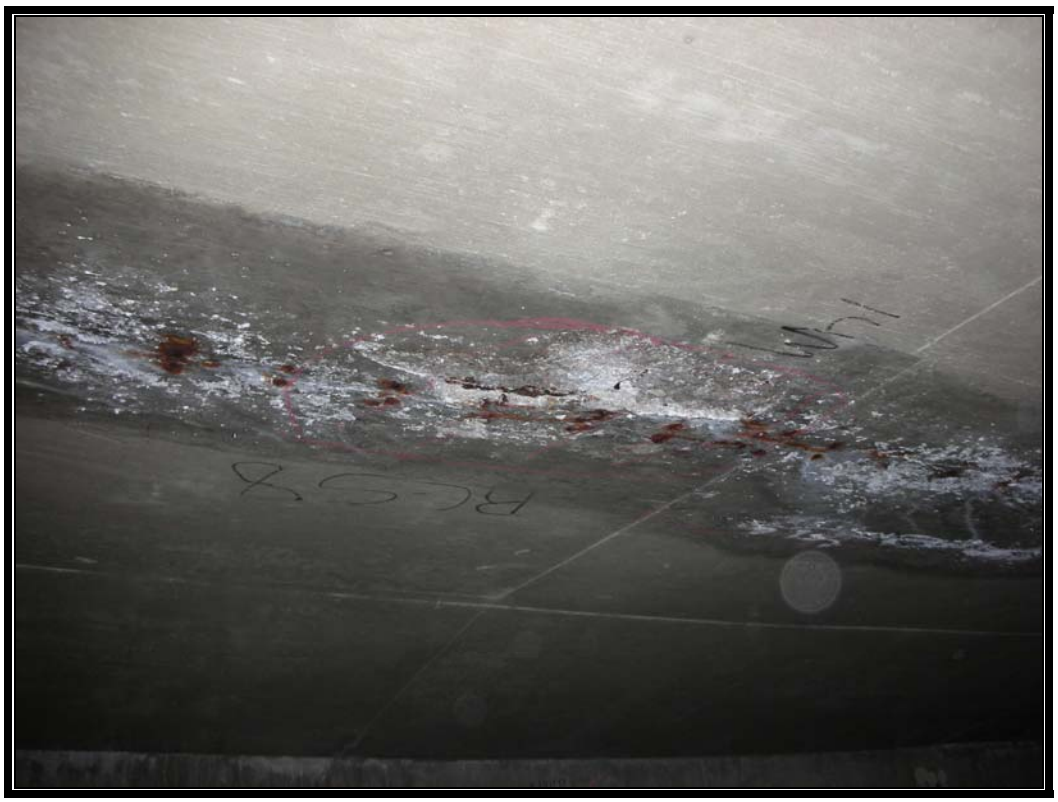


Figure 4.6-2

5.0 –SIGNIFICANT FINDINGS

5.1 – BOTTOM OF DECK CONDITIONS

The bottom of the top deck was visually inspected. There is extensive cracking, with some delaminated concrete, spalling, efflorescence, exposed and corroding re-steel and water seepage on the underside of the deck.



Bottom of Top Deck (Example Cracked w/ Efflorescence and Rust Staining)

The vast majority of the deterioration seen on the underside of the deck is located longitudinally along the centerline of each cell. Transverse effects such as loading creep and shrinkage, and temperature may cause these longitudinal cracks.

The deterioration of the bottom of the deck does appear to have advanced as evidenced by the additional spalling, re-bar exposure and delaminations. The extent of the deterioration was mapped longitudinally. The condition of the underside of the top deck was broken into five categories as follows:

- Clean
- Cracked
- Cracked with Efflorescence and/or Rust Staining
- Sporadic (Cracking intermixed with Cracking with Efflorescence and/or Rust Staining)
- Cracked and Spalled/Delaminated

Bottom of Top Deck (Example of Sporadic Condition)

Approximate measurements were taken with a measuring wheel. Those measurements were then plotted on the drawings shown in Appendix G.

5.2 – "HOT-SPOT" CRACKS

Based on the amended scope only the segments on the west side of the Harbor Canal (Segments 4, 5 and 6) and Ramps A, C and D were inspected during Phase 2. Of the 303 'Hot-Spot' cracks located throughout the structure, only 120 cracks fell into the area that was inspected during this phase. The width, length, and location of each of these cracks were documented and compared to the general sketch that was generated during the Phase 1 inspection. These cracks are located throughout the structure, as shown in Table 5.2-1 below.

Segment 4	43
Segment 5	28
Segment 6	34
Ramp A	2
Ramp C	7
Ramp D	6
TOTAL	120

Table 5.2-1: Number of "hot-spot" cracks per segment or ramp

According to each crack's location on the structure and orientation, these "hot spot" cracks are classified under one of the following categories:

Diaphragm cracks	DP	96
Hinge cracks	HG	4
Web cracks located near a tendon anchorage zone	WA	1
Web cracks possibly due to indirect support	WI	0
Web cracks shear orientated	WS	3
Web cracks following tendon profile	WT	8
Unclassified		8
TOTAL		120

Table 5.2-2: Number of cracks per classification

During the inspection of the 120 "hot spot" cracks only 3 cracks had increased width. These cracks are all classified as diaphragm cracks with two located in Segment 4 and one located in Segment 5. The two cracks located in Segment 4 are in Cell 2 at Pier 19 and in Cell 4 at Pier 16. The crack in Segment 5 is in Cell 2, Span 18 on a backwall adjacent to a hinge. All the cracks grew in width by 0.1 mm.

The following section provides a brief description and photograph of each type of crack. A comparison of the data between the current and previous inspections follows. The complete detailed list of the findings and a plan view drawing detailing the locations of the cracks is provided in Appendix F. *The electronic file of the "Hot-Spot" crack table in Appendix F has links for the photograph and sketch for each crack.*

5.2.1 – Crack Classifications

5.2.1.1 – Diaphragm Cracks (DP)

Diaphragm cracking is found throughout the mainline segments of the Cline Ave Bridge. Full depth diaphragms approximately four feet wide are located inside the cells at each pier locations. In addition, transition diaphragms are located where the structure transitions either the number or arrangement of the cells. Exterior diaphragms are located at pier locations in Segment 1.

Typically, the diaphragm cracks are orientated at approximately 45°, originating near the bottom slab at the center of the diaphragm and terminating at the corner between the diaphragm and web. At many locations, the cracks run thru the access holes. Some of these cracks extend into either the top slab, bottom slab, and/or the web.

Typical orientation of diaphragm cracking (Crack #4006 shown)

5.2.1.2 – Hinge Cracking (HG)

This category includes all cracking that occurs near hinges in the SR912 structure. These cracks are found in the web, bottom slab, top slab, or backwall at or near a hinge location. Hinges are located between the segment-to-segment connections or segment-to-ramp connections in the structure.

Cracks in dapped hinges usually follow a 45° path from the corner of the hinge. In some structures the crack pattern may be more widespread and complex, particularly if the bearings in the hinge zone are offset transversely to the line of the webs without adequate transverse stiffening (Corven Engineering, 2002).

Cracking at the hinge between Segment 3 and Ramp A is of particular concern, because it is shear orientated.

Hinge cracking between Segment 3 and Ramp A

5.2.1.3 – Web Cracks Located Near a Tendon Anchorage Zone (WA)

This type of cracking is found in the structure near the end of tendon anchorage zone. Typically, these anchorages are found in blisters, which is a widening of the web or bottom slab in which the tendon anchorages are located. This type of cracking is typically found at the end or sides of the blisters or in the adjacent webs.

These cracks are induced by tensile effects from the anchor forces, transmitted by shear lag to the slab or web. Such cracks might occur with single anchor blister even if the slab is appropriately reinforced. If there is more than one anchor in a group in such a blister then the effect is much more likely. The cracks are usually permanent. Since they are induced by load effects they are structural. The effects that cause these cracks (anchor forces) tend to reduce with time due to losses (Corven Engineering, 2002).

In Segment 3, the cracking generally occurs in the web above the web blisters. Typically, this type of cracking commences near the bottom slab or blister, extends towards the middle of the span and terminates near the top slab.

Typical cracking at end of web blister anchorage zone (Crack #1061)

Typical cracking in web above blister anchorage zone (Crack #3022)

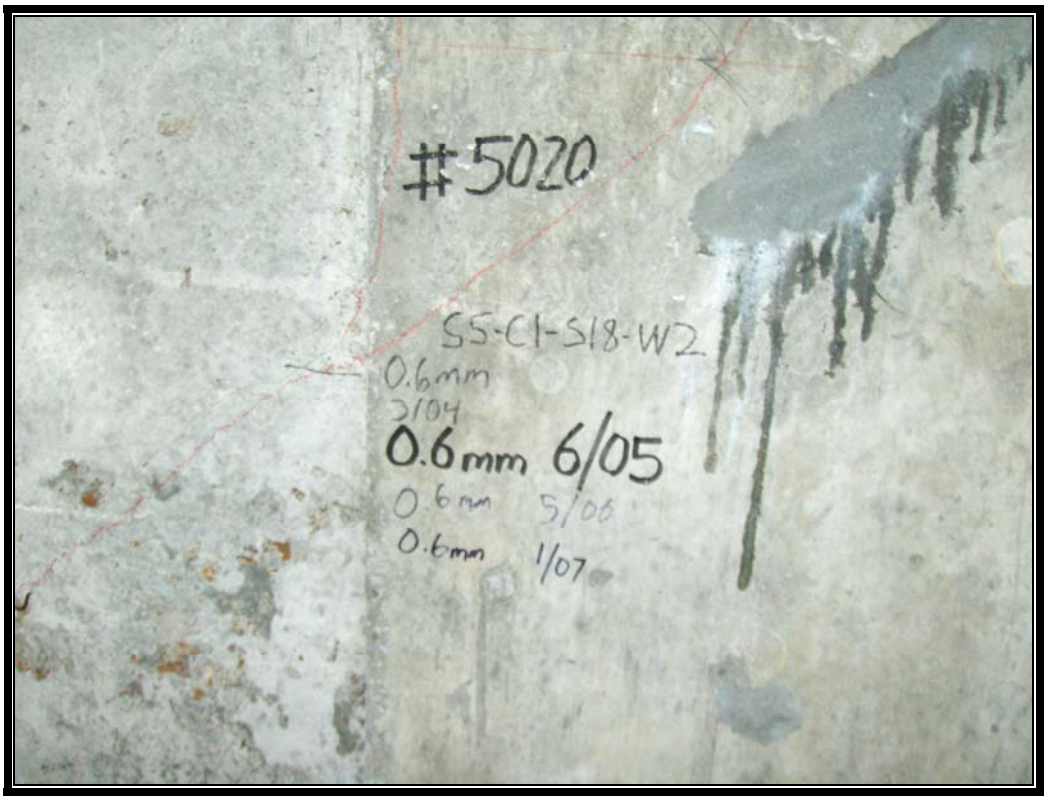
5.2.1.4 – Web Cracks Possibly Due to Indirect Support (WI)

This type of crack is located in the web adjacent to diaphragm locations where the bearing is not located directly underneath the web (indirect support). This type of cracking is detected on the exterior of the cells in Segment 1.

Exterior web cracking possibly due to indirect support (Segment 1, Pier 7).

5.2.1.5 – Web Cracks Shear Orientated (WS)

Shear cracks generally are located in the webs near the piers and are inclined at an approximate 45° angle. Shear cracks may be isolated or may occur at intervals along the web. They may be of any width and are generally at their widest in the mid to upper half of a web in a box-section near the neutral axis of the section. Shear cracks generally pass through a web and appear on both sides. In general once a shear crack occurs in a web, it does not close under any conditions. Consequently, if there is draped post-tensioning in the web, this type of crack can be significant to corrosion protection since it permanently breaches the tendon path (Corven Engineering, 2002). This type of cracking was found on both interior and exterior web faces of the Cline Ave Bridge.



Typical shear orientated crack on interior face (Crack #5020)

In the SR912 bridge shear orientated "hot-spot" cracks most often occur in the cantilever spans, namely in Spans 10, 13 (Cell 5), and 14 of Segment 3, and in Span 18 of Segment 5. However, shear orientated cracking is also concentrated near Pier 13 in Span 11 of Segment 3, where a transition is made from 2 to 3 cells.

5.2.1.6 – Web – Tensile Stress (TS)

Tensile stress cracks are longitudinal cracks that follow the general path of an internal prestressing tendon. These cracks may be horizontal, straight, or have slight curvature. A crack along the path of an internal tendon, draped in a web, may occur at any location, be of any length and of any width. It is usually initiated by a design or construction defect such as a badly installed duct with too much wobble, a duct crushed locally by too tight of reinforcing around it, lack of web width or a local weakness in the web itself (low strength material, void, honeycomb) etc. (Corven Engineering, 2002).

Typical web tensile stress crack (Crack #4002)

This type of cracking is prevalent throughout the structure; however the majority of these cracks are not classified as “hot-spots”. The eight “hot-spot” cracks are located in Segments 2, 4, and 5.

5.3 – CORROSION INSPECTION FINDINGS

5.3.1 – Summary of Phase 1 Corrosion Evaluations

The Phase I report included a comparison of the 1980 to current AASHTO specification for grouting of post-tensioned ducts and a summary of relevant sections of the 2004 inspection report by HERCEG. The following is a summary of Phase I corrosion findings:

- A total of 28 locations were tested; 12 high points, 9 low points, and 7 couplers.
- The corrosion classification of the exposed wires/strands was from 2 (light surface rust) to 4 (surface rust with pits). Two of the test locations had one broken wire.
- The wire breaks were not due to corrosion but stress related.
- Variations in temperature from 70F to 94F and relative humidity from 49% to 70% were recorded.
- Moisture content of grout samples varied from a low of 11% to a high of 29%. The average moisture content was 21%.
- The chloride content was from a low of 0.0029% to a high of 0.0363% by weight of cement.
- Several locations had a pH of 11 at the strand level with one location at a pH of 9.

- The corrosion rate varied from as low as 0.1mpy (insignificant) to as high as 3.1mpy (severe). Only one out of 28 tendons (< 4%) indicated severe corrosion and 7 out of 28 tendons (25%) indicated a high corrosion rate. A majority (71% or 5 out of 7) of the strands in the couplers indicated a corrosion rate of 1.48 to 3.14 mpy, which is classified as high to severe.
- The strands were experiencing mild to moderate pitting (based on cyclic polarization data).
- Petrographic analysis concluded the following: carbonated grout in contact with the strand, presence of voids at the grout/strand interface, cracking in the grout, and presence of corrosion product on the strands.

For information related to a Comparison of the AASHTO Specifications and the 2004 HERCEG Report refer to sections 4.10 and 4.11, respectively of the Phase 1 Cline Ave report submitted by URS Corp in October 2006.

VSL was consulted regarding the wire breaks on the post-tensioning strands. They indicated that wire breaks are a relatively common occurrence. Wire breaks can occur due to the following factors:

- Rate in which the tendon is stressed
- If wires are nicked during storing or handling
- If wedges are not seated properly during stressing a wire can be pinched and/or nicked

Wire breaks can occur as frequently as one a day or as seldom as one in two weeks. The experience of the post-tensioning crew dramatically affects the frequency of wire breaks.

5.3.2 – Significant Findings of Petrographic Examination

The weight of the grout samples range from 5 to 18 grams. All of the samples were irregular in shape, with the maximum dimensions of the largest sample measuring approximately 30 mm by 30 mm by 10 mm. The primary focus of the petrographic evaluation is on features of the grouts that would be expected to have some effect on the corrosion of the prestressing elements (including the ducts) in service. It is acknowledged that the small grout samples examined here represent a tiny fraction of the grout that is in place in the structure. Despite this, the observations and conclusions offered here can be viewed in a global context with respect to what has influenced the corrosion activity in the structure.

5.3.2.1 – Characterization of the Grout

- The grout is a simple mix of Portland cement and water.
- The water-cement ratio (w/c) of the grout ranges from 0.36 to 0.90. For five of the grout samples (A through E) the water-cement ratio ranges from 0.36 to 0.46, with an average value of 0.41. Sample F has a w/c of 0.9 (white chalky grout).
- The grout is not air-entrained. The entrapped air content is low, ranging from 0.5 percent to 2.5 percent. No air-entraining admixture or air-inducing shrinkage compensating additive was used in the grout.

- The Saturated Surface Dry (SSD) density of the grout samples (A through E) ranges from 115.0 lb/ft^3 to 124.5 lb/ft^3, with an average value of 119.5 lb/ft^3. The SSD density of the grout sample F is 92.2 lb/ft^3.
- The water absorption value of the grout samples (A through E) ranges from 19.3 percent to 28.9 percent, with an average of 25.1 percent. The water absorption value of the grout sample F is 66.7 percent.
- The permeable void volume for the grout samples (A through E) ranges from 35.3 percent to 43.8 percent, with an average value of 39.1 percent. The permeable void volume for the grout sample F is 62.7 percent.
- The factors affecting the variability in w/c, absorption, porosity, and density of the grout samples are discussed in detail in LML's report presented in Appendix E-6.

5.3.2.2 – Primary Grout-Related Factors Affecting the Corrosion Issue

- It is assumed that corroding elements in the bridge structures include both the prestressing tendons and the tendon ducts.
- Under ideal conditions in service the duct is completely surrounded on the exterior surfaces by portland cement concrete and on the interior surfaces by complete coverage of the portland cement grout. Under ideal conditions in service the prestressing tendons are completely embedded in the portland cement grout. These ideal conditions were not consistently realized in the present case. It is understood that borescope sightings revealed the presence of voids in the ducts where both the interior duct wall and portions of the prestressing wires were revealed.
- At least some of the voids in the ducts can be attributed to the occurrence of bleeding in the grout. Bleeding involves the downward segregation of solid particles under the force of gravity in a fluid cementitious system. Bleeding is influenced by the water content of the grout and by the duration of the open-time of the grout. The presence of entrapped air voids in the low w/c grout material (ca. 0.4) that is not in contact with the prestressing wires is not expected to have any effect on carbonation or corrosion activity. However, the accumulation of entrapped air voids in the high w/c grout material (laitance) may indirectly result in a higher rate and degree of carbonation in this material. Where this high w/c grout material is in contact with prestressing wires the potential for corrosion may be higher.
- The average water-cement ratio (w/c) of the grout samples examined here (0.41, excluding Sample F) is not abnormally high for a grout of this era. However, it is now recognized that anti-bleeding additives are necessary if the complete elimination of bleeding is desired. Most proprietary commercial grouts now contain such an additive.
- It is this feature of the grout (bleeding) that is judged to have had the greatest effect on the formation of voids in the ducts. Where the duct walls and prestressing elements lost contact with the hardened grout material (with a pH of ca. 13.5) the steel was not protected from corrosion. It is very likely that it is this corrosion activity that has caused the greatest amount of corrosion-related distress in the bridge.

5.3.2.3 – Other Grout Related Factors Affecting the Corrosion Issue

- Several other features of the grout samples examined here could have led to an increased potential for corrosion activity in the prestressing elements. They include (1) cracking in the grout, (2) the presence of voids at the interface between the grout and the prestressing wires, and (3) carbonation of the grout in contact with the prestressing wires.
- Cracking in the grout was seen in all of the grout samples examined here. It is also possible that some of the fracture surfaces that represent the exterior surfaces of the grout samples were also pre-exiting fractures. Fractures within the grout in service represent potential conduits for air and moisture to the prestressing wires. However, the cracks are very tight with a width typically less than 0.02mm.
- Small (0.5 mm to 2 mm), irregularly-shaped voids are present at the interface between the grout and the prestressing wires in all of the grout samples. The voids represent isolated sites where the wires are not protected by contact with the high pH of the grout. Corrosion initiation at these sites was seen in the grouts examined here.
- Most of the material comprising the six grout samples shows the high pH level (ca. 13.5) expected for a portland cement-based material. However, all of the grout samples showed a slightly reduced pH level on the grout in direct contact with the prestressing wire (relative to the expected value of ca. 13.5 for a portland cement-based material).
- The corrosion activity associated with the presence of small voids as described in (3) is characterized as “mild” as discussed in more detail in the report.

6.0 – LOAD RATING AND ANALYSIS FOR CLINE AVE BRIDGES

6.1 – INTRODUCTION

This section primarily describes the progress of Load Rating Analysis work and a discussion of the preliminary Load Rating Analysis results available for Ramp D.

6.2 – DESIGN METHODOLOGY

Based on INDOT budget constraints, the load rating analysis was limited in scope during this project phase and focused primarily upon developing the rating criteria and beginning the rating analysis for Ramp D using LRFD HL-93 live loading. The load rating analysis for Ramp D, as well as the remainder of the structure, will be expanded to included HS 20 and H 20 live loads in accordance with INDOT requirements in the future. These loads will be added as the analyses progresses and the findings will be incorporated into upcoming reports. The specific tasks that were commenced to varying portions of completion are summarized in Table 6.2-1.

Task	Description
Plan review / document collection	The basic plan review and document collection sorted the drawings, reviewed bridge details, assembled "as built" information, and developed a more thorough understanding of the current and past inspection reports. This background information will serve as the basis for selecting locations which may require more attention during the analysis and also supported the decision making process for setting the load rating criteria.
Development of analysis criteria.	The development of the load rating criteria involved summarizing codes to be used, material properties, PT loss coefficients, selection of rating trucks, and other items which may be bridge specific or general in nature. The analysis criteria document provided a "road map" for the analysis and load rating. The criteria "Initial Issue" dated February 20, 2007 is located in Appendix D1.
Load rating analysis (Ramp D)	Ramp D is a single cell ramp which has some of its tendons deteriorating due to advanced corrosion. It is also a relatively simple structure compared to other portions of the Cline Avenue bridge network. For these two reasons, Ramp D was used as a starting point for both the analysis and load rating.
Hot Spots	Structural review of "hot spot" areas was initiated. Specifically, opinions were expressed related to top of column spalling at Pier 7 of the main bridge
General	Preliminary research, evaluation, and discussion of retrofit issues suggested by INDOT were undertaken.

Table 6.2-1 – Scope of Structural Analysis for Phase 2

An incremental approach towards the development of the load rating/analysis has been used and has offered a very efficient way to continue with this portion of the work. Some components of the above work, such as "hot spot" review are generally not part of a traditional load rating.

Additional analysis required due to "hot spot" findings may be very important to understanding the overall performance of the bridge.

6.3 – LOAD RATING ANALYSIS

The structural condition evaluation and amount of redundancy of the bridge system has been incorporated into the load rating analysis. Table 2.4.1 of the Structural Load Rating Criteria – Appendix D1 shows a condition factor ($\varnothing_c$) based upon the bridge's NBI Rating. Table 2.5.1 of the Structural Load Rating Criteria – Appendix D1 shows a system factor ($\varnothing_s$) that is derived based upon the redundancy of the bridge and the number of tendons per web for particular spans. Both of these additional $\varnothing$-factors are applied in deriving member capacities. For the initial analyses, it is reasonable to start with appropriate $\varnothing_c$ and $\varnothing_s$ factors. However, the structure is considered "pristine" without accounting for section loss of concrete, reinforcing or post-tensioning. With more refined analyses (incorporating the results of the inspection and predominantly the corrosion studies) the structural models will be modified to account for the actual condition of the structure.

The analysis can be divided into two basic parts:

- Longitudinal analysis
  - Global stress at extreme fibers due to flexure
  - Global stress at web neutral axis due to principal stress
  - Global shear capacity
  - Global moment capacity
- Transverse analysis
  - Moment capacity of top deck and webs

The longitudinal analysis was carried out using specially developed programs which account for issues such as construction staging, time dependent effects, primary and secondary post-tensioning application and losses. Tango, RM-Spaceframe, and Midas are programs available for this analysis. Due to the complexity of the time-dependent analysis it is our in-house procedure to run a primary analysis with one program and a completely separate and independent analysis with a separate program. If there is agreement between the results of the two analyses then there is a high confidence level of the accuracy of the results.

The transverse analysis is carried out with a combination of influence surface diagrams and plane frame models. This is a straight-forward solution method and is not overly extensive computationally. Influence surface charts and a subsequent 2D analysis to distribute fixed end moment offers conservative results. A more vigorous transverse analysis approach may be undertaken with finite element models incorporating plate or shell elements. Finite element modeling may show lower member demands and consequently higher rating factors. In situations where the member is only marginally overstressed finite element modeling may be used to better evaluate the element's response to loads. Thus, it becomes the judgment of the engineer to pursue the use of finite element models. The drawback being more computation effort, while the reward may be improved rating factors based on lesser moment demands.

The global effects produced by longitudinal demands ("A" – Shear As) must be combined with the local effect of transverse demands ("B" – Moment As) in three different cases. The empirical method listed below will be used to combine these demands:

Case 1 -	1.0 A + 0.5 B
Case 2 -	0.5 A + 1.0 B
Case 3 -	0.7 A + 0.7 B

The greatest of Cases 1, 2 and 3 is used to determine web reinforcing requirements.

The preliminary results for Ramp D (see Section 6.4) first indicated severe overstress for the factored shear cases for the webs adjacent to the pier supports. Research found that in Florida[1] a variable angle truss model is used to give enhanced shear capacity by using a flatter angle for the model's diagonal elements. The enhancement of shear capacity must also be accompanied by a proportional reduction in moment capacity to assure equilibrium of the model. It was decided to employ the variable angle shear model only adjacent to pier support in the negative moment regions and use a 45° shear model in all other regions.

The behavior of the real structure will be compared to the results obtained from the load rating analysis. This comparison will give guidance regarding feasible strengthening / retrofit solutions and potential fixes for problem areas. Once the primary analysis and rating factor evaluations are done parametric studies may be used to determine how much section loss the structure can tolerate.

6.4 – RAMP D – PRELIMINARY RESULTS

The load rating analysis for Ramp D included graphical studies of demand and capacity to give a thorough understanding of structural behavior. Additionally, the bridge analysis captured the rating factors at inventory and operating levels for various loading and element conditions.

Table 6.4-1 gives a summary of inventory and operating rating factors in accordance with the criteria found in Appendix D1. This work is currently unchecked. Graphs containing summary representations of capacity and demand and various rating factor information are found in Appendix D2.

AASHTO Load Group	Inventory	Operating
Longitudinal - Strength I		
Flexural	1.00	1.30
Shear	0.97	1.21
Longitudinal - Service I		
Flexural	0.88	1.55
Longitudinal - Service III		
Principal Stresses	1.52	2.03
Transverse - Strength I		
Top Slab - Centerline	0.87	1.13
Top Slab - Webs	0.89	1.16
Webs	0.96	1.24
Target Minimums	1.00	1.30

Figure 6.4-1 – Rating Factor Summary Table – Ramp D – HL-93 Live Loading

Note that the inventory ratings represent the load level at which the structure can be used for an indefinite period of time and is also called the design level. The operating rating represents the absolute maximum permissible load allowed on the bridge.

Strength evaluations solely indicate an element's load carrying capacity. Service evaluations will show potential problems with serviceability issues such as cracking. The structure may or may not be overstressed at ultimate design levels when the service cases are exceeded or when service level rating factors are less than the target minimums.

6.5 – RETROFIT AND REHABILITATION SCHEMES

VSL has furnished the following costs associated with retrofitting and rehabilitation. These are listed as follows:

Item	Repair Cost (sq. ft.)
Overhead Repairs	$150
Metalizing entire surfaces for sacrificial cathodic protection	$20
Metalizing discreet rebar surfaces	$40
FRP Strengthening	$25 per ply

For structural strengthening we have estimated:

Item	Repair Cost
Additional External PT Bars or Tendons	$50k to 200k each
Repairs at tops of columns	$50k to 75k each

Please note that these estimates do not include costs associated with mobilization, accessibility, and up-front engineering work which would add approximately 40% to any of the above to derive the total costs.

The level of funding over time and the results of the testing / inspection program and the rating analysis will drive the development of the rehabilitation concepts. This document will not address costs in detail as it is still too early to derive the scope of the repairs, the time frame, and most economical solutions.

6.5.1 – Primary Considerations

The following comments were derived from the URS Corporation Tampa office walk-through inspection of Ramp D on February 21, 2007:

The walk-through inspection of Ramp D revealed telling information which clarified the major causes of ongoing corrosion for the Cline Avenue Bridge.

The full depth crack at the middle of the top deck along the nearly the full length of the box is allowing for the ingress of water and road salts. On the day of the walk-through, the crack surfaces were damp or dripping and this was caused by snow melt water running across the bridge width. Some of this water is able to find its way to the concrete and reinforcing matrix via the concrete cracks.

It also appears that the majority of staining on the undersides of the deck is caused by rusting of the feet of the rebar chairs (used during the initial construction to provide cover to the bottom rebar) which essentially have zero cover and are virtually unprotected against corrosion. In some cases, the deterioration of the rebar chair is enough to have split and spalled the concrete covers and exposed some of the bottom slab rebar. Where this has occurred, the reinforcing steel bars are showing some staining. In terms of area, it appears that corrosion of the rebar chairs is much more prevalent than the reinforcing steel corrosion.

If this state of corrosion is left unmitigated, the corrosion of the system will accelerate and the outcome will be more staining, spalling, section loss of the bars, and reduced load carrying capacity of the structural system. This becomes a very insidious situation and expensive problem to fix as the top slab is a vital component to the bridge's structural system. If left long enough, it practically becomes more economical to replace the bridge versus trying to repair it.

For Ramp D, there was also severe corrosion affecting the Tendon 12 lower deck tendons and the primary cause appears to be a "salt water pond" that was created due to a malfunctioning of the drainage system. While the deterioration of Tendon 12 is severe, it should not be linked to the common top slab crack, nor should its' state be thought of as representative of other tendons in place for the Cline Avenue Bridge.

Considering INDOT's budget constraints, we believe the first order of business should be to try to mitigate corrosion occurring in the top decks. We believe a possible short term solution would be to apply a corrosion inhibitor by roller or spray to the areas vulnerable to corrosion,

i.e., the cracked areas of the deck or other surfaces (See data sheets for the Sika product attached – Appendix D3). Then as a second step, saw cut an opening at the cracks in the top deck surface and use hot poured rubber, or sealant (such as Dow Corning attached – Appendix D4) to essentially provide a flexible joint bridging the working crack. Corrosion of the rebar chairs and rebar could then be sand blasted away as best as possible and these surfaces be painted with a zinc rich coating.

If the deck overlay looks competent and the ingress of chlorides is not too deep, the above "band aid" will buy some time and will also allow an evaluation of this solution on a limited scale. The problem with this solution is that corrosion inhibitors are not considered to be a long term corrosion mitigating feature. Nonetheless, 2 or 3 years of time at low cost could be of great value to INDOT and we believe this solution should be further investigated and discussed in terms of its technical promise, application and a refined cost.

On a limited scale, Ramp D also allows an opportunity to possibly incorporate and assess the performance of FRP strengthening techniques, other coatings or sealants, and cathodic protection by metalizing or impressed current systems.

There are two special situations that are present that we believe require attention immediately. These are:

- Active spalling at the tops of piers.
- Deterioration of Tendon 12 – Ramp D.

We believe Item 1 is a "time of the essence" issue that requires a structural fix to restore structural integrity as soon as possible. One potential fix would involve corrosion cell mitigation, assessment and the restoration of the concrete, providing proper confinement and cover. For Item 2, the consequence of full or partial loss of Tendon 12 should be mitigated before it causes future, more significant and expensive problems. A solution should include cathodic protection, installation of some mild steel to guarantee a load transfer mechanism between tendon and concrete, and lastly plies of FRP added to address serviceability under strength issues.

6.5.2 – Advanced Strengthening Concepts

To fully rehabilitate the bridge, mitigating sources of corrosion and preventing future deterioration as best as possible, and strengthening where appropriate, advanced techniques discussed in the following section could be used. Figures 6.5.2-1 and 6.5.2-2 show rehabilitation options to mitigate further corrosion for the top deck. Figures 6.5.2-3, 6.5.2-4 and 6.5.2-5 show bonded FRP strengthening techniques to enhance the structural moment capacity of the top deck and the shear carrying capacity of the webs. Figures 6.5.2-6 and 6.5.2-7 show the addition of external bars or tendons to enhance the longitudinal moment capacity, and the diaphragm load transfer capacity, respectively. Figure 6.5.2-8 show strengthening of a diaphragm with an external corbel system.

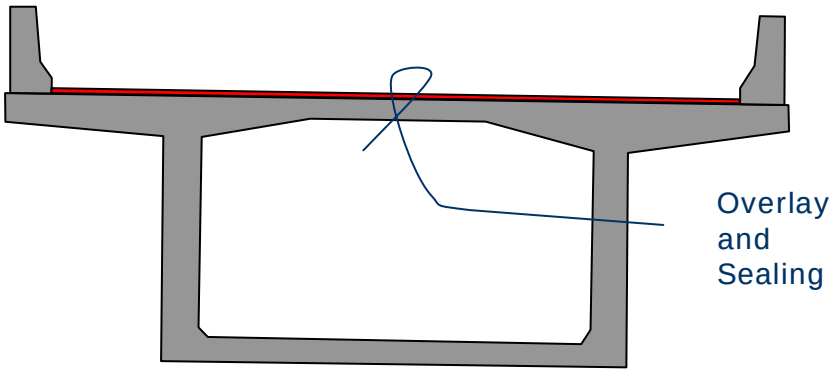


Figure 6.5.2-1 – Rehabilitation by Overlay and Sealing

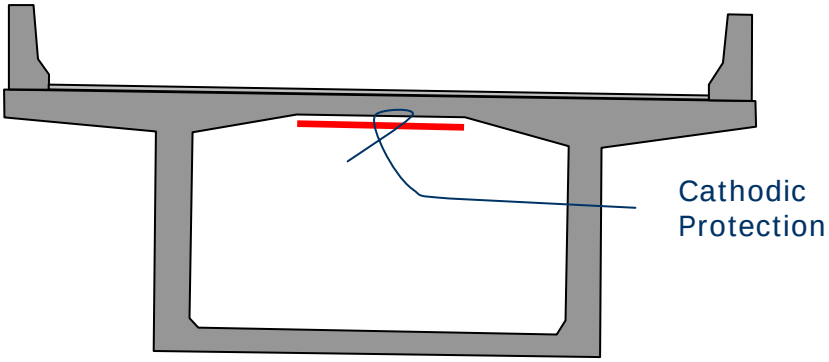


Figure 6.5.2-2 – Rehabilitation by Cathodic Protection

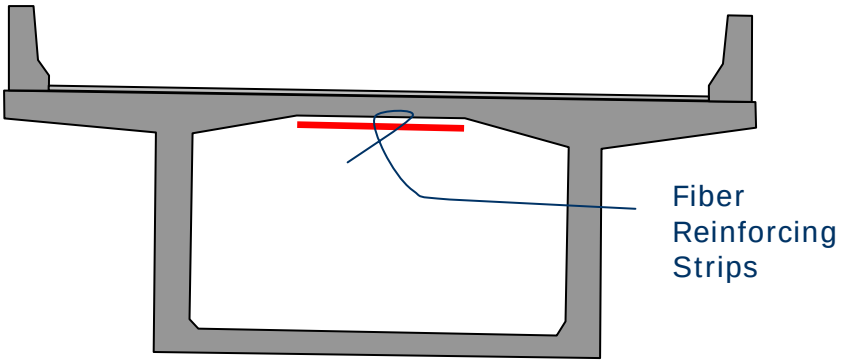


Figure 6.5.2-3 – M+ Strengthening by FRP Strips

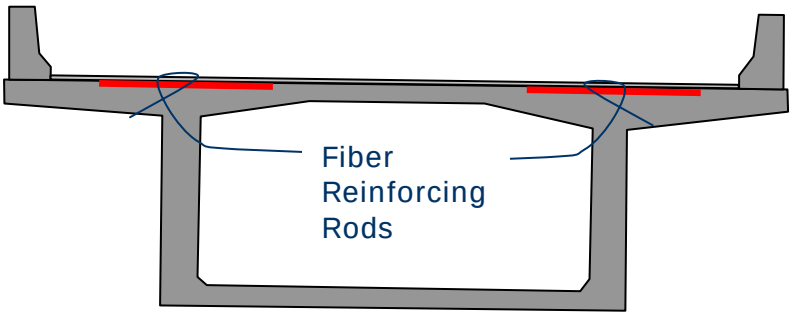


Figure 6.5.2-4 – M- Strengthening by FRP Rods

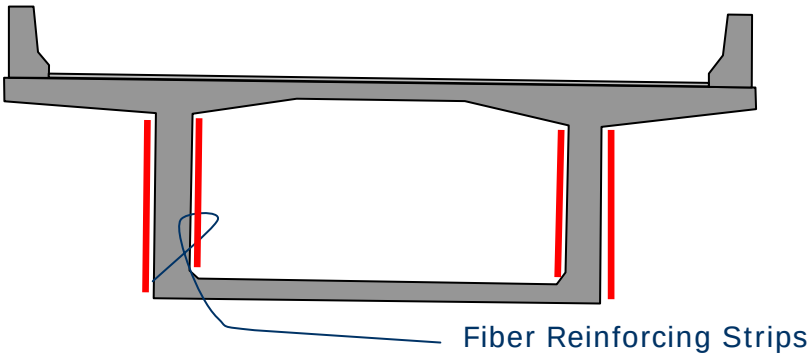


Figure 6.5.2-5 – Shear Strengthening by FRP Strips

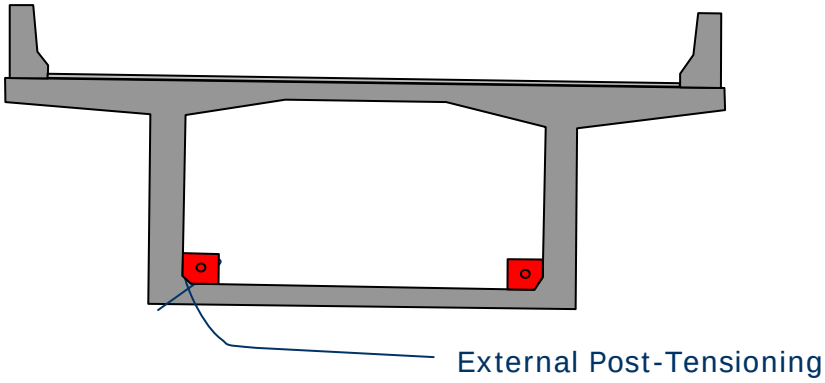


Figure 6.5.2-6 – Strengthening by External PT Bars or Tendons

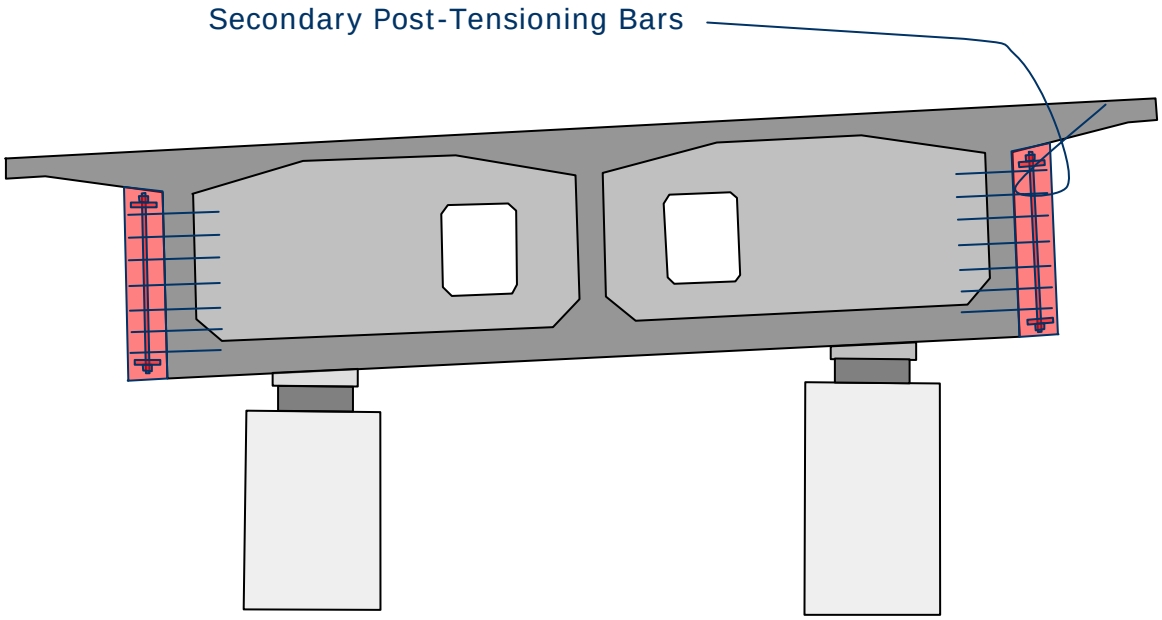


Figure 6.5.2-7 – Diaphragm Strengthening by External PT Bars

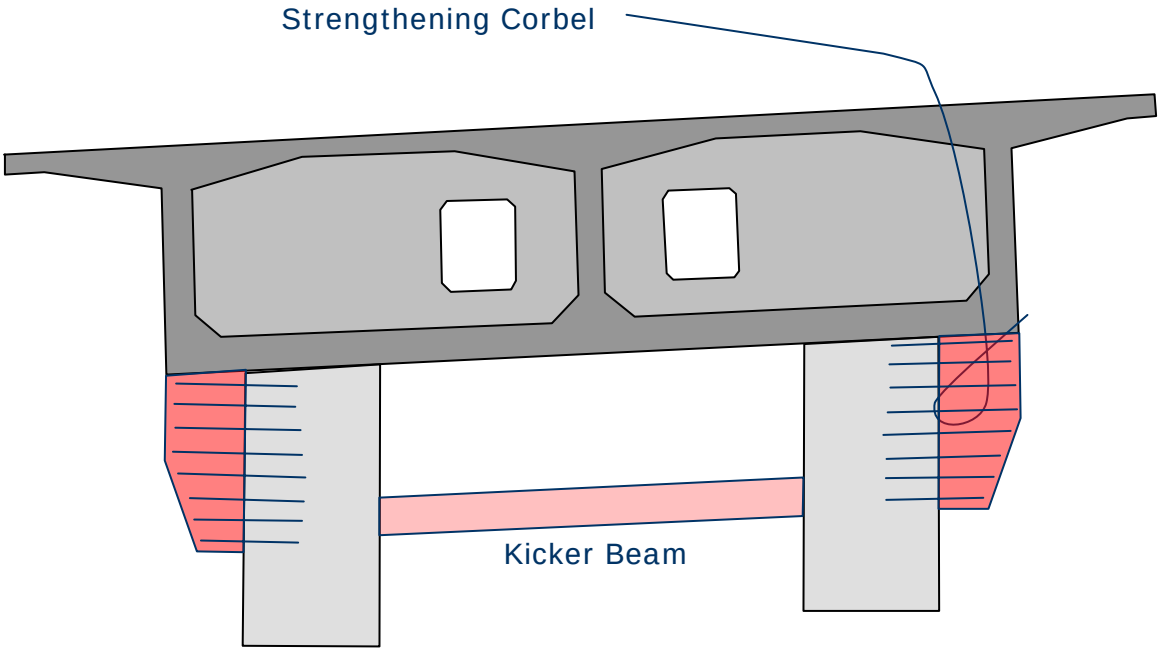


Figure 6.5.2-8 – Diaphragm Strengthening by External Corbels

For the audience reading this document, the figures are self explanatory and do not require a great deal of further discussion at this time. In order to develop the most viable solution, the first concern should be the mitigation of the ongoing corrosion. The tendon evaluations and top slab core sampling are two ongoing investigations serving to provide data regarding the structure's condition related to corrosion and corrosive elements. Crack mapping and measurements are also useful in showing areas of structural distress due to either serviceability and/or strength limit states. The load rating analysis, and rating factors, show the calculated capacity of the bridge and also allow a comparison, coordination, and integration of the physical inspection results with analytical results. The results of the inspection, testing program, and load rating analysis will form the basis of future rehabilitation and strengthening schemes.

7.0 – CONCLUSIONS AND RECOMMENDATIONS

7.1 – CORROSION CONSULTANT CONCLUSIONS

7.1.1 – Overall Corrosion Activity

The average corrosion rate of couplers was 1.0mpy (high). Corrosion rate of couplers varied from 0.2mpy (low) to 1.9mpy (high). Seven (47%) of the couplers indicated a high corrosion rate. Most of the voids (and associated carbonated or partially carbonated grout) were found in the couplers.

The average corrosion rate of high points was 0.4mpy (low). Corrosion rate of high points varied from 0.01mpy (low) to 0.9mpy (moderate). Three (25%) of the high points had a moderate corrosion rate and none had a high corrosion rate.

Rate of corrosion of strands is directly proportional to the temperature (i.e. increases with increasing temperature and decreases with decreasing temperature). Measured rate of corrosion is generally lower in winter months than during summer months. We recommend that the future testing be performed when the ambient temperature is above freezing so that we capture the upper bounds of corrosion rate data.

7.1.2 – Mainline Corrosion Activity

A total of 24 locations were tested in the mainline: 12 couplers and 12 high points. The majority of the test locations on the mainline exhibited Class 2 (minor) corrosion. The Class 2 corrosion was typically discoloration of the wires and/or a thin layer of surface rust with no visible pitting. Six out of twelve couplers (50%) had Class 3 or higher corrosion (surface corrosion with minor pitting). Two out of twelve couplers (17%) had Class 4 (surface corrosion with pitting) corrosion. Two out of twelve high points (17%) had Class 3 corrosion (surface corrosion with minor pitting).

The corrosion Class indicates the level of damage that has occurred in the past. The corrosion rate indicates the on-going corrosion activity. White chalky grout is typically carbonated and porous. It is possible that post-tensioned structures, over time, can lose the protective properties of the grout in areas where grout is partially carbonated. Over time, this porous material allows the carbonation front to reach the strands, thus initiating the corrosion process. Therefore, rate of corrosion data is necessary to determine the current status of the strands.

The majority of the couplers in the mainline (seven out of twelve couplers, 58%) had a high corrosion rate (1-3 mpy). Most of the void areas with white chalky material were found at the coupler locations as well. None of the high points analyzed in this round of testing had a high corrosion rate. Three out of twelve (25%) high points had moderate corrosion. This may have been due to reduced corrosion rate during the winter months.

There were several locations where pH of the grout at the strand interface was well below 13 to 13.5. The pH of the grout is not uniformly 13 but varies along the structure indicating a varying quality of grout. This, typically, leads to corrosion of strands in post-tensioned structures.

Unlike reinforced concrete structures where corrosion damage leads to visible signs well before significant metal cross section is lost, post-tensioned structures may not show signs up to the point of failure.

7.1.3 – Ramp "A" Corrosion Activity

A total of two locations were tested in this round of testing. Both locations on Ramp A exhibited Class 2 (minor) corrosion. Corrosion rate data indicate that both locations had low corrosion rate. The pH of the grout was 13 at both locations.

7.1.4 – Ramp "C" Corrosion Activity

A total of two locations were tested in this round of testing. Both locations on Ramp C exhibited Class 2 (minor) corrosion. Corrosion rate data indicates that one location had low corrosion rate and another location had moderate corrosion rate. The pH of the grout was 13 at both locations.

7.1.5 – Ramp "D" Corrosion Activity

A total of two locations were tested in this round of testing. One location on Ramp D exhibited Class 2 (minor) corrosion and another exhibited Class 3 (surface corrosion with minor pitting). Corrosion rate data indicates that one location had a low corrosion rate and another location had a moderate corrosion rate. The pH of the grout was 13 at both locations.

7.2 – CORROSION CONSULTANT RECOMMENDATIONS

The purpose of the Phase 3 inspection will be to conduct localized testing and evaluations of top mat of epoxy coated bars in select areas of the bridges. The purpose of the Phase 4 inspection is to determine the extent of chloride contamination on the underside of the deck and to estimate the extent of future damage due to corrosion.

A complete scope of work for the two phases can be found in Appendix E.7.

7.2.1 – Phase 3 Inspection – Topside of Deck

It is recommended extracting at least thirty-two (32) cores from the deck surface. We propose that these cores be extracted with top mat epoxy coated rebar so that we can evaluate the condition of the coating and the bar as well as measure the remaining cross section of the rebar. This is necessary to define the remaining life of the deck. SCS, Inc will select the core locations based on a cover survey.

It is possible that epoxy coated rebar of different types may have been used in different segments of the bridge. Additional cores may be needed if the test results indicate a scatter or presence of different types of coating. If additional cores are required a revised scope of work will be submitted.

We are proposing two cores per mainline segment for both the westbound and the eastbound lanes for a total of 24 cores (6 segments x 2 cores x 2 directions). Additionally we are proposing

two cores per ramp for a total of 8 cores (2 cores x 4 ramps). Of the two cores, one will be located on the cantilever and the other will be located at the center of the box. It is possible that some of the cores may break above the rebar. Additional cores may be required near existing core locations based on site conditions. The depth of the cores will be at least 1-inch below the epoxy-coated rebar. All cores will be extracted from the deck surface. The core locations will be at least three feet away from any tendon location.

We recognize that the number of cores proposed is low compared to the total surface area of the deck (over 600,000 sq. ft.). We purposefully limited the number of cores to limit cutting the number of reinforcing bars. In place of additional cores, we recommend collecting concrete powder samples from spans where no cores will be extracted. The concrete powder samples will be collected from at least five locations per test area and from two levels (top of the deck and at rebar depth) per location for a total of ten (10) concrete powder samples per test area (i.e. span-lane). We will perform cover survey to define sampling depths. We will drill 5/8-inch diameter holes on the deck surface. After collecting the powder samples the holes will be vacuumed and filled with an approved fast setting mortar.

A test area is defined as the area in one span-lane. Based on this definition, the total number of test areas in SR 912 is over 150. We recommend collecting powder samples from at least 50 test areas spread throughout the bridge. This, in combination with the core data, can help us better define the remaining life of the deck.

7.2.2 – Phase 4 Inspection – Underside of Deck

Most of the structures built before 1982 used epoxy coated rebar only in the top mat of the deck. Several states started using epoxy coated rebar on both the top and bottom mat following the 1982 FHWA memorandum recommending the use of epoxy coated rebar in both mats. Few states, if any, used epoxy coated rebar on both mats prior to 1982. According to the plans and the comments from the INDOT Project Manager for SR 912, both the top and bottom mats of rebar are epoxy coated. We have developed the following recommendation of work based on this information.

We propose a maximum of thirty-two (32) locations (or areas) of testing. **We do not plan on cutting or coring through the bottom mat rebar.** An area is defined as the portion of the top deck between haunches in one span of one cell. The selection of test areas will be based on the following:

- Areas that show spalling.
- Areas that show efflorescence.
- Areas that show cracks but no efflorescence or spalling.
- Areas that show no cracks.

Test areas will be distributed as follows:

- Ramp A – Four test areas
- Ramp B – Two test areas

- Ramp C – Four test areas
- Ramp D – Two test areas
- Segment 1, 2, and 3 East Bound – Five test areas
- Segment 4, 5, and 6 East Bound – Five test areas
- Segment 1, 2, and 3 West Bound – Five test areas
- Segment 4, 5, and 6 West Bound – Five test areas

The nature and the extent of chloride contamination and the associated corrosion damage are unknown. By distributing the test locations throughout the structures, any local variation will be captured. Though some spans and cells will not be tested, we expect similar transport mechanism throughout the deck. Our proposed number of test areas and their distribution is based on this information.

7.3 – URS RECOMMENDATIONS

This inspection completes Phase 2 of six phases of inspection, testing, and analysis on the Cline Avenue bridges. The primary two goals of this project are to:

- Monitor the bridge for advanced deterioration/corrosion so that immediate corrective action can be taken if needed to maintain public safety.
- Develop a repair/rehabilitation recommendation for this bridge to remain in service for 25 years.

A schedule has been developed to help achieve these goals over the next four phases. The project team will evaluate this planned schedule as the project progresses and make the necessary adjustments to best achieve the outlined goals.

PHASE		DATE	INSPECTION	TESTING	ANALYSIS
COMPLETED	Phase 1	5/06~9/06	*Segments 1~6, Ramps A~D* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing Low Points, Couplers, and High Points (28 Locations)	• None
	Phase 2	12/06~2/07	*Segments 4~6, Ramps A, C, & D* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing at Couplers and High Points (30 Locations)	• Ramp D, Preliminary
PLANNED	Phase 3	Spring '07	*Segments 1~6, Ramps A~D* • Hinges • "Smiley" Cracks *Segments 1~3, Ramp B* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing of 32 top deck cores • Determine chloride contamination with the use of cores and drill holes in the top deck • Corrosion reading of deck slab reinforcement • Corrosion Test of Reinforcing Steel at a "Smiley Crack" and a hinge	• Ramp D, Final • Begin Segments 1~6, Ramps A~C
	Phase 4	Fall '07	*Segments 4-6, Ramps A~D* • "Hot Spot" Cracks • Bottom of Top Slab	• Determine chloride contamination level through the use of drill hole samples in the underside of the deck	• Finalize Segments 1~6, Ramps A~C
	Phase 5	Spring '08	*Segments 1~3* • "Hot Spot" Cracks • Bottom of Top Slab • Hinges	• Corrosion Testing at Couplers and High Points	
	Phase 6	Fall '08	*Segments 4-6, Ramps A~D* • "Hot Spot" Cracks • Bottom of Top Slab • Hinges	• Corrosion Testing at Couplers and High Points	

Table 7.3-1 Future Inspection, Testing, and Analysis Plan

7.3.1 – "Hot-Spot" Cracks

The five bridges are all showing continual degradation throughout each structure, from the substructure to the roadway deck. The "Hot Spot" cracks inspected during Phase 2 (those

located in Segments 4~6, and Ramps A, C, and D) are continuing to grow, however, due to the short amount of time between inspections, only a small number of cracks (3 of 120) had recorded growth.

It is recommended that the inspection of the "Hot Spot" cracks for Segments 1, 2, and 3 and Ramp B be performed during Phase 3. In addition, the exterior webs of the concrete box girders should be examined for "smiley" cracks over the piers. These cracks should be fully documented and mapped. A corrosion test on the reinforcing steel should be performed at one of the "smiley" crack locations.

7.3.2 – Hinges

URS recommends inspecting the hinge locations, both internally and externally. Cracks should be measured, documented, and mapped so that future growth rates can be determined. A corrosion test on the reinforcing steel should be performed at a hinge location that is showing excessive cracking.

7.3.3 – Top Slab

The top deck of the concrete box girders is exhibiting signs of deterioration. This deterioration includes cracking, efflorescence, rust staining, delaminations and spalling. In an effort to determine the extent of the deterioration and the possible causes, testing of the deck should be performed during Phase 3. This should include taking approximately 100 cores from the top of the deck to determine the limits of chloride contamination in the concrete. The cores should be examined to determine at a minimum:

- Amount of chlorides
- Black and epoxy coated re-steel locations
- Cover measurements
- Condition of the re-steel

In addition, corrosion readings of the reinforcing steel should be taken at spalled or delaminated areas from the underside of the top deck.

7.3.4 – Tendon/Coupler Testing

Due to the extensive amount of testing being performed in the top slab, it is recommended that the testing of the tendons and couplers be continued during a later phase.

7.3.5 – Load Rating Analysis

URS has completed the preliminary analysis of the load rating for Ramp D. URS recommends that this preliminary analysis be finalized during the Phase 3 inspection. In addition, as funds are available, the load rating should commence for other sections of the bridge. The results from the load rating will aid in guiding the inspection/testing team and determining long term bridge rehabilitation options.

7.3.6 – Rehabilitation

The URS project team is continually developing retrofit schemes to address the structural deficiencies and the causes of deterioration on the Cline Avenue Bridge. This work is still in the early stages, as further information regarding crack growth, corrosion, and load rating will help steer the direction of the rehabilitation. Some potential retrofit/rehabilitation options to strengthen the structure are discussed in Section 6.5.2.

Mitigating the corrosion occurring in the top slab of the bridge should be addressed soon. The testing recommended to be performed on the top slab during the upcoming Phase 3 will help the project team develop recommendations. Mitigating this corrosion in the top deck as soon as possible is imperative as the top slab is a vital component to the bridge's structural system.

URS recommends addressing two structural deficiencies in the bridge immediately. These are:

- Active spalling at top of Pier 7 and 7' (refer to October 2006 Phase 1 Report by URS Corporation)
- Deterioration of Tendon 12 in Ramp D (refer to April 2005 Report by Ken Herceg and Associates)

Item 1 is a "time of the essence" issue that requires a structural fix to restore structural integrity as soon as possible. For Item 2, the consequence of full or partial loss of Tendon 12 should be mitigated before it causes future, more significant and expensive problems. Repair of the structural deficiencies are discussed in further detail in Section 6.5.1.

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- Phase 1 Bridge Inspection Report, "SR 912 Over the Indiana Harbor Canal at East Chicago, Lake County, Indiana," URS Corporation, October 2006.

The Appendices of this Report

Are not Included

In the Calculation Book

BRIDGE INSPECTION REPORT
PHASE 3

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

STATE OF INDIANA
DEPARTMENT OF TRANSPORTATION

DECEMBER 2007

URS

BRIDGE INSPECTION REPORT
PHASE 3

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

MAINLINE	**BRIDGE NO. 912-45-2546A**
RAMP A	**BRIDGE NO. 912-45-2546RWXA**
RAMP B	**BRIDGE NO. 912-45-2546RWN**
RAMP C	**BRIDGE NO. 912-45-2546RENA**
RAMP D	**BRIDGE NO. 912-45-2546REX**

PREPARED FOR:

STATE OF INDIANA

DEPARTMENT OF TRANSPORTATION
OFFICE OF TECHNICAL SERVICES
BRIDGE INSPECTION SECTION

DECEMBER 2007

PREPARED BY:

URS

SENIOR INSPECTING ENGINEER
URS CORPORATION

12/31/2007
DATE

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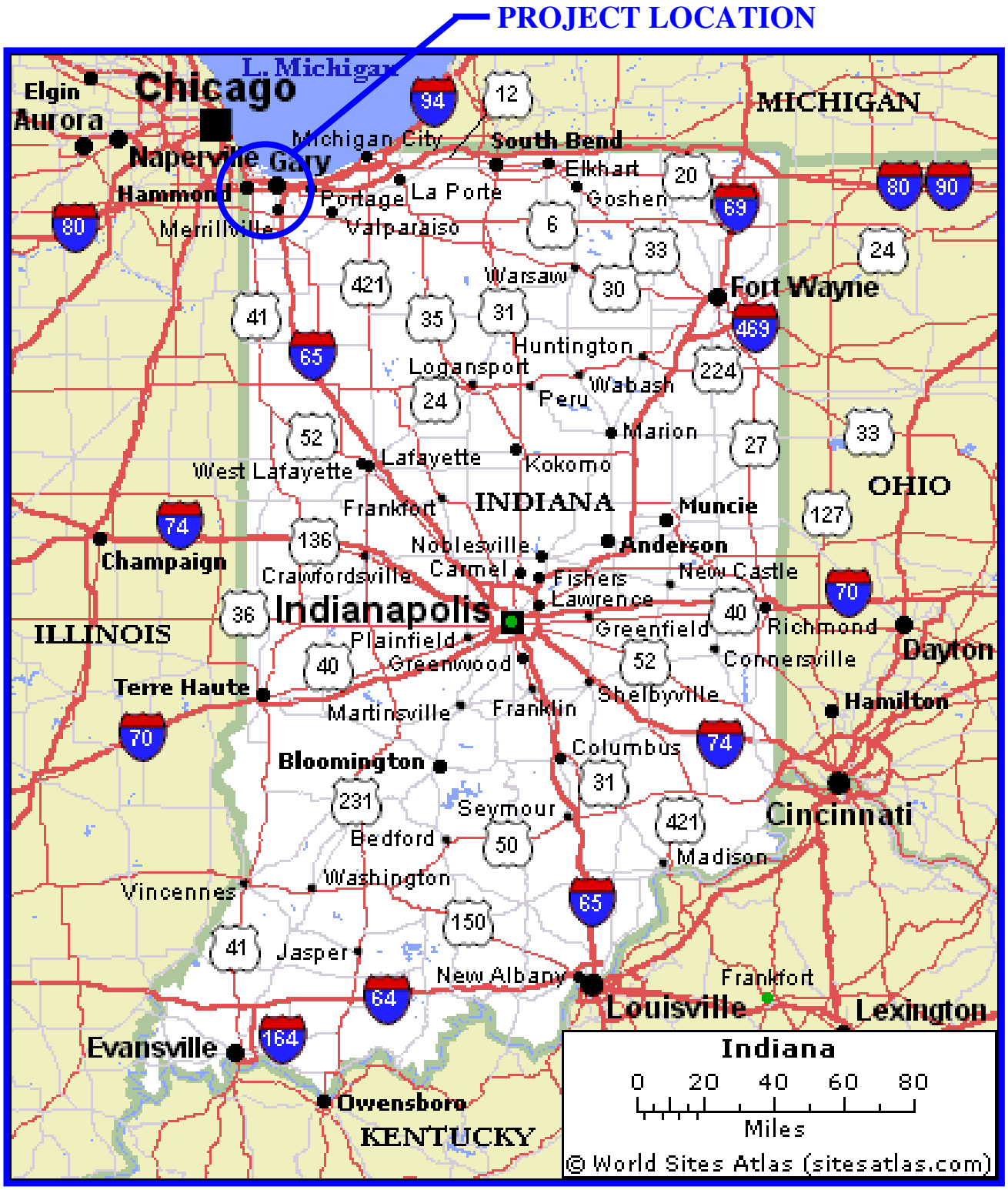
MISCELLANEOUS FILES
Folder 1 - Bridge Deck Coring Photos & VSL Daily Inspection Logs

DISCLAIMER

This inspection report is based on data and conditions that are generally applicable as of December 2007 and the conclusions and recommendations herein are therefore applicable only to that timeframe. This report should not be used as the sole basis for final design, construction or remedial action, or as a basis for major capital decisions. Further studies including a complete load rating analysis, additional testing of the post-tensioning system and top deck should be performed prior to such decisions.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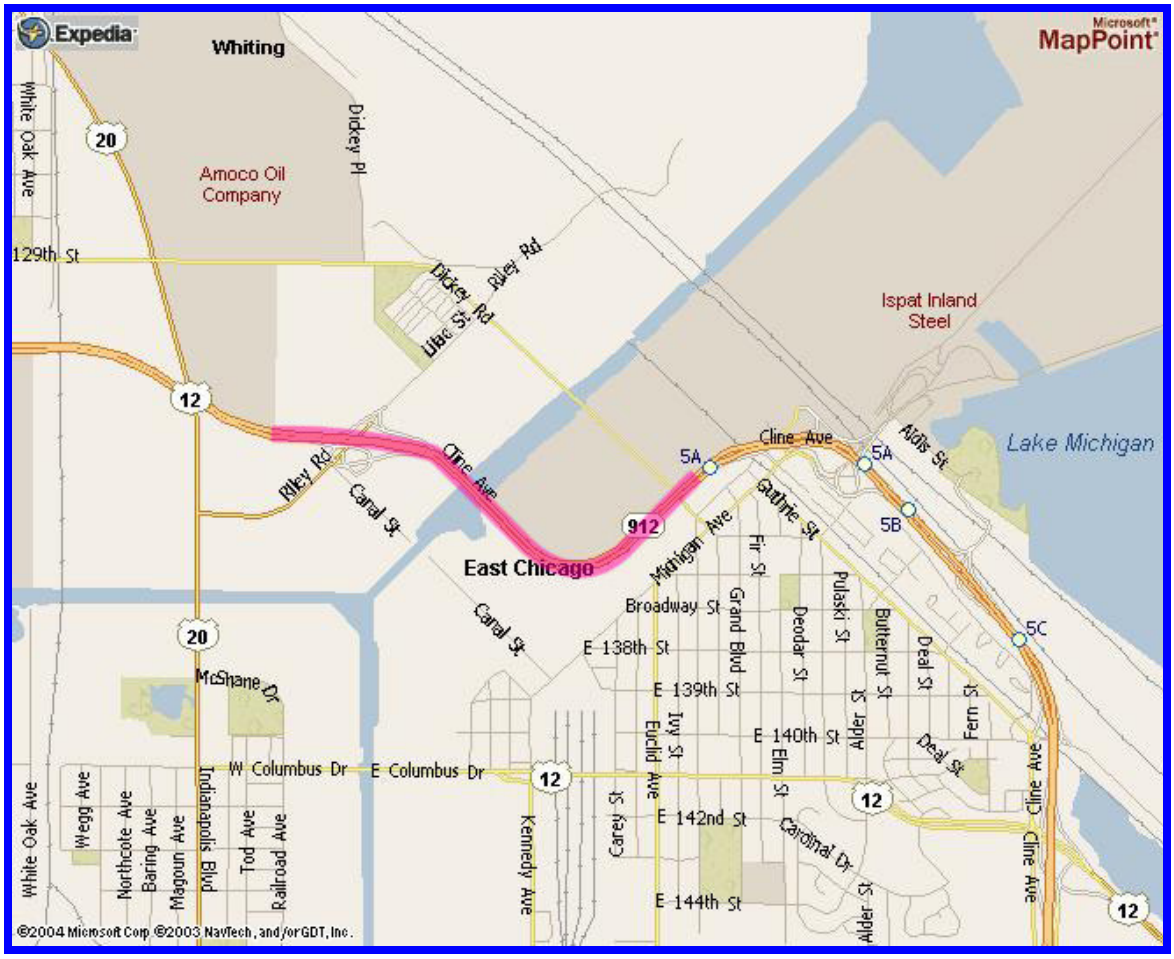
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Butternut St
Deal St
Fern St
Broadway St
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E 140th St
E 142nd St
E 144th St
Ivy St
Euclid Ave
Elm St
Alder St
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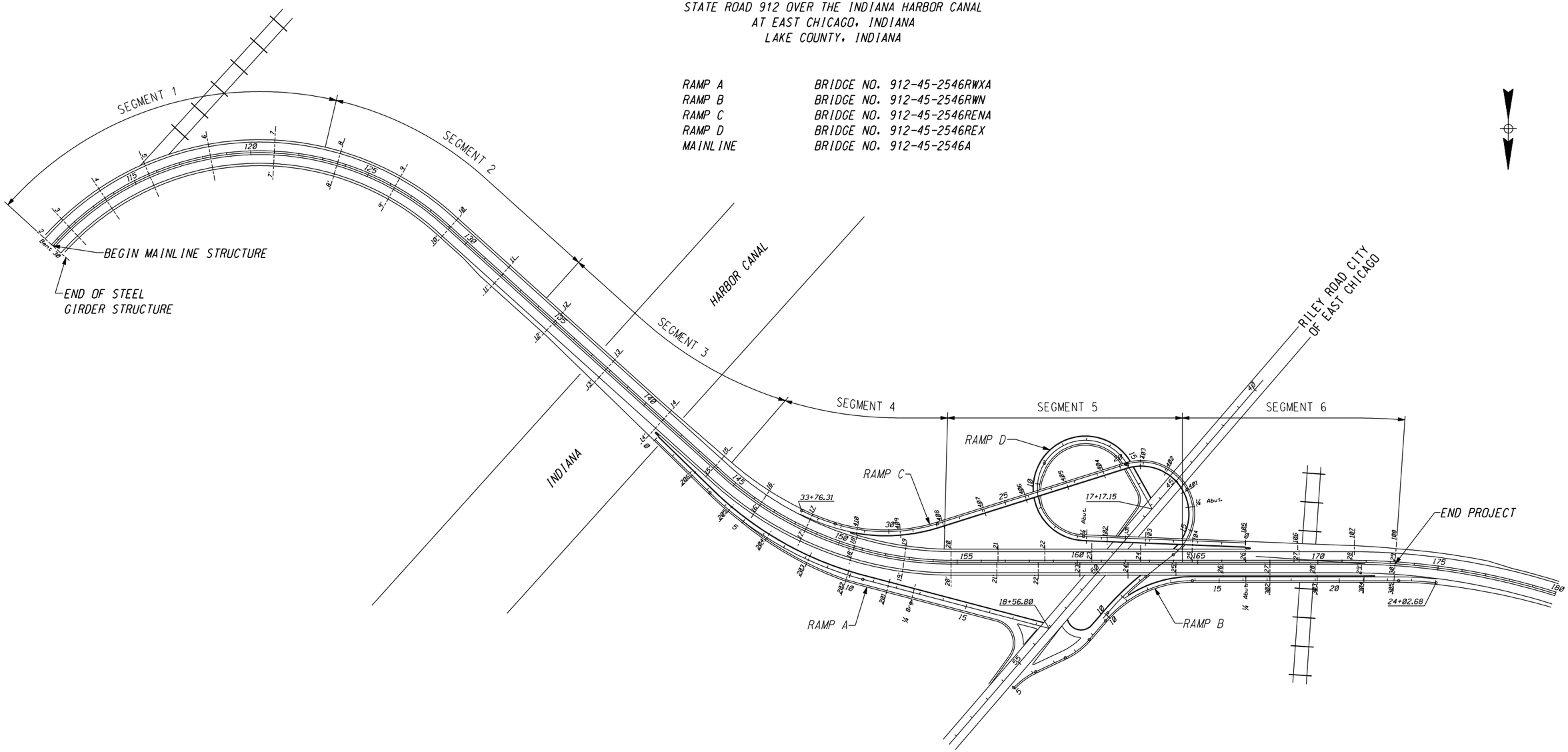
CLINE AVENUE BRIDGE

STATE ROAD 912 OVER THE INDIANA HARBOR CANAL
AT EAST CHICAGO, INDIANA
LAKE COUNTY, INDIANA

RAMP A	BRIDGE NO. 912-45-2546RWXA
RAMP B	BRIDGE NO. 912-45-2546RWN
RAMP C	BRIDGE NO. 912-45-2546RENA
RAMP D	BRIDGE NO. 912-45-2546REX
MAINLINE	BRIDGE NO. 912-45-2546A



GENERAL LAYOUT PLAN

1.0 INTRODUCTION

1.1 GENERAL

In accordance with an agreement with the Indiana Department of Transportation, URS Corporation conducted the Phase 3 "Hot-Spot" inspection of the post-tensioned girder spans of the SR 912 (Cline Avenue) bridge and ramps over the Indiana Harbor Canal and Riley Road. This inspection included the re-inspection of "Hot-Spot" cracks in Segments 1, 2, and 3 and Ramp B and localized testing and evaluation of the bridge decks. The hinge between Segments 5 and 6 and a "smiley" crack at Pier 6 were also tested and evaluated. The scope of the inspection is provided below.

- URS subcontracted VStructural LLC (VSL) to core the top of the deck and patch core locations and provided general post-tensioning expertise.

- Siva Corrosion Services (SCS) was utilized by URS to evaluate the epoxy coating on the reinforcing steel, provide corrosion analysis of the reinforcing steel, provide a cover survey of the top mat of reinforcing steel at select locations, determine chloride content of the concrete samples, perform a petrographic analysis of the samples and predict subsequent concrete damage.

- URS subcontracted INTECH Contracting LLC to provide traffic control.

This *Bridge Inspection Report*, prepared by URS adheres to the Scope of Work as amended by the pre-inspection meeting held on Wednesday, May 9, 2007. This report includes all findings discovered during the field inspection.

1.2 SCOPE OF WORK

- Prepare inspection drawings
- Perform (detailed) visual crack inspection
    - Re-inspect "Hot Spots" and document findings (Ramp B/ Segments 1, 2 and 3 only)
    - Examine hinges for crack growth.
    - Examine exterior webs of the concrete box girders for "smiley" cracks over the piers and document all cracks at one location
- Perform testing
    - Measure and record concrete cover in spans and lanes where cores are taken
    - Extract 32 cores from the bridge deck surfaces. Each core will include a portion of an epoxy coated reinforcing bar
    - Collect concrete powder samples from the bridge decks. (The number of samples taken was reduced from the scope due to concerns about cost and invasiveness of the procedure. The amount of future testing required will be determined after the results from these tests are examined and analyzed.)
- Perform evaluations of testing

- Evaluate the epoxy coating condition and measure the remaining cross section of the reinforcing bars
- Determine chloride content at varying depths within the cores. Analyze the chloride diffusion to determine the time-to-corrosion initiation and to predict subsequent concrete damage
- Test concrete powder samples for chloride content
- Perform a petrographic analysis on a maximum of four samples to determine if alkali reactive aggregates are present

- Prepare analysis and reports
  - Draft inspection report
    - Summary of inspection findings
    - Drawings of cracks, summary of cracks
    - Photographs
    - Summary of confined space procedures
    - Summary of testing and coring procedures
    - Recommendations for future inspections and testing
  - Final report and recommendations
    - Summary of quality control standards and procedures
    - Summary of inspection and testing findings
    - Discussion and summary of any structural analysis
    - Confined space entry requirements

2.0 OVERVIEW

2.1 PRE-INSPECTION MEETING

A pre-inspection meeting was held on Wednesday May 9, 2007. The meeting provided a forum to discuss and clarify the scope, schedule, safety concerns, goals and other pertinent aspects of the inspection by the stakeholders in this endeavor. The original scope of work was amended to focus the inspection on the bridge decks, hinges and "smiley" cracks on the exterior webs over the piers. Refer to Appendix A for the minutes of this meeting.

2.2 INSPECTION PERSONNEL

The inspection was performed by URS Corporation with the assistance of several subconsultants/subcontractors. Primary inspection personnel consisted of:

2.2.1 URS Corporation

- Dallas Montgomery, PE
  Qualified NBIS Team Leader who has completed NHI "Fracture Critical Inspection Techniques for Steel Bridges" course.
- Bill Curtis, PE
  Qualified NBIS Team Leader
- Frank Sailer, PE
- Rachel Katchmar
- Kyle Moelker

2.2.2 Siva Corrosion Services (SCS)

- Siva Venugopalan
- Tom O'Neill
- Joe Kish
- Stuart Mundth

2.2.3 VStructural LLC (VSL)

- Bruce Osborn
- Alex Davenport
- Charles Black
- Fred Hedrick

2.3 INSPECTION PERIOD

• URS inspection of interior "Hot-Spot" cracks, hinges and "smiley" cracks	7/10/07-7/17/07, 7/23/07-7/31/07, 8/1/07-8/3/07
• URS inspection support and coordination	7/10/07-8/16/07
• VSL support services	7/10/07-8/16/07
• SCS walkthrough and testing	7/10/07-8/2/07
• INTECH maintenance of traffic	7/10/07-8/3/07

2.4 INSPECTION EQUIPMENT AND TOOLS

The following equipment was utilized for the visual inspections:

- Air monitor
- Feeler gauges
- 25' tape
- Measuring wheel
- Flashlights
- Black markers
- Whisk broom

2.5 SAFETY TRAINING

VSL conducted a 5 hour training program attended by all onsite personal prior to the Phase 1 inspection. The training consisted of the proper procedures which would be followed when entering and exiting a confined space. The training also discussed proper fall protection and emergency exiting procedures necessary for confined space work. This training included proper procedures for working around potentially hazardous conditions present around the work site due to the manufacturing facilities located around the structure. Further subjects including air monitoring and sample pieces of required equipment were presented for hands on training and sample testing.

Segments 2 and 3 are located on the property of Kemiron an industrial gas manufacturer. Prior to entering their property each individual was required to view a safety training video concerning possible hazards and safety precautions. Kemiron utilizes a siren to warn of gas leaks and wind socks to aide in determining at which designated location personnel should assemble if a leak occurs. Kemiron required that anyone entering their property carry a respirator as a safety precaution.

Segment 6 is located on the property of BP-Amoco. Prior to entering their property all inspection personnel were required to view a video concerning rules, regulations, hazards and safety precautions. After passing an exam about the contents of the video each individual was assigned a tag to be worn while on BP-Amoco's property.

2.6 SAFETY CONSIDERATIONS

A VSL written Safety Plan was developed specific for the Cline Avenue project. It included bridge access plans and the equipment required. Confined space training procedures and instructions and directions for locating a medical facility are included as part of this plan. For additional information on VSL's Safety Plan see Appendix B.

URS Corporation developed a Safe Work Plan before mobilizing to the project site. This included essential information and guidelines, such as the location of the nearest hospital. Known hazards included traffic, confined space, use of aerial lifts, heat stress and hearing protection were also included in the URS Safe Work Plan.

The interior concrete box girder cells of the Cline Ave Bridge are considered a non-permit required confined space. All personnel were properly trained in confined space entry. Guidelines in the VSL Safety Plan and the URS Safe Work Plan were strictly followed. An air monitor was used to check the air quality before entering the space and while working inside. Confined space entry forms were completed when the cells were entered.

2.7 ACCESS EQUIPMENT AND PROCEDURES

A 120' manlift was used to gain access to Segments 1, 2 and 3 while a 50' scissor lift was used to access Ramp B. Safety harnesses were utilized to attach personnel to the manlift for the ascent and descent to each segment cell.

Manlift use with Safety Harness

A wooden safety railing was placed around the access hatches for each cell.

Safety Railing at Cell Access Hatch

2.8 QUALITY CONTROL STANDARDS AND PROCEDURES

The quality assurance program involves the proper functioning of many interrelated activities and extends to all personnel engaged in this project. A project quality assurance plan is a project specific plan that identifies the elements of the quality assurance program that are applicable to the project based upon the scope of services to be provided. It identifies a schedule of deliverables, planned independent technical reviews, and reviewers. URS Corporation has established a set of quality guidelines for this project. The quality assurance and quality control plan document followed for this project is included in Appendix C.

2.9 CORROSION MECHANISM OF STEEL IN CONCRETE

Normally steel embedded in a good quality concrete is protected from corrosion by the formation of a passive film on the steel at its interface with the high pH concrete. This passive film can be compromised when chlorides contaminate the concrete at levels beyond defined acceptable threshold levels and disrupt the passive film. The passive film can also be compromised by the carbonation process where the carbon dioxide from the atmosphere reacts with alkaline hydroxide in the concrete to form calcium carbonate. This results in lowering of the pH and the dissolution of the passive film. Our experience over several years has shown that carbonation is not an issue as it relates to corrosion of bridge decks in the US.

In the US, commonly quoted threshold levels of chlorides for regular reinforced concrete structures range from 1 to 1.35 lb per cubic yard of concrete. This approximately translates to

0.035% by weight of concrete, or 0.020% by weigh of cement. Indiana DOT uses a threshold limit equal to 1.52 lb/CY of concrete, or 0.039% by weight of concrete. Chloride levels above these thresholds indicate a potential for corrosion occurring on uncoated reinforcing steel.

For new prestressed and post-tensioned structures the American Association of State Highway Transportation Officials (AASHTO) and American Concrete Institute limit the acid soluble chloride content to a maximum of 0.080% by weight of cement. A recent study by Sagues suggests that the allowable chloride value for new prestressed concrete structures should be adjusted down from 0.080% by weight of cement. Though these threshold limits are based on laboratory studies, the actual threshold value is a function of the structure and its exposure to environments.

The passive layer on steel breaks down typically somewhere between pH 10 and pH 11 for regular reinforced concrete without chlorides. The passive film on the reinforcing steel can also break down if the chloride concentration at the steel level is greater than the threshold. Structural collapse of reinforced concrete structures due primarily to corrosion is rare since these structures show significant signs of deterioration prior to failure.

Since the top and bottom decks are part of the box girders structural components, the integrity of the decks is important in a post-tensioned box girder bridge. It is important to evaluate post-tensioned box girders at the first sign of distress, i.e. structural cracks, spalls, delaminations, efflorescence, misalignments, or other similar issues. Presence of cracks, efflorescence, and moisture are indications that salt is diffusing through. Corrosion evaluation can pinpoint the location and the extent of the problem. The corrosion evaluation can also assist in identifying the time to rehabilitation and all possible rehabilitation options.

2.10 REPORTING PROCEDURE

The procedure and format for reporting the condition of this structure conforms to the *Scope of Work as amended by the pre-inspection meeting held on Wednesday May 9, 2007* and instructions provided by the Bridge Inspection Section of the Office of Technical Services.

3.0 HISTORY

3.1 BRIDGE HISTORY

3.1.1 Design

The regulatory guidelines called for the Cline Avenue Bridge to have two separate designs, one being a steel alternate and the second being a steel and post-tensioned precast segmental concrete alternate. Both designs were advertised and let for bid in 1978, with the steel and concrete alternate receiving the lowest bid from Walsh Construction Company. The original steel and concrete alternate was designed by American Consulting Engineers; Reid, Quebe, Allison, Wilcox and Associates Inc.; and Beam, Longest and Neff, Inc. This design required the concrete box girders to be precast in segmental units, lifted into place, and then secured with tendons until the girder construction in the span was complete. Since the maximum height of the superstructure above the ground was less than 100 feet, Walsh Construction requested that they be allowed to cast-in-place the segmental concrete units of the girders instead of precasting them. They proposed to do this by using falsework to support the cast-in-place operation where the ground would allow and a moving Trauler Crane equipped with a slip form over those areas that could not support false work, such as the Indiana Harbor Canal area. They received permission from the Indiana State Highway Commission and the following delineates who performed the final design and at which location:

Cast-In-Place Segmental Concrete Main Spans (Redesign):
T.Y. Lin International
Reid, Quebe, Allison, Wilcox and Associates, Inc.

Cast-In-Place Segmental Concrete Four Approach Ramp Spans (Redesign):
Figg and Muller Engineers, Inc.
Beam, Longest and Neff, Inc.

Steel Girder Spans (Original Design):
American Consulting Engineering

The design and construction, for all portions of the structure, were to comply with the American Association of State Highway and Transportation Officials (AASHTO) 1977 Edition. The live load design was HS 20-44 including special toll road and military loading, the dead load design included 156 lbs/ft^3 for concrete and steel, 1 ½" modified P.C.C. overlay, 35 lbs/ft^3 for future wearing surface, curbs and barrier walls. Design speed was 50 mph, the 1977 design average daily traffic (ADT) was 32,900 vehicles per day (vpd) and the projected 1997 ADT was 56,100 vpd. The roadway deck, which is also the top flange of the post-tensioned concrete box girders, varies in thickness from 9 inches at the center of the box girder to 14 inches near the girder walls. Differential temperature allowance permits the top slab to be 18º F warmer or 9º F colder than the remaining portion of the structure. The prestressed steel for the post-tensioning of the segmental box girders was to be in accordance with ASTM Grade 270.

3.1.2 Construction

Construction began in 1978 and was completed in 1985. Total construction cost for the main spans was approximately $54 million. For the four approach ramps and the Riley Road reconstruction, the cost was $18 million. Since the redesign of the concrete portion of the bridge from precast to cast-in-place did not occur until after the contract was awarded for the project, time was of the essence. As construction began on the substructure units and fabrication of the structural steel commenced the redesign of the concrete portion was started. Completion of the concrete redesign did not occur before some of the substructure units were ready for superstructure construction. In order to expedite the construction schedule, when portions of the concrete redesign became available, the design drawings were used for construction and fabrication. On April 15, 1982 a section of the falsework, which consisted of steel scaffolding and beams, supporting the superstructure of Ramp C collapsed causing 13 fatalities and delaying the project. The cause of the falsework collapse was failure of several of the temporary concrete footing supports. Once the failure occurred it overloaded the adjacent footing and scaffolding and caused them to fail in a domino like fashion.

3.2 PAST INSPECTIONS

The following is a summary of past inspections that have been performed on the concrete mainline, four approach ramp bridges, and steel girder spans. Included is the date of the inspection, type of inspection and any significant findings.

Inspection Date	Inspection Type	Significant Findings
1/5/84	Initial Two Year Biennial INDOT	This was a walkover inspection of both the steel girder spans, post tension concrete box girder main spans and Ramps A, B, C and D. Construction on the project was still underway with respect to Riley Road and Ramps B & D. The only significant find was vehicle damage to the outside barrier wall in the horizontal curve of Ramp C.
5/23/85	Central and District Office Personnel, INDOT	An inspection was conducted inside two of the steel box pier caps of the steel girder spaces. No problems encountered.
5/24/85	Central and District Office Personnel, INDOT	This inspection was for the columns of Pier 2 and the interior of the center concrete cell of spans A through G (spans 1 through 6) Segment 1. The only finding was a crack in the metal plate in the center column of Pier 2.

Inspection Date	Inspection Type	Significant Findings
1/4/88 – 1/5/88	Two Year Biennial INDOT	This appeared to be a walkover inspection of the steel girder spans, mainline concrete spans and Ramps A, B, C & D. The exterior of the structures we accessed by foot as well as the interior of Ramps A, C & D. Significant findings included cracking of the ceiling in all cell interiors, rapid deterioration of the drain system and numerous clogged inlets.
6/29/88 – 6/30/88	Central and District Office Personnel, INDOT	It appears this inspection included the use of a snooper to inspect the exterior of the steel girder bridge. No significant problems were encountered.
1/10/90	Two Year Biennial INDOT	The interiors and exteriors of Ramps A, B & C were inspected. Cracks in the ceiling near the cell centers with efflorescence showing. The outside barrier wall in the horizontal curve near the abutment of Ramp C had extensive vehicle damage.
6/10/93	Two Year Biennial INDOT	An inspection of the exteriors of the bridge with no equipment for access. The majority of the drains were clogged. The barrier wall, at several locations, exhibited vehicle impact. The sides of the concrete cells directly above Piers 10-10' & 15-15' have some light cracking.
6/10/94	Underwater Inspection Collins Engineering Inc.	Included Piers 13-13'& 14-14'. No significant deficiencies were found but some cracks were found in the crash walls of all the piers.
12/29/94	Two Year Biennial	This inspection was for the inside & outside of Ramps A, B, C & D. Light cracks in the concrete of the diaphragms, hinges, cell walls and ceiling. Numerous clogged drains. Spalls and patches in deck. Standing water in the interior of Ramp D.

Inspection Date	Inspection Type	Significant Findings
5/26/95 – 6/2/95	Concrete Cell Inspection INDOT	This inspection was for two of the concrete cells; Segment 1, north box, interior; Segment 2, south box, interior & exterior. Both concrete cells were accessed by a snooper and bucket truck. A two year biennial walkover inspection was conducted over the concrete portion of the mainline and ramp bridges.
5/24/95 – 6/29/95	Two Year Biennial INDOT	The problems that were found during the 1994 inspection were also evident during this inspection as well as the following items; the traveling public occasionally contacts the District office concerning the bridge falling down. This is believed to be due to the fact that the concrete fascia at the hinge appears to support the superstructure and it looks like it is allowing the bridge to fall. The fact that this is not what is happening and the structure is quite safe is not apparent to the casual observer. Some falsework from the concrete construction phase was left in place at some interior locations. Some tension cracks exist at the base of the columns at Pier 3. This is believed to have been caused by bearing failure at the time of construction. Several exterior cell walls of the superstructure over the piers exhibit cracks. Some of the substructure units have small to medium cracks and spalls throughout the structure.
11/14/96	Two Year Biennial INDOT	The conditions are similar to what was found during the 1994 two year biennial inspection except for the outside barrier wall at Ramp C which appears to have been repaired since the last inspection.

Inspection Date	Inspection Type	Significant Findings
8/3/97 – 8/28/97	Critical Elements BRW Hazelet and Erdal	The elements inspected were the post-tensioned concrete bridge spans of the mainline and the 4 approach ramps, as well as the steel pier caps. Intermittent parallel cracks run along the centerline of the cells at most concrete girder locations. These cracks extend through the deck and efflorescence is seen on the underside of the deck. The majority of the deck inlets are plugged. Some end caps on the drain pipes are broken allowing water and debris to drain into cell interiors. A section of drain pipe is broken in Ramp D. Concrete cracking is occurring in both the webs in the shear zones and at the diaphragms in both the mainline and ramps. The mainline is exhibiting significantly more cracking than the ramp structures. There is cracking at the hinges that appears to be stress relief cracks and do not appear to be growing. Small spalled areas with exposed reinforcing steel exist at Piers 6, 203, 205 and 409. Piers 7-7' exhibits heavy spalling at the top 4 feet of the columns with deterioration up to 6" deep.
9/2/99	Two Year Biennial INDOT	Deck drains are clogged. There is deterioration in cells due to clogged drains. The top of the columns at Piers 7-7' are deteriorated. There is delamination of the Ramp A overlay. Cracking was observed at Piers 201, 202, and 303. A retaining bar has fallen off of the left bearing at Pier 301. The bottom of the box girder of Ramp D has minor collision damage in an area over Ramp C.

Inspection Date	Inspection Type	Significant Findings
11/15/00	Two Year Biennial INDOT	The deck underside shows cracking and efflorescence inside the cells and there is longitudinal cracking and spalling of the wearing surface. (Information derived from BRW, Hazelet & Erdal inspection report.) Interior drains are clogged and caps are blown off between Piers 12-12' and 13-13' of the mainline. Mainline superstructure cracks were checked at various piers and there was no growth from last measurement. The top of the columns at Piers 7-7' are spalling and have rust stains.
11/7/03	Two Year Biennial INDOT	Snooper was used to inspect diagonal cracks in web wall at Piers 7-7' (5/20/03). Professor Wang from the University of Illinois at Chicago and Mario Pasarel of Ken Herceg and Associates Inc. participated in the inspection. Prof Wang summarized diagonal cracks were likely caused from temperature differential from east side to west side of bridge. A snooper was used to inspect exteriors of the ramps and no significant cracking was found.
2/20/04	Two Year Biennial INDOT	The underside of the deck inside the cell is exhibiting significant cracking, rust staining and efflorescence. A modular joint failure occurred on the eastbound lanes near Piers 15-15'. The modular joint near Piers 8-8' is starting to fail. Voids in post-tensioning ducts and strand corrosion noted. (Information from Ken Herceg and Associates, Inc. inspection report.)

Inspection Date	Inspection Type	Significant Findings
2004	Post-Tensioned Conc. Spans Ken Herceg and Associates, Inc	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were inspected. High levels of localized corrosion in the post-tensioning system were found in the four ramp structures. Extensive cracking was found in diaphragms and web cracking in the shear zones in the mainline. Longitudinal cracking is occurring in the deck in both the mainline and the ramps. Voids were found at tendon couplers and at tendon high points.
6/20/05 – 7/8/05	Post-Tensioned Conc. Spans Ken Herceg and Associates, Inc	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were re-inspected. The inspection did not uncover any significant changes in the bridge's condition that are cause for immediate concern. There are some cracks that have likely widened and lengthened since they were measured in 2004, however the majority of the findings are inconclusive due to the low degree of precision of the crack measurement technique. The top slab continues to deteriorate and two new top slab spalls were discovered that were previously identified as delaminations in the 2004 inspection.
4/4/06	Two Year Biennial INDOT	The problems found during previous inspections are also evident during this inspection with the following inclusions: the drainage system needs to be cleaned at the deck surface as well as at the outlets. It was noted that the six month inspection cycle is NOT being met. It was also noted that URS/VSL/SCS are doing a "hot-spot" / corrosion inspection throughout the structure.

Inspection Date	Inspection Type	Significant Findings
5/22/06 – 9/18/06	Phase 1 Hot-Spot Inspection Post-Tensioned Conc. Spans URS Corporation	The post-tensioned concrete bridge spans of the mainline and the 4 approach ramps were re-inspected. The inspection did not uncover any significant changes in the bridge's condition that are cause for immediate concern. The "hot-spot" cracks have grown as compared to the 2004 measurements. Approximately 29% of the cracks are showing an increase in width. In addition to the crack inspection, 28 locations throughout the mainline and ramp structures were chipped open to expose the PT tendons for corrosion testing. The test results showed a higher rate of corrosion in the ramp structures then in the mainline structure, especially at the coupler locations.
11/30/06 – 2/13/07	Phase 2 Hot-Spot Inspection Post-Tensioned Conc. Spans URS Corporation	The post-tensioned concrete bridge spans of Segments 4, 5 & 6 along with Ramps A, C & D were inspected. Only 3 of the "hot-spot" cracks have grown as compared to the 2006 measurements. In addition to the crack inspection, 30 locations were chipped open to expose the PT tendons for corrosion testing. The corrosion testing focused on couplers and highpoints. The couplers average corrosion rate was 1.0 mpy (high) while the corrosion rate of the highpoints averaged 0.4 mpy (low).
7/10/07 – 8/3/07	Phase 3 Hot-Spot/Bridge Deck/Hinge/"Smiley" Crack Inspection Post-Tensioned Conc. Spans, URS Corporation	The "hot-spot" cracks in post-tensioned concrete bridge spans of Segment 1, 2 & 3 along with Ramp B were inspected. There were 46 cracks that grew from May 2006 inspection. The hinges were inspected at all locations and in one location there was corrosion testing of reinforcing steel. The exterior girder webs over the piers were inspected for "smiley" cracks and a core was taken for concrete testing. Chloride levels at the reinforcing steel level for the hinge and the "smiley" crack are above the INDOT threshold for corrosion but below the 0.20% (by weight of concrete) level associated with epoxy coating damage within this bridge. Cores were taken out of the bridge deck to determine condition of re-steel and amount of chlorides present. The lowest chloride concentration recorded at the rebar level was 0.054% by weight of concrete.

3.3 HISTORICAL SUMMARY OF SIGNIFICANT FINDINGS

This section summarizes the significant findings found on the SR 912 bridges from past inspections as well as the current inspection. The summary presented below is a living document which will be updated and revised as the inspection progresses during future inspection phases. Additional, detailed information can be found on all significant findings in past inspection reports.

3.3.1 "Smiley" Cracks

There are cracks in exterior web walls over supports which are termed "smiley" cracks. It is believed that these cracks are due to indirect support of the webs at the pier diaphragms. Currently there are 14 locations where "smiley" cracks occur. This cracking only occurs on mainline exterior web walls. Concrete core testing was performed at one of these locations during Phase 3. The chloride level found at the reinforcing steel was above the INDOT threshold to have the potential for corrosion (0.039% by weight of concrete) but below the 0.20% associated with epoxy coating damage within this bridge. No further invasive testing is recommended. Further structural analysis and studying is required to assess the cause and remedy of the problem.

3.3.2 Hinge Cracking

There is cracking of the concrete at the hinges. This area is of concern because the hinge connection for the structures is a non-redundant feature. There is cracking at some of the hinge locations which is shear oriented. The crack widths at the hinges are less than 0.3 mm and appear to be static. The Phase 3 inspection included testing of the concrete and reinforcing steel at the hinge. The chloride level found at the reinforcing steel in the bottom slab and backwall was above the INDOT threshold to have the potential for corrosion (0.039% by weight of concrete) but below the 0.20% associated with epoxy coating damage within this bridge.

3.3.3 Substructure Shear Cracking

There is visual evidence of what appears to be shear cracking of the hammerheads on 7 of the ramp piers. In many cases the cracks begin at the inside face of the bearings and extend down towards the junction of the hammerhead caps and the stem. These cracks were noted in 2006 and were less than 0.3 mm at that time. See the URS Corporation Phase 1 Inspection Report for additional information.

3.3.4 "Hot-Spot" Cracking

URS Corporation is re-inspecting all the interior and exterior cracks that were classified as "Hot-Spot" cracks during the 2004 inspection. These 303 cracks are either actively growing or have a significant width. The lengths and widths of these cracks are being re-measured at least once a year during this current multi-phase inspection. There are a number of cracks growing and the amount of growth is detailed in the inspection report for each phase. Crack mapping and measurements are useful in showing areas of structural distress due to either serviceability and/or

strength limit states. In addition, rapid growth will indicate areas of structural distress which may require immediate action. Crack information will be compared with load rating and corrosion results to determine possible causes of individual cracking. The use of Ground Penetrating Radar (GPR) may be used in future phases to determine if reinforcement shown on design plans matches actual conditions.

3.3.5 Top Deck Deterioration

There is extensive cracking of the top and bottom of the top deck. There are delaminations, spalling, efflorescence, exposed and corroding reinforcing steel and water seepage on the underside of the top deck. The ramp structures by visual observation appear to have significantly more advanced deterioration than the mainline structure. The vast majority of the deterioration of the top deck is located longitudinally along the centerline of each cell. The bottom of the top deck was visually inspected during the Phase 2 inspection and the results are contained within the inspection report for that phase. The Phase 3 inspection included testing of the concrete and reinforcing steel of the top deck. The longitudinal cracks at the center of the cells had higher chloride concentrations than the concentrations found near the concrete bridge rail. At many cores in the center of the cells, the epoxy coating has been destroyed and corrosion of the reinforcing steel has commenced. During the Phase 4 inspection there will be additional testing of the top deck. The corrosion testing of the top deck will help determine the overall condition of the reinforcing steel to aid the rehabilitation efforts.

3.3.6 Roadway Drainage

The roadway drainage system for the structure is in fair to poor condition. The majority of the downspouts attached to the substructure columns are full of debris and aren't transporting water to the underground portion of the system. There are a number of roadway drains in the top deck which aren't functioning properly due to either being full or partially full of debris. There have been failures of the system within the interiors of the cells. End caps have blown off and leaking has occurred. A failure of the drainage system is blamed for the deterioration of the Ramp D bottom deck tendons. Even though these failures have been repaired there is evidence of leaking and corrosion currently within the system on the interior of the cells. URS Corporation is currently documenting deficiencies on the inside of the cells and will be presenting that information in the next inspection report.

3.3.7 Piers 7-7'

The tops of the columns at Piers 7-7' are in poor condition. There is cracking, delaminations, spalling and rusting of exposed reinforcing steel on the column faces. Column 4 (columns are numbered left to right looking up station) is in the worst condition with cracking, delaminations, spalling, and rusting of exposed reinforcing steel on all faces. In addition at Column 4 there is cracking and spalling that runs parallel to the bearing faces and is in close proximity to those faces. It has been recommended that these be rehabilitated in a timely manner. See the URS Corporation Phase 1 Inspection Report for additional information.

3.3.8 Ramp D Tendons

There are two bottom deck tendons in Ramp D that have experienced significant deterioration. It is believed that this deterioration is due to water ponding on the bottom deck when a failure of the interior portion of the roadway drainage system occurred. The deterioration was documented in 2004 by Ken Herceg and Associates, Inc. The tendons were exposed and their condition, which included large amounts of corrosion and wire breaks, was recorded. These tendons are still exposed. No further testing is expected to be performed.

3.3.9 Ramp C Post-Tensioning Bars

The post-tensioning bars used in Span 10 of Ramp C near the hinge have some deterioration. This deterioration was documented during the 2004 inspection by Ken Herceg and Associates, Inc. There were 11 out of 12 locations where the grout tubes around the bars were empty. The bars in the locations without grout were heavily corroded. The voided areas have since been grouted.

3.3.10 Post-Tensioning System Testing

The post-tensioning system is being tested by a corrosion consultant during this multi-phase inspection by URS Corporation. The post-tensioning system tendons and couplers are being exposed and tests are being performed on the system in-situ. The tests are being performed at the high and low points of the draped tendons and at the couplers. Testing has occurred during Phase 1 and Phase 2 of this multi-phase inspection and will recommence during Phase 5. The results of the testing is shown in Tables 3.3-1 and 3.3-2 below. Further testing in future phases will help determine the overall extent of tendon corrosion on the SR 912 bridge.

POST-TENSIONING SYSTEM CORROSION FINDINGS							
	EXISTING CORROSION			CORROSION RATE			No. of Tests
PHASE 1	Minor	Moderate	High	Low	Moderate	High	
Mainline							
Couplers		1		1			1
High Pts	3			1	1	1	3
Low Pts	4	1		4	1		5
Ramp A							
Couplers		2			1	1*	2
High Pts	2			2			2
Low Pts	1			1			1
Ramp B							

High Pts	2			2			2
Low Pts	1			1			1
Ramp C							
Couplers	1	1				2*	
High Pts	3			1	2		3
Low Pts		1				1	
Ramp D							
Couplers	1	1				2*	2
High Pts	2			2			2
Low Pts	1			1			1

Table 3.3-1 Phase 1 Post-Tensioning System Corrosion Summary

* There may be anomalies in the data gathering that artificially raised the rate of corrosion above what is actually occurring. See the URS Corporation Phase 1 Inspection Report Appendix E.7 for additional information.

POST-TENSIONING SYSTEM CORROSION FINDINGS							
	EXISTING CORROSION			**CORROSION RATE**			**No. of Tests**
PHASE 2	**Minor**	**Moderate**	**High**	**Low**	**Moderate**	**High**	
Mainline							
Couplers	7	5		2	3	7	12
High Pts	9	3		9	3		12
Ramp A							
Couplers	1			1			1
High Pts	1			1			1
Ramp C							
Couplers	1				1		1
High Pts	1			1			1
Ramp D							
Couplers		1			1		1
High Pts	1			1			1

Table 3.3-2 Phase 2 Post-Tensioning System Corrosion Summary

3.4 LOAD RATING ANALYSES

There have been two load rating analyses performed and completed for the post-tensioned concrete box girder superstructure portions of the Cline Avenue Bridge and associated ramps. The first was done in 1999 by BRW Hazelet and Erdal. The second was done in 2005 by Ken Herceg and Associates, Inc. A third load rating analysis has been initiated by URS Corporation in 2007 with preliminary calculations completed for Ramp D and additional analyses to be performed. All three analyses assumed that the bridges were constructed according to the details and dimensions shown on the plans.

3.4.1 1999 Analysis

The 1999 analysis was performed with a program that was developed in-house by BRW Hazelet and Erdal. An inventory rating was determined for HS20-44 and H20-44 vehicles. An operating level rating was determined for all trucks. The ratings were done in accordance with the AASHTO Manual for Condition Evaluation of Bridges 1994, including the 1995 and 1996 interim revisions. Ratings were provided for three different loading conditions:

Case 1: 1 ½" overlay, 35 lbs/ft^2 FWS, and W_c = 156 lbs/ft^3
Case 2: 1 ½" overlay, 0 lbs/ft^2 FWS, and W_c = 156 lbs/ft^3
Case 3: 1 ½" overlay, 0 lbs/ft^2 FWS, and W_c = 150 lbs/ft^3

The loads in Case 1 utilize values given on the design drawings. Case 2 was considered because at that time there was not a future wearing surface on the bridge. Case 3 was evaluated because the actual unit weight of concrete with steel in the structure is much closer to 150 lbs/ft^3 than 156 lbs/ft^3.

The lowest HS20 inventory rating factor for the existing loads with W_c = 150 lbs/ft^3 was 1.021. This rating factor being greater than one indicated the structural capacity was adequate for this case. For Case 1 eleven locations had a rating factor less than one. Eight of those locations were for shear capacity and three were for flexural capacity.

All of the rating factors for flexure were determined without considering the mild steel reinforcement in the slab. If this reinforcement is considered along with the prestressing steel the three flexural rating factors below one increase to more than one.

3.4.2 2005 Analysis

Conbox from Leap Software was used to complete the initial analyses in support of establishing Load Ratings. Rating factor's at both inventory and operating levels were determined using a program developed in-house by Ken Herceg and Associates. This program was developed based upon the AASHTO Manual for Condition Evaluation and Load and Resistance Factor Rating of Highway Bridges (LRFR) requirements.

The load rating analysis took into account dead loads, thermal effects, live loads and other permanent loads used in load ratings including the permanent secondary effects of post-tensioning tendons. Inspection findings from 2004 were incorporated into the load ratings through the use of condition factors. The global condition factors were based upon the NBI Superstructure Condition Rating and were derived from the AASHTO LRFR manual. The localized condition factors were developed with the aide of Florida DOT's (FDOT) Load Rating Post-Tensioned Concrete Segmental Concrete Bridges. The system factor was based upon the AASHTO LRFR manual with additional guidance from FDOT's Load Rating Post-Tensioned Concrete Segmental Bridges.

Rating factors were calculated based upon Strength and Service limit states. Additional parameters of the analysis are as follows:

- Ratings were developed for the HL-93 live loading at the LRFR Design Level.
- The number of lanes of Live Load used was the design number of lanes per the LRFR manual.
- No allowance for future wearing surface has been included.
- Ultimate flexural strength calculated using strain compatibility in lieu of the simplified rectangular distribution.
- Ultimate strengths and allowable stresses have been adjusted for identical structural deterioration thru the use of applicable Condition Factors.
- Ratings for global condition adjusted with applicable condition factors relating to NBIS item #59 rating (superstructure).
- Ratings for localized condition adjusted with applicable condition factors related to identified deterioration and/or corrosion.

Results of the load rating analysis found the controlling sections typically occur due to shear forces in the web immediately adjacent to the piers at the critical shear section (h/2 from face of support). Based on Rating Factors using the localized long-term condition factor all segments of the mainline and all four ramps exceed an Inventory Rating Factor = 1.0. Most noteworthy are Segment 4 and Ramp A where a Rating Factor of 1.0 and 1.01 indicates the structure's capacity nearly equals the load demands. Further review of the Operating Rating Factor finds all Rating Factors increased to more reasonable values with a minimum of 1.30 in Ramp A.

Integration of the inspection findings into the load rating analysis did not identify significant capacity reductions of the structure. Therefore, the mainline and ramp structures were found to have adequate capacity to carry all AASHTO legal loads and remain open to traffic without restrictive load postings at the time of this rating.

3.4.3 2007 Analysis

The initial load rating analysis of Ramp D was limited in scope and focused primarily on developing the rating criteria and only analyzed LRFD HL-93 loadings. The structure was considered "pristine" without accounting for section loss of concrete, reinforcing or post-tensioning. Future models will be modified to account for the condition of the structure. The analysis was broken down into longitudinal and transverse analyses. The longitudinal analysis

was carried out using specially developed programs which account for issues such as construction staging, time dependent effects, primary and secondary post-tensioning application and losses. The transverse analysis was carried out with a combination of influence surface diagrams and plane frame models.

The global effects produced by longitudinal demands ("A" – Shear As) must be combined with the local effect of transverse demands ("B" – Moment As) in three different cases. The empirical method listed below was used to combine these demands:

Case 1 - 1.0 A + 0.5 B
Case 2 - 0.5 A + 1.0 B
Case 3 - 0.7 A + 0.7 B

The greatest of Cases 1, 2 and 3 is used to determine web reinforcing requirements.

The load rating analysis for Ramp D included studies of demand and capacity to give a thorough understanding of structural behavior. Additionally, the bridge analysis captured the rating factors at inventory and operating levels for various loading and element conditions.

Table 3.4-1 gives a summary of inventory and operating rating factors. This work is currently unchecked.

AASHTO Load Group	Inventory	Operating
Longitudinal - Strength I		
Flexural	1.00	1.30
Shear	0.97	1.21
Longitudinal - Service I		
Flexural	0.88	1.55
Longitudinal - Service III		
Principal Stresses	1.52	2.03
Transverse - Strength I		
Top Slab - Centerline	0.87	1.13
Top Slab - Webs	0.89	1.16
Webs	0.96	1.24
Target Minimums	1.00	1.30

Table 3.4-1 – Rating Factor Summary Table – Ramp D

Note that the inventory ratings represent the load level at which the structure can be used for an indefinite period of time and is also called the design level. The operating rating represents the absolute maximum permissible load allowed on the bridge.

Strength evaluations solely indicate an element's load carrying capacity. Service evaluations will show potential problems with serviceability issues such as cracking. The structure may or may not be overstressed at ultimate design levels when the service cases are exceeded or when service level rating factors are less than the target minimums.

4.0 FIELD INSPECTION AND TESTING

4.1 MEASURING AND DOCUMENTING "HOT-SPOT" CRACKS

This re-inspection includes all the interior cracks in Ramps B and Segments 1, 2 and 3 from the 2004 inspection that met one of the following conditions:

- Greater than 1.0 mm in width
- "New" cracks (not recorded in 1997)
- Cracks with increased width versus the 1997 inspection
- Cracks with significant (>5–10%) increase in length versus the 1997 inspection

These cracks are considered "hot-spot" cracks. Each "hot-spot" crack is identified with a 4 character designation. The first character designates the segment or ramp where the crack is located and the remaining three characters are the numerical designation for the specific crack. (i.e. "B009" indicates a "hot-spot" crack in Ramp B that was the ninth crack to be numbered.)

Each of these cracks was re-inspected by checking crack width with a feeler gauge. The ends of the crack were checked against the existing end marks to determine if they had lengthened. The largest width of the crack was documented on the wall and dated. A picture was taken showing the crack and the written documentation on the wall.

4.2 BRIDGE DECK CONCRETE CORING PROCEDURES

4.2.1 Coring

SCS selected 48 coring locations (39 - 4"ø cores and 9 – 2"ø cores) in the top of the top deck. The cores were taken at the locations as shown below:

Location	4"ø Cores	2"ø Cores
Segment 1	2	
Segment 2	2	
Segment 3	2	
Segment 4	2	1
Segment 5	2	2
Segment 6	2	1
Ramp A	5	2
Ramp B	2	
Ramp C	6	1
Ramp D	2	2

Table: 4.2-1 Core Locations

The location of the reinforcing steel in the deck was mapped using an Elcometer 331 Model SH Concrete Covermeter at the selected locations.

At least one 4”ø core was taken a minimum of 3’ away from the concrete bridge railing and one 4”ø core was taken in the center of a cell for each segment and each ramp. The 4”ø core taken in the center of the cells was located where significant cracking was observed with the exception of Core #12. All cores through the cracks were taken such that the crack on the underside is at the center of the core. A ½”ø hole was drilled through the top slab prior to taking a 4”ø core to ensure the cores was being taken at a crack with the exception of Core #12. The rationale for extracting cores from these locations was based on the facts that chloride can easily permeate through the cracks and that salt piled up along the concrete bridge railing (after the plowing operation) will result in a higher concentration of chloride near the railing. Thus, if these locations indicate low chloride levels, it is quite likely that chloride levels at other locations will be even lower.

In order to test both the concrete and steel 4”ø cores included transverse reinforcing steel taken from the top mat of reinforcing steel. The cores ended above the bottom mat of reinforcing steel. The 2” ø cores were 5” to 6” deep and did not include any reinforcing steel, as they were taken for concrete testing only.

4.2.1.1 Core Locations

It was noted that most of the large cracks were in the top deck. Concrete spalling on the underside of the deck was noticed at several locations. At locations where no significant rusting was found, cracks with efflorescence were present indicating that water is penetrating through the full depth of the deck. This clearly indicated that salt from deicing is accumulating at the reinforcing steel and will definitely lead to increased spalling and delaminations in the future. Corrosion evaluations in Phase 3 were to focus on quantifying the severity of corrosion in the top slab.

Core locations were selected based on the following factors:

- Spall or delaminations on the underside of the top slab;
- Efflorescence on the underside of the top slab;
- Cracks on the top surface of the top slab;
- Absence of delamination/debonding of the concrete at core locations.

SCS developed a list of core locations based on the crack data from URS Corporation. This was developed primarily to help optimize the movement of equipment and personnel in the field. Drawing E-1 (11 sheets) in Appendix E-1 identifies test locations where cores were extracted. Table E-1-1 in Appendix E-1 lists the core number, diameter, length, reinforcing steel present or not, and whether the core broke at the reinforcing steel level during extraction. It must be noted that if the core breaks at the reinforcing steel level, it is possible that corrosion related damage is in progress at these locations.

Once the cores were extracted from the deck, they were dried and photographed. Soon after extraction, the cores were wrapped in wet burlap and placed inside a zip lock bag. All cores were placed in a freezer to be transported back to the laboratory. The cores were left in the freezer until they were tested.

Core locations were documented by at least three distinct measurements and GPS coordinates. Drawings in Appendix E-2 show the exact location of each core. These drawings are arranged by core numbers.

The cracks in the core zigzag through the depth of the core and sometimes through small voids. Figure 4.2-1 below shows the crack in core #3 that travel in a zigzag pattern through the depth of the core. These cracks provide easy access to salt water. The salt accumulates wherever the cracks narrow or if it intersects a void/reinforcing steel. Figure 4.2-2 demonstrates the proposed chloride accumulation phenomena.

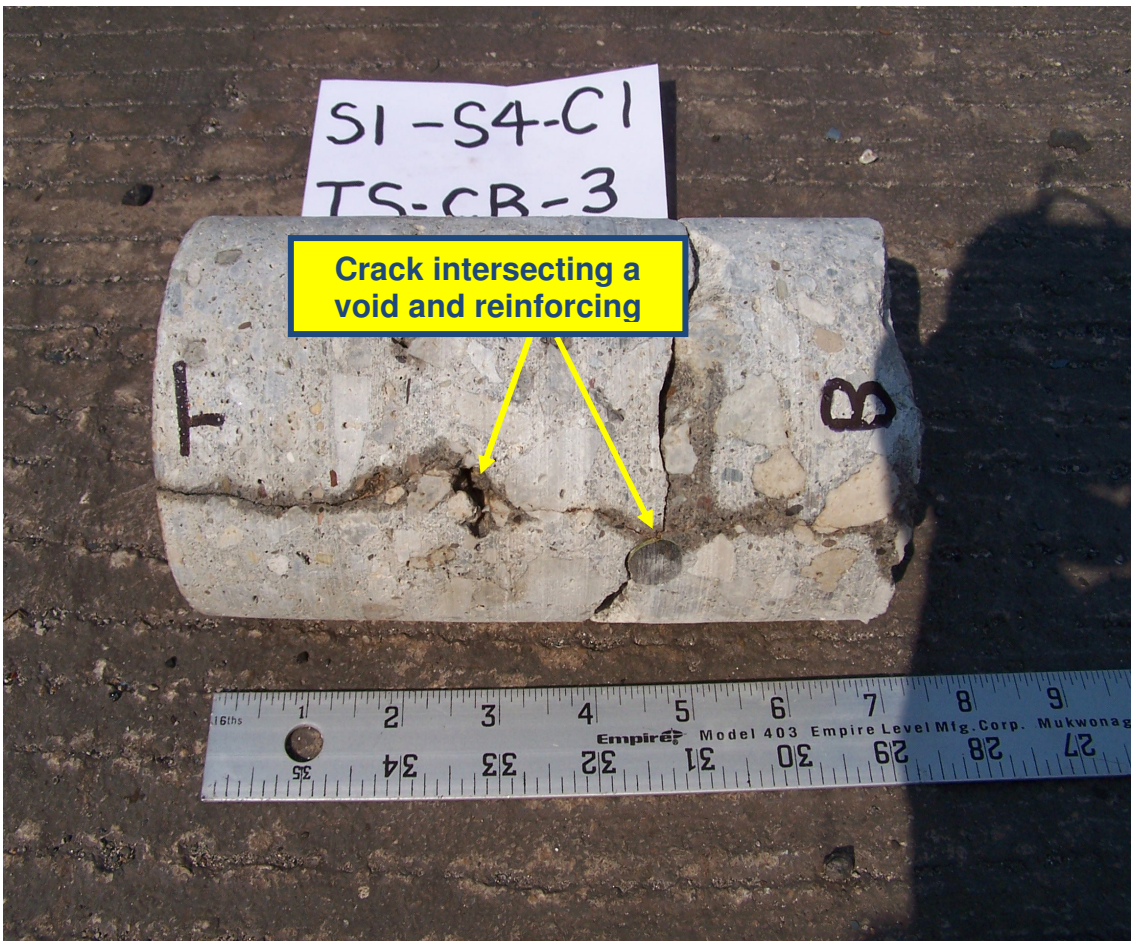


Figure 4.2-1. Typical zigzag crack through the depth of the core

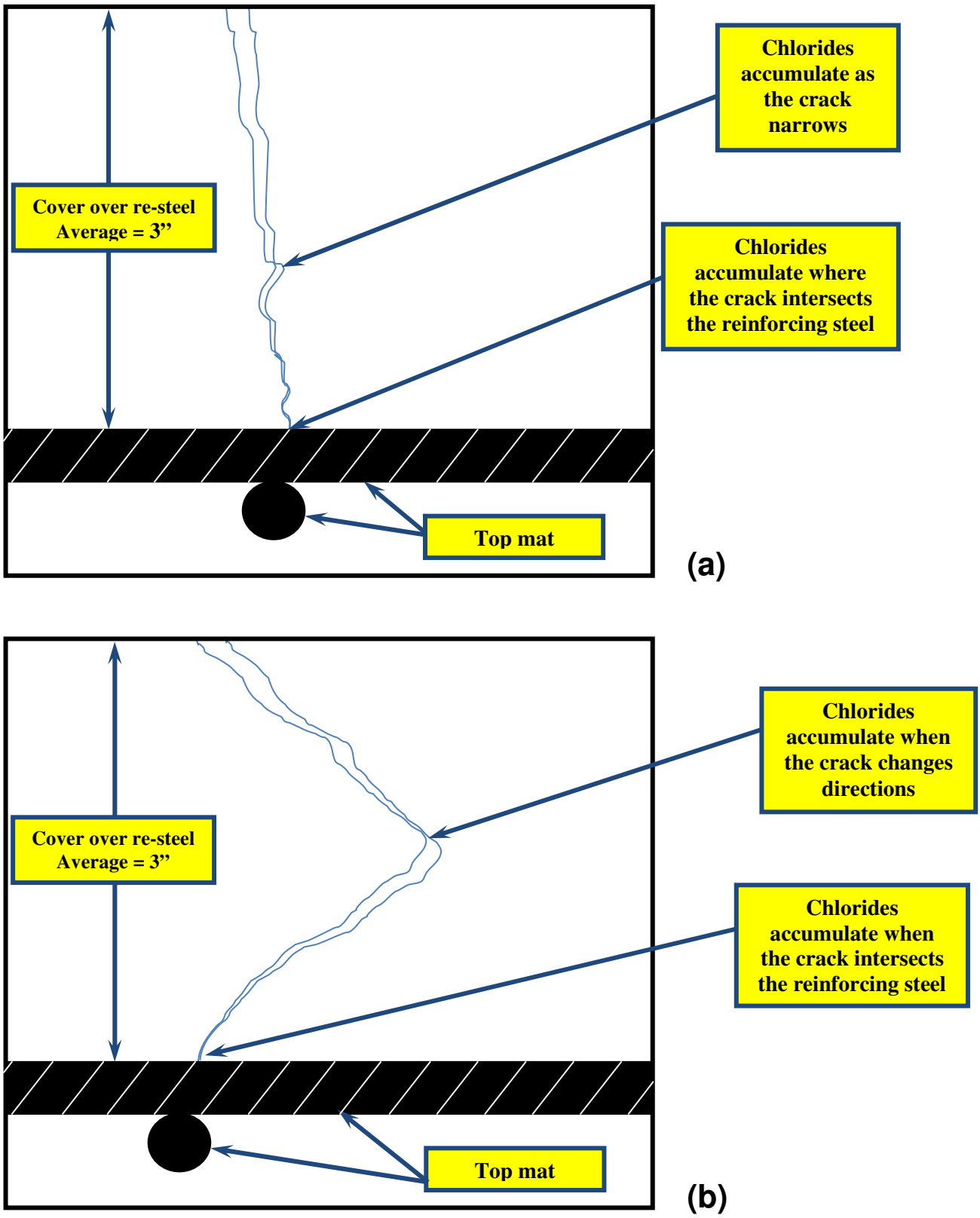


Figure 4.2-2 Proposed mechanism of chloride accumulation along the depth of the crack

4.2.2 Repairing the Bridge Deck

The ½"ø holes were filled with Hilti HY-150 epoxy. The 2"ø and 4"ø core holes were filled with Veraspeed LS (a rapid setting repair mortar). After the epoxy and the mortar cured a minimum 1 foot square area over the repaired areas were sealed with Euco-Guard 100 (a siloxane sealer). See Appendix D for product details.

4.3 HINGE TESTING

The reinforcing steel in the backwall and floor of the hinge between Segments 5 and 6 was exposed for corrosion testing. The backwall's reinforcing steel is epoxy coated so a corrosion test couldn't be performed at that location. The reinforcing steel in the floor was uncoated so a corrosion test was conducted there. A 2"ø concrete core was taken from the backwall for further laboratory testing.

4.4 "SMILEY"CRACK TESTING

The web crack at the Pier 6 south exterior web wall was exposed to the reinforcing steel. The vertical stirrups were epoxy coated so a corrosion test couldn't be performed on them and the epoxy coating eliminated the electrical connectivity required for in-situ testing. The longitudinal reinforcing steel is uncoated but it had been decided that reinforcing in the web walls shouldn't be cut due to its' role in providing structural capacity for the bridge. A 2"ø concrete core was obtained for testing from this location. (See Section 5.1.4 for definition of "smiley" crack)

Exposed re-steel at Pier 6 south exterior web wall.

4.5 PIERS 7-7' TESTING

A 2"ø concrete core was extracted from the east face of one of the columns on Piers 7-7' for chloride testing. See Appendix E-8 for the exact location. A piece of delaminated concrete was removed from a column and was cut into cubes for compressive strength testing.

5.0 SIGNIFICANT FINDINGS

5.1 "HOT-SPOT" CRACKS

Based on the amended scope only "Hot-Spot" cracking in Segments 1, 2 and 3 and Ramp B were inspected during Phase 3. In addition web cracking due to indirect support (termed "smiley" cracks) was inspected on the exterior of all segments. Of the 303 'Hot-Spot' cracks located throughout the structure, 156 cracks were inspected during this phase. The width, length, and location of each of these cracks were documented and compared to the general sketch that was generated during the Phase 1 inspection. These cracks are located throughout the structure, as shown in Table 5.1-1 below.

Segment 1	47
Segment 2	18
Segment 3	82
Ramp B	9
TOTAL	156

Table 5.1-1: Number of "hot-spot" cracks inspected per segment or ramp

According to each crack's location on the structure and orientation, these "hot spot" cracks are classified under one of the following categories:

Diaphragm cracks	DP	100
Hinge cracks	HG	1
Web cracks located near a tendon anchorage zone	WA	37
Web cracks possibly due to indirect support	WI	0
Web cracks shear orientated	WS	10
Web cracks following tendon profile	WT	3
Unclassified		5
TOTAL		156

Table 5.1-2: Number of cracks per classification

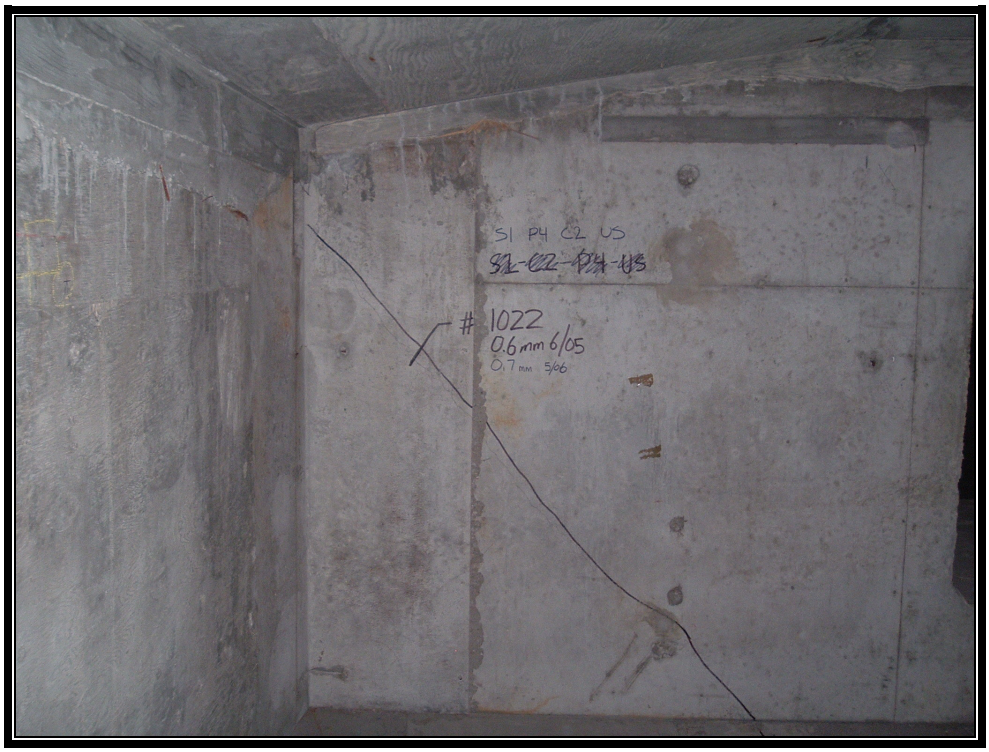
The following section provides a brief description and photograph of each type of crack. A comparison of the data between the current and previous inspections follows. The complete detailed list of the findings and a plan view drawing detailing the locations of the cracks is provided in Appendix F. *The electronic file of the "Hot-Spot" crack table in Appendix F has links for the photograph and sketch for each crack.*

Crack mapping and measurements are useful in showing areas of structural distress due to either serviceability and/or strength limit states.

5.1.1 Diaphragm Cracks (DP)

Diaphragm cracking is found throughout the mainline segments of the Cline Ave Bridge. Full depth diaphragms approximately four feet wide are located inside the cells at each pier location. In addition, transition diaphragms are located where the structure transitions either the number or arrangement of the cells. Exterior diaphragms are located at pier locations in Segment 1.

Typically, the diaphragm cracks are orientated at approximately 45 degrees, originating near the bottom slab at the center of the diaphragm and terminating at the corner between the diaphragm and web. At many locations, the cracks run thru the access holes. Some of these cracks extend into either the top slab, bottom slab, and/or the web. The diaphragm cracks are up to 1.5 mm in width.



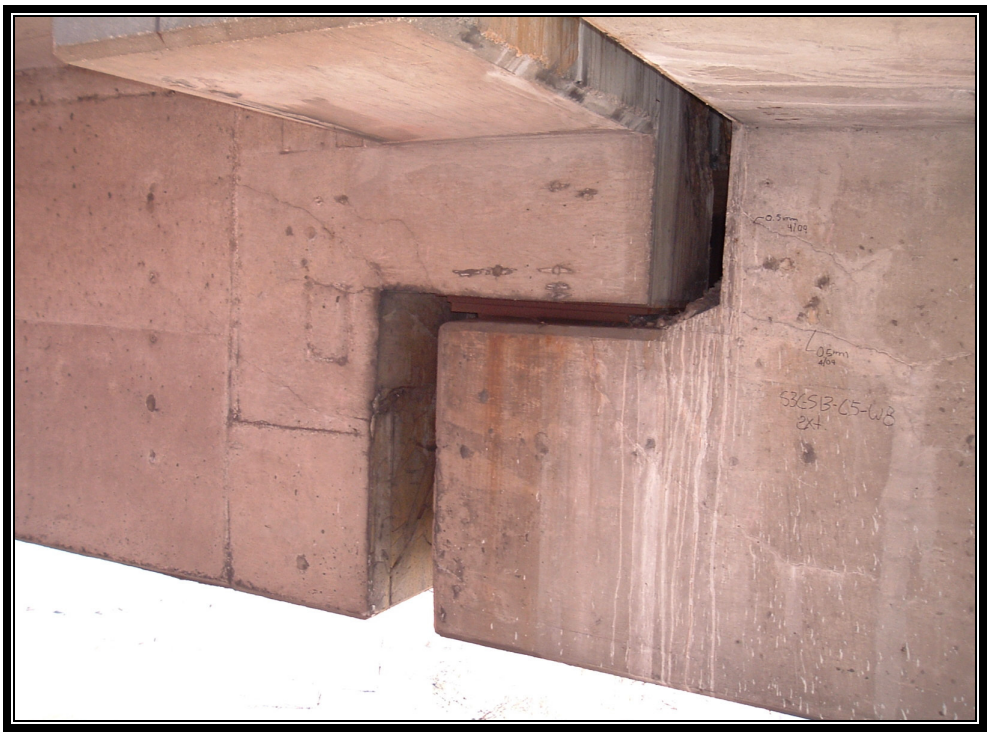
Typical orientation of diaphragm cracking (Crack #1022 shown)

5.1.2 Hinge Cracking (HG)

This category includes all cracking that occurs near hinges in the SR 912 structure. These cracks are found in the web, bottom slab, top slab, or backwall at or near a hinge location. Hinges are located between the segment-to-segment connections or segment-to-ramp connections in the structure.

All hinges of the mainline and the ramps were inspected for crack growth. The existing cracks are narrow and tight with crack widths less than 0.3 mm. The cracks will be checked for growth during Phase 5.

Typical interior view of hinge between Segments 5 and 6



Hinge cracking between Segment 3 and Ramp A

5.1.3 Web Cracks Located Near a Tendon Anchorage Zone (WA)

This type of cracking is found in the structure near the end of tendon anchorage zone. Typically, these anchorages are found in blisters, which is a widening of the web or bottom slab in which the tendon anchorages are located. This type of cracking is typically found at the end or sides of the blisters or in the adjacent webs.

In Segment 3, the cracking generally occurs in the web above the web blisters. Typically, this type of cracking commences near the bottom slab or blister, extends towards the middle of the span and terminates near the top slab.

Typical cracking at end of web blister anchorage zone (Crack #1061)

Typical cracking in web above blister anchorage zone (Crack #3022)

5.1.4 Web Cracks Possibly Due to Indirect Support (WI)

This type of crack is located in the web adjacent to diaphragm locations where the bearing is not located directly underneath the web (indirect support). This type of cracking has also been termed a "smiley" crack. This type of cracking is visible at 14 locations throughout the structure. The locations are as follows:

Segment	# of Crack Locations
1	5
2	4
3	1
4	0
5	1
6	3
Ramps	0

Table 5.1-3: "Smiley" Crack Locations

The existing cracks are narrow and tight with crack widths less than 0.3 mm. The cracks will be checked for growth during Phase 5.

Exterior web cracking possibly due to indirect support (Segment 1, Piers 7-7').

5.1.5 Web Cracks Shear Orientated (WS)

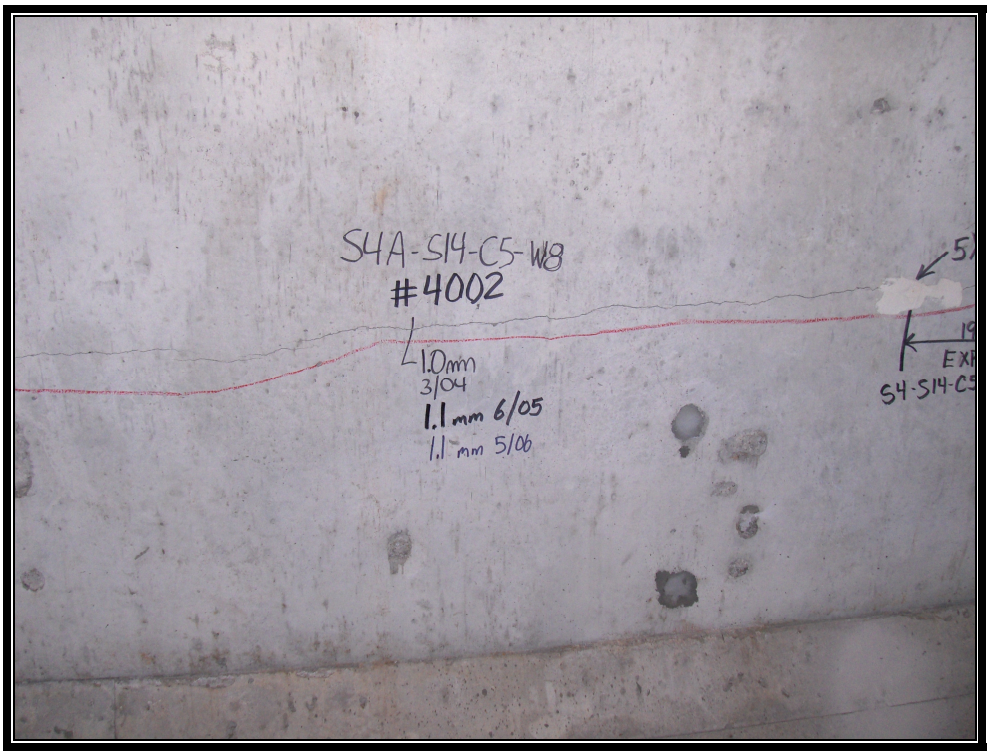
Shear cracks generally are located in the webs near the piers and are inclined at an approximate 45-degree angle. This type of cracking was found on both interior and exterior web faces of the Cline Ave Bridge.

Typical shear orientated crack on interior face (Crack #5020)

In the SR 912 bridge shear orientated "hot-spot" cracks most often occur in the cantilever spans, namely in Spans 10, 13 (Cell 5), and 14 of Segment 3, and in Span 18 of Segment 5. However, shear orientated cracking is also concentrated near Piers 13-13' in Span 11 of Segment 3, where a transition is made from 2 to 3 cells.

5.1.6 Web – Tensile Stress (WT)

Tensile stress cracks are longitudinal cracks that follow the general path of an internal post-tensioning tendon. These cracks may be horizontal, straight, or have slight curvature.



Typical web tensile stress crack (Crack #4002)

This type of cracking is prevalent throughout the structure; however the majority of these cracks are not classified as “hot-spots”. The eight “hot-spot” cracks are located in Segments 2, 4, and 5.

5.1.7 Data Comparison for Cracks

There were 46 cracks that grew from the May 2006 inspection. There were 39 cracks that grew 0.1 mm. There were 7 cracks that grew more than 0.1 mm and those particular cracks will be re-inspected during the Phase 4 inspection to confirm the amount of crack width growth.

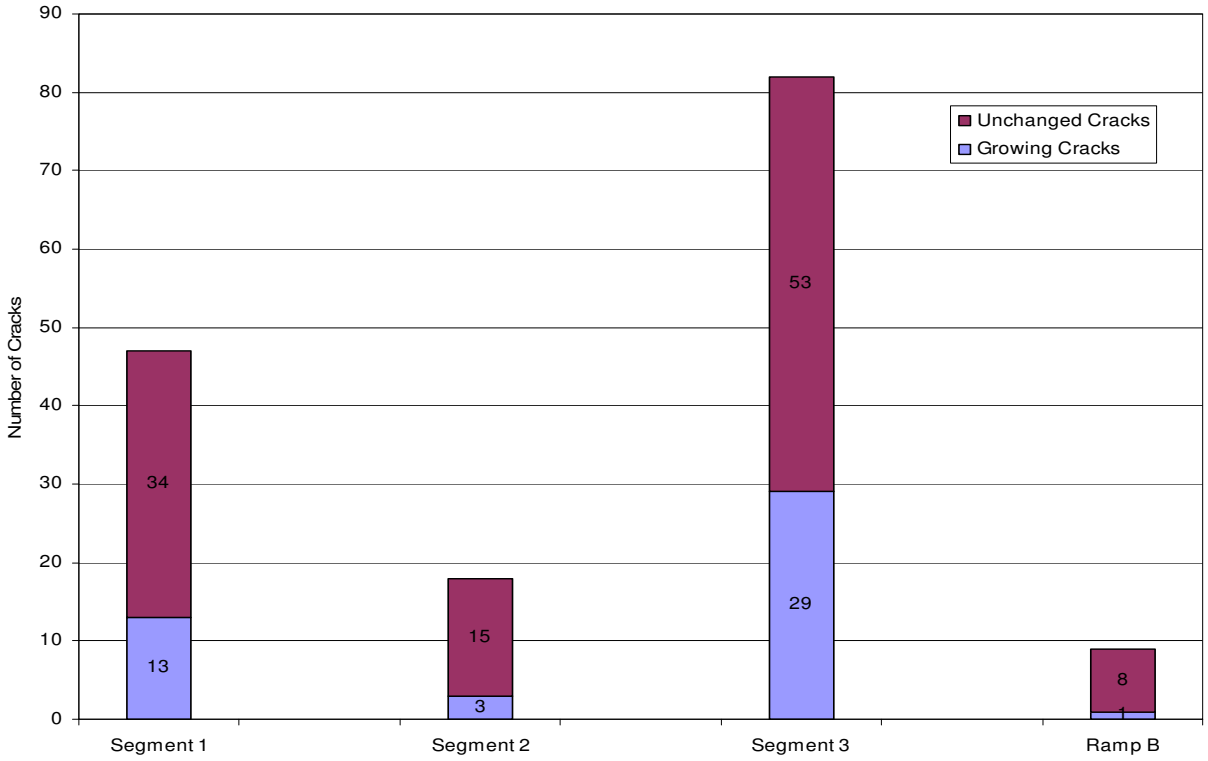


Figure 5.1-1: Crack activity since May 2006

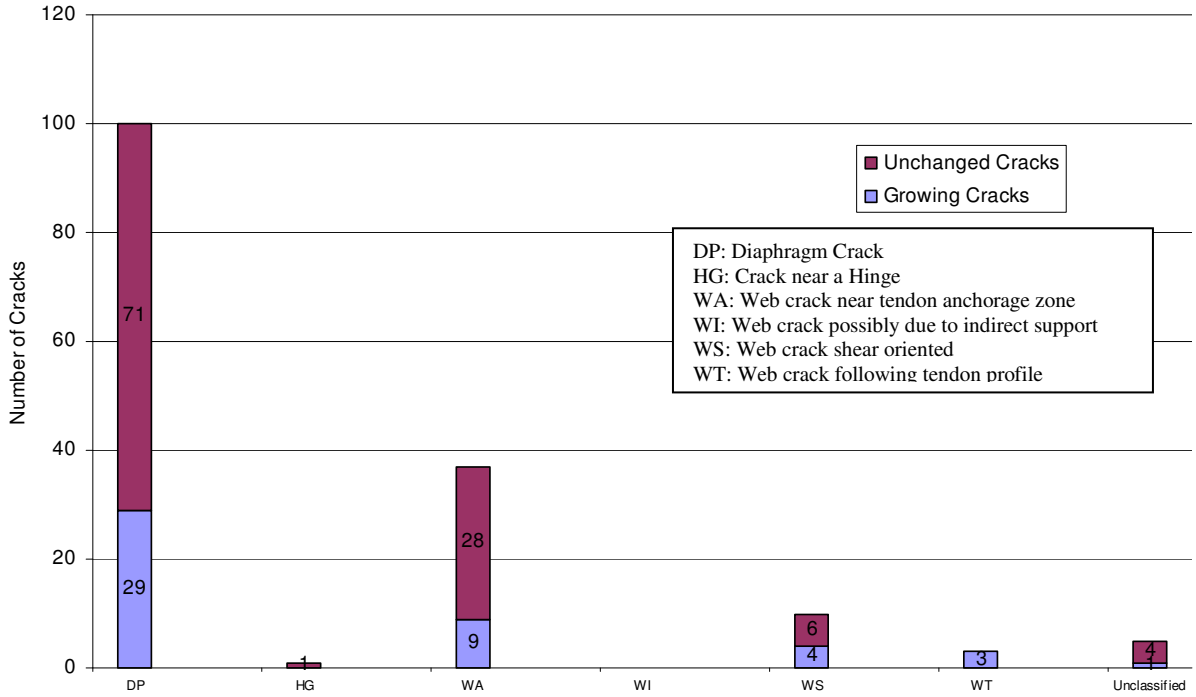


Figure 5.1-2: Crack activity since May 2006

5.2 CONCRETE-CORROSION TESTING EVALUATION

5.2.1 Holes (Holidays) in the Epoxy Coating

Cores were removed from the freezer and allowed to thaw at the room temperature. Once the core reached room temperature, reinforcing steel was extracted from the core. Two screws were attached to either end of the bar. A tag with the core number was attached to one of the screws. The reinforcing steel was tested for any holidays in the coating using a low voltage holiday detector per ASTM G62. Table E-4-1 in Appendix E-4 summarizes the total number of holidays and the length of the bar. Most of the reinforcing steel exhibited a significant number of holidays (bare areas in the coating that allow corrosion). The low voltage holiday detector operates by providing a beep when holidays are detected, a continuous beep indicated the majority of the coating on a bar is damaged. For bars with a continuous beep the number of holidays was calculated by dividing the length of the bar by the width of the test probe. When chlorides at the reinforcing steel exceed the INDOT threshold value of 0.039% by weight of concrete, corrosion has the potential to initiate at bare locations. Once corrosion starts, it undercuts the coating and develops acidic conditions where corrosion can continue unabated even in the absence of oxygen.

5.2.2 Coating Adhesion

The reinforcing steel was evaluated visually based on the corrosion condition of the reinforcing steel. Table E-4-2 summarizes the visual rating of the reinforcing steel and the adhesion rating of the coating. Effectiveness of adhesion of the epoxy coating was tested by performing a knife adhesion test. The adhesion of the epoxy to the reinforcing steel was classified as follows:

Adhesion #	Description
1	Well Adhered coating, unable to insert blade tip under coating
3	Coating can be removed from the reinforcing steel but not easily
5	Coating can be easily removed from the reinforcing steel in big pieces (>1/2 cm)

Table 5.2-1

Epoxy coated reinforcing steel data for each core is summarized and presented in Appendix E-5. Most of the reinforcing steel from the center of the box (cores with cracks) had minor to extensive corrosion (visual rating of 3 to 5, see Table 5.2-2 below). However, reinforcing steel from the concrete bridge rail area (minimal to no cracking on the deck) had minor to no evidence of corrosion. Almost all of the reinforcing steel had poor adhesion (a rating of 5) except some reinforcing steel near the concrete bridge rail (adhesion rating of 3 or less). The corrosion mechanism in epoxy coated reinforcing steel is complex and depends on the chloride level at the reinforcing steel, number of bare areas, and availability of oxygen and moisture at corrosion sites.

Class	Description
1	No visible rust.
2	Light surface rust.
3	Surface rust with pits underneath (pit size not more than 0.002in* diameter or length).
4	Same as Class 3 except pits exceed 0.002in* diameter or length.
5	Large oxidized areas, with flakes developing in the corrosion affected zones, loss of steel section noticeable to the unaided eye.
6	Heavy oxidation on most or all of the exposed surface areas, with strong flaking and pit formation.
7	Heavy surface rust & heavy surface pitting.

*Based on visual inspection only and not actual measurement of pits in the field.

Table 5.2-2 - Rust Classification for SR 912-Cline Avenue Bridge

5.2.3 Visual Condition of the Reinforcing Steel

Once the reinforcing steel was extracted from the core, the condition of the reinforcing steel was rated based on the total surface area that exhibited corrosion. Data for each core is summarized in one page and presented in Appendix E-5. Table E-4-2 summarizes the visual rating of the reinforcing steel. The rating scale used was as follows:

Rating #1 – No evidence of corrosion
Rating #2 – A number of small countable corrosion spots
Rating #3 – Corrosion area less than 20% of the reinforcing steel surface
Rating #4 – Corrosion area between 20 to 60% of the reinforcing steel area
Rating #5 – Corrosion area greater than 60% of the reinforcing steel area

Active ongoing corrosion is visible in the form of rust and coating damage in all reinforcing steel where chloride content at the reinforcing steel level is in excess of 0.20% by weight of concrete (7.8 lb/CY). A majority of the cores extracted from the center of the box have in excess of 0.20% chloride by weight of concrete at the reinforcing steel level. Core #13 (center of the box) had 0.71% of chloride (by weight of concrete) at the reinforcing steel level. Significant coating damage and corrosion were observed on the reinforcing steel (see Core # 13 sheet in Appendix E-5). The reinforcing steel at this location is expected to corrode similar to uncoated reinforcing steel, resulting in concrete damage within 7 years.

Core #12 (center of the box) had 0.086% chloride concentration by weight of concrete at the reinforcing steel level. This was the only core (from the center of the box) that had such low chloride levels at the reinforcing steel. This may be due to the fact that this core had no cracks (see Figure 5.2-1 below) and therefore no easy path for chlorides. This reinforcing steel did not have any rust or black corrosion product underneath the coating (see Core #12 sheet in Appendix E-5). This reinforcing steel had a visual corrosion rating of 2, consistent with the level of chloride contamination at the reinforcing steel level.

Figure 5.2-1. Core #12 – No cracks above the reinforcing steel

Corrosion mechanism of epoxy coated reinforcing steel is complex. Once the chlorides reach the threshold levels at the reinforcing steel, corrosion initiates at bare areas and holidays. Ongoing corrosion undercut the epoxy coating over a period of time. During this time additional chlorides accumulate at the reinforcing steel level. The ongoing corrosion degrades the coating and exposes the reinforcing steel to chlorides. At this stage, corrosion continues at a rate similar to uncoated reinforcing steel.

At this time, significant corrosion damage was not observed in epoxy coated reinforcing steel even when chloride levels were several times higher than the threshold (i.e. 0.2% by weight of concrete). This may be due to inherent lack of electrical continuity between reinforcing steel that limits corrosion to local areas unlike in black bar decks. It is well known that the rate of corrosion increases with the increase in chloride content at the reinforcing steel level. Corrosion of reinforcing steel at these sites will proceed at an accelerated pace since chloride levels at these locations are more than five times the threshold concentrations and the coating has been destroyed from previous corrosion activity. Future corrosion related concrete damage is expected to occur in less than 7 years at all cracked areas of the deck.

5.2.4 Concrete Cover over Reinforcing Steel (from cores)

The minimum and maximum concrete cover over reinforcing steel was measured for all cores with reinforcing steel. Table E-4-3 in Appendix E-4 summarizes the reinforcing steel size and the concrete cover over reinforcing steel. The maximum and minimum cover was 5.88 inches and 2 inches respectively.

5.2.5 Overlay Bond to the Base Concrete

Table E-4-4 in Appendix E-4 summarizes the overlay thickness and the bond to the base concrete. The overlay concrete had a good bond to the base concrete. The minimum and maximum depths of overlay were 1.06 inches and 4.88 inches, respectively. The average overlay thickness was 1.94 inches.

5.2.6 Chloride Profile along the Depth of Top Slab (from cores)

Deicing salts applied on the deck diffuse through the concrete to deeper depths. The rate of diffusion of salt depends on the quality of concrete. Concretes with high resistance to chloride penetration delay the time to concrete damage by as much as 20 to 40 years. It is rather easy and inexpensive to measure the chloride penetration resistance and rate the concrete quality.

If chlorides at the reinforcing steel levels are below the threshold concentrations, we perform diffusion analysis to determine how long before chlorides exceed the threshold levels at the reinforcing steel. The following equation is used:

$$C_{xt} = C_o \left[1 - erf\left(\frac{x}{2\sqrt{Dt}} \right) \right]$$

C_o = Concentration of chlorides at the surface
x = Distance from the surface in inches (i.e. depth)
D = Apparent diffusion coefficient
t = The age of the structure in years
$C_{x,t}$ = Chloride concentration at depth “x” and at age “t”
erf = The error function

Concrete powder samples were drilled (from each core) at various depths and at reinforcing steel depth. All samples were identified and bagged in a zip lock bag until it was tested. The chloride content of the concrete powder samples was determined based on AASHTO T260. Table E-4-5 in Appendix E-4 summarizes the chloride profile for each core (i.e. chloride content along the depth of the core). The chloride content at the surface of the top slab (i.e. 0.25 to 0.5 inch) was significantly higher than the concentrations at deeper depths. This clearly points to the fact that the main source of chlorides is the deicing salt applied on the structure. No diffusion analysis was necessary since the chlorides at the reinforcing steel levels were above the INDOT defined threshold concentrations.

The minimum chloride concentration recorded at the reinforcing steel level was 0.054% by weight of concrete (core # 25). The one page data summary for core #25 in Appendix E-5 shows that the reinforcing steel does not have any corrosion even though the chlorides are above the threshold value of 0.039%. This may be due to the fact that some of the chlorides may be a part of the aggregate and may not be available for corrosion reaction. Another reason may be that the cement used in this structure may have had high tricalcium aluminate (C_3A) content. A copy of the original concrete mix used in the SR 912 structure would be useful in verifying this assumption.

5.2.7 Chloride Content at the Reinforcing Steel Level at Top Mat of Top Slab

Table E-4-6 in Appendix E-4 summarizes chloride content at the reinforcing steel level. The minimum and maximum chloride contents by weight of concrete at the reinforcing steel level were 0.05% and 0.67%, respectively. Since the minimum chloride content at the reinforcing steel level is higher than the threshold level of 0.039%, corrosion has the potential to initiate at bare areas and at holidays. Ongoing corrosion undercuts the epoxy coating over a period of time. During this time additional chlorides accumulate at the reinforcing steel level. The ongoing corrosion destroys the coating and exposes the reinforcing steel to chlorides. At this stage, corrosion continues at a rate similar to uncoated reinforcing steel.

Once the coating is destroyed, it takes about 7 years to result in concrete damage. The time-to-concrete damage may be higher for epoxy coated reinforcing steel decks but may lead to larger areas of concrete damage. The extent of concrete damage depends on chloride concentrations at the reinforcing steel, the percentage of bare areas on epoxy coated reinforcing steel, and the availability of oxygen and moisture at active corrosion sites. Delaminations at the reinforcing steel level are expected within 7 years (i.e. by 2014) along the center of the box where the chloride levels are many times higher than the INDOT threshold and epoxy coating is significantly damaged.

Delaminations near the concrete bridge railing (where salt laden snow sits during winter months) will follow. It is hard to predict the timing of this since it depends on the amount of salt used, the number of salt applications, rain, and other factors. Based on the past performance of this bridge, it is clear that the coating is destroyed and corrosion proceeds at a rate similar to uncoated reinforcing steel when the chloride concentration by weight of concrete at the reinforcing steel reaches or exceeds 0.40%. Currently, chlorides at the reinforcing steel levels in the concrete bridge railing are below 0.25% (by weight of concrete). Based on the diffusion analysis, chlorides at the reinforcing steel level are expected to reach 0.40% (by weight of concrete) in another 18 years (i.e. 2025). During this time, corrosion at the holidays and bare areas of the coating will destroy the coating. Once the coating is destroyed, the reinforcing steel will corrode at the same rate as the bare reinforcing steel. Widespread concrete damage is expected within 25 years (i.e. 2032) near the concrete bridge railing (where the salt laden snow is piled up and where the slab does not have any cracking).

5.2.8 Corrosion Potential

The corrosion potential of a metal in concrete is measured using a standard reference electrode. Most field engineers use a Copper-Copper Sulfate Reference Electrode (CSE) since it is rugged and stable. In high chloride solutions such as seawater, a Silver-Silver Chloride Reference is used to avoid errors in measurements due to backflow of chloride solution into the reference electrode. The corrosion potential is measured and interpreted according to ASTM C876, "Standard Test Method for Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete." The criteria (based on CSE) for evaluating corrosion potentials are as follows:

Corrosion potential > -200mV = 90% probability of no active corrosion.
Corrosion potential between -200mV and –350mV = Corrosion condition is uncertain.
Corrosion potential < -350mV = 90% probability of active corrosion.

Corrosion potential of epoxy coated reinforcing steel is not a reliable indicator of corrosion due to the high resistance of the epoxy coating. Potential measurements of black bars were conducted with a high (200 meg ohms) impedance voltmeter. The Copper-Copper Sulfate Reference Electrode (CSE) was placed in contact with the concrete on a sponge wetted with distilled water. A high impedance voltmeter is used to assure that errors such as contact resistance are not introduced in the measurement.

5.2.9 Reinforcing Steel Cover Survey

In addition to the reinforcing steel cover data at each core location, reinforcing steel cover surveys were performed at all span-lanes where cores were extracted. A minimum of 50 readings were taken in each span. Table E-4-7 in Appendix E-4 summarizes the cover data for each span-lane tested. The lowest average was 3.09 inches. This indicates that the top mat of reinforcing steel had approximately 1" cover before the overlay was placed. The reinforcing steel cover report for each span-lane is presented in Appendix E-6. The data from all the span-lanes were combined as a set and analyzed. The minimum, maximum, average, standard deviation of the cover readings are 1.45 inches, 6.35 inches, 3.61inches, and 0.58 inches, respectively. This is based on 2750 cover readings. Statistical analysis of the cover data indicated that only 10% of the deck does have reinforcing steel cover less than 2.87 inches and only 1% of the deck does have reinforcing steel cover less than 2.25 inches.

5.2.10 Compressive Strength of Cubes from Piers 7-7' Delamination Sample

It was difficult to obtain a 4"ø core from the top of Piers 7-7' due to the amount of reinforcing steel. Instead of cores for compressive strength, a large sample of delaminated concrete was removed from Piers 7-7'. The sample was then packaged and transported to SCS. The sample was cut using a diamond saw into three 2" cubes. The cubes were tested for compressive strength per ASTM C109 (8). The compressive strengths of the cubes were as follows:

Sample #	Compressive Strength, psi
1	4300
2	2375
3	3850

Table 5.2-3

One of the cubes had low compressive strength (2375 psi). Since these cubes were cut from the delaminated sample, the above compressive strength values must be taken as a guide and must not be relied upon to make rehabilitation decisions. We recommend a non-invasive compressive strength test at several locations in the field. Based on the non-invasive strength tests, select locations to obtain cores for compressive strength tests. This would allow us to compare the in-situ tests to the actual strength from core testing. This two-step process would keep the number of cores at a minimum.

5.2.11 Corrosion Evaluation of the Hinge between Piers 24 and 25

The hinge cavity has a backwall, two corbels (sidewalls) and a floor. The backwall of the hinge cavity was wet from the previous day's rain. The floor had standing water prior to testing. The floor also had a thick layer of grime accumulated over the years. It was clear that water from the deck (and therefore chloride laden water in winter months) leaks through into the hinge cavity.

The accumulated grime and the standing water were removed before locating reinforcing steel and measuring reinforcing steel cover. All the reinforcing steel in the walls is epoxy coated. All the reinforcing steel in the floor is uncoated. The reinforcing steel cover on the backwall and one of the corbels was 2.6 inches and 1.95 inches, respectively. The reinforcing steel cover on the floor was 2.95 inches.

One 2"ø core was extracted from the backwall and the floor for chloride content analysis. The exact locations of the cores are shown in Drawing E-7-1 in Appendix E-7. The chloride content by weight of concrete at the reinforcing steel level for the backwall and the floor is 0.10% and 0.09%, respectively (see Table E-4-6). The chloride contents by weight of concrete at the surface (i.e. 0.25 to 0.5 inch) were 0.11% and 0.18% for the backwall and the floor, respectively. This is consistent with the fact that water ponding on the floor leads to higher chloride concentration on the floor surface.

The corrosion potential of the floor slab was measured using a saturated copper copper sulfate electrode. Figure 5.2-2 shows the corrosion potentials. The maximum and minimum corrosion potentials were –256 mV (may or may not be corroding) and –602 mV (90% probability of active corrosion), respectively.

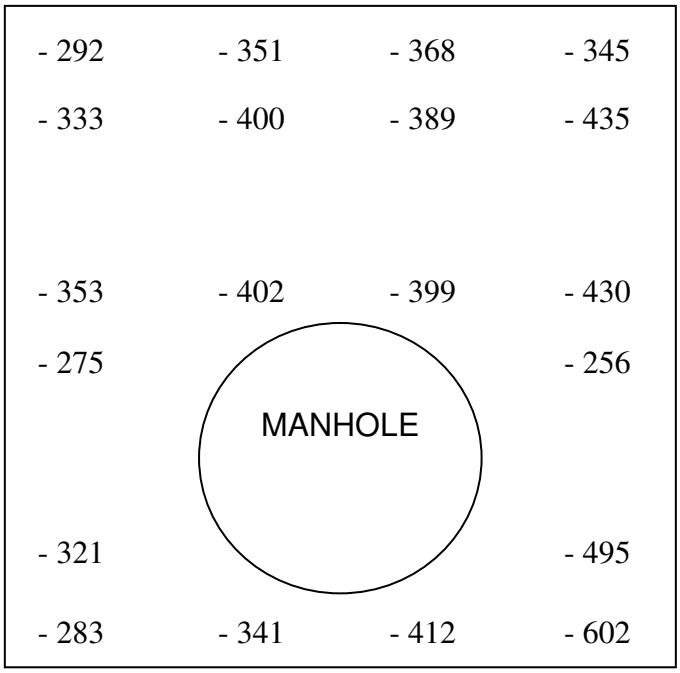


Figure 5.2-2 Corrosion potential of the hinge cavity floor

The rate of corrosion was measured where there were no delaminations or cracks on the hinge floor surface. The rate of corrosion was 0.08mpy (see plots E-7-1A and E-7-1B in Appendix E-7) and is considered low. Sounding of the floor indicated no delaminations as of August 2007. Since the chloride at the reinforcing steel level is above the threshold, the corrosion rate is expected to increase and will lead to concrete damage. Once the cracking from delaminations reaches the surface, it provides easy access to saltwater runoff.

It is clear that chloride laden water is leaking through the hinge (presence of water puddle on the floor after a rain) and contaminating the backwall and the floor. Unless this is fixed, increasing chloride content will lead to increased corrosion rate and concrete damage. Once the concrete damage occurs, this provides a path for saltwater to reach the reinforcing steel surface.

5.2.12 Corrosion Evaluation of Piers 7-7'

Extensive corrosion related concrete spalling was observed in the top 4 to 6 feet of Piers 7-7'. Significant section losses were observed on reinforcing steel that was exposed. The reinforcing steel bar sizes in the pier were #4, #6, and #14 (based on the exposed reinforcing steel). A few #4 reinforcing steel bars were completely rusted away (see Figure 5.2-3). Based on this, the actual average rate of section loss in Piers 7-7' is 10mpy (i.e. 250 mils in 25 years). This rate of corrosion does not take into account the fact that corrosion did not start until chlorides reached the reinforcing steel levels in sufficient quantities. It must be remembered that the actual rate of corrosion would be higher.

One 2”ø core was extracted from the east face of Piers 7-7’ for chloride content analysis. The exact locations of the core are shown in Drawing E-8-1 in Appendix E-8. The concrete cover over reinforcing steel is 2 inches. The chloride content by weight of concrete at the reinforcing steel level was 0.06% (see Table E-4-6). The chloride content by weight of concrete at the surface (i.e. 0.25 to 0.5 inch) was 0.18%.

Figure 5.2-3 Corrosion damage at the top of Piers 7-7’

The corrosion potential of the east face of Piers 7-7’ was measured using a saturated copper copper sulfate electrode. Figure 5.2-4 shows the corrosion potentials. The maximum and minimum corrosion potentials were –72 mV (90% probability of no corrosion) and –362 mV (90% probability of active corrosion), respectively.

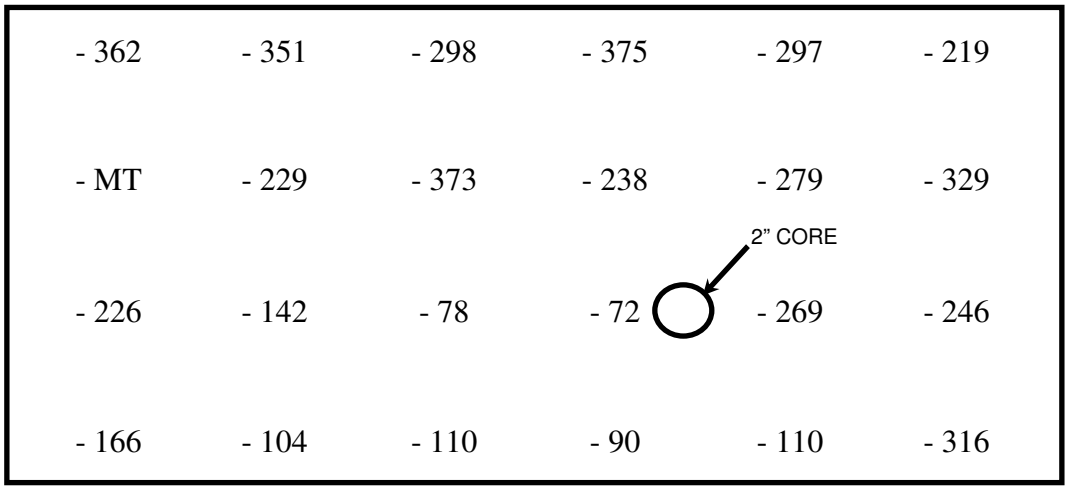


Figure 5.2-4 Corrosion potentials – East Face of Piers 7-7'

The rate of corrosion was measured where there were no delaminations or cracks on the pier surface. The rate of corrosion was 0.13mpy (see plots E-8-1A and E-8-1B in Appendix E-8) and is considered low. Since the chloride at the reinforcing steel level is above the threshold, corrosion rate is expected to increase and lead to concrete damage. The misaligned drainpipe is spraying chloride-laden water onto the top section of this pier. Unless this is fixed, the rate of corrosion and associated concrete damage will continue to increase. Once the concrete cracks, this provides an easy access for saltwater to reach the reinforcing steel surface.

Electrical continuity between exposed reinforcing steel was measured. All reinforcing steel was electrically continuous. It is possible to design a corrosion protection system to slow down the corrosion at chloride-contaminated areas.

5.2.13 Corrosion Evaluation of "Smiley" Crack at Pier 6

A long crack was observed on the side of the box girder at Pier 6. There was concern regarding salt from deicing and the moisture from the environment penetrating through the crack and affecting the reinforcing steel and the tendons. A small excavation was made to evaluate the condition of the reinforcing steel along the crack. Figure 5.2-5 shows the condition of the reinforcing steel intersecting the crack. Minor corrosion was noticed on the epoxy coated reinforcing steel at the crack.

One 2"ø core was extracted from the web of the box girder about 5 feet above Pier 6 for chloride content analysis. The exact location of the core is shown in Drawing E-9-1 in Appendix E-9. The concrete cover over the reinforcing steel was 3.5 inches. The chloride content at the reinforcing steel level was 0.12% by weight of concrete (see Table E-4-6). The chloride content at the surface was 0.18% by weight of concrete. The chloride level at the reinforcing steel is above the INDOT threshold (0.039%) for the potential to initiate active corrosion of bare steel.

Epoxy coated reinforcing steel may be able to tolerate a higher level of chlorides because the coating can act as a barrier (assuming that the holidays are within that allowed by the standards:

2 holidays per foot) and prevent chlorides from coming in contact with the reinforcing steel. Since the chloride content at the reinforcing steel level is higher than the threshold levels, corrosion has the potential to initiate at bare areas and at holidays. Ongoing corrosion undercuts the epoxy coating over a period of time. During that time additional chlorides can accumulate at the reinforcing steel level. The ongoing corrosion destroys the coating and exposes the reinforcing steel to chlorides. At that stage, corrosion continues at a rate similar to uncoated reinforcing steel.

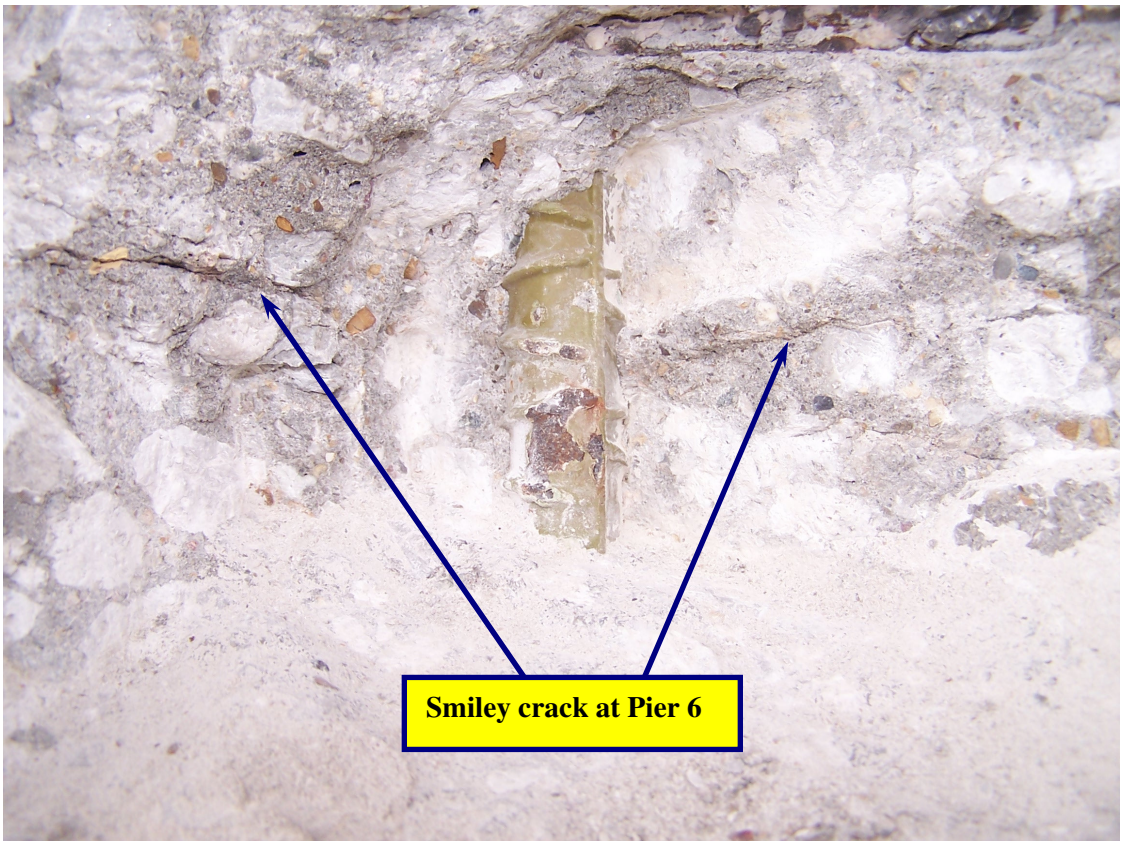


Figure 5.2-5 Minor corrosion on reinforcing steel intersecting the “smiley” crack at Pier 6

6.0 LOAD RATING AND ANALYSIS FOR CLINE AVE BRIDGES

6.1 STATUS

The load rating analysis for Phase 2 and 3 focused primarily upon developing the rating criteria and beginning the rating analysis for Ramp D using LRFD HL-93 live loading. The load rating analysis for Ramp D, as well as the remainder of the structure, will be expanded to included additional live loads in accordance with INDOT requirements in Phase 4 and beyond. These loads will be added as the analyses progress and the findings will be incorporated into upcoming reports.

The load rating analysis, and rating factors, show the calculated capacity of a structure and also allow comparison, coordination, and integration of the physical inspection results with analytical results.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CORROSION CONSULTANT CONCLUSIONS

Chloride concentration by weight of concrete was tested at various locations of the SR 912 structure during this phase. For the SR 912 bridge, chloride concentrations represent various stages of corrosion, from the potential of corrosion to active corrosion. Table 7.1-1 below summarizes these approximate limits.

Chloride Concentration at Reinforcing Steel (by weight of concrete)	Description
Above 0.039%	Above INDOT threshold limit for corrosion to potentially occur on uncoated reinforcing steel
Above 0.20%	Limit above which epoxy coating damage and corrosion of reinforcing steel was noted during this inspection on these structures (when a significant number of holidays were present)
Above 0.40%	Based upon past performance, epoxy coating typically destroyed and corrosion can proceed as it would on uncoated steel

Table 7.1-1

7.1.1 Corrosion Activity in the Top Deck

The lowest chloride concentration recorded at the reinforcing steel level was 0.054% by weight of concrete. This is higher than the current INDOT threshold limit for the potential of corrosion of 0.039% by weight of concrete. This is true in all cores that had reinforcing steel.

The main source of chlorides is deicing salt application. It is possible that there may be a secondary source of chlorides in this structure.

Loss of adhesion of the epoxy coating alone did not result in corrosion.

Significant coating damage and corrosion of reinforcing steel was observed when chlorides at the reinforcing steel level were higher than 0.20% by weight of concrete and the reinforcing steel had a significant number of holidays. If the reinforcing steel had a small number of holidays, no corrosion was observed even if the chlorides at the reinforcing steel level exceeded 0.20% by weight of concrete. When the chloride at the reinforcing steel level was below 0.20% by weight of concrete (but above 0.039%), no corrosion or coating damage was observed. This may be due to inherent lack of electrical continuity in an epoxy coated reinforcing steel mat that limits corrosion to the local areas unlike in uncoated reinforcing steel decks. Use of epoxy coated reinforcing steel in both the top and bottom mat of the top deck has delayed or prevented corrosion related concrete damage in some areas thus far. It is well known that chlorides and moisture play a role in destroying the epoxy over a period of time. This bridge has an abundance of chlorides and moisture at the reinforcing steel level, particularly at crack locations. Continual

buildup of chlorides at the reinforcing steel level will most likely lead to widespread concrete damage within the next 25 years.

Several cores broke at the reinforcing steel level indicating that corrosion is already resulting in cracks at the reinforcing steel level. More extensive corrosion related concrete damage is expected within 7 years in areas where the top deck is cracked (center of the cells). These are critical locations since concrete damage on the top and on the underside is expected to occur at the same location.

Delaminations near the concrete bridge rail (where salt laden snow sits during winter months) will follow. It is hard to predict the timing of this since it depends on the amount of salt used, the number of snow showers, rain, and other factors. Based on the past performance of this bridge, it is clear that the coating is destroyed and corrosion proceeds at a rate similar to uncoated reinforcing steel when the chlorides at the reinforcing steel reach or exceed 0.40%. Currently, chlorides at the reinforcing steel level near the concrete bridge railing is below 0.25%. Based on the diffusion analysis, chloride concentration at the reinforcing steel level is expected to reach 0.40% in another 18 years (i.e. 2025). During this time, corrosion at the holidays and bare areas will destroy the coating. Once the coating is destroyed, the reinforcing steel will corrode at the same rate as the bare reinforcing steel. Widespread concrete damage is expected within 25 years (i.e. 2032) near the concrete bridge rail (where the salt laden snow is piled up and where the slab does not have any cracking).

7.1.2 Corrosion Activity in the Hinge Cavity

Water leaks through the joints at the hinges is contaminating the backwalls and the floors.

The reinforcing steel in the backwall and the corbels are epoxy coated.

Chlorides at the reinforcing steel level are currently above the threshold. The chloride level at the reinforcing steel in the backwall is above the INDOT threshold but well below the 0.20% threshold (by weight of concrete) associated with coating damage within this bridge.

Water leaking through the expansion joints at the hinges is expected to increase chloride contamination. Unless the water leaks are fixed, increasing chloride content will lead to an increased corrosion rate and concrete damage. Once the concrete damage occurs, this provides a path for salt laden water to the reinforcing steel surface. Reinforcing steel, when exposed directly to salt water, corrodes almost 10 to 20 times faster resulting in section loss that leads to structural problems.

The above conclusions are based on evaluating just one hinge cavity and therefore must not be relied on for rehabilitation decisions.

7.1.3 Corrosion Activity at Piers 7-7'

Severe corrosion and concrete damage was noticed at the top section of Piers 7-7'. The actual average rate of section loss is 10mpy (based on #4 bar completely corroded away in 25 years).

Saltwater runoff is being dumped on Piers 7-7' due to misaligned drainpipes. Unless this is rectified, additional concrete damage is expected in the future.

It is possible that this situation is occurring at other piers as well.

7.1.4 Corrosion Activity at "Smiley" Crack at Pier 6

Chloride level at the reinforcing steel is above the INDOT threshold but below the 0.20% (by weight of concrete) concentration associated with coating damage within this bridge.

7.2 CORROSION CONSULTANT RECOMMENDATIONS

7.2.1 Top Slab

Identify locations of high chlorides mentioned in the 2004 inspection report.

Investigate the corrosion status of the underside of the deck and determine if chloride contamination is limited to areas of cracks. Combine the results from Phases 3 and 4 and identify areas of concern.

Post-tensioned tendons at true high points are within a few inches of the top surface of the top slab. Since the chloride contamination reaches deeper into the slab, it is possible that metal ducts at true high points may currently be experiencing corrosion. If the metal duct is actively corroding, it is possible that chlorides can enter into the duct and start corrosion of the strands. It is important to evaluate tendons at true high points.

7.2.2 Hinge Cavities

Prevent water leaks through the expansion joints at the hinges.

Monitor for concrete damage in the hinge cavities over the next 5 years. If corrosion related concrete damage develops, a corrosion protection system should be installed to stop additional concrete damage.

7.2.3 Piers 7-7'

Prevent salt water from being dumped on piers by repairing all the drain pipes.

Identify the extent of chloride contamination on Piers 7-7' for concrete removal and repair. Concrete removal must extend at least 1 inch behind the bars. The repair concrete should have low electrical resistivity (i.e. less than 25,000 ohm-cm). Since there is a considerable amount of

steel, an effective corrosion protection system must be installed to prevent additional concrete damage in the future.

Evaluate other piers and quantify the extent of chloride contamination and corrosion activity. If other piers are already chloride contaminated, an effective corrosion protection system may need to be installed to extend the life of piers.

7.2.4 "Smiley" Crack at Pier 6

Inject the "smiley" cracks with epoxy.

7.3 URS RECOMMENDATIONS

This inspection completes Phase 3 of six phases of inspection, testing, and analysis on the Cline Avenue bridges. The primary two goals of this project are to:

- Monitor the bridge for advanced deterioration/corrosion so that immediate corrective action can be taken if needed to maintain public safety.
- Provide the rehabilitation consultant with the information required to enable them to produce a comprehensive rehabilitation scheme which will extend the service life of the structure a minimum of 25 more years.

A schedule has been developed to help achieve these goals over the next three phases. The project team will evaluate this planned schedule as the project progresses and make the necessary adjustments to best achieve the outlined goals.

PHASE		DATE	INSPECTION	TESTING	ANALYSIS
COMPLETED	Phase 1	5/06~9/06	*Segments 1~6, Ramps A~D* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing Low Points, Couplers, and High Points (28 Locations)	• None
	Phase 2	12/06~2/07	*Segments 4~6, Ramps A, C, & D* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing at Couplers and High Points (30 Locations)	• Ramp D, Preliminary
	Phase 3	7/07~8/07	*Segments 1~6, Ramps A~D* • Hinges • "Smiley" Cracks *Segments 1~3, Ramp B* • "Hot Spot" Cracks	• Corrosion Testing of 32 top deck cores • Determine chloride contamination with the use of cores and drill holes in the top deck • Corrosion reading of deck slab reinforcement • Corrosion Test of Reinforcing Steel at a "Smiley" Crack and a hinge	• Ramp D, Continue
PLANNED	Phase 4	Fall '07	*Segments 4-6, Ramps A,C &D* • "Hot Spot" Cracks	• Determine chloride contamination level through the use of drill hole samples in the underside of the deck	• Finalize Ramp D • Begin Segments 1~6, Ramps A~C
	Phase 5	Spring '08	*Segments 1~3, Ramp B* • "Hot Spot" Cracks • Bottom of Top Slab • Hinges	• Corrosion Testing at Couplers and High Points	
	Phase 6	Fall '08	*Segments 4-6, Ramps A,C & D* • "Hot Spot" Cracks • Bottom of Top Slab • Hinges	• Corrosion Testing at Couplers and High Points	

Table 7.3-1 Future Inspection, Testing, and Analysis Plan

7.3.1 "Hot-Spot" Cracks

The five bridges are all showing continual degradation throughout each structure, from the substructure to the roadway deck. The "Hot Spot" cracks inspected during Phase 3 (those

located in Segments 1 ~ 3 and Ramp B) are continuing to grow. Crack widths which increased in width in excess of 0.1 mm will be re-measured during Phase 4 to verify the amount of growth.

It is recommended that the "Hot Spot" cracks in Segments 4, 5, and 6 and Ramps A, C, and D be re-inspected during Phase 4. URS recommends adding crack gauges to at least 10 highly active cracks during the next phase. These gauges will aide inspectors in determining accurate crack growth rates during future inspections.

7.3.2 Hinges

URS inspected the hinge locations, both internally and externally, during Phase 3. The majority of cracks are small (less than 0.3 mm in width). A corrosion test on the reinforcing steel was performed at a hinge location. It is recommended that the hinges be inspected again in Phase 5.

7.3.3 Top Slab

The top slabs of the concrete box girders are exhibiting signs of deterioration. This deterioration includes cracking, efflorescence, rust staining, delaminations and spalling. In an effort to determine the extent of the deterioration and the possible causes, testing of the slab should be continued during Phase 4. This should include testing approximately 32 locations on the bottom of the top slab. This testing should include the following:

- Determine amount of chlorides from concrete powder samples
- Determine re-steel locations
- Cover measurements
- Condition of the re-steel
- Petrographic analysis of the spalled concrete
- Adhesion testing of the epoxy coating on the re-steel

7.3.4 Tendon/Coupler Testing

Due to the extensive amount of testing being performed in the top slab, it is recommended that the testing of the tendons and couplers be continued during Phase 5.

The tendon evaluation is an ongoing investigation serving to provide data regarding the structure's condition related to corrosion and corrosive elements.

7.3.5 Load Rating Analysis

URS has completed the preliminary analysis of the load rating for Ramp D. URS will finalize this analysis during the Phase 4 inspection. In addition, the load rating analyses of the other structures will commence. The results from the load rating will aid in guiding the inspection/testing team and determining long term bridge rehabilitation options.

7.3.6 Rehabilitation

Mitigating the corrosion occurring in the top slab of the bridge should be addressed soon. The testing already performed and the testing to be performed on the top slab during Phase 4 will aide the bridge rehabilitation consultant in developing repair alternatives. Mitigating this corrosion in the top slab as soon as possible is imperative as the top slab is a vital component to the bridge's structural system.

URS recommends addressing two structural deficiencies in the bridge immediately. These are:

- Active spalling at top of Piers 7-7' (refer to October 2006 Phase 1 Report by URS Corporation)
- Deterioration of Tendon 12 in Ramp D (refer to April 2005 Report by Ken Herceg and Associates)

Item 1 is a "time of the essence" issue that requires a structural fix to restore structural integrity as soon as possible. For Item 2, the consequence of full or partial loss of Tendon 12 should be mitigated before it causes future, more significant and expensive problems.

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The Appendices of this Report

Are not Included

In the Calculation Book

BRIDGE INSPECTION REPORT
PHASE 4

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

STATE OF INDIANA
DEPARTMENT OF TRANSPORTATION

MARCH 2008

URS

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BRIDGE INSPECTION REPORT
PHASE 4

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

MAINLINE	**BRIDGE NO. 912-45-2546A**
RAMP A	**BRIDGE NO. 912-45-2546RWXA**
RAMP B	**BRIDGE NO. 912-45-2546RWN**
RAMP C	**BRIDGE NO. 912-45-2546RENA**
RAMP D	**BRIDGE NO. 912-45-2546REX**

PREPARED FOR:

STATE OF INDIANA

DEPARTMENT OF TRANSPORTATION
OFFICE OF TECHNICAL SERVICES
BRIDGE INSPECTION SECTION

MARCH 2008

PREPARED BY:

URS

SENIOR INSPECTING ENGINEER
URS CORPORATION

12/1/2008
DATE

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SUPPLEMENTAL ELECTRONIC DOCUMENTS

SD-A "Hot-Spot" Crack Inspection (Table, Photos, and Sketches)
SD-B Underside of Top Deck Drawings

DISCLAIMER

This inspection report is based on data and conditions that are generally applicable as of March 2008 and the conclusions and recommendations herein are therefore applicable only to that timeframe. This inspection was not intended to be a complete arms-length inspection, therefore findings and conclusions in this report are limited to specific areas of the bridge as defined in the scope of work. While this report understandably will serve as a tool for future work, it should not be used as the sole basis for final design, construction or remedial action, or as a basis for major capital decisions. Additionally, further studies including a complete load rating analysis and additional testing of the post-tensioning system and top deck are planned and could have an impact upon future decisions.

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1.0 INTRODUCTION

1.1 GENERAL

In accordance with an agreement with the Indiana Department of Transportation (INDOT), URS Corporation (URS) conducted the Phase 4 "hot-spot" inspection of the post-tensioned box girder spans of the S.R. 912 (Cline Avenue) bridge and ramps over the Indiana Harbor Canal and Riley Road. This inspection included the re-inspection of "hot-spot" cracks in Segments 4, 5, and 6 and Ramps A, C, and D and localized testing and evaluation of the underside of the top slab. A summary of the scope of the inspection is provided in Section 1.2. The following firms were subcontracted for this inspection:

- Siva Corrosion Services (SCS) was utilized by URS for the corrosion evaluation of the underside of the top deck and to assist in the visual inspection of the underside of the top deck.

- VStructural LLC (VSL) was utilized for inspection and testing support and to provide general post-tensioning expertise.

1.2 SCOPE OF WORK

As part of an agreement between INDOT and URS, a scope of work was defined for the Phase 4 inspection of the S.R. 912 Cline Avenue Bridge over the Indiana Harbor Canal. This scope of work defined the level of inspection and testing to be performed.

A pre-inspection meeting was held on Thursday, December 6, 2007, via telephone conference. This meeting provided a forum to discuss and clarify the scope, schedule, safety concerns, goals and other pertinent aspects of the inspection by the stakeholders in this endeavor.

The project team amended the scope of work in progress, to include visual inspection of areas of the underside of the top deck. This was commenced in Phase 4 in order to provide information to the rehabilitation team in an expeditious manner.

The complete scope of work and pre-inspection meeting minutes are attached in Appendix A. A summary of the scope of work, as amended by the pre-inspection meeting, is provided below:

- Prepare relevant field data sheets
- Perform (detailed) visual crack inspection
    - Re-inspect "hot-spot" cracks and document findings (Ramp A, C, and D/ Segments 4, 5 and 6)
    - Install test crack gauges to help more accurately measure crack growth
- Perform (detailed) underside of top deck inspection
    - Inspect underside of top deck in Ramps, Segment 2, Segment 3, and Span 23 of Segment 6
- Select areas for testing of underside of top deck
- Perform corrosion field testing on thirty-six areas on the underside of the top deck

  - Select areas based upon spalling, efflorescence, cracked areas without efflorescence or spalling, and uncracked areas
  - Perform delamination survey
  - Locate steel reinforcement and measure concrete cover
  - Expose a small section of reinforcement where necessary
  - Measure electrical continuity of rebars within test area
  - Collect concrete samples from rebar exposure process
  - Drill and collect a minimum of seven concrete samples at the rebar depth at each test area
  - Prepare adhesion testing of reinforcement
- Repair areas that were exposed for testing
- Perform lab evaluations
  - Complete moisture content test of concrete samples
  - Test concrete for chloride content in the lab
  - Test concrete powder samples for chloride content
  - Perform a petrographic analysis on four samples to determine if alkali reactive aggregates are present
- Continue load rating analysis
- Prepare analysis and reports
  - Draft inspection report
  - Final report and recommendations

1.3 REPORT

This *Bridge Inspection Report*, prepared by URS, adheres to the scope of work as amended by the pre-inspection meeting held on December 6, 2007.

The format for the Phase 4 report is a revised version of the format employed for the inspection reports submitted for Phases 1, 2, and 3. This new format of the report includes information regarding the scope of work for the current phase, inspection and testing findings, and brief recommendations. This report should be used in conjunction with these previous reports for general information. Background information is only presented if it is has been altered or was not previously presented. The corrosion report will be submitted under separate cover.

1.4 INSPECTION PERSONNEL

The inspection was performed by URS Corporation with the assistance of several subconsultants/subcontractors. Primary inspection personnel consisted of:

1.4.1 URS Corporation

- Dallas Montgomery, PE
  Qualified NBIS Team Leader who has completed NHI "Fracture Critical Inspection Techniques for Steel Bridges" course.
- Craig Klusman, PE
  Qualified NBIS Team Leader

- Travis Baker, EIT
- Jack Katerburg

1.4.2 Siva Corrosion Services (SCS)

- Siva Venugopalan
- Joe Kish

1.4.3 VStructural LLC (VSL)

- Bruce Osborn
- Alex Davenport
- Gary Stevens
- Fred Hedrick

1.5 INSPECTION PERIOD

• URS inspection of interior "Hot-Spot" cracks	12/11/07-12/21/07
• SCS top slab corrosion testing	1/7/08-2/8/08
• URS/SCS visual inspection of top slab	2/11/08-3/12/08
• URS inspection support and coordination	12/11/07-3/12/08
• VSL support services	12/11/07-3/12/08

1.6 BACKGROUND INFORMATION NOT SPECIFIC TO PHASE 4

The intent of this section is to provide general information pertaining to the project that is not specific to current phase, but has been added or updated since the previous phase(s).

1.6.1. Access on Private Property

Portions of Segment 1, including Pier 7, are on the property of Mittal Steel. (However, the access hatch for Segment 1 is accessible without entering the property of Mittal Steel). Permission must be granted from Mittal Steel before entering their property.

Segments 2 and 3 are located on the property of Kemiron, an industrial chemical manufacturer whom utilize hazardous gases. Prior to entering their property, each individual was required to view a safety training video concerning possible hazards and safety precautions. Kemiron utilizes a siren to warn of gas leaks and wind socks to aide in determining at which designated location personnel should assemble if a leak occurs.

Access to Segment 6 and Ramp B is located on the property of BP-Amoco. Access to the bridge is through a MARSEC U.S. Coast Guard security area. Prior to entering their property all inspection personnel were required to attend a four-hour training class concerning rules, regulations, hazards and safety precautions. After passing an exam about the contents of the training, each individual was assigned a tag to wear while on BP-Amoco's property.

1.6.2. Coding System

The coding system, developed during the 2004 inspection by Ken Herceg and Associates, is being used for the consistent location of specific superstructure bridge defects and inspection areas. The format of this coding system is as follows:

S# (Segment) or R# (Ramp) – C# (Cell) – S# (Span) or (P#) Pier - *Location*,

where *Location* can be one of the following:

- US – Looking upstation at diaphragm
- DS – Looking downstation at diaphragm
- W# - Web number
- TS - Top slab
- BS - Bottom slab
- BW - Backwall
- TD - Transition diaphragm

For example, S1-C2-P6-US, describes looking upstation at the diaphragm at Pier 6 in Cell 2 of Segment 1.

General plan drawings provided in Appendix B provide segment, span, pier, cell and web numbering for the mainline and ramp structures. Segment, ramp, and pier designations match the titles provided in the original design drawings. Span, cell, and web designations were added for ease of reference.

2.0 VISUAL INSPECTION

2.1 "HOT-SPOT" CRACK INSPECTION

2.1.1 Introduction

This re-inspection included the "hot-spot" interior cracks in Ramps A, C, and D and Segments 4, 5 and 6 and verification of a few active "hot-spot" cracks in other areas of the bridge. "Hot-spot" cracks were defined in the 2005 inspection as cracks that met one of the following conditions:

- Greater than 1.0 mm in width
- Not recorded in 1997
- Increased width versus the 1997 inspection
- Significant (>5–10%) increase in length versus the 1997 inspection

Each "hot-spot" crack is identified with a 4 character designation. The first character designates the segment or ramp where the crack is located and the remaining three characters are the numerical designation for the specific crack. (i.e. "B009" indicates a "hot-spot" crack in Ramp B that was the ninth crack to be numbered.)

Beginning with the Phase 2 inspection, the "hot-spot" inspection schedule was revised to inspect cracks on an annual basis which differs from the originally specified six-month interval. Consequently, only the "hot-spot" cracks in designated portions of the structure are inspected in each inspection phase. Table 2-1 below shows the history of hot-spot inspections.

Table 2-1: "Hot-Spot" Inspection History

	Phase 1	Phase 2	Phase 3	Phase 4
Segment 1	√		√	
Segment 2	√		√	
Segment 3	√		√	
Segment 4	√	√		√
Segment 5	√	√		√
Segment 6	√	√		√
Ramp A & S3-C5-S11	√	√		√
Ramp B	√		√	
Ramp C	√	√		√
Ramp D	√	√		√
Exterior	√		√	

The complete detailed list of "hot-spot" cracks and a plan view drawing detailing their locations are provided in Appendix C. An electronic file of the "hot-spot" crack table included in the Supplemental Electronic Documents has links for the photograph and sketch for each crack. The total number of "hot-spot" cracks per segment or ramp is shown in Table 2-2. A comparison between the current and previous inspections is provided in Section 2.1.4.

Table 2-2: Total Number of "Hot-Spot" Cracks per Segment or Ramp

Segment 1	55
Segment 2	19
Segment 3	98
Segment 4	43
Segment 5	27
Segment 6	34
Ramp A	2
Ramp B	9
Ramp C	7
Ramp D	6
TOTAL	300

2.1.2 Inspection Procedures

The width, length, and location of each inspected "hot-spot" crack was documented and compared to the general sketch that was generated during the Phase 1 inspection. The crack width was measured by using a feeler gauge. The ends of the crack were checked against the existing end marks to determine if they had lengthened. The largest width of the crack was documented on the concrete and dated. A picture was taken showing the crack and the written documentation on the concrete.

2.1.3 "Hot-Spot" Crack Classification

"Hot-spot" cracks on the Cline Avenue Bridge were classified into various categories to sort similar cracks (see Table 2-3 and Figure 2-1). URS used the classifications provided in *New Directions for Florida Post-Tensioned Bridges Volume 9, Condition Inspection and Maintenance of Florida Post-Tensioned Bridges* by the Florida Department of Transportation (FDOT). A copy of this publication can be found on the CD submitted with this report and online by using the link provided in the references. This publication classifies typical cracks found on post-tensioned bridges into 31 types (Category 1-31) and provides descriptions and likely causes for each category. URS created additional categories (Category A-D) for "hot-spot" cracks on the Cline Avenue Bridge which could not easily be classified into one of the 31 categories. The remainder of the cracks are unclassified (Category U). The following sections provide brief descriptions and photographs of each type of crack.

To decide on the proper category, URS utilized engineering judgment in combination with the location, orientation, and physical attributes of each crack. The fundamental cause of cracking in any concrete specimen is due to the fact that at some point a loading was applied that exceeded the concrete's tensile capacity. These loadings or stresses could be caused by a combination of forces, such as dead load, live load, shrinkage, temperature, wind, tendon forces, anchorages, and/or residual stresses created during the construction process. Further study and/or detailed

structural analysis beyond the scope of this inspection will be necessary if a more precise classification (and thus cause) of the cracking is desired.

Table 2-3: Number of "Hot-Spot" Cracks per Category

Post-Tensioned Concrete Crack Classifications		**Number of Cracks**
Category	**Description**	
9	Shear crack in web	20
11	Crack in anchorage or blister	4
18	Longitudinal crack along path of internal tendon in web	10
22	Crack in dapped hinge zone	3
24	Crack across slab or web due to anchorage	46
A	Crack in diaphragm due to indirect support	194
B	Crack in web due to indirect support	7
C	Longitudinal crack through bottom slab	5
D	Cracks in raised (stiffened) bottom slab	5
U	Unclassified	6
TOTAL		300

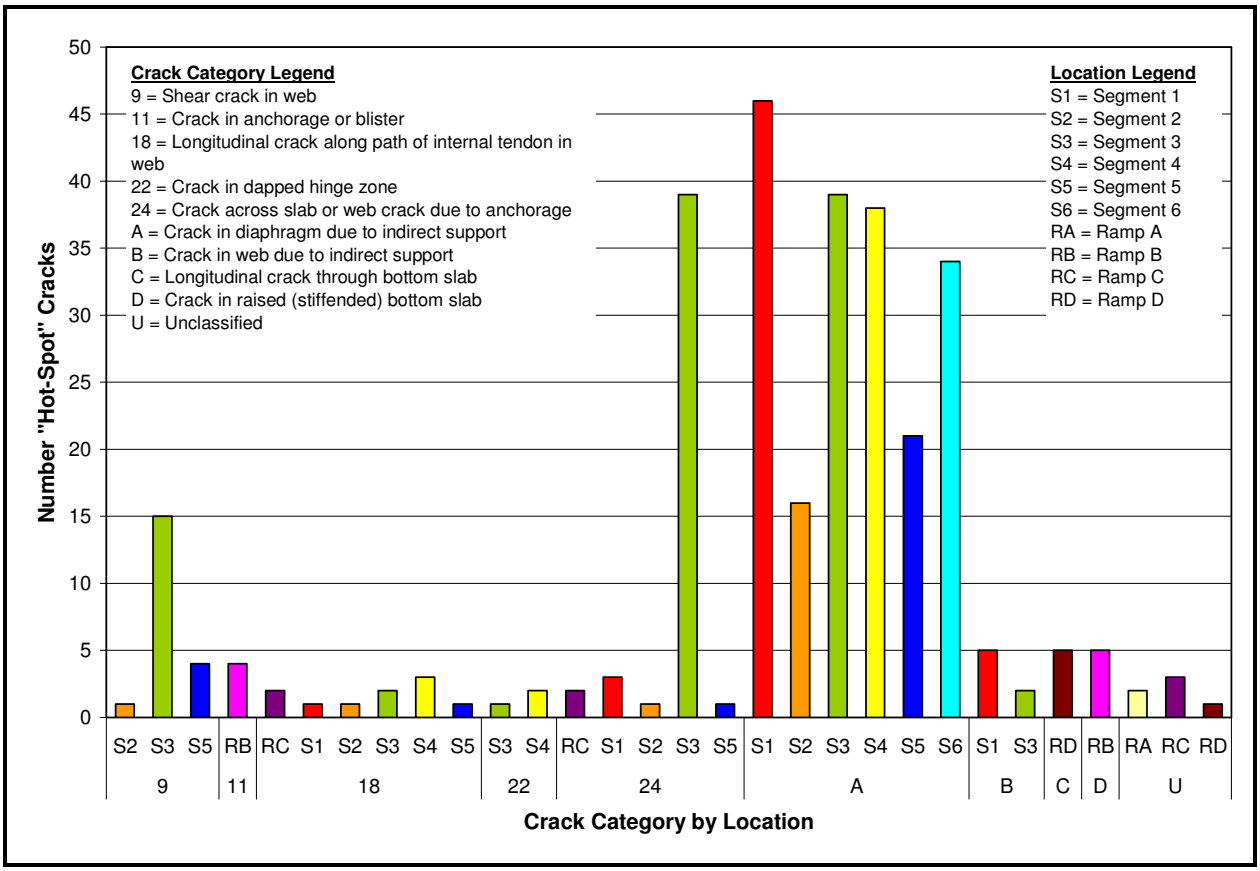


Figure 2-1: "Hot-spot" crack classification by ramp or segment location

2.1.3.1 Category 9 – Shear Crack in Web

Category 9 describes inclined shear cracks found in the web of the post-tensioned girders. They generally occur near the ends of a span in regions near the supports (usually less than one-quarter of the span of a member). Shear cracks may be isolated or may occur at intervals along the web. In prestressed (and post-tensioned) structures with no vertical post-tensioning, shear cracks are typically inclined less than 45 degrees to the horizontal and rising towards mid-span (see Figure 2-2). They are often initiated once the principle stress in the web exceeds the tensile capacity of the concrete. They may continue to grow as straining occurs in the reinforcing steel.

This type of cracking can be significant to corrosion protection of draped post-tensioning in the web since it permanently breaches the tendon path.

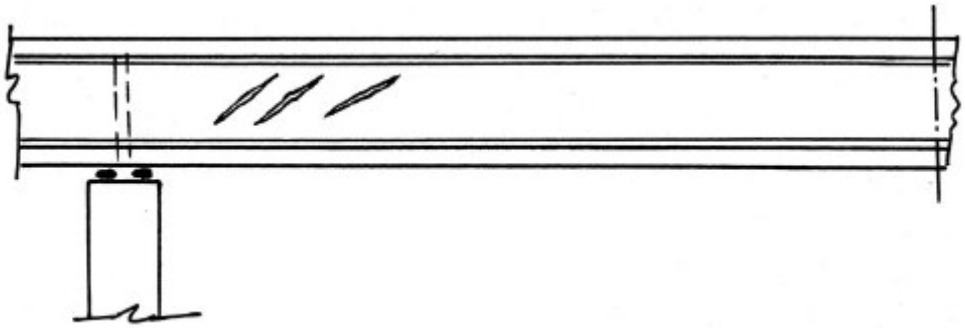


Figure 2-2: Typical Category 9 inclined shear cracking (Ref. Corven Engineering)

In the Cline Avenue Bridge shear orientated "hot-spot" cracks were found on both interior and exterior surfaces. This cracking most often occurred in the cantilever spans, namely in Spans 10, 13 (Cell 5), and 14 of Segment 3, and in Span 18 of Segment 5 (see Photo 2-1). However, shear orientated cracking is also concentrated near Piers 13-13' in Span 11 of Segment 3, where a transition is made from 2 to 3 cells.

Photo 2-1: Example of inclined shear crack on interior face (Crack #5020 shown)

2.1.3.2 Category 11 - Crack in Anchorage or Blister

Category 11 cracks are generally categorized as localized cracks at the anchor block which are structural in nature. They may be caused by concentrated forces from the tendon anchor bearing on the concrete (see Figure 2-3), strut-tie action, or from bending of the element adjacent to the blister. These cracks generally have the following characteristics:

- Anchor block cracks may be of any width, but are generally narrow and of limited length (several inches to about a foot).
- Cracks may extend a short distance from the end of the anchor block along the center of the tendon path (i.e. a splitting crack – similar to driving a wedge lengthwise into a log).
- Cracks may propagate from the corners of the anchor bearing plate, flaring at an angle to the tendon path when viewed from the side, from above or below.
- Cracks may also propagate from the center or corners of an anchor plate laterally across the width of the anchor block when viewed from the end (i.e. looking along the tendon).
- Cracks from one anchor may propagate and join with those from an adjacent anchor when there is a group of anchors together.

During the initial tensioning phase, cracks in anchor blocks should be arrested and contained by local reinforcing within the anchor block, blister or diaphragm containing the anchor(s).

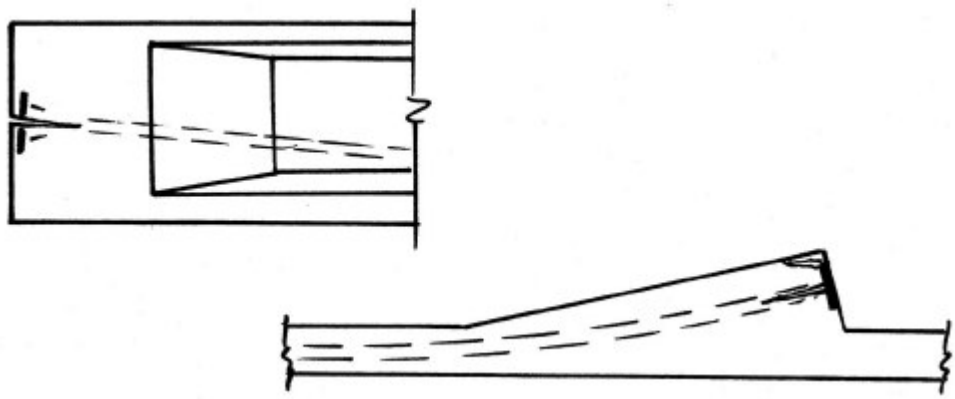


Figure 2-3: Typical Category 11 cracking in anchorages (Ref. Corven Engineering)

In the Cline Avenue Bridge, four cracks were classified into this category, all occurring in Ramp B. Each of these four cracks was located at the end of a web anchorage blister (see Photo 2-2).

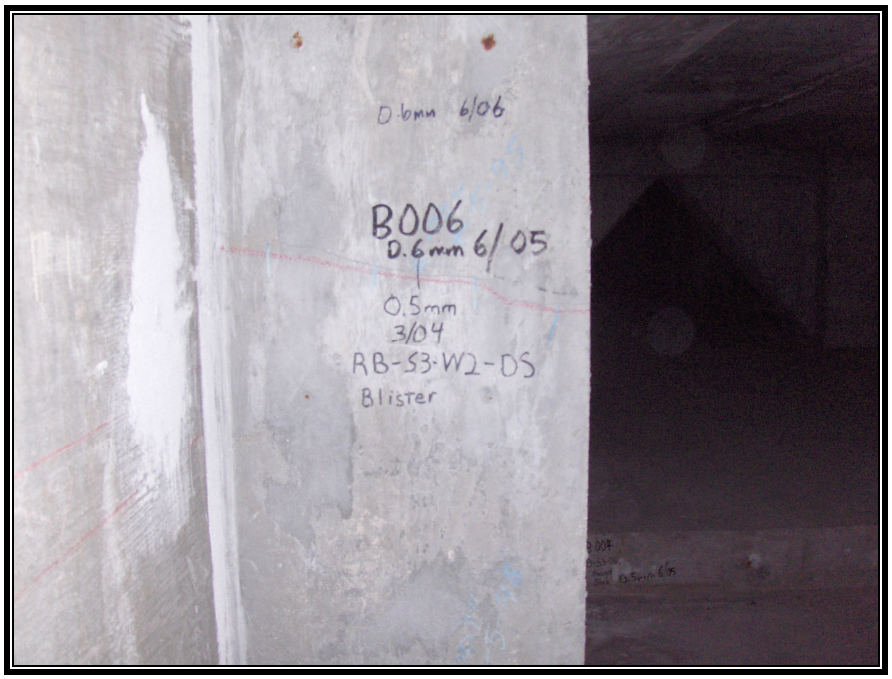


Photo 2-2: Typical Category 11 crack in anchorage blister (Crack #B006 shown)

2.1.3.3 Category 18 - Longitudinal Crack along Path of Internal Tendon in Web

These longitudinal cracks which are along the path of an internal tendon (see Figure 2-4) generally have the following characteristics:

- A crack along the path of an internal tendon, draped in a web, may occur at any location, be of any length and of any width – sometimes as wide as 0.7 mm or more.
- It usually is initiated by a design or construction defect – such as a badly installed duct with too much wobble, a duct crushed locally by too tight of reinforcing, lack of web width or a local weakness in the web itself (low strength concrete, void, honeycomb, etc).
- Occasionally, a longitudinal crack along the path of a tendon in a web may have an associated delamination or spall. A spall might significantly weaken a web, locally.

Although such cracks and spalls may not necessarily be structurally significant, they breach the concrete cover, opening the tendon duct and strands to water and/or salts.

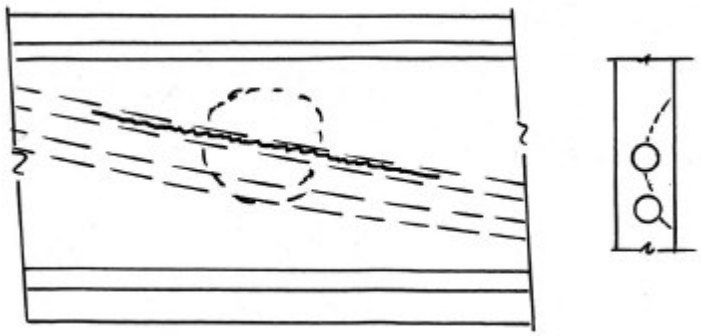


Figure 2-4: Typical longitudinal crack along path of tendon in web (Ref. Corven Engineering)

In the Cline Avenue Bridge this type of cracking is prevalent throughout the structure; however, only ten of these cracks are classified as "hot-spots" (see Photo 2-3 for example).

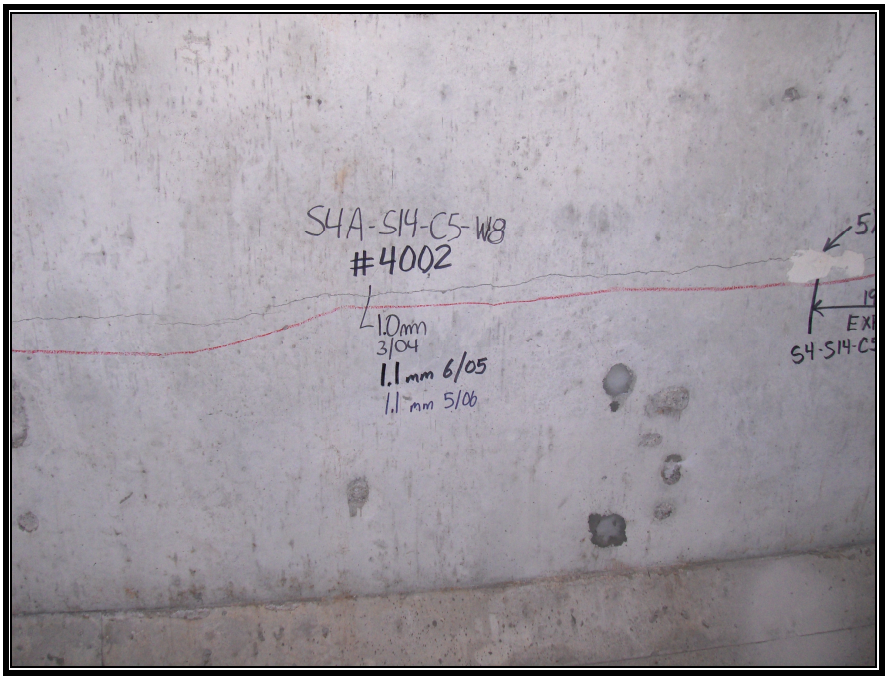


Photo 2-3: Typical Category 18 crack in web (Crack #4002 shown)

2.1.3.4 Category 22 - Crack in Dapped Hinge Zone

Cracks in dapped hinges usually follow a 45 degree path from the corner of the hinge. These cracks may be attributed to strut-tie action and can become significant if insufficient tie reinforcing is provided. The crack path may be steeper if there is any effective longitudinal prestress in the hinge zone. Cracks in dapped hinges can occur in any type of structure, i.e. box sections or I-girders.

In some structures, (e.g. boxes) the crack pattern may be more widespread and complex, particularly if the bearings in the hinge zone are offset transversely to the line of the webs without adequate transverse stiffening.

The key to preventing cracks in such hinges is to provide the right amount and disposition of effective post-tensioning to compress the concrete - supplemented with mild steel reinforcement to contain the post-tensioning bursting forces and local bearing effects.

The Cline Avenue Bridge utilizes two different hinge configurations:

(A) Bearings at corbels supported from diaphragms at each side of a mainline to mainline hinges
(B) Bearings supported from thickened webs at each side of a mainline to ramp, or ramp to ramp hinge.

The numbering of expansion hinges joints, in accordance with the expansion joint numbering shown on the design drawings, and type of hinge utilized is shown in Table 2-4.

Table 2-4: Hinge Locations and Type in Cline Avenue Bridge

Expansion Hinge	Cantilever Side	Supported Side	Hinge Type
2	Segment 2	Segment 1	A
3	Segment 3	Segment 2	A
4	Segment 3	Ramp A	B
5	Segment 3	Segment 4	A
6	Segment 4	Ramp C	B
7	Segment 5	Segment 4	A
8	Segment 6	Segment 5	A
9	Segment 6	Ramp D	B
C	Ramp C	Ramp C	B

Type A Hinge

At the mainline to mainline expansion joint hinges, corbels are suspended from the backwall of the diaphragm on the cantilever span (see Figure 2-5). A bearing rests on the cantilever span corbel which supports a corbel connected to the supported span diaphragm backwall. Generally there is a corbel for each web; however the bearings are offset transversely to the line of the webs. Cheek walls in line with the exterior of the webs hide the bearing/corbel assemblies from outside of the structure. (The alignment of these cheek walls often give the appearance to the passer-by that the structure is “falling” due to lack of support at the hinges.) In addition, a bottom slab connects each suspended span corbel.

At Type A hinges, bearings are numbered from left to right looking upstation. Bearings 1-4 are on the eastbound bridge, and Bearings 5-8 are on the westbound bridge. Access is thru manholes from an aerial lift. Access is limited to only one side of each bearing. It is not possible to perform an arms-length inspection of both sides of the bearing and corbel and portions of the backwall.

At Type A hinges, cracks were found propagating from near the corner of the bearings (see Figure 2-5).

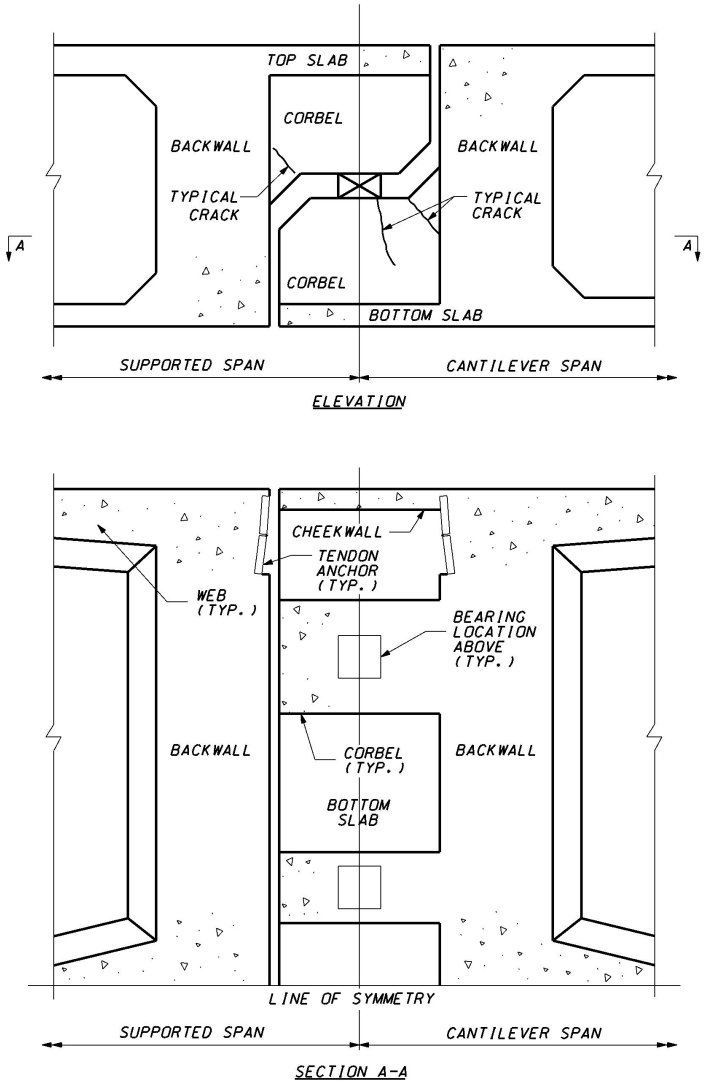


Figure 2-5: Type A hinge connection

Type B Hinge

At the mainline-to-ramp and ramp-to-ramp hinges, the bearings are supported from a thickened dapped web (see Figure 2-6). The use of a diaphragm is present at these locations; however, it is often only a partial diaphragm and is not used for direct transfer of the load between the web and the bearing. This type of connection is used at all locations where a single cell unit is supporting another single cell unit.

Cracking at Type B hinges typically extends from the corner, as showing in Figure 2-6.

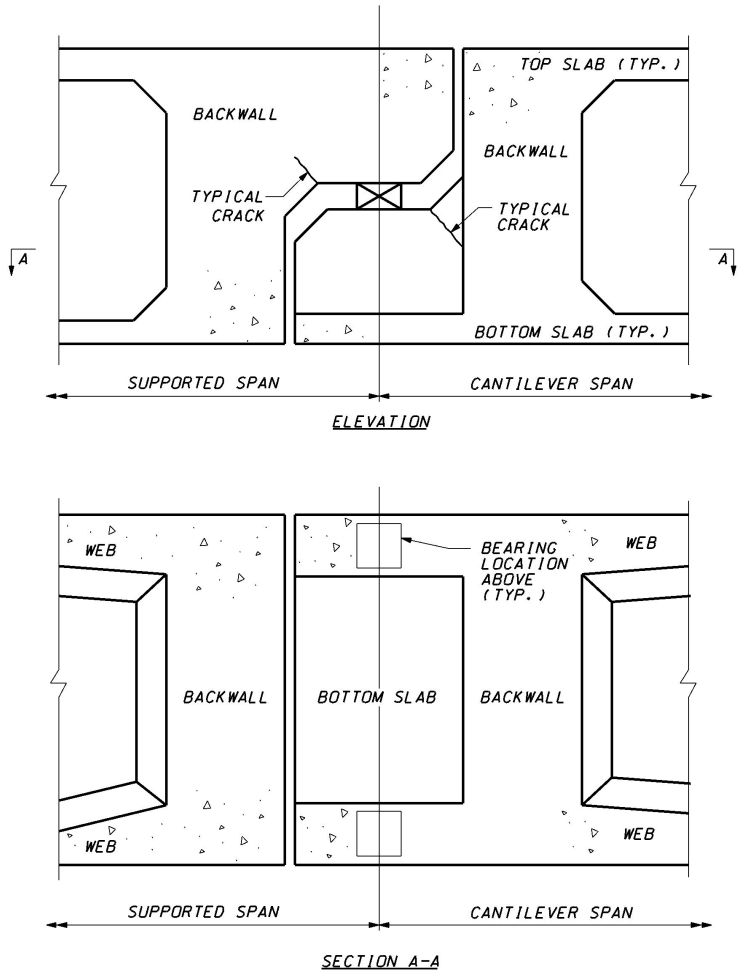


Figure 2-6: Type B hinge connection

Category 22 "Hot-Spot" Cracking

Only three hinge cracks throughout the structure are considered hot-spot cracks. At Expansion Joint 4, Crack #3113 is typical of Type A hinge cracking (see Photo 2-4). Cracks #4001 and #4025 are cracks which are reflected from the corbels and are appearing on the backwall of the diaphragm on the cell interior.

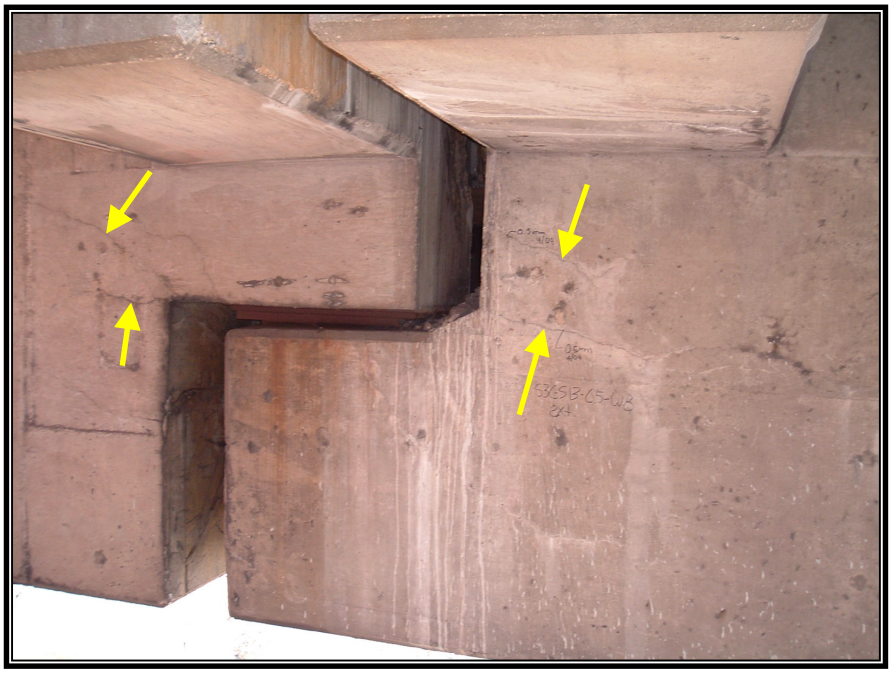


Photo 2-4: Typical hinge cracking (shown with yellow arrows) at Expansion Joint 4 hinge between Segment 3 and Ramp A

Additional Category 22 cracking

Category 22 cracking is present at the majority of the hinges in the Cline Avenue Bridge. During Phase 4, the expansion hinge at Expansion Joint 7 between Segments 4 and 5 was re-inspected to precisely document cracking and deficiencies. The protocol for documenting cracks was revised from Phase 3 to include documentation of all cracks above 0.1mm in width. It is intended to inspect all hinges in a similar manner during the Phase 5 inspection.

An example of type of cracking found at Expansion Joint 7 is shown above in Figure 2-5. This cracking is similar to cracking found at other mainline to mainline expansion joints. Though this cracking is less than 0.3mm in width, it is of concern due to its orientation and location. The observed cracking is generally orientated at about 45° and perpendicular to the main reinforcing steel. In addition, the potential of water and salt infiltration from the expansion joint area puts the load carrying mild steel at risk from chloride infiltration. The surfaces of the hinge area have been treated with an epoxy sealer; however, this has been compromised at cracked areas.

The joint was leaking at time of the inspection. In addition, heavy saturated debris was covering the entire bottom slab area between corbels.

2.1.3.5 Category 24 - Crack Across Slab or Web Due to Anchorage

Category 24 describes local cracks that occur at or near to the anchorage end of a blister in a web or slab (see Figure 2-7). They are induced by tensile effects from the anchor forces, transmitted by shear lag to the slab or web. Cracking may occur at a single anchor blister even if the slab is appropriately reinforced. The likelihood of Category 24 cracking is much greater if there are multiple blisters located in close proximity.

These cracks might open avenues for water to get into any tendons contained in a top or bottom slab. Similar cracks located solely on the underside of a top slab or interior surface of a web would not necessarily present a risk.

The cracks are usually permanent. Since they are induced by load effects, they are structural. However, the effects that cause them (anchor forces) tend to reduce with time due to losses. Consequently, such cracks, if small and narrow, may not be a significant structural concern.

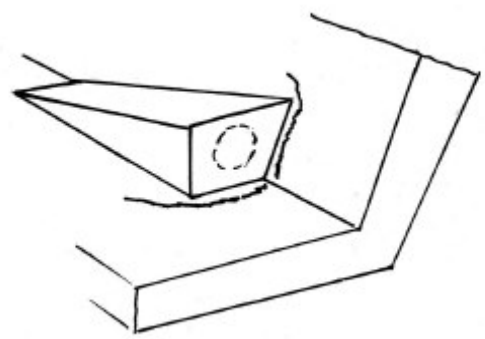


Figure 2-7: Local crack across slab or web at anchor end of blister (Ref. Corven Engineering)

In the Cline Avenue Bridge, this type of cracking can be subdivided into two types:

(A) Cracking found through the end of an anchorage blister
(B) Cracking found in the web above web blisters.

Category 24, Type A cracking was typically found in web blisters directly below the tendon anchorages. Blisters are a widening of the web (or slab) in which tendon anchorages are located. These cracks sometimes extended into the adjacent web or along the side of the blister. This type of cracking was generally noted in Segments 1, 2, and 5 (see Photo 2-5).

Category 24, Type B cracking, generally found in Segment 3, is located in the web directly above web blisters along the bottom slab (see Photo 2-6). Typically, this type of cracking begins near the bottom slab or blister, extends towards the middle of the span and terminates near the top slab.

Photo 2-5: Typical Category 24, Type A cracking at end of web blister anchorage zone (Crack #1061 shown)

Photo 2-6: Typical Category 24, Type B cracking in web above blister anchorage zone (Crack #3022 shown)

2.1.3.6 Category A and B - Cracks Due to Indirect Support

In post-tensioned bridges, the ideal position of support bearings is directly underneath the center of the webs. In the Cline Avenue Bridge mainline spans, the bearings are offset from the webs and the load is transferred through the diaphragms at the piers. The lack of proper mild steel reinforcement or post-tensioning is likely leading to shear cracking in the pier diaphragms (Category A crack). The diaphragm cracking may result in "smiley" cracking occurring in the adjacent webs (Category B cracks). Both types of cracking are termed "cracking due to indirect support".

Category A cracking is found throughout the mainline structures. Typically, the diaphragm cracks are orientated at approximately 45 degrees, originating near the bottom slab at the center of the diaphragm and terminating at the corner between the diaphragm and web (see Photo 2-7). At many locations, the cracks run thru the access holes. Some of these cracks extend into either the top slab, bottom slab, and/or the web. The diaphragm cracks are up to 1.7 mm in width.

These cracks are most typically noted on interior diaphragms surfaces; however, they are present at the unusual configuration of the Pier 7 diaphragm. At Pier 7, four columns support a continuous diaphragm through the three box girders. Columns are located directly below exterior cells (Cells 1 and 3) and between the exterior cells and the interior cell (Cell 2). Therefore, a bearing is not located directly below Cell 2 and all load is transferred by the diaphragm. Category A cracks are present on this exterior diaphragm.

Category B "hot-spot" cracks are located in Segments 1 and 3 (see Photo 2-8). These cracks are generally noted on exterior surfaces; however, interior web cracks may be classified as Category B.

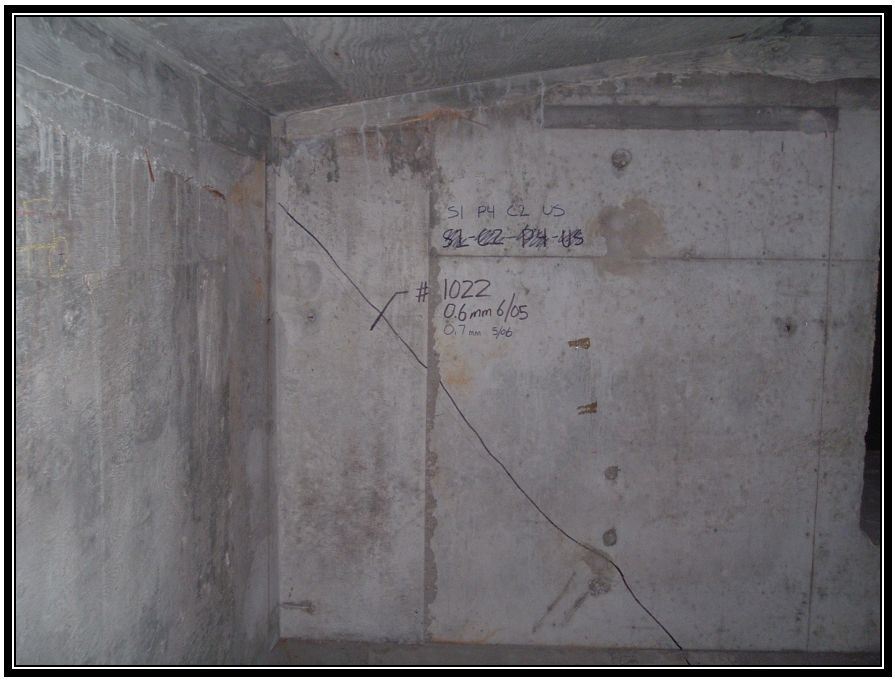


Photo 2-7: Typical orientation of Category A cracking in diaphragms
(Crack #1022 shown)

Photo 2-8: Exterior web cracking possibly due to indirect support (Segment 1, Piers 7-7').

2.1.3.7 Category C - Longitudinal Crack through Bottom Slab

Category C cracks are longitudinal cracks in the bottom slab located at the hinge at Expansion Joint 9 (see Photo 2-9). The cracks are located on the Segment 6 side of the hinge; however, they are classified as "Ramp D" since they are accessed through Ramp D.

These cracks are located on the hinge side of the diaphragm backwall; therefore, the bottom slab at this location is a secondary member. The cracking is likely induced by temperature, shrinkage, or torsional forces.

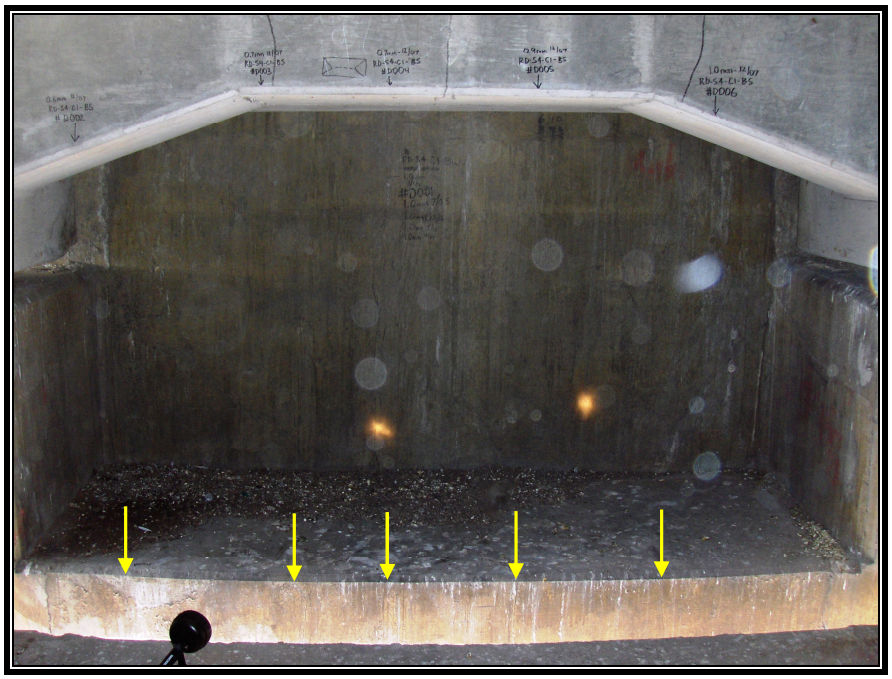


Photo 2-9: Bottom slab at Expansion Joint 9 hinge
(approx. location of cracks shown with yellow arrows)

2.1.3.8 Category D - Cracks in Raised (Stiffened) Bottom Slab

Category D cracks are located in the raised (stiffened) slab in Ramp B (see Photo 2-10). These raised slab areas are located adjacent to web blisters and are most likely present to resist transverse forces from the tendon anchorages. Further analysis and study is required to determine the cause of cracking in these raised slabs.

Photo 2-10: Example of crack in raised bottom slab (Crack #B001 shown)

2.1.4 Crack Growth Comparison

To track the growth rate of each "hot-spot" category and location on the bridge, graphs were developed to show the average increase in width from the March 2004 inspection (see Figures 2-8 and 2-9). This average increase in width was determined by comparing the average crack widths for a given category, segment, or ramp at each inspection. The March 2004 inspection was used as a baseline for the growth comparison, as this was the first year with a nearly complete set of crack measurements. For graphing purposes, any widths that were not recorded on specific inspections between March 2004 and December 2007 were interpolated based on the available data. For the cracks not measured during the Phase 4 inspection, the last available widths were used and no growth was assumed. This has resulted in a flattening of the crack width increase rate between the Phase 3 and Phase 4 inspections. It is expected that this will be corrected after obtaining all crack widths during the Phase 5 inspection. (The Phase 5 inspection will be in an-depth inspection of the entire structure.)

The graphs are not intended to show exact crack growth rates, but to assist in identifying overall crack growth trends. Even though care is taken, crack width measurements may have some degree of error. Inaccurate measurements can possibly be attributed to the following:

- Interpreting crack widths with the feeler gauge is very subjective.
- The repeated use of the feeler gauge may be smoothing the crack interfaces and thus widening the cracks at the surface, therefore resulting in a false reading.
- The crack widths may be dependent on the ambient temperature at the time which the widths were measured, consequently resulting in smaller widths during warmer temperatures and larger widths during colder temperatures. Though previous inspections have occurred at different times of the year, the available data does not yet support or revoke this theory.

In addition, caution should be utilized when drawing conclusions from this information for data sets which have less than 5 cracks, as there may not be enough data to accurately illustrate the trends. This includes Category 11, Category 24, Category C, Category D, and Ramp A.

In analyzing the growth rate of each "hot-spot" category since the 2004 inspection, the following results can be interpreted:

- Category A cracks have grown the most. The average width of cracks in these categories has increased steadily, almost twice the rate of other categories.
- Category 18 cracks are somewhat active.
- Category B and Category 9 cracks have shown relatively little growth.
- Category 22 cracks have not shown any growth.
- Categories 11, 24, C, and D have insufficient data to interpret results.

In analyzing the growth rate of the "hot-spot" cracks per segment or ramp since the 2004 inspection, the following results can be interpreted:

- Cracks in Segment 1 have grown the most; increasing at nearly twice the rate of the other Segments and/or Ramps.
- Cracks in Segment 5 show the least amount of growth compared to the rest of the segments; at almost a quarter of the crack growth shown in Segment 1
- Crack growth in the ramps is generally less than the segments
- Cracks in Ramp D show no crack growth
- Cracks in Ramp A have insufficient data to interpret results.

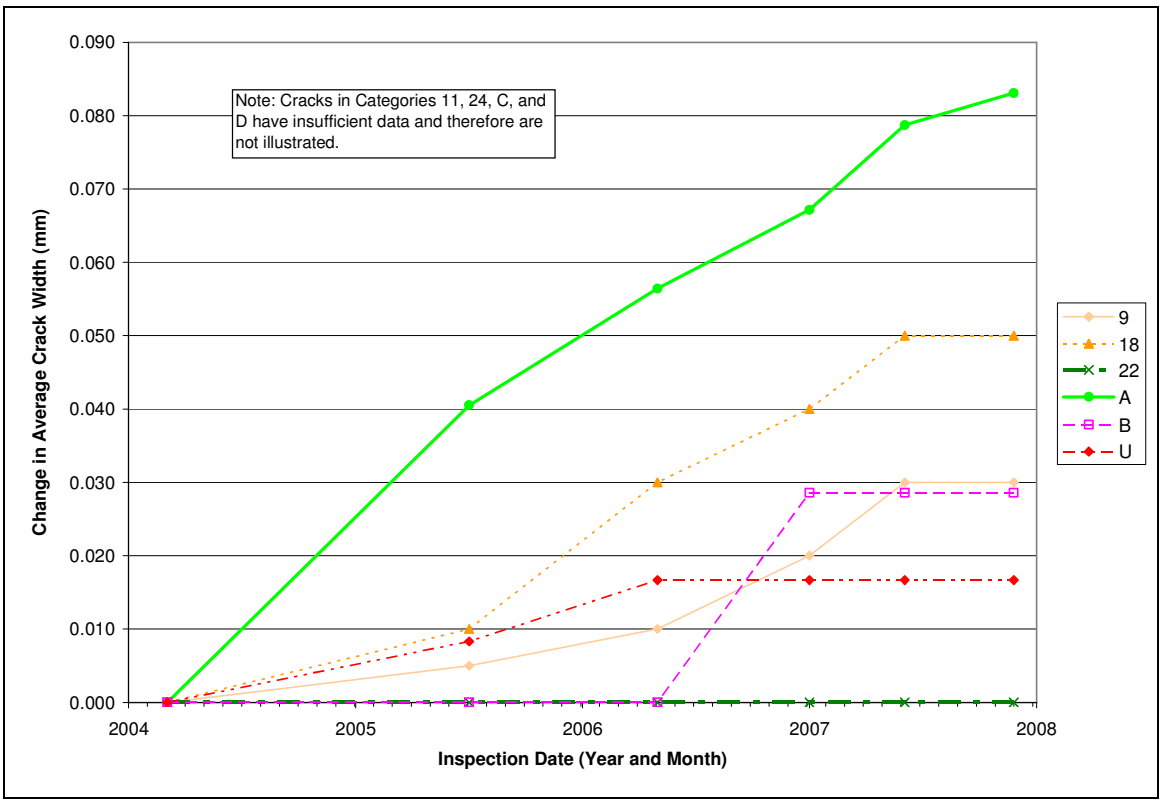


Figure 2-8: Change in average crack widths per category since 2004 inspection.

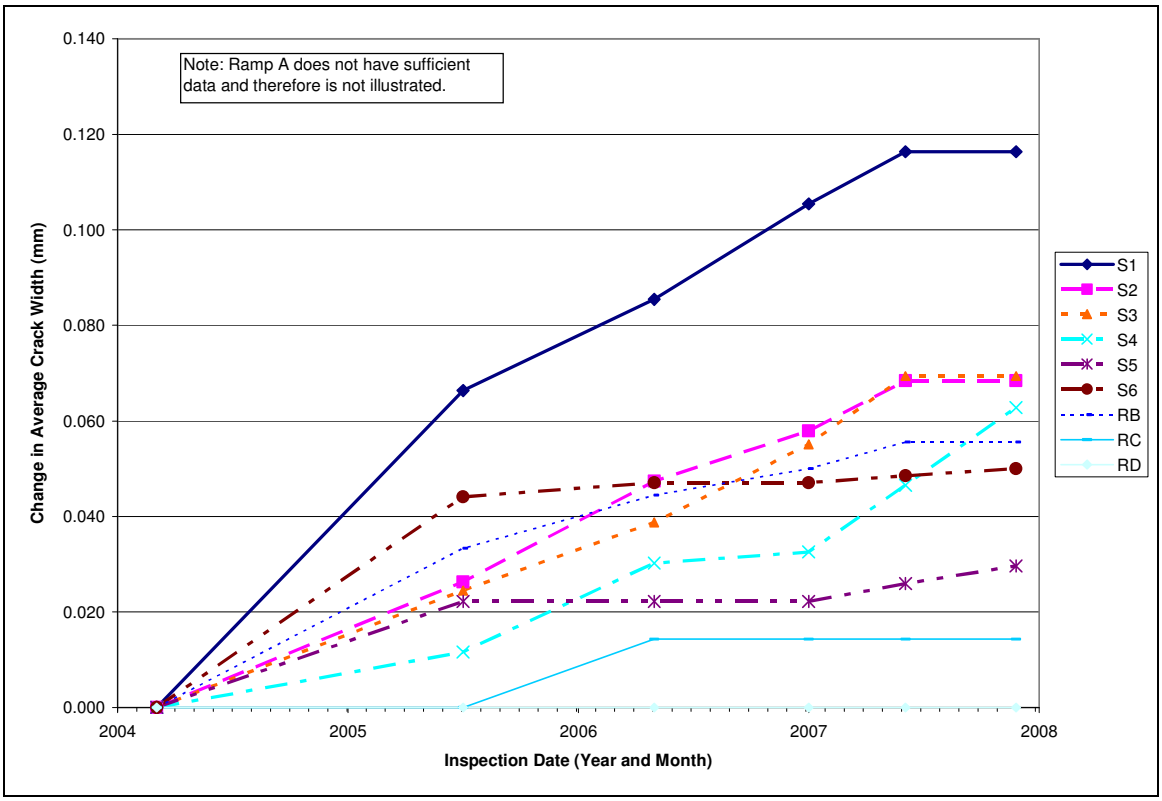


Figure 2-9: Change in average crack widths per segment or ramp since 2004 inspection.

2.1.5 Hot-Spot Crack Gauges

A pilot program was implemented in Phase 4 for more accurately measuring "hot-spot" crack growth. Eight crack gauges were installed at "hot-spot" crack locations which have shown recent growth (see Photo 2-11). These gauges are manufactured by Geotest Instrument Corporation (Part No. C-1940).

Photo 2-11: Installed crack gauge

A protocol was defined for the installation and measurement of these devices. The gauges were attached to the concrete wall over cracks by using a two-part epoxy suitable for concrete and plastics. The wall was preheated to assist in setting the epoxy when the surface temperature was less than 7° C (45° F) (see Photo 2-12). After the epoxy set, pre-installed tape connecting each side of the gauge was cut. A line was scored with a knife on each side of the gauge where a measurement was taken with digital calipers. The surface temperature of the gauge was recorded with an infrared thermometer. Measurements for length and temperature were recorded in millimeters and Celsius, respectively.

Photo 2-12: VSL heating the surface prior to crack gauge installation

The gauge field measurement was adjusted by using the coefficient of linear expansion of the plastic from the measured temperature to 15°C (59°F). Measurements taken during future inspections will likewise be adjusted to this temperature so an equal comparison can be made. The difference between measurements will indicate the difference in crack width between inspections.

The locations and measurements from the Phase 4 installation of these gauges are located in Appendix D.

URS estimates the error in measurement due to human and instrument precision of the digital calipers to be ±0.03mm. The error of the infrared thermometer, according to the manufacturer is ±2°C. This translates into an additional error of ±0.02mm. In the opinion of URS, this amount of error is tolerable in confirming crack growths over 0.10mm. For changes under this threshold, it is difficult to predict if growth is due to actual crack growth or measurement error.

After completion of the field installation, the protocol and instrumentation was discussed and evaluated for improvements. The magnitude of possible errors could be greatly reduced by utilizing more accurate parts and instruments. For example, the *Crack Gauge Plus* (Part No. C-1944) from Geotest Instrument Corporation has a specific location for measuring with the digital caliper. In addition, higher quality calipers and thermometers are available that will provide higher accuracy.

Consideration may be given to studying future crack growth with a series of linear potentiometers and a data acquisition system.

2.2 UNDERSIDE OF TOP DECK INSPECTION

The underside of the top deck was visually inspected in the ramps, Segments 2 and 3, and Span 23 of Segment 6. In Phase 2, the top deck was visually inspected in Segments 4, 5, and 6. Segments 1, 4, 5, and 6 will be inspected/reinspected in Phase 5.

The protocol was changed in Phase 4 to increase documentation and revise procedures and, therefore, the results from this inspection should not be directly compared with Phase 2 inspection results. The top deck inspection in Phase 2 was only a cursory visual assessment. A delamination survey was not performed.

2.2.1 Inspection Procedures

The underside of the top deck was classified into six different categories along the length of each cell. These classifications were made for the worst condition across the entire width of the cell, from web to web. Classifications were generally not made in lengths smaller than two feet. These conditions, along with brief descriptions, are listed below. Example photographs are shown in Figure 2-10.

(1) Clean
- Represents sections that are free of any superficial deficiencies.

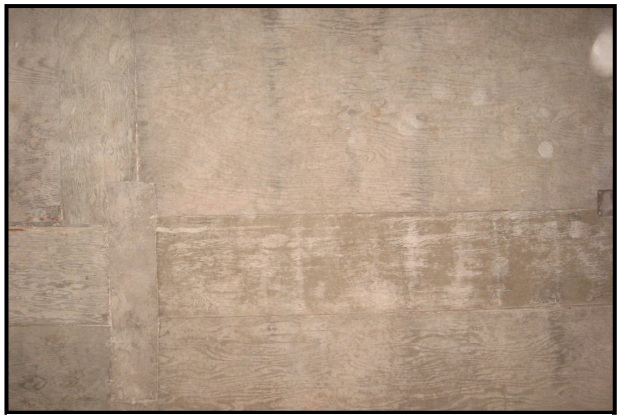
(2) Cracked
- Represents sections that have shrinkage or structural cracks of varying widths. These cracks may be oriented longitudinally, transversely, diagonally, or a combination of each.

(3) Cracked with intermittent (<50%) efflorescence and/or rust staining
- Represents sections that meet the criteria of Condition 2, and in addition, have efflorescence and/or rust staining in sections amounting to less than 50% of the overall length.

(4) Cracked with efflorescence and/or rust staining
- Represents sections that meet the criteria of Condition 2, except that the amount of efflorescence and/or rust staining is greater than 50% of the overall length.

(5) Delaminated
- Represents sections that, when sounded with a hammer, indicate delaminated concrete. Sections with this condition may or may not meet the criteria of the above conditions.

(6) Spalled
- Represents sections that have spalled areas of concrete. Sections with this condition may or may not meet the criteria of the above conditions.

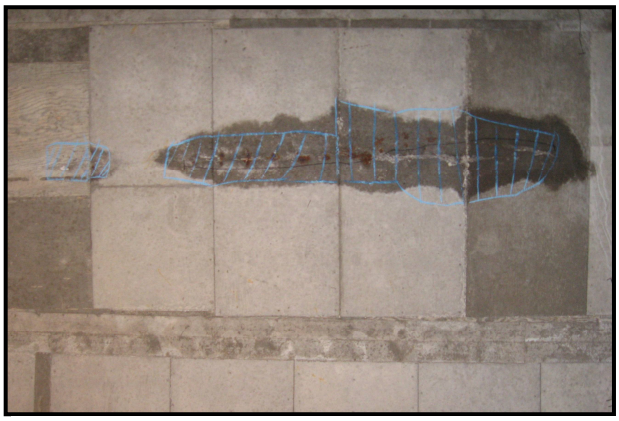


Condition 1
Clean

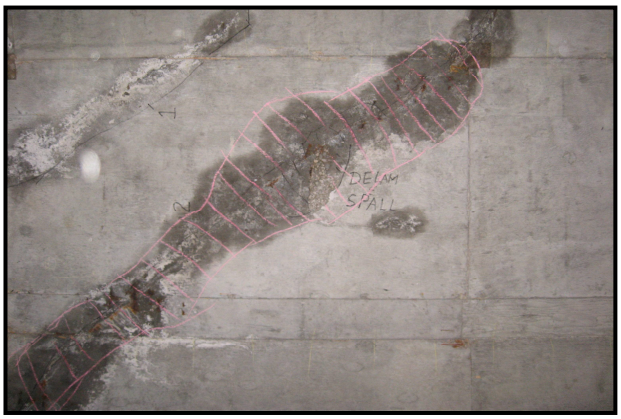
Condition 2
Cracked

Condition 3
Cracked with intermittent (<50%) efflorescence and/or rust staining

Condition 4
Cracked with efflorescence and/or rust staining



Condition 5
Delaminated



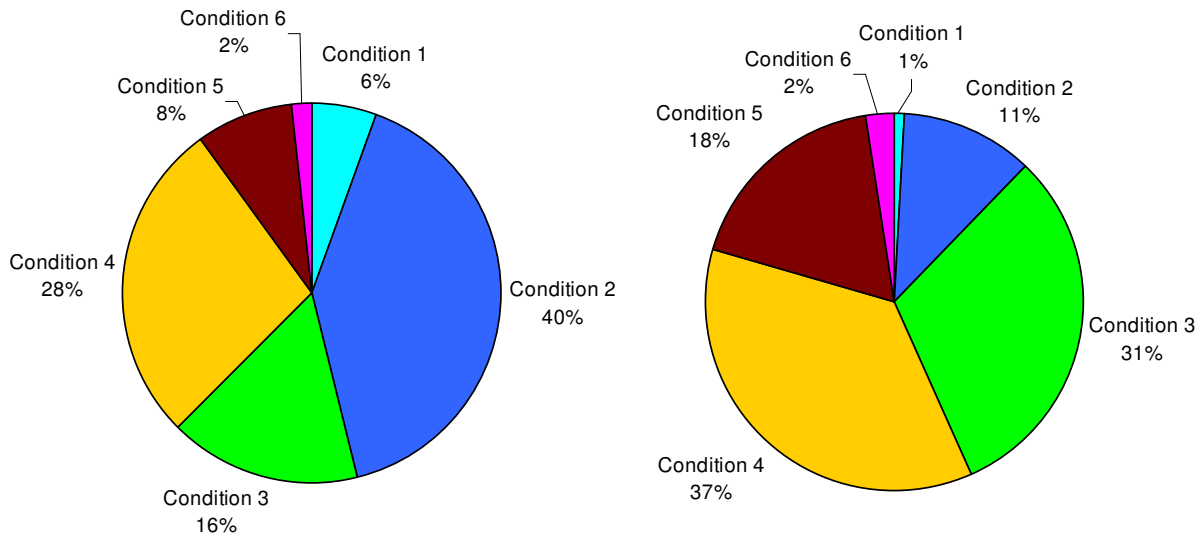
Condition 6
Spalled

Figure 2-10: Example photographs of top slab conditions

2.2.2 Significant Findings

Sketches for each cell-span depicting general cracking, delamination, and spall locations can be found in the supplemental electronic documents, Appendix SD-B. Summary plan sheets for each segment or ramp of the underside of top deck condition is provided in Appendix E.

The inspection of the top deck found the segment spans to be in better condition than the ramp spans. The charts provided in Figure 2-11 illustrate that the segment spans have comparatively large portions of clean (Condition 1) and cracked (Condition 2) areas. Meanwhile, the ramps have large portions of efflorescence and/or rust staining (Conditions 3 & 4) and delaminations (Condition 5) (see Figure 2-12). In both the segments and ramps, water staining accompanies the longitudinal cracking in many locations.



Segment Percentages Ramp Percentages

Figure 2-11: Total condition percentages in segments and ramps.

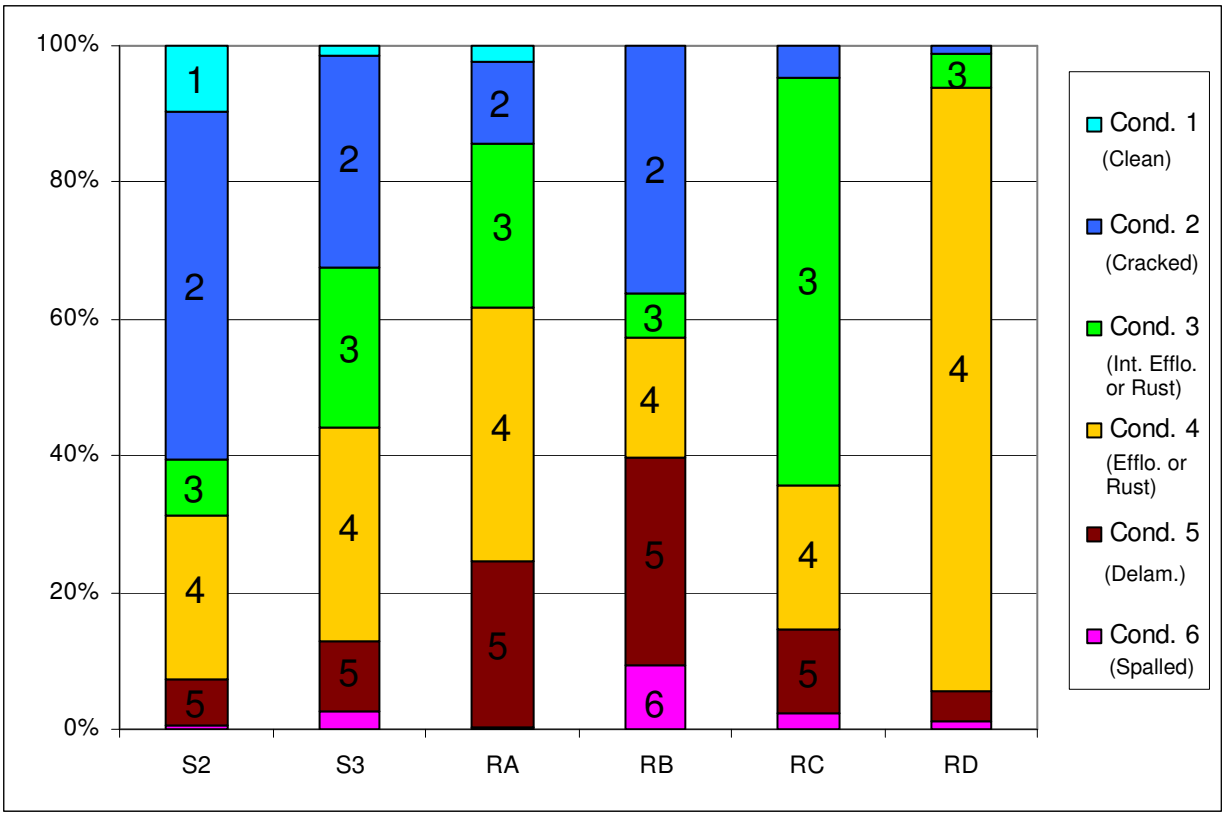


Figure 2-12: Individual condition percentages for each segment and ramp.

Cracking

Most of the cracking (Conditions 2, 3, and 4) found in the top deck was oriented longitudinally and centered transversely along the width of the cells. This type of cracking is likely the result of a combination of shrinkage, temperature, and transverse flexure. Given the small thickness of the deck at the center of the cells compared to the deep haunches over the adjacent webs, it is possible that the cracks are due to excessive positive flexure in the deck spanning between the webs. Present-day post-tensioned concrete bridge design utilizes transverse post-tensioning to prevent this type of cracking.

Though their occurrence is not as common as the longitudinal cracks, transverse cracks were also found during the inspection. Some of these cracks extend the full widths of the cells, while others occupy only portions of the cell widths. Similar to longitudinal cracks, transverse cracks can result from shrinkage and thermal forces, and can also indicate insufficient structural capacity. Because they are located in the top slab, these cracks could indicate a potential overstress due to negative moment forces near the piers. However, in analyzing the locations of the transverse cracks, it is not completely evident that the primary cause of the transverse cracks is negative moment overstress. Although the areas listed below show a moderate amount of transverse cracks adjacent to the piers, several other areas of the bridge have transverse cracking spread throughout the entire lengths of the spans. Some areas of concern with transverse cracks showing potential overstress from negative moment:

- Segment 2 - Cells 3-4 adjacent to Pier 9 and Pier 11
- Segment 3 - Cells 1-4 adjacent to Pier 12
- Segment 3 - Cells 1-2 adjacent to Pier 15

Diagonal cracking was occasionally found adjacent to the pier diaphragms and hinge backwalls. This cracking is most likely the result of the conditions described above for longitudinal cracking. However, the orientation is likely attributed to the top deck configuration changing from a one-way slab to a partial two-way slab at these locations.

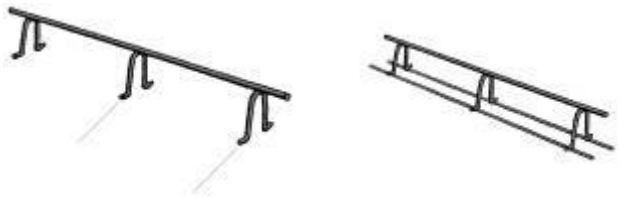
Delaminations and Spalls

Delaminations (Condition 5) found on the underside of the top deck are typically two feet wide and centered transversely along the width of the cells. Spalls (Condition 6) are usually one to two feet wide, generally less than four inches deep, and are also located along the center of the cells. Most of the exposed steel reinforcing bars in the spalled areas have heavy surface rust, with little or no loss of section. Delaminations and spalls generally occur along longitudinal or diagonal cracks in the top slab. The delaminating and spalling was most commonly found adjacent to the diaphragms at the piers and backwalls at the hinges. Some of the top deck areas near the hinges exhibit heavy amounts of delaminating and spalling in concentrated locations. To a lesser extent, these deficiencies were also noted to be widespread throughout the entirety of some spans. Most of the delaminating and spalling has likely occurred due to the corrosion of reinforcing steel which has been exposed to water and chlorides which have penetrated the concrete via cracks in the top slab.

Observations Regarding Steel Reinforcement Chairs

The type of steel chair used to maintain steel reinforcement clearances from the formwork is contributing to some of the deterioration of the top deck and ultimately affecting the structural performance of the top deck due to delaminations and exposure of the bottom mat of steel to corrosive elements. Two different types of chairs for the bottom mat steel were utilized (see Figure 2-13):

Type 1: Chairs with individual tips
Type 2: Chairs with continuous bottom rails (intended to support the upper mat of reinforcing steel).



Type 1 Chair Type 2 Chair

Figure 2-13: Rebar chair types (Illustrations courtesy www.rebarchairs.com)

At locations where the Type 1 chair was utilized, small rust spots were noted at each individual tip in the vicinity of the main longitudinal crack (see Photo 2-13). Current practices specify to

coat the tips of the metal chairs with plastic, hot dip galvanizing, epoxy coating, or another suitable material to prevent this problem.

Photo 2-13: Top deck in Ramp C where reinforcing chairs with tips are utilized

At locations where the Type 2 chair was utilized, moderate to heavy surface rust was noted along the continuous rails on those chairs in the vicinity of the longitudinal cracks (see Photo 2-14). The placement of the continuous rail chairs under the bottom mat of steel has left the rails exposed with little or no concrete cover. The rusting is thus causing moderate superficial delamination and spalling of the top deck around the rails. This type of chair use was noted in Ramp B specifically, but may be present in other sections of the bridge. In Ramp B, the change between chair types coincided directly with the condition of the top deck. The use of the Type 2 chair in Ramp B has resulted in a large amount of delaminated and spalled areas (Conditions 5 and 6). However, it is felt that these delaminated and spalled areas are likely not as deep as those found in other areas of the bridge.

Photo 2-14: Top deck in Ramp B where a Type 2 reinforcement chair was utilized – Note surface rust and adjacent concrete delaminations.

Deck Patches

Concrete deck patches to cover the construction access openings are common in both the segment and ramp spans (see Photo 2-15). Some of these patches were properly finished, whereas others still have the construction formwork left in place. The shrinkage of the newer concrete in the patches has resulted in cracking around the edges, which is often accompanied by efflorescence.

Photo 2-15: Top deck patch location with formwork left in place

2.3 DRAINAGE INSPECTION

The purpose of this inspection was to identify the as-built locations of the drainage system, as modifications were made during construction of the system that are not reflected in the design drawings. The approximate locations and quantities of the drainage pipes, including the inlets and downspouts, were documented throughout the entire superstructure and are provided in Appendix F.

The functional condition of the drainage system was not documented under the assumption that the entire system would be replaced or reconfigured during the rehabilitation. However, a cursory observation reveals that the system is in poor condition. Many deficiencies were observed including leaking pipes, steel corrosion, numerous rust holes, rusted end caps, and clogged pipes.

The approximate total length of drainage pipes and the numbers of scuppers in the superstructure is provided in Tables 2.5 and 2.6. This quantity was derived using rough field measurements and dimensions taken from the design drawings. Therefore, it is believed this quantity is within 5% of the actual quantity.

Table 2-5: Approximate Quantities of Superstructure Drainage

Segment	Pipe Diameter	Total (feet)
Ramp A	6”	800
	8”	250
	10”	0
Ramp B	6”	370
	8”	200
	10”	0
Ramp C	6”	650
	8”	440
	10”	10
Ramp D	6”	190
	8”	300
	10”	10
Segment 1	6”	320
	8”	1620
	10”	430
Segment 2	6”	460
	8”	1560
	10”	200
Segment 3	6”	440
	8”	1750
	10”	0
Segment 4	6”	290
	8”	1340
	10”	0
Segment 5	6”	310
	8”	1190
	10”	0
Segment 6	6”	470
	8”	740
	10”	240
Total of 6” Pipe		4300
Total of 8” Pipe		9400
Total of 10” Pipe		900

Table 2-6: Approximate Number of Scuppers

Segment	Sum of Scuppers
Ramp A	16
Ramp B	7
Ramp C	16
Ramp D	5
Segment 1	34
Segment 2	34
Segment 3	34
Segment 4	23
Segment 5	23
Segment 6	20
Total Sum of Scuppers	212

2.4 BRIDGE INTERIOR CLEANING

To help aid in the inspection efforts of the cell interiors, particularly the bottom slab, it has been proposed to clean the interior of the cells in Phase 5. As an initial part of this effort, an environmental analysis was performed on the particulate matter in the bridge cells to determine if it is considered a hazardous material. Debris was sampled and sent to a laboratory for analysis.

The environmental assessment determined the particulate matter in the bridge is not considered hazardous waste. In addition, it is safe to utilize a pressure washer to clean the bridge and to let the water exit through the drains and openings in the bottom slab which discharge to the ground.

This environmental report is located in Appendix G.

3.0 CONCLUSIONS AND RECOMMENDATIONS

This report summarizes the inspection and evaluation of the Phase 4 inspection. The corrosion evaluation report will be submitted under separate cover. The primary goals of this project are:

- Monitor the bridge for advanced deterioration/corrosion so that immediate corrective action can be taken if needed to maintain public safety.
- Provide the rehabilitation consultant with the basic information required or needed to produce repair plans and construction documents for a comprehensive rehabilitation scheme.

A schedule (see Table 3-1) has been developed to help achieve these goals over the next few phases. The project team will evaluate this planned schedule as the project progresses and make the necessary adjustments to best achieve the outlined goals.

Table 3-1: Future Inspection, Testing, and Analysis Plan

	PHASE	DATE	INSPECTION	TESTING	ANALYSIS
COMPLETED	Phase 1	5/06~9/06	*Segments 1-6, Ramps A~D* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing Low Points, Couplers, and High Points (28 Locations)	• None
COMPLETED	Phase 2	12/06~2/07	*Segments 4-6, Ramps A, C, & D* • "Hot Spot" Cracks • Bottom of Top Slab	• Corrosion Testing at Couplers and High Points (30 Locations)	• Ramp D
COMPLETED	Phase 3	7/07~8/07	*Segments 1-6, Ramps A~D* • Hinges • "Smiley" Cracks *Segments 1~3, Ramp B* • "Hot-Spot" Cracks	• Corrosion Testing of 32 top deck cores • Determine chloride contamination with the use of cores and drill holes in the top deck • Corrosion reading of deck slab reinforcement • Corrosion Test of Reinforcing Steel at a "Smiley" Crack and a hinge	• Ramp D
COMPLETED	Phase 4	Winter '07	*Segments 4-6, Ramps A,C,&D* "Hot-Spot" Cracks	• Determine chloride contamination level through the use of drill hole samples in the underside of the deck	• Longitudinal model
PLANNED	Phase 5	Summer '08	In-Depth Inspection of Entire Mainline and Ramps • Interior • Exterior • Top Deck • Hinges • Substructure	• Evaluation of 30 tendon locations in Segments 1, 2, 3, and Ramps B and D • Bottom Deck Evaluation in Ramps B and D • Pier 7 and Pier 8 Evaluation • Top Deck Evaluation (36 Cores)	• Transverse model
PLANNED	Phase 6	Winter '08	• As-Needed for Rehabilitation	• Tendon Evaluations • Column Evaluations in Ramps A and C • Bottom Deck Evaluation in Ramps B and D	• Evaluate load rating results
PLANNED	Phase 7	Summer '09	• "Hot-Spot" Crack Inspection	• To Be Determined	• Final Report

3.1 "HOT-SPOT" CRACKS

The five bridges are all showing continual degradation throughout each structure, from the substructure to the roadway deck. The "hot-spot" cracks inspected during Phase 4 (those located in Segments 4 ~ 6 and Ramps A, C, and D) have generally shown growth since the initial "hot-spot" inspection.

Sufficient data has been gathered to begin making some conclusions regarding the rate of crack growth in the structure. This will continued to be refined as information is gathered in subsequent inspections.

Cracks in all classifications are growing; however, cracks in the diaphragms due to indirect support (Type A) are growing at the fastest rate. Crack growth has also been observed in every segment and or/ramp, but Segment 1 has shown by far to have the most active cracks. The Segment 1 "hot-spot" cracks with growth are generally Type A cracks.

3.2 "HOT-SPOT" CRACKS – RECOMMENDED STUDY

It is recommended to study the areas around the widest hot-spots to look for a redistribution of stresses or signs of overstress in the structure. A greater understanding of these areas could help identify if a localized failure may occur.

URS recommends performing this at five to ten locations, concentrating on any crack widths above 1.5mm. In this study area, the location of all cracks and structural defects should be traced and noted, regardless of size. The exact extents of this area may be defined in the field, but at a minimum should include walls and/or slabs immediately adjacent to the cracked surface(s). It is recommended that the study area include interior and exterior surfaces.

It is recommended to monitor these areas on a six month basis, however a detailed investigation of crack widths and lengths is only recommended annually.

3.3 "HOT-SPOT" CRACK GAUGES

A pilot program was implemented in Phase 4 to more accurately measure "hot-spot" crack growth. URS installed eight crack gauges on active cracks in the structure. The purpose of this pilot program is to assess the use of the gauges and to make recommendations regarding the installation in future phases.

There is growing concern regarding the accuracy of the measurements determined by the feeler gauge. The repeated use of the feeler gauge may be smoothing the crack interfaces and thus widening the cracks at the surface, therefore resulting in a false reading. In addition, the reading of the feeler gauge is subjective.

However, the use of the crack gauges still introduces error in the measurements, through human and instrument precision. The error due to instrument precision can be reduced by using higher quality instruments and different gauges. In the opinion of URS, if the measurement error is

reduced, these crack gauges will provide more reliable readings than utilizing feeler gauges. The crack gauges are more advantageous because they measure the change in the crack width, rather than the actual crack width. Thus, they can more accurately measure the actual growth of the cracks.

The actual success of the crack gauges cannot be judged until actual crack growth can be measured in the future. Therefore, URS recommends that we continue to install crack gauges on the most active cracks in the structure. Future installations and measurements should be taken with the intent to increase instrument precision as much as possible.

3.4 TOP SLAB

In the current phase, the condition of the underside of the top slab in Segments 2, 3, and the ramps was inspected and documented. Six conditions categories were defined and the condition along the length of the cells was recorded.

The top slabs of the concrete box girders are exhibiting signs of rapid deterioration. Longitudinal cracking is noted throughout the concrete box girders cells, most likely the result of a combination of shrinkage, temperature, and possibly transverse flexure. In many places, rust staining, efflorescence, delaminations, and spalling accompany the cracking. These conditions are attributed to water and chlorides leaching through the deck and causing corrosion of the reinforcing steel. In addition, transverse and diagonal cracking were found at intermittent locations throughout the cells.

This initial inspection shows that the underside of the top slab in the ramps are generally in worse condition than the underside of the deck in Segments 2 and 3. An overall assessment of the underside of the top slab will be made following the inspection of the remainder of the structure in Phase 5.

3.5 LOAD RATING ANALYSIS

URS is in the process of load rating the entire mainline and ramp structures in accordance with AASHTO LRFR (Load and Resistance Factor Rating) criteria. The results from the load rating will aid in guiding the inspection/testing team and determining long term bridge rehabilitation options.

URS is working on finalizing the main longitudinal analytical model, using the program RM Spaceframe. The input of the model geometry, dead load, and live load is near completion. The input of the post-tensioning tendons and construction sequence is complete. Finally, design capacities and rating factors will be determined.

Verification of the longitudinal model using the program TANGO is nearly complete. Performing verification studies of the transverse analysis with the BRUG program is complete.

3.6 CORROSION EVALUATION

Results, conclusions, and recommendations for the corrosion evaluation will be submitted under separate cover.

3.7 REHABILITATION

Mitigating the corrosion occurring in the top slab of the bridge should be addressed in the near future. The testing already performed and the testing to be performed on the top slab during Phase 5 will aide the bridge rehabilitation consultant in developing repair alternatives. Mitigating this corrosion in the top slab as soon as possible is imperative as the top slab is a vital component to the bridge's structural system.

URS recommends addressing two structural deficiencies in the bridge immediately. These are:

(1) Active spalling at top of Piers 7-7' (refer to October 2006 Phase 1 Report by URS Corporation and report by SCS regarding the corrosion evaluation)
(2) Deterioration of Tendon 12 in Ramp D (refer to April 2005 Report by Ken Herceg and Associates)

Item 1 is a "time of the essence" issue that requires a solution to restore the structural integrity as soon as possible. For Item 2, the consequence of full or partial loss of Tendon 12 should be mitigated before it causes future, more significant and expensive problems.

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4.0 REFERENCES

- Corven Engineering, Inc. "Condition Inspection and Maintenance of Florida Post-Tensioned Bridges." New Directions for Florida Post-Tensioned Bridges. Vol. 9. Florida Department of Transportation. 22 Mar 2002 <http://www.dot.state.fl.us/structures/posttensioning/NewDirectionsPostTensioningVol9.pdf>.

- URS Corporation, "Bridge Inspection Report – Phase 1, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", October 2006.

- URS Corporation, "Bridge Inspection Report – Phase 2, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", April 2007.

- URS Corporation, "Bridge Inspection Report – Phase 3, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", February 2008.

The Appendices of this Report

Are not Included

In the Calculation Book

BRIDGE INSPECTION REPORT
PHASE 5 - DRAFT

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

STATE OF INDIANA
DEPARTMENT OF TRANSPORTATION

SEPTEMBER 2008

URS

BRIDGE INSPECTION REPORT
PHASE 5 - DRAFT

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

MAINLINE	**BRIDGE NO. 912-45-2546A**
RAMP A	**BRIDGE NO. 912-45-2546RWXA**
RAMP B	**BRIDGE NO. 912-45-2546RWN**
RAMP C	**BRIDGE NO. 912-45-2546RENA**
RAMP D	**BRIDGE NO. 912-45-2546REX**

PREPARED FOR:

STATE OF INDIANA

DEPARTMENT OF TRANSPORTATION
OFFICE OF TECHNICAL SERVICES
BRIDGE INSPECTION SECTION

SEPTEMBER 2008

PREPARED BY:

URS

SENIOR INSPECTING ENGINEER
URS CORPORATION

xx/xx/2008
DATE

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SUPPLEMENTAL ELECTRONIC DOCUMENTS
SD-A "Hot-Spot" Crack Inspection (Table, Photos, and Sketches)
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DISCLAIMER

This inspection report is based on data and conditions that are generally applicable as of September 2008 and the conclusions and recommendations herein are therefore applicable only to that timeframe. This inspection was not intended to be a complete arms-length inspection, therefore findings and conclusions in this report are limited to specific areas of the bridge as defined in the scope of work. While this report understandably will serve as a tool for future work, it should not be used as the sole basis for final design, construction or remedial action, or as a basis for major capital decisions. Additionally, further studies including a complete load rating analysis and additional testing of the post-tensioning system and top deck are planned and could have an impact upon future decisions.

1.0 INTRODUCTION

1.1 GENERAL

In accordance with an agreement with the Indiana Department of Transportation (INDOT), URS Corporation (URS) conducted the Phase 5 full in-depth inspection of the post-tensioned box girder spans of the S.R. 912 (Cline Avenue) bridge and ramps over the Indiana Harbor Canal and Riley Road. This inspection included a full in-depth inspection of the entire mainline and ramps. A summary of the scope of the inspection is provided in Section 1.2. The following firms were subcontracted for this inspection:

- Siva Corrosion Services (SCS) was utilized by URS for an evaluation of the top deck, bottom deck, tendons, and Piers 7 and 8.

- VStructural LLC (VSL) was utilized for inspection and testing support and to provide general post-tensioning expertise.

1.2 SCOPE OF WORK

As part of an agreement between INDOT and URS, a scope of work was defined for the Phase 5 inspection of the S.R. 912 Cline Avenue Bridge over the Indiana Harbor Canal. This scope of work defined the level of inspection and testing to be performed.

A pre-inspection meeting was held on Thursday, May 15, 2008, via telephone conference. This meeting provided a forum to discuss and clarify the scope, schedule, safety concerns, goals and other pertinent aspects of the inspection by the stakeholders in this endeavor.

The project team amended the scope of work in progress, to include a full in-depth inspection of the entire mainline, ramps, and substructure. This was commenced in Phase 5 in order to provide information to the rehabilitation team in an expeditious manner.

The complete scope of work and pre-inspection meeting minutes are attached in Appendix A. A summary of the scope of work, as amended by the pre-inspection meeting, is provided below:

- Prepare relevant field data sheets
- Re-inspect “Hot-Spot” Crack and document findings (entire mainline and ramps)
- Inspect all interior and exterior webs, exterior bottom slab, and diaphragms (entire mainline and ramps)
- Inspect interior of bottom slab (Segments 1, 2, and ramps)
- Inspect underside of top deck (Segments 1, 4, 5, and 6)
- Inspect accessible hinge areas
- Inspect top deck (entire mainline and ramps)
- Inspect all bearing and substructure units
- Perform corrosion evaluation for tendons in thirty locations
    - Field testing will include measurement of:
        - Moisture content

        - Grout pH
        - Corrosion potentials
        - Corrosion rate
    - Laboratory testing will include:
        - Chloride content
        - pH
        - Moisture content
        - Documentation of corrosion stains
        - Density and porosity
        - Air void size and distribution
        - Characterization of the cement past phase
        - Cement paste chemistry using EDS
        - Water-cement ratio
        - Cement hydration
        - Petrographic analysis
- Perform corrosion evaluation on the underside of the top deck of Ramp B and D
    - Select areas in two spans of both ramps based upon spalling, efflorescence, cracked areas without efflorescence or spalling, and areas with no cracking
    - Perform delamination survey
    - Locate steel reinforcement and measure concrete cover
    - Expose a small section of reinforcement where necessary
    - Measure electrical continuity of rebars within test area
    - Collect concrete samples from rebar exposure process
    - Drill and collect a maximum of five concrete samples at the rebar depth at each test area
    - Perform half-cell potential survey to identify active areas of corrosion
    - Perform corrosion rate test at the most active location of each test area
    - Repair areas that were exposed for testing
    - Define time-to-corrosion initiation
    - Define the remaining life of the deck
    - Identify suitable corrosion protection systems
- Perform corrosion evaluation on Pier 7 and 8
    - Take chloride samples every five feet along the downspout face of Column 2 and 4 of Pier 7 and one column on Pier 8
    - Locate rebar using GPR
    - Perform compressive strength test on concrete taken from bottom of Pier 7 – Column 4 and one column on Pier 8
- Obtain gunite samples from two different sections of the bridge and perform Petrographic analysis
- Perform corrosion evaluation on thirty-six cores taken from the top deck
    - Select areas located in the middle of the driving lane, at crack free areas of the deck, and three feet from any tendon
    - Perform delamination survey
    - Drill and collect concrete samples
    - Measure concrete cover
    - Measure coating damage

  - Determine chloride content
  - Perform chloride diffusion analysis on a minimum of five samples
- Continue load rating analysis
- Prepare analysis and reports
  - Draft inspection report
  - Final report and recommendations

1.3 REPORT

This *Bridge Inspection Report*, prepared by URS, adheres to the scope of work as amended by the pre-inspection meeting held on May 15, 2008.

Updated - The format for the Phase 5 report is a revised version of the format employed for the inspection reports submitted for Phases 1, 2, and 3. This new format of the report includes information regarding the scope of work for the current phase, inspection and testing findings, and brief recommendations. This report should be used in conjunction with these previous reports for general information. Background information is only presented if it is has been altered or was not previously presented. The corrosion report will be submitted under separate cover.

1.4 INSPECTION PERSONNEL

Updated -

The inspection was performed by URS Corporation with the assistance of several subconsultants/subcontractors. Primary inspection personnel consisted of:

1.4.1 URS Corporation

- Dallas Montgomery, PE
  Qualified NBIS Team Leader who has completed NHI "Fracture Critical Inspection Techniques for Steel Bridges" course.
- Craig Klusman, PE
  Qualified NBIS Team Leader
- Travis Baker, EIT
- John Harstad, EIT
- Rachel Katchmar
- Kyle Moelker
- Blair Ellison, PS
- Steve Heyl, PS

1.4.2 Siva Corrosion Services (SCS)

- Siva Venugopalan
- Joe Kish
- Stewart Mundth

1.4.3 VStructural LLC (VSL)

- Bruce Osborn
- Alex Davenport
- Gary Stevens
- Fred Hedrick

1.5 INSPECTION PERIOD

Updated, but VSL and SCS help needed -

• URS full in-depth inspection of interior cracks	06/23/08-07/30/08
• URS full in-depth inspection of substructure	07/31/08-08/22/08
• URS full in-depth inspection of exterior superstructure using mark IV and V Snooper	08/11/08-09/19/08
• Top-side of top deck inspection	08/11/08-09/10/08
• VSL support services	05/11/07-3/12/08

1.6 BACKGROUND INFORMATION NOT SPECIFIC TO PHASE 5

The intent of this section is to provide general information pertaining to the project that is not specific to current phase, but has been added or updated since the previous phase(s).

1.6.1 Access on Private Property

Portions of Segment 1, including Pier 7, are on the property of Mittal Steel. (However, the access hatch for Segment 1 is accessible without entering the property of Mittal Steel). Permission must be granted from Mittal Steel before entering their property.

Segments 2 and 3 are located on the property of Kemiron, an industrial chemical manufacturer whom utilize hazardous gases. Prior to entering their property, each individual was required to view a safety training video concerning possible hazards and safety precautions. Kemiron utilizes a siren to warn of gas leaks and wind socks to aide in determining at which designated location personnel should assemble if a leak occurs.

Access to Segment 6 and Ramp B is located on the property of BP-Amoco. Access to the bridge is through a MARSEC U.S. Coast Guard security area. Prior to entering their property all inspection personnel were required to attend a four-hour training class concerning rules, regulations, hazards and safety precautions. After passing an exam about the contents of the training, each individual was assigned a tag to wear while on BP-Amoco's property.

1.6.2 Coding System

General plan drawings provided in Appendix B provide segment, span, pier, cell and web numbering for the mainline and ramp structures. Segment, ramp, and pier designations match the titles provided in the original design drawings. Span, cell, and web designations were added for ease of reference.

1.6.2.1 Superstructure

The coding system, developed during the 2004 inspection by Ken Herceg and Associates, is being used for the consistent location of specific superstructure bridge defects and inspection areas. The format of this coding system is as follows:

S# (Segment) or R# (Ramp) – C# (Cell) – S# (Span) or (P#) Pier - *Location*,

where *Location* can be one of the following:

- US – Looking upstation at diaphragm
- DS – Looking downstation at diaphragm
- W# - Web number
- TS - Top slab
- BS - Bottom slab
- BW - Backwall
- TD - Transition diaphragm

For example, S1-C2-P6-US, describes looking upstation at the diaphragm at Pier 6 in Cell 2 of Segment 1.

1.6.2.2 Hinges

Each corbel was labeled H#-B# according to location. H represents the hinge or expansion joint number. B represents the bearing number. The bearings were numbered looking up station from left to right. Typically, Bearings 1-4 are on the eastbound bridge, and Bearings 5-8 are on the westbound bridge. Example: At the hinge between segments 5 and 6 and the 5th bearing in from the left would be labeled as H8-B5.

1.6.2.3 Substructure

In Phase 5, an additional coding system was developed for the consistent location of specific substructure bridge defects and inspection areas. The format of this coding system is as follows:

P### (Pier) – *Location*

Where *Location* can be one of the following:

- C(x) – Column Number(s)
- F – Footer
- B – Brace

2.0 VISUAL INSPECTION

The Phase 5 inspection included a full in-depth inspection of the superstructure, substructure, and top deck surfaces. While previous inspections have focused on measuring and monitoring "Hot-Spot" cracks in the superstructure (see Section 2.1.2.2), this in-depth inspection was conducted to better assess the overall condition of the bridge. An effort was made to not only document cracks meeting the "Hot-Spot" criteria, but to inspect the structure for any signs of structural cracking, as well as other concrete deficiencies such as delaminating and spalling.

To perform the inspection, inspectors used hammers and a chain drag to sound the concrete and tape measures, feeler gauges, and survey wheels for measuring. Wherever possible, the deficiencies found were traced with permanent marker such that they may be located during the following inspections. Photos of notable deficiencies were also taken.

For note taking, pre-made forms were developed which provided inspectors a scaled outline of each critical bridge area. Deficiencies were documented on these forms according to their size and location. Previously found deficiencies were also included on the forms, allowing inspectors to easily compare data between inspections.

2.1 SUPERSTRUCTURE (WITHOUT TOP DECK)

2.1.1 Inspection Procedures

2.1.1.1 Interior Inspection

Inspectors accessed the interior of the superstructure through hatches on the bottom slab which were reached with 60', 80', 120', and 125' man-lifts. To light the interior of the cells, floodlights were powered from extension cords connected to generators on the ground. Inspectors also used head-lights and flashlights to increase visibility. Ladders were used inside the cells as needed.

The webs, diaphragms, blisters, and anchorages were visually inspected for deficiencies. The bottom slabs in Segments 1 and 2 as well as the Ramps were visually inspected for cracks and spalls and sounded for delaminations.

2.1.1.2 Exterior Inspection

Inspectors accessed the exterior of the superstructure with a 125' man-lift, Mark IV Snooper, and Mark V Snooper. The webs and bottom slabs were visually inspected for deficiencies. In addition to photographing notable deficiencies, pictures were also taken of the cell webs directly above the piers.

2.1.1.3 Hinge Inspection

Accessible hinges are accessed through manholes from an aerial lift or a man-lift. Access is limited to only one side of each bearing. It is not possible to perform an arms-length inspection of both sides of the bearing and corbel and portions of the backwall.

2.1.2 Significant Findings

2.1.2.1 Cracking

To help organize the location, orientation, and physical attributes of cracks on the Cline Avenue Bridge, a crack classification system was adopted from the *New Directions for Florida Post-Tensioned Bridges Volume 9, Condition Inspection and Maintenance of Florida Post-Tensioned Bridges* by the Florida Department of Transportation (FDOT). A copy of this publication can be found on the CD submitted with this report and online by using the link provided in the references. This publication classifies typical cracks found on post-tensioned bridges into 31 types (Category 1-31) and provides descriptions and likely causes for each category. URS created additional categories (Category A-D) for cracks on the Cline Avenue Bridge which could not easily be classified into one of the 31 categories. The remaining cracks are unclassified (Category U). The following sections provide brief descriptions and photographs of each type of crack.

To decide on the proper category, URS utilized engineering judgment in combination with the location, orientation, and physical attributes of each crack. The fundamental cause of cracking in any concrete specimen is due to the fact that at some point a loading was applied that exceeded the concrete's tensile capacity. These loadings or stresses could be caused by a combination of forces, such as dead load, live load, shrinkage, temperature, wind, tendon forces, anchorages, and/or residual stresses created during the construction process. Further study and/or detailed structural analysis beyond the scope of this inspection will be necessary if a more precise classification (and thus cause) of the cracking is desired.

2.1.2.1.1 Category 9 – Shear Crack in Web

Category 9 describes inclined shear cracks found in the web of the post-tensioned girders. They generally occur near the ends of a span in regions near the supports (usually less than one-quarter of the span of a member). Shear cracks may be isolated or may occur at intervals along the web. In prestressed (and post-tensioned) structures with no vertical post-tensioning, shear cracks are typically inclined less than 45 degrees to the horizontal and rising towards mid-span (see Figure 2-1). They are often initiated once the principle stress in the web exceeds the tensile capacity of the concrete. They may continue to grow as straining occurs in the reinforcing steel.

This type of cracking can be significant to corrosion protection of draped post-tensioning in the web since it permanently breaches the tendon path.

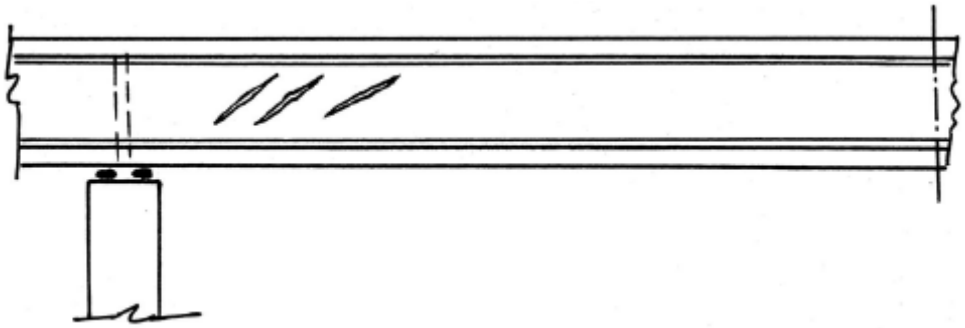


Figure 2-1: Typical Category 9 inclined shear cracking (Ref. Corven Engineering)

In the Cline Avenue Bridge shear orientated cracks were found on both interior and exterior surfaces. This cracking most often occurred in the cantilever spans, namely in Spans 10, 13 (Cell 5), and 14 of Segment 3, and in Span 18 of Segment 5 (see Photo 2-1). Shear orientated cracking is also concentrated near Piers 13-13' in Span 11 of Segment 3, where a transition is made from 2 to 3 cells.

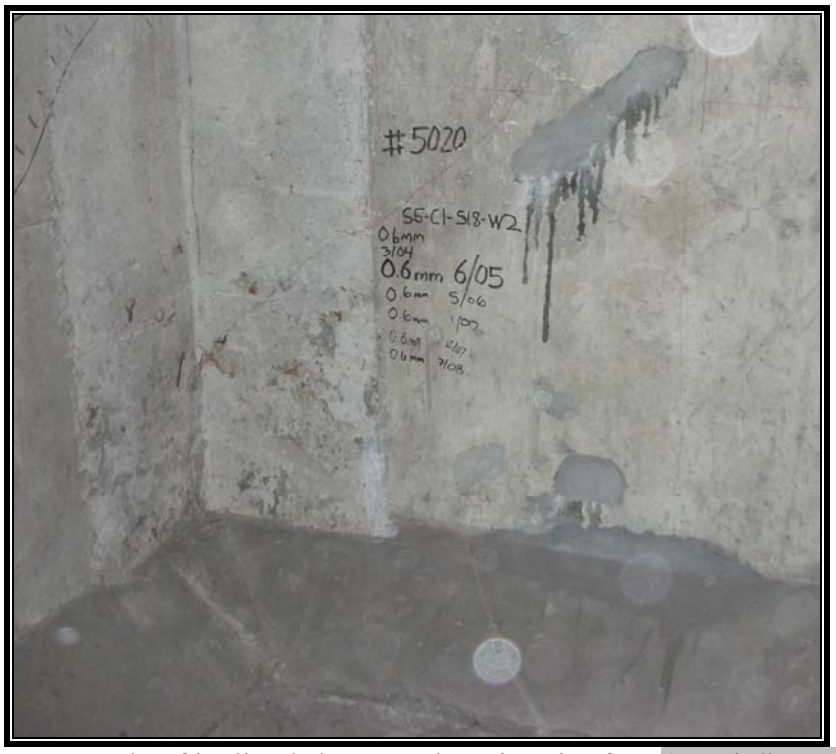


Photo 2-1: Example of inclined shear crack on interior face (Crack #5020 shown)

2.1.2.1.2 Category 11 - Crack in Anchorage or Blister

Category 11 cracks are generally categorized as localized cracks at the anchor block which are structural in nature. They may be caused by concentrated forces from the tendon anchor bearing on the concrete (see Figure 2-2), strut-tie action, or from bending of the element adjacent to the blister. These cracks generally have the following characteristics:

- Anchor block cracks may be of any width, but are generally narrow and of limited length (several inches to about a foot).
- Cracks may extend a short distance from the end of the anchor block along the center of the tendon path (i.e. a splitting crack – similar to driving a wedge lengthwise into a log).
- Cracks may propagate from the corners of the anchor bearing plate, flaring at an angle to the tendon path when viewed from the side, from above or below.
- Cracks may also propagate from the center or corners of an anchor plate laterally across the width of the anchor block when viewed from the end (i.e. looking along the tendon).
- Cracks from one anchor may propagate and join with those from an adjacent anchor when there is a group of anchors together.

During the initial tensioning phase, cracks in anchor blocks should be arrested and contained by local reinforcing within the anchor block, blister or diaphragm containing the anchor(s).

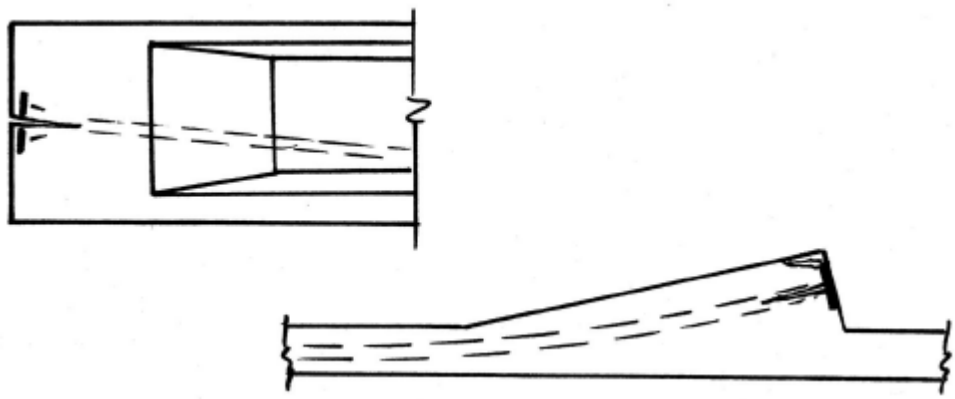


Figure 2-2: Typical Category 11 cracking in anchorages (Ref. Corven Engineering)

In the Cline Avenue Bridge, these cracks occur throughout the bridge and are most notable in Segments 2 and 3 on top of a web blister and a diaphragm (see Photo 2-2) and at the end of a web anchorage blister in Ramp B.

Photo 2-2: Category 11 crack in diaphragm (Crack #2104 shown)

2.1.2.1.3 Category 18 - Longitudinal Crack along Path of Internal Tendon in Web

These longitudinal cracks which are along the path of an internal tendon (see Figure 2-3) generally have the following characteristics:

- A crack along the path of an internal tendon, draped in a web, may occur at any location, be of any length and of any width – sometimes as wide as 0.7 mm or more.
- It usually is initiated by a design or construction defect – such as a badly installed duct with too much wobble, a duct crushed locally by too tight of reinforcing, lack of web width or a local weakness in the web itself (low strength concrete, void, honeycomb, etc).
- Occasionally, a longitudinal crack along the path of a tendon in a web may have an associated delamination or spall (see Photo 2-3). A spall might significantly weaken a web, locally.

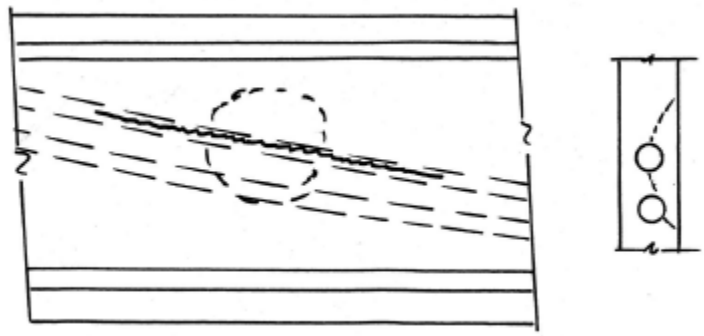


Figure 2-3: Typical longitudinal crack along path of tendon in web (Ref. Corven Engineering)

Photo 2-3: Delamination in the web

Although such cracks and spalls may not necessarily be structurally significant, they breach the concrete cover, opening the tendon duct and strands to water and/or salts.

In the Cline Avenue Bridge this type of cracking is prevalent throughout the structure (see Photo 2-4).

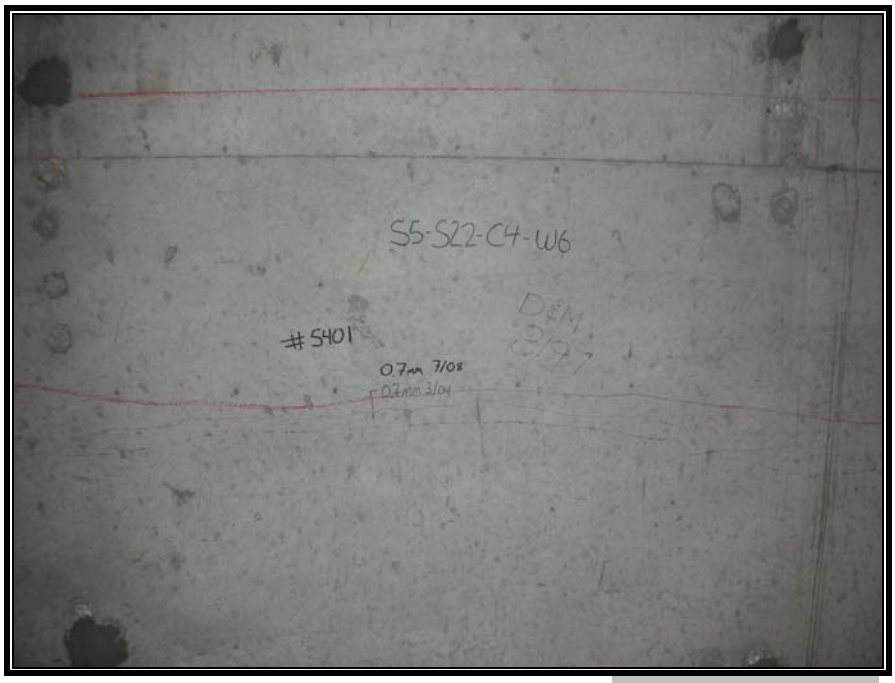


Photo 2-4: Typical Category 18 crack in web (Crack #5401 shown)

2.1.2.1.4 Category 22 - Crack in Dapped Hinge Zone

Cracks in dapped hinges usually follow a 45 degree path from the corner of the hinge. These cracks may be attributed to strut-tie action and can become significant if insufficient tie reinforcing is provided. The crack path may be steeper if there is any effective longitudinal prestress in the hinge zone. Cracks in dapped hinges can occur in any type of structure, i.e. box sections or I-girders.

In some structures, (e.g. boxes) the crack pattern may be more widespread and complex, particularly if the bearings in the hinge zone are offset transversely to the line of the webs without adequate transverse stiffening.

The key to preventing cracks in such hinges is to provide the right amount and disposition of effective post-tensioning to compress the concrete - supplemented with mild steel reinforcement to contain the post-tensioning bursting forces and local bearing effects.

The Cline Avenue Bridge utilizes two different hinge configurations:

(A) Bearings at corbels supported from diaphragms at each side of a mainline to mainline hinges
(B) Bearings supported from thickened webs at each side of a mainline to ramp, or ramp to ramp hinge.

The numbering of expansion hinges joints, in accordance with the expansion joint numbering shown on the design drawings, and type of hinge utilized is shown in Table 2-1.

Table 2-1: Hinge Locations and Type in Cline Avenue Bridge

Expansion Hinge	Cantilever Side	Supported Side	Hinge Type
2	Segment 2	Segment 1	A
3	Segment 3	Segment 2	A
4	Segment 3	Ramp A	B
5	Segment 3	Segment 4	A
6	Segment 4	Ramp C	B
7	Segment 5	Segment 4	A
8	Segment 6	Segment 5	A
9	Segment 6	Ramp D	B
C	Ramp C	Ramp C	B

Type A Hinge

At the mainline to mainline expansion joint hinges, corbels are suspended from the backwall of the diaphragm on the cantilever span (see Figure 2-4). A bearing rests on the cantilever span corbel which supports a corbel connected to the supported span diaphragm backwall. Generally there is a corbel for each web; however the bearings are offset transversely to the line of the webs. Cheek walls in line with the exterior of the webs hide the bearing/corbel assemblies from outside of the structure. (The alignment of these cheek walls often give the appearance to the passer-by that the structure is "falling" due to lack of support at the hinges.) In addition, a bottom slab connects each suspended span corbel.

At Type A hinges, cracks were found propagating from near the corner of the bearings (see Figure 2-4).

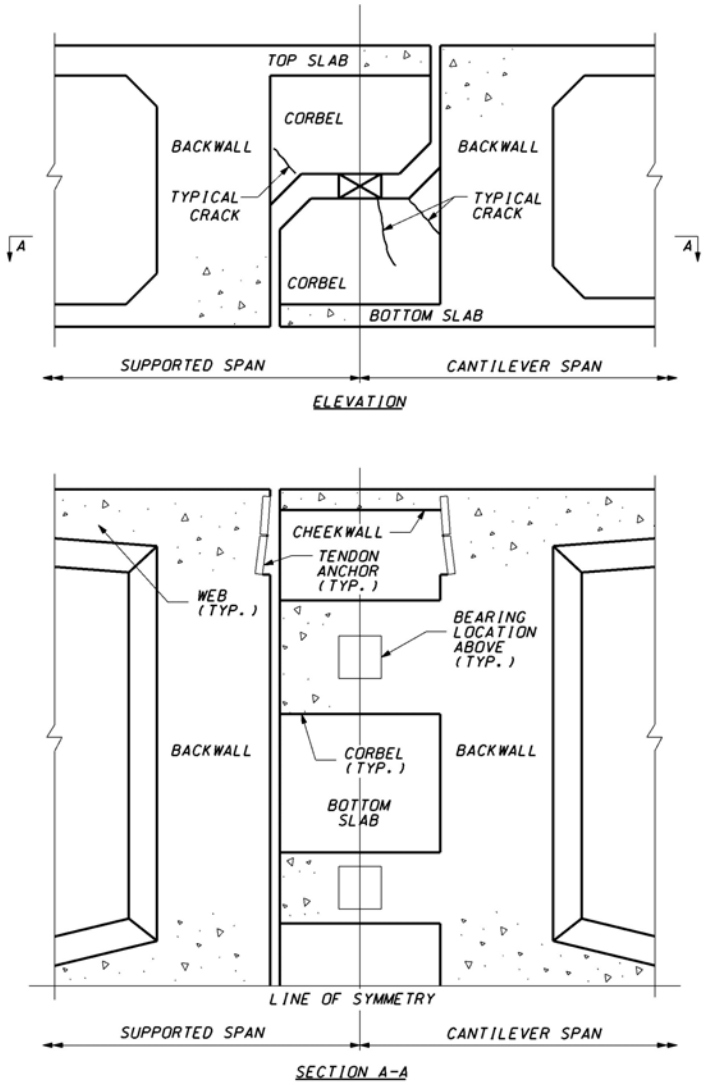


Figure 2-4: Type A hinge connection

Type B Hinge

At the mainline-to-ramp and ramp-to-ramp hinges, the bearings are supported from a thickened dapped web (see Figure 2-5). The use of a diaphragm is present at these locations; however, it is often only a partial diaphragm and is not used for direct transfer of the load between the web and the bearing. This type of connection is used at all locations where a single cell unit is supporting another single cell unit.

Cracking at Type B hinges typically extends from the corner, as showing in Figure 2-5.

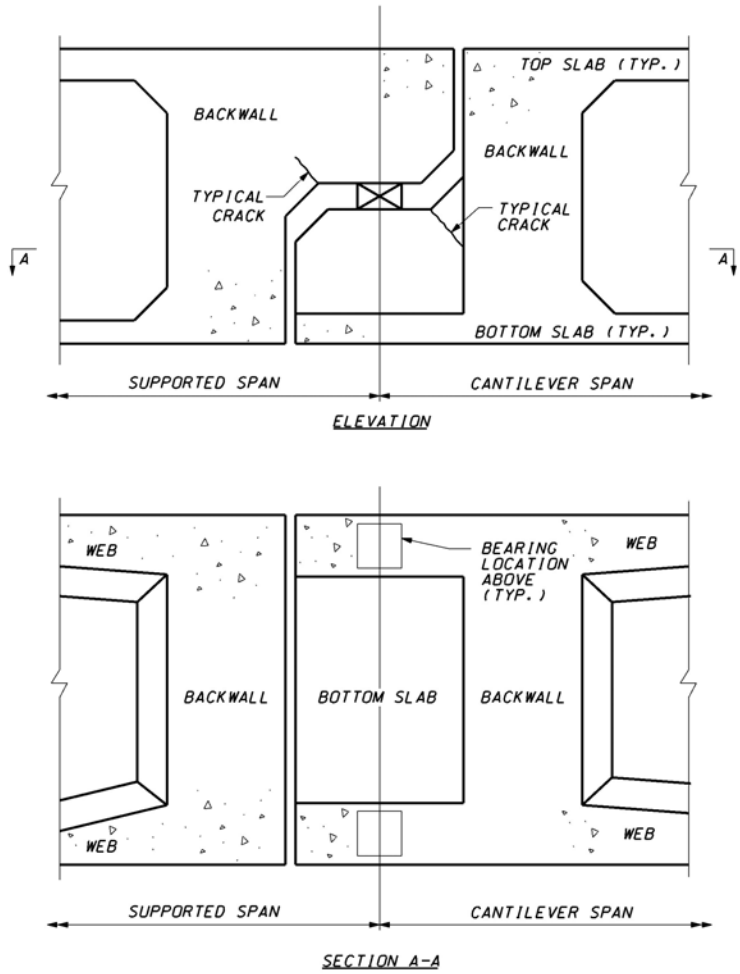


Figure 2-5: Type B hinge connection

Category 22 cracking

Category 22 cracking is present at the majority of the hinges in the Cline Avenue Bridge. An example of type of cracking found at Expansion Joint 7 is shown above in Figure 2-4. This cracking is similar to cracking found at other mainline to mainline expansion joints. Though this cracking is less than 0.3mm in width, it is of concern due to its orientation and location. The observed cracking is generally orientated at about 45° and perpendicular to the main reinforcing steel. In addition, the potential of water and salt infiltration from the expansion joint area puts the load carrying mild steel at risk from chloride infiltration. The surfaces of the hinge area have been treated with an epoxy sealer; however, this has been compromised at cracked areas.

Hinge cracks are present throughout the bridge and are typically seen with the same orientation and in the same general locations. A typical type B hinge crack at Expansion Joint 4 can be seen in Photo 2-5.

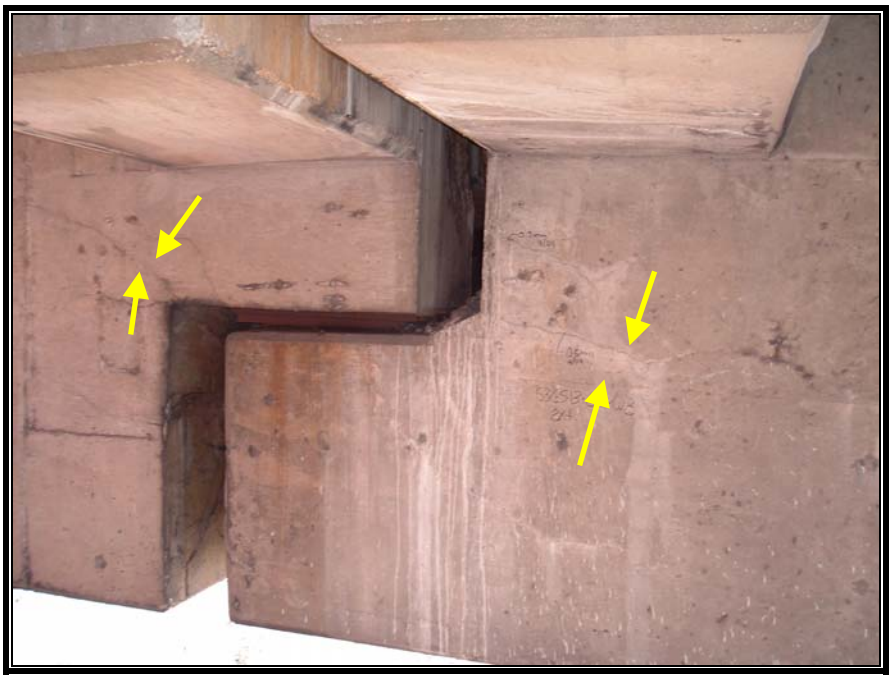


Photo 2-5: Typical hinge cracking (shown with yellow arrows) at Expansion Joint 4 hinge between Segment 3 and Ramp A

The joint was leaking at time of the inspection. In addition, heavy saturated debris was covering the entire bottom slab area between corbels at most hinges. Debris from the top deck was covering the top of corbels. Birds have found the hinges as an escape from weather and predators.

2.1.2.1.5 Category 24 - Crack Across Slab or Web Due to Anchorage

Category 24 describes local cracks that occur at or near to the anchorage end of a blister in a web or slab (see Figure 2-6). They are induced by tensile effects from the anchor forces, transmitted by shear lag to the slab or web. Cracking may occur at a single anchor blister even if the slab is appropriately reinforced. The likelihood of Category 24 cracking is much greater if there are multiple blisters located in close proximity.

These cracks might open avenues for water to get into any tendons contained in a top or bottom slab. Similar cracks located solely on the underside of a top slab or interior surface of a web would not necessarily present a risk.

The cracks are usually permanent. Since they are induced by load effects, they are structural. However, the effects that cause them (anchor forces) tend to reduce with time due to losses. Consequently, such cracks, if small and narrow, may not be a significant structural concern.

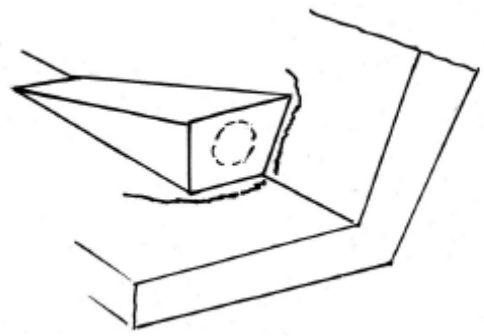


Figure 2-6: Local crack across slab or web at anchor end of blister (Ref. Corven Engineering)

In the Cline Avenue Bridge, this type of cracking can be subdivided into two types:

(A) Cracking found through the end of an anchorage blister
(B) Cracking found in the web above web blisters.

Category 24, Type A cracking was typically found in web blisters directly below the tendon anchorages. Blisters are a widening of the web (or slab) in which tendon anchorages are located. These cracks sometimes extended into the adjacent web or along the side of the blister. This type of cracking was generally noted in Segments 1, 2, and 5 (see Photo 2-6).

Photo 2-6: Typical Category 24, Type A cracking at end of web blister anchorage zone (Crack #1061 shown)

Category 24, Type B cracking, generally found in Segment 3, is located in the web directly above web blisters along the bottom slab (see Photo 2-7). Typically, this type of cracking begins near the bottom slab or blister, extends towards the middle of the span and terminates near the top slab.

Photo 2-7: Typical Category 24, Type B cracking in web above blister anchorage zone (Crack #3022 and #3023 shown)

2.1.2.1.6 Category A and B - Cracks Due to Indirect Support

In post-tensioned bridges, the ideal position of support bearings is directly underneath the center of the webs. In the Cline Avenue Bridge mainline spans, the bearings are offset from the webs and the load is transferred through the diaphragms at the piers. The lack of proper mild steel reinforcement or post-tensioning is likely leading to shear cracking in the pier diaphragms (Category A crack). The diaphragm cracking may result in “smiley” cracking occurring in the adjacent webs (Category B cracks). Both types of cracking are termed “cracking due to indirect support”.

Category A cracking is found throughout the mainline structures. Typically, the diaphragm cracks are orientated at approximately 45 degrees, originating near the bottom slab at the center of the diaphragm and terminating at the corner between the diaphragm and web (see Photo 2-8). At many locations, the cracks run thru the access holes. Some of these cracks extend into either the top slab, bottom slab, and/or the web. The diaphragm cracks are up to 1.8 mm in width.

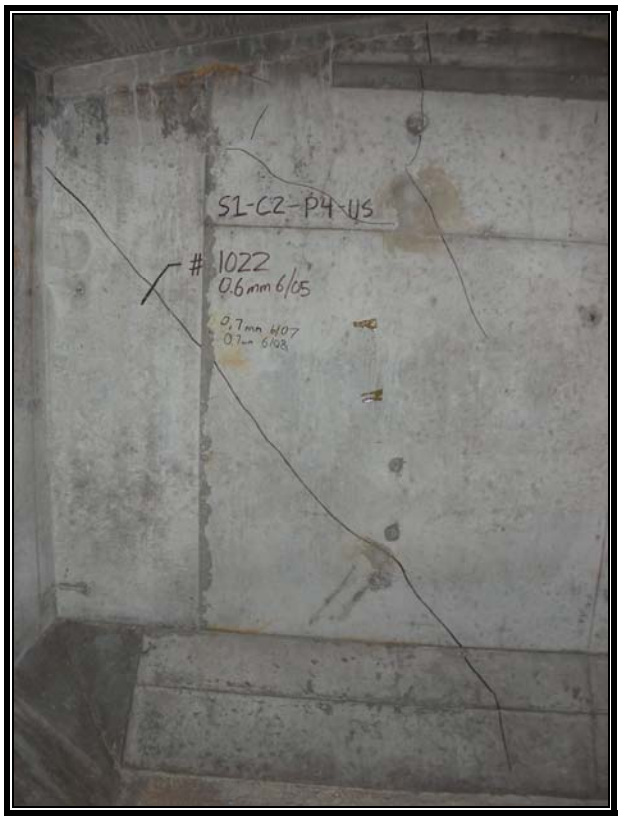


Photo 2-8: Typical orientation of Category A cracking in diaphragms
(Crack #1022 shown)

These cracks are most typically noted on interior diaphragm surfaces; however, they are present at the unusual configuration of the Pier 7 diaphragm (see Photo 2-9). At Pier 7, four columns support a continuous diaphragm through the three box girders. Columns are located directly below exterior cells (Cells 1 and 3) and between the exterior cells and the interior cell (Cell 2). Therefore, a bearing is not located directly below Cell 2 and all load is transferred by the diaphragm. Category A cracks are present on this exterior diaphragm.

Photo 2-9: Category A cracks on exterior diaphragm (Cracks #1602 and #1603)

Category B cracks are located in Segments 1 and 3 (see Photo 2-10). These cracks are generally noted on exterior surfaces; however, interior web cracks may be classified as Category B.

Photo 2-10: Exterior web cracking possibly due to indirect support (Segment 1, Piers 7-7').

2.1.2.1.7 Category C - Longitudinal Crack through Bottom Slab

Category C cracks are longitudinal cracks in the bottom slab located at the hinge at Expansion Joint 9 (see Photo 2-11). The cracks are located on the Segment 6 side of the hinge; however, they are classified as "Ramp D" since they are accessed through Ramp D.

These cracks are located on the hinge side of the diaphragm backwall; therefore, the bottom slab at this location is a secondary member. The cracking is likely induced by temperature, shrinkage, or torsional forces.

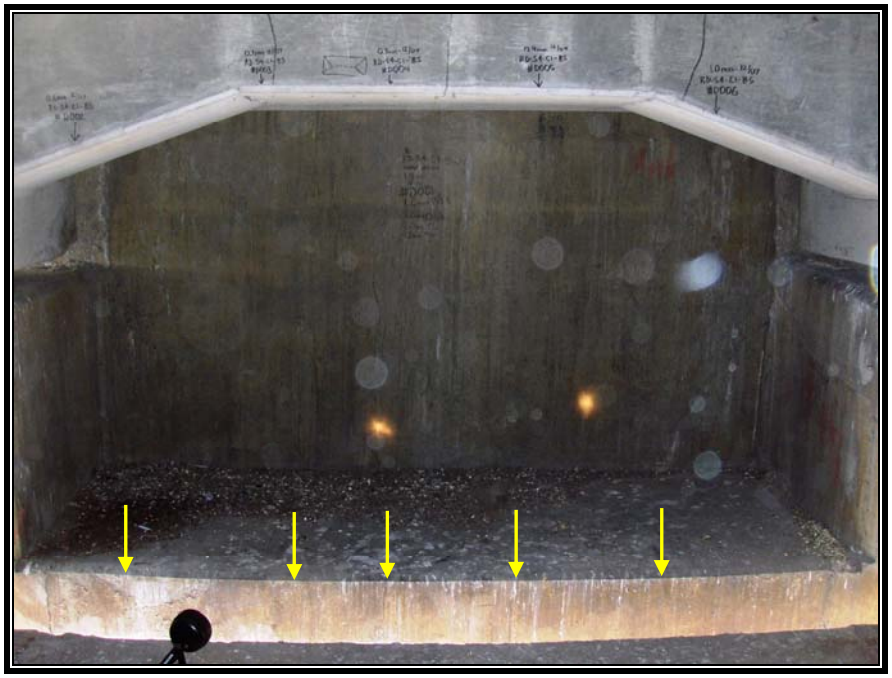


Photo 2-11: Bottom slab at Expansion Joint 9 hinge
(approx. location of cracks shown with yellow arrows)

2.1.2.1.8 Category D - Cracks in Raised (Stiffened) Bottom Slab

Category D cracks are located in the raised (stiffened) slab in Ramp B (see Photo 2-12). These raised slab areas are located adjacent to web blisters and are most likely present to resist transverse forces from the tendon anchorages. Further analysis and study is required to determine the cause of cracking in these raised slabs.

Photo 2-12: Example of crack in raised bottom slab (Crack #B001 shown)

2.1.2.2 "Hot-Spot" Cracks

2.1.2.2.1 Introduction

The previous inspections of the Cline Avenue Bridge have been focused on what have come to be known as "Hot-Spot" cracks. These cracks have been of particular concern due to various reasons including the size, growth rate, location, and orientation of the cracks. Throughout the previous inspections, cracks have been added and removed from the "Hot-Spot" list based on various criteria. The "Hot-Spot" criteria for the Phase 5 superstructure inspection has been updated as follows:

- Interior/Exterior Crack Width ≥ 0.5mm
- Hinge Corbel Shear Crack Width ≥ 0.1mm

For tracking purposes, the "Hot-Spot" cracks have been assigned a four-character designation. The first character designates the segment or ramp where the crack is located and the reaming three characters are the numerical designation for the specific crack (i.e. "5002" indicates a "Hot-Spot" crack in Segment 5 that was the second crack to be numbered.).

Beginning with the Phase 2 inspection, the "Hot-Spot" inspection schedule was revised to inspect cracks on an annual basis which differs from the originally specified six-month interval.

Consequently, only the "Hot-Spot" cracks in designated portions of the structure are inspected in each inspection phase. Table 2-2 below shows the history of hot-spot inspections.

Updated - Table 2-2: "Hot-Spot" Inspection History

	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**	**Phase 5**
Segment 1	√		√		√
Segment 2	√		√		√
Segment 3	√		√		√
Segment 4	√	√		√	√
Segment 5	√	√		√	√
Segment 6	√	√		√	√
Ramp A & S3-C5-S11	√	√		√	√
Ramp B	√		√		√
Ramp C	√	√		√	√
Ramp D	√	√		√	√
Exterior	√		√		√

2.1.2.2.2 Inspection Procedure

In addition to checking the widths and lengths of all existing "Hot-Spot" cracks, all new suspect "Hot-Spot" cracks were measured using a feeler gauge. Cracks meeting the "Hot-Spot" criteria were assigned a number and the largest width along the crack was documented on the concrete and dated. Photographs of all "Hot-Spot" cracks were taken and include the crack's written documentation on the concrete.

2.1.2.2.3 "Hot-Spot" Crack Comparison

The complete detailed list of "Hot-Spot" cracks and a plan view drawing detailing their locations are provided in Appendix C. An electronic file of the "Hot-Spot" crack table included in the Supplemental Electronic Documents has links for the photograph and sketch for each crack. The total number of "Hot-Spot" cracks per segment or ramp is shown in Table 2-3.

Table 2-3: Total Number of "Hot-Spot" Cracks per Segment or Ramp

Segment 1	90
Segment 2	59
Segment 3	131
Segment 4	50
Segment 5	41
Segment 6	48
Ramp A	3
Ramp B	4
Ramp C	5
Ramp D	9

TOTAL	440

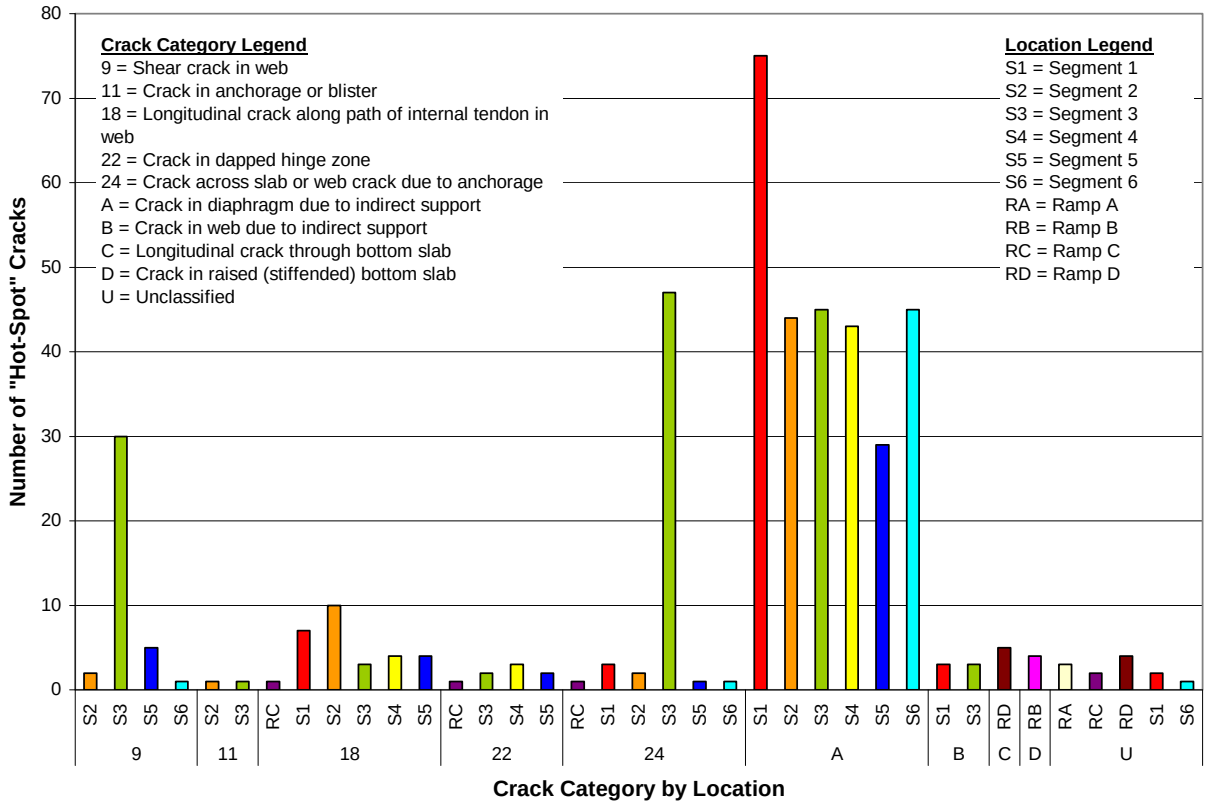
Category A cracks are most prevalent throughout the bridge. In Phase 4, 194 Category A cracks were considered "Hot-Spot" cracks. In Phase 5, 281 Category A cracks are considered "Hot-Spot" cracks (see Table 2-4).

Updated - Table 2-4: Number of "Hot-Spot" Cracks per Category

Post-Tensioned Concrete Crack Classifications		**Number of Cracks**
Category	**Description**	
9	Shear crack in web	38
11	Crack in anchorage or blister	2
18	Longitudinal crack along path of internal tendon in web	29
22	Crack in dapped hinge zone	8
24	Crack across slab or web due to anchorage	55
A	Crack in diaphragm due to indirect support	281
B	Crack in web due to indirect support	6
C	Longitudinal crack through bottom slab	5
D	Cracks in raised (stiffened) bottom slab	4
U	Unclassified	12
TOTAL		440

Segment 1 has almost twice as many 'Category A' cracks as any other section of the bridge. Category 9 and 24 cracks are mostly found in Segment 3. A complete list of crack category by location can be found in Figure 2-7.

Updated - Figure 2-7: "Hot-Spot" crack classification by ramp or segment location



2.2 TOP DECK INSPECTION

2.2.1 Underside of Top Deck Inspection

The underside of the top deck was visually inspected in Segments 1, 4, 5, and 6. In Phase 4, the top deck was visually inspected in Segments 2, 3, and ramps.

The protocol was changed in Phase 4 to increase documentation and revise procedures and, therefore, the results from this inspection should not be directly compared with Phase 2 inspection results. The top deck inspection in Phase 2 was only a cursory visual assessment. A delamination survey was not performed.

2.2.1.1 Inspection Procedures

Inspectors accessed the interior of the superstructure with a man-lift. Scaffolding was used when necessary for proper ergonomics while inspecting the underside of top deck. The underside of top deck was visually inspected and sounded for deficiencies. Cracks and delaminations were traced with permanent marker and a movie was taken using the video capabilities of the digital camera.

The underside of the top deck was classified into six different categories along the length of each cell. These categories were made for the worst condition across the entire width of the cell, from web to web. Categories were generally not made in lengths smaller than two feet. These conditions, along with brief descriptions, are listed below. Example photographs are shown in Figure 2-8.

(1) Clean
- Represents sections that are free of any superficial deficiencies.

(2) Cracked
- Represents sections that have shrinkage or structural cracks of varying widths. These cracks may be oriented longitudinally, transversely, diagonally, or a combination of each.

(3) Cracked with intermittent (<50%) efflorescence and/or rust staining
- Represents sections that meet the criteria of Condition 2, and in addition, have efflorescence and/or rust staining in sections amounting to less than 50% of the overall length.

(4) Cracked with efflorescence and/or rust staining
- Represents sections that meet the criteria of Condition 2, except that the amount of efflorescence and/or rust staining is greater than 50% of the overall length.

(5) Delaminated
- Represents sections that, when sounded with a hammer, indicate delaminated concrete. Sections with this condition may or may not meet the criteria of the above conditions.

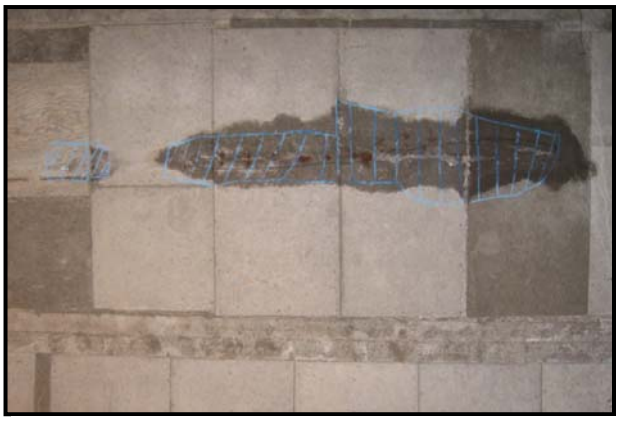
(6) Spalled
- Represents sections that have spalled areas of concrete. Sections with this condition may or may not meet the criteria of the above conditions.

Condition 1
Clean

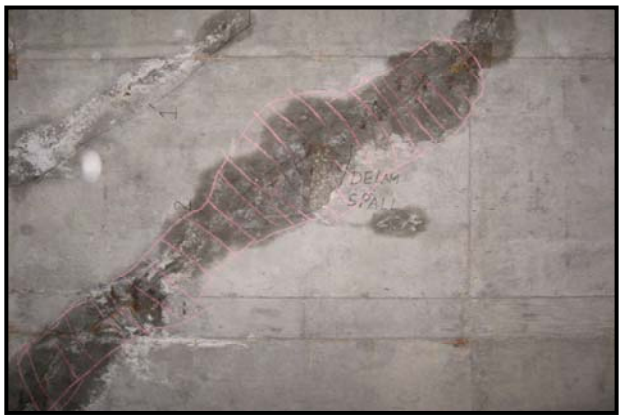
Condition 2
Cracked

Condition 3
Cracked with intermittent (<50%) efflorescence and/or rust staining

Condition 4
Cracked with efflorescence and/or rust staining



Condition 5
Delaminated



Condition 6
Spalled

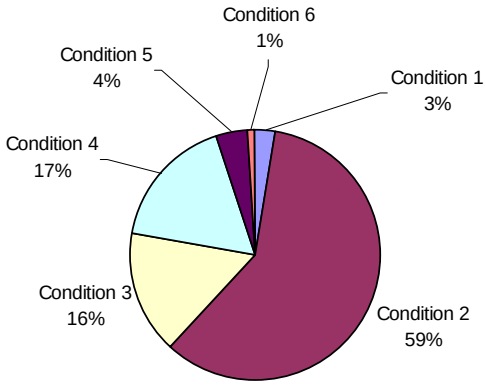
Figure 2-8: Example photographs of bottom of top slab conditions

2.2.1.2 Significant Findings

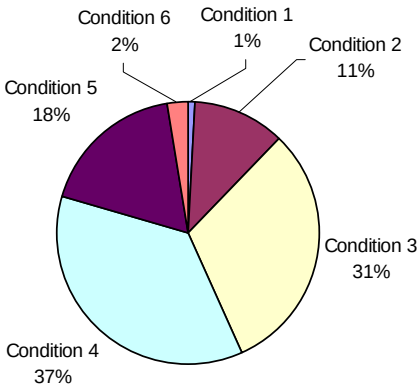
2.2.1.2.1 Cracking

Sketches for each cell-span depicting general cracking, delamination, and spall locations can be found in the supplemental electronic documents, Appendix SD-B. Summary plan sheets for each segment of the underside of top deck condition are provided in Appendix E.

The inspection of the top deck found the segment spans to be in better condition than the ramp spans. The charts provided in Figure 2-9 illustrate that the segment spans have comparatively large portions of clean (Condition 1) and cracked (Condition 2) areas. Meanwhile, the ramps have large portions of efflorescence and/or rust staining (Conditions 3 & 4) and delaminations (Condition 5) (see Figure 2-10). In both the segments and ramps, water staining accompanies the longitudinal cracking in many locations.



Segment Percentages



Ramp Percentages

Figure 2-9: Total condition percentages in segments and ramps.

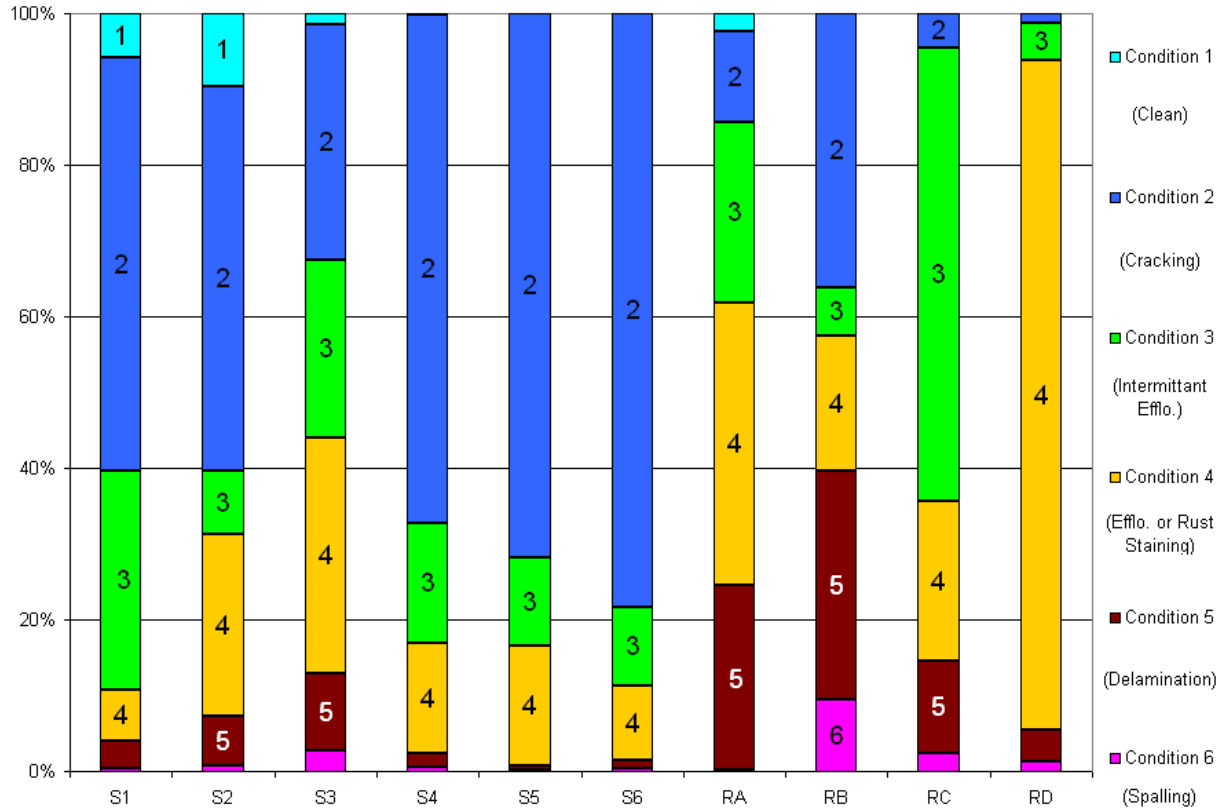


Figure 2-10: Individual condition percentages for each segment and ramp.

Most of the cracking (Conditions 2, 3, and 4) found in the top deck was oriented longitudinally and centered transversely along the width of the cells. This type of cracking is likely the result of a combination of shrinkage, temperature, and transverse flexure. Given the small thickness of the deck at the center of the cells compared to the deep haunches over the adjacent webs, it is possible that the cracks are due to excessive positive flexure in the deck spanning between the webs. Present-day post-tensioned concrete bridge design utilizes transverse post-tensioning to prevent this type of cracking.

Though their occurrence is not as common as the longitudinal cracks, transverse cracks were also found during the inspection. Some of these cracks extend the full widths of the cells, while others occupy only portions of the cell widths. Similar to longitudinal cracks, transverse cracks can result from shrinkage and thermal forces, and can also indicate insufficient structural capacity. Because they are located in the top slab, these cracks could indicate a potential overstress due to negative moment forces near the piers. However, in analyzing the locations of the transverse cracks, it is not completely evident that the primary cause of the transverse cracks is negative moment overstress. Although the areas listed below show a moderate amount of transverse cracks adjacent to the piers, several other areas of the bridge have transverse cracking spread throughout the entire lengths of the spans. Some areas of concern with transverse cracks showing potential overstress from negative moment:

- Segment 1 - Cell 1 adjacent to Pier 5
- Segment 1 - Cell 2 adjacent to Pier 7
- Segment 4 - Cell 2 adjacent to Pier 18 and Pier 19
- Segment 4 - Cell 3 adjacent to Pier 18 and Pier 19
- Segment 5 - Cell 1 adjacent to Pier 22, 23, and 24
- Segment 5 - Cell 2 adjacent to Pier 22 and Pier 23
- Segment 5 - Cell 3-4 adjacent to Piers 20, 21, 22, 23, and 24
- Segment 6 - Cell 1 adjacent to Pier 108
- Segment 6 - Cell 2 adjacent to Pier 25, 26, and 27
- Segment 6 - Cell 3 adjacent to Pier 26
- Segment 6 - Cell 4-5 adjacent to Pier 25, 26, 27, 28, and 29

Diagonal cracking was occasionally found adjacent to the pier diaphragms and hinge backwalls. This cracking is most likely the result of the conditions described above for longitudinal cracking. However, the orientation is likely attributed to the top deck configuration changing from a one-way slab to a partial two-way slab at these locations.

2.2.1.2.2 Delaminations and Spalls

Delaminations (Condition 5) found on the underside of top deck are typically two feet wide and centered transversely along the width of the cells. Spalls (Condition 6) are usually one to two feet wide, generally less than four inches deep, and are also located along the center of the cells. Most of the exposed steel reinforcing bars in the spalled areas have heavy surface rust, with little or no loss of section. Delaminations and spalls generally occur along longitudinal or diagonal cracks in the top slab. The delaminating and spalling was most commonly found adjacent to the diaphragms at the piers and backwalls at the hinges. Some of the top deck areas near the hinges exhibit heavy amounts of delaminating and spalling in concentrated locations. To a lesser extent, these deficiencies were also noted to be widespread throughout the entirety of some spans. Most of the delaminating and spalling has likely occurred due to the corrosion of reinforcing steel which has been exposed to water and chlorides which have penetrated the concrete via cracks in the top slab.

2.2.2 Top of Top Deck Inspection

2.2.2.1 Inspection Procedures

Lane closure permits were issued for one lane at a time. Inspectors walked along the lane closure documenting any deficiency across the lane closure. The middle lane was visually inspected from the lane closure for any deficiencies. Suspect areas were sounded for delaminations. The deficiencies were stationed along the length of the bridge.

Deficiency conditions along the topside of the top deck throughout the entire lane closure were identified and classified into five different categories. Each deficient section's worst deficiency was documented. Classifications were generally not made in lengths smaller than two feet. These conditions and corresponding brief descriptions are listed below. Example photographs are shown in Figure 2-11.

(1) Clean
- Represents sections that are free of any superficial deficiencies.

(2) Longitudinal Cracks
- Represents sections that have longitudinal shrinkage or structural cracks of varying widths.

(3) Transverse Cracks
- Represents sections that have transverse shrinkage or structural cracks of varying widths.

(4) Curved or Diagonal Cracks
- Represents sections that have curved or diagonal shrinkage or structural cracks of varying widths.

(5) Delaminated
- Represents sections that, when sounded with a chain drag or hammer, indicate delaminated concrete. Sections with this condition may or may not meet the criteria of the above conditions.

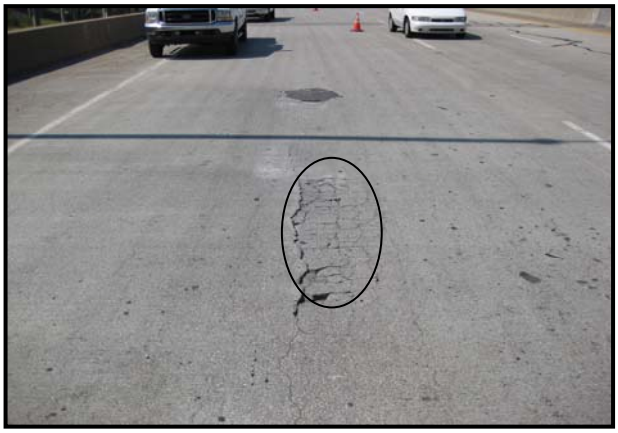
(6) Spalled
- Represents sections that have spalled areas of concrete. Sections with this condition may or may not meet the criteria of the above conditions.

Condition 1
Clean

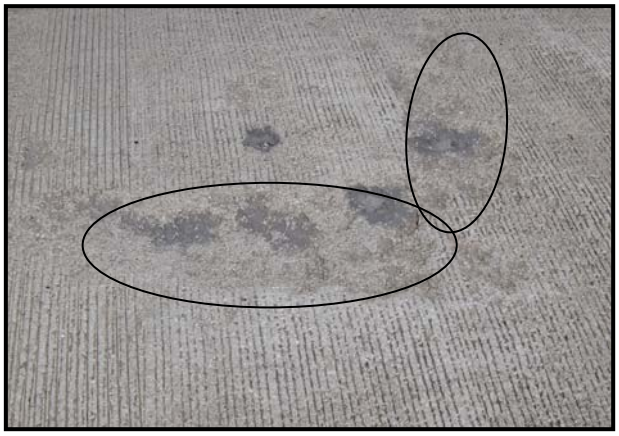
Condition 2
Longitudinal Cracks

Condition 3
Transverse Cracks

Condition 4
Diagonal or Curved Cracks



Condition 5
Delaminated



Condition 6
Spalled

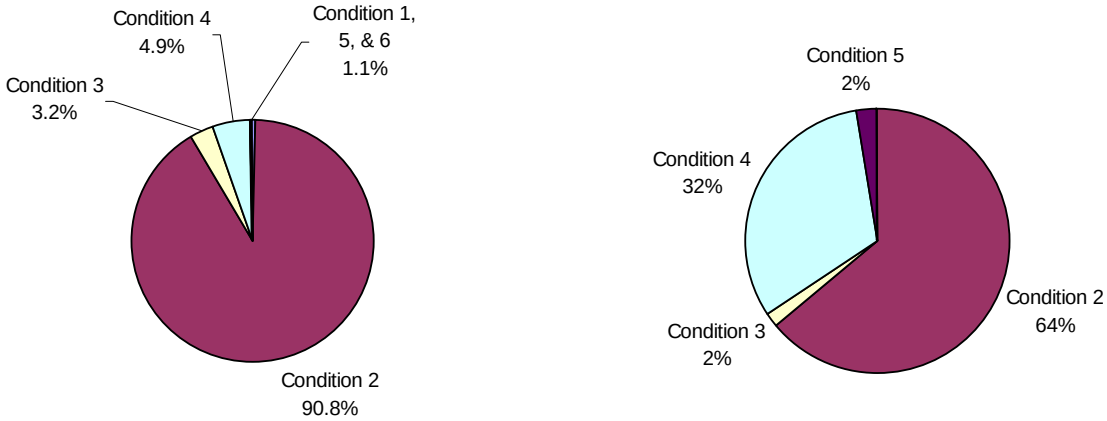
Figure 2-11: Example photographs of top of top slab conditions (outlined)

2.2.2.2 Significant Findings

2.2.2.2.1 Cracking

Sketches for each cell-span depicting general cracking, delamination, and spall locations can be found in the supplemental electronic documents, Appendix SD-B. Summary plan sheets for each segment of the topside of top deck condition are provided in Appendix E.

Inspection of the top deck found segment spans to be in better condition than ramp spans. Figure 2-12 chart illustrates that segment spans have comparatively large portions of cracked (Condition 2) areas. Additionally, ramps have relatively larger portions of delaminations (Condition 5). In both segments and ramps, longitudinal cracking is present throughout the bridge. Ramp A has comparatively more transverse cracking (Condition 4) than other ramps (see Figure 2-13).



Segment Percentages Ramps Percentages

Figure 2-12: Total condition percentages in segments and ramps.

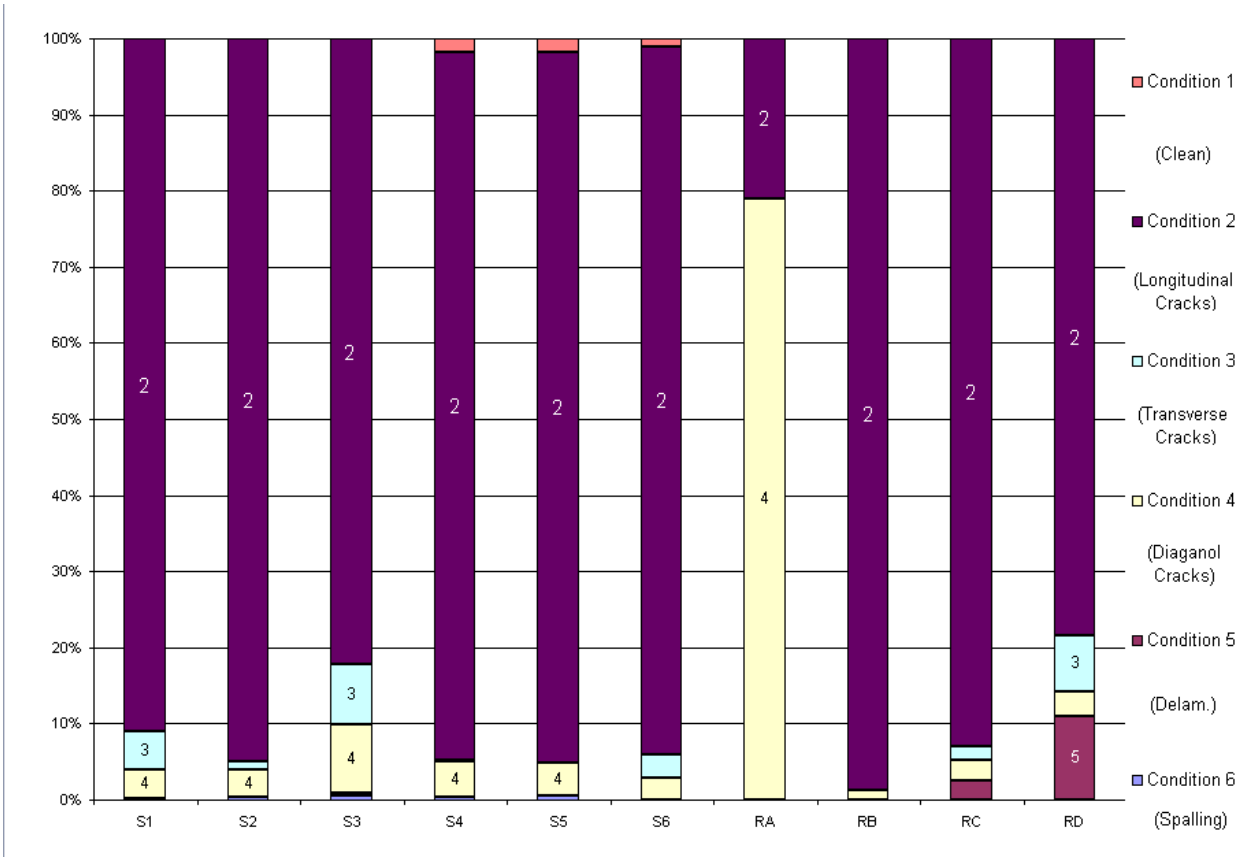


Figure 2-13: Individual condition percentages for each segment and ramp.

Cracks were found in the same general areas throughout the bridge. Diagonal cracking was apparent at the hinges and the piers. Cracking at the hinges may indicate excessive shear loads in the immediate area of the bearings. Lane surface cracking in the immediate area of the piers may indicate negative flexural moment and shear forces occurring at the load transfer from superstructure to substructure elements. Throughout the spans, longitudinal cracks ran for the majority of each span. Longitudinal cracks may indicate transverse positive flexural moment. In general, crack conditions found in the top deck exterior were the same as in the top deck interior. Cracks have formed around some of the patches. The length of efflorescent cracks is inconsistent with the length of exterior longitudinal cracks. Efflorescent areas on the underside of top deck and longitudinal cracking found on exterior of top deck may indicate that cracks on the exterior are the same cracks as on the interior.

Ramp A showed a lot of surface cracking (conditions 2 – 4) on the majority of the ramp. This cracking may be only in the concrete cover which was constructed XX years ago and is not viewed as a structural defect.

2.2.2.2.2 Delaminations and Spalls

Delaminations and spalls occurred at remote locations. Generally, these delaminations occur along longitudinal and transverse cracks. Significant delamination was found on Ramp D, and most delaminations occurred near Pier 104. Transverse and/or longitudinal cracks frequently run

through locations where delaminations were found, and the cracks may be causing increased delamination and eventual spalling.

2.3 SUBSTRUCTURE INSPECTION

2.3.1 Inspection Procedures

Inspectors inspected each pier using man-lifts that reach the length of the pier. An arms length inspection was performed on each pier, and consisted of up and close visual inspection for cracks and sounding for delaminations. All deficiencies were field-marked with permanent black marker and photographed.

For each pier, inspection field notes show columns, braces, and footers numbered from left to right and looking up-station.

2.3.2 Significant Findings

2.3.2.1 Cracking

Cracks running lengthwise are identified as longitudinal cracks and cracks running across the width are identified as transverse cracks.

Most of the piers show longitudinal cracks toward the middle of the column face. These cracks may not be significant because the columns are not post-tensioned. Transverse cracks along pier braces may be structurally insignificant. Typically, cracks were found transversely on the columns. This is likely due to the construction of the piers and probably does not affect the structural integrity of the column. Longitudinal cracks on the braces may indicate flexure or torsion from the columns twisting. Cracks found on the footers are probably from a negative flexural moment or shear forces from settlement of the substructure.

2.3.2.2 "Hot-Spot" Cracking

The "Hot-Spot" criteria for the Phase 5 substructure inspection has been updated as follows:

- Substructure Crack Width ≥ 0.5mm
- Pier Hammerhead Shear Crack Width ≥ 0.1mm

Crack IDs follow the form **PXXX##**:

- **P** represents pier cracking
- **XXX** represents the pier number

is the crack number which is incremented for each new crack at a pier. At each pier, crack numbers will start with 00. Ex. Pier 14, crack number 2 would acquire the crack number P01401.

16 "Hot-Spot" substructure cracks were found on Piers 8, 9, 10, 24, and 27. Mainline footer "Hot-Spot" cracks were found on Piers 8, 24, and 27, and range from 0.5 mm to 3.42 mm.

Longitude brace "Hot-Spot" cracks were found on Pier 9. Longitudinal "Hot-Spot" cracks were found on the columns of Piers 9 and 10. Pier 10 "Hot-Spot" cracks outline a delamination which likely indicates the enclosed area of concrete will soon start to spall (Photo 2-13).

Photo 2-13: Cracks down Pier 10 outlining a delamination
(Cracks #P01000 and #P01001 are shown)

2.3.2.3 Delaminations and Spalls

Delaminations and spalls generally occur on column faces along the path of drainage pipes. They are likely caused by water and deicing salts overflowing from drainage pipes and running down the concrete columns. During cold weather, the thermal expansion and contraction of the water contribute to the delaminating pier surface. Additionally, numerous spiders and other small insects make their shelter behind delaminated surfaces and any related burrowing activity below the concrete surface may also contribute to the delamination and eventual spall. Pier 206 drainage pipes are misaligned; the collector pipe is not directly below the discharge pipe from the bridge superstructure, and is causing rusting, spalling, and delamination.

The drainage system that is connected to the substructure is deteriorating. Downspout drainage pipe brackets are cracked and the pipe is pulling from the column (see Photo 2-14).

Photo 2-14: Cracked downspout bracket

2.3.2.4 Bearings

In general, all bearings are in fair condition. All bearings show rust and the concrete pedestals and tops of columns show rust staining. Shiny surfaces on the top and bottom of bearing pads indicate proper movement of the superstructure. Some bearings (Piers 19, 20, and 24) appear to be set incorrect (see Photo 2-15). This may have been constructed like this. Between Piers 19 and 20 is a hinge and adjacent piers have fixed connections to the superstructure. The footing to Pier 24 has heavy cracking.

Photo 2-15: Offset bearing at Pier 24 Column 3 towards upstation hinge

2.4 DRAINAGE INSPECTION

The purpose of this portion of the inspection was to identify as-built locations of the drainage system, as modifications were made during construction of the system and are not reflected in (original) design drawings. Approximate locations and quantities of the drainage pipes, including inlets and downspouts, were documented throughout the entire superstructure and are provided in Appendix F.

Phase 4 documented S1-C2 and C3; S2-C1, C2, and C4; S3-C1, C3, and C5; S4-C1; S5-C1, C2, C3, and C4; S6-C2, C3, and C5; Ramp A; Ramp B; Ramp C; and Ramp D. Phase 5 documented the interior drainage structures in S1-C3; S3–C4; S4-C2 and 4; and S6-C1.

The functional condition of the drainage system was not documented under the assumption that the entire system would be replaced or reconfigured during the rehabilitation. However, a cursory observation reveals that the system is in poor condition. Many deficiencies were observed including leaking pipes, steel corrosion, numerous rust holes, rusted end caps, and clogged pipes.

2.5 BRIDGE INTERIOR CLEANING

To help aid in the inspection efforts of the cell interiors, particularly the bottom slab, Segments 1, 2, 3, and Ramps were power washed. It has been proposed to clean the interior of the cells of Segments 4, 5, and 6 in Phase 6. As an initial part of this effort, an environmental analysis was

performed on the particulate matter in the bridge cells to determine if it is considered a hazardous material. Debris was sampled and sent to a laboratory for analysis.

The environmental assessment determined the particulate matter in the bridge is not considered hazardous waste. In addition, it is safe to utilize a pressure washer to clean the bridge and to let the water exit through the drains and openings in the bottom slab which discharge to the ground.

This environmental report is located in Appendix G.

3.0 CONCLUSIONS AND RECOMMENDATIONS

This report summarizes the inspection and evaluation of the Phase 5 inspection. The corrosion evaluation report will be submitted under separate cover. The primary goals of this project are:

- Monitor the bridge for advanced deterioration/corrosion so that immediate corrective action can be taken if needed to maintain public safety.
- Provide the rehabilitation consultant with the basic information required or needed to produce repair plans and construction documents for a comprehensive rehabilitation scheme.

A schedule (see Table 3-1) has been developed to help achieve these goals over the next few phases. The project team will evaluate this planned schedule as the project progresses and make the necessary adjustments to best achieve the outlined goals.

Table 3-1: Future Inspection, Testing, and Analysis Plan

	PHASE	DATE	INSPECTION	TESTING	ANALYSIS
COMPLETED	Phase 1	5/06~9/06	*Segments 1-6, Ramps A~D* • "Hot-Spot" Cracks • Bottom of Top Slab	• Corrosion Testing Low Points, Couplers, and High Points (28 Locations)	• None
COMPLETED	Phase 2	12/06~2/07	*Segments 4-6, Ramps A, C, & D* • "Hot-Spot" Cracks • Bottom of Top Slab	• Corrosion Testing at Couplers and High Points (30 Locations)	• Ramp D
COMPLETED	Phase 3	7/07~8/07	*Segments 1-6, Ramps A~D* • Hinges • "Smiley" Cracks *Segments 1~3, Ramp B* • "Hot-Spot" Cracks	• Corrosion Testing of 32 top deck cores • Determine chloride contamination with the use of cores and drill holes in the top deck • Corrosion reading of deck slab reinforcement • Corrosion Test of Reinforcing Steel at a "Smiley" Crack and a hinge	• Ramp D
COMPLETED	Phase 4	Winter '07	*Segments 4-6, Ramps A,C,&D* "Hot-Spot" Cracks	• Determine chloride contamination level through the use of drill hole samples in the underside of the deck	• Longitudinal model
PLANNED	Phase 5	Summer '08	<u>In-Depth Inspection of Entire Mainline and Ramps</u> • Interior • Exterior • Top Deck • Hinges • Substructure	• Evaluation of 30 tendon locations in Segments 1, 2, 3, and Ramps B and D • Bottom Deck Evaluation in Ramps B and D • Pier 7 and Pier 8 Evaluation • Top Deck Evaluation (36 Cores)	• Transverse model
PLANNED	Phase 6	Winter '08	• As-Needed for Rehabilitation	• Tendon Evaluations • Column Evaluations in Ramps A and C • Bottom Deck Evaluation in Ramps B and D	• Evaluate load rating results
PLANNED	Phase 7	Summer '09	• "Hot-Spot" Crack Inspection	• To Be Determined	• Final Report

3.1 "HOT-SPOT" CRACKS

The five bridges are all showing continual degradation throughout each structure, from the substructure to the roadway deck. The "Hot-Spot" cracks inspected during Phase 5 have generally shown growth since the initial "Hot-Spot" inspection.

Sufficient data has been gathered to begin making some conclusions regarding the rate of crack growth in the structure. This will be continued to be refined as information is gathered in subsequent inspections.

Cracks in all classifications are growing; however, cracks in the diaphragms due to indirect support (Type A) are growing at the fastest rate. Crack growth has also been observed in every segment and or/ramp, but Segment 1 has shown by far to have the most active cracks. The Segment 1 "Hot-Spot" cracks with growth are generally Type A cracks.

3.2 TOP SLAB

The Cline Ave. top slab conditions have been inspected and documented. Six conditions categories were defined and the condition along the length of the cells was recorded.

The underside of the top slabs of the concrete box girders are exhibiting signs of rapid deterioration. Longitudinal cracking is noted throughout the concrete box girders cells, most likely the result of a combination of shrinkage, temperature, and possibly transverse flexure. In many places, rust staining, efflorescence, delaminations, and spalling accompany the cracking. These conditions are attributed to water and chlorides leaching through the deck and causing corrosion of the reinforcing steel. In addition, transverse and diagonal cracking were found at intermittent locations throughout the cells.

This inspection shows that the underside of the top slab in the ramps are generally in worse condition than the underside of the deck in the Segments.

The topside of the top slabs of the concrete box girders are exhibiting signs of rapid deterioration. Clean conditions are noted throughout the shoulders of the bridge and rarely noted throughout the concrete box girders cells. Longitudinal cracking is noted throughout the concrete box girders cells, most likely the result of a combination of shrinkage, temperature, and possibly transverse flexure. Transverse and diagonal cracking is mostly noted at Piers and Hinges and most likely the result of shear and flexure forces at these locations. Delaminations and spalls occurred mostly on Ramp D. Longitudinal and/or transverse cracking are present at delaminations and spalls.

3.3 LOAD RATING ANALYSIS

I am not sure about this section. Wasn't the plan to include it under a separate report?

URS is in the process of load rating the entire mainline and ramp structures in accordance with AASHTO LRFR (Load and Resistance Factor Rating) criteria. The results from the load rating will aid in guiding the inspection/testing team and determining long term bridge rehabilitation options.

URS is working on finalizing the main longitudinal analytical model, using the program RM Spaceframe. The input of the model geometry, dead load, and live load is near completion. The input of the post-tensioning tendons and construction sequence is complete. Finally, design capacities and rating factors will be determined.

Verification of the longitudinal model using the program TANGO is nearly complete. Performing verification studies of the transverse analysis with the BRUG program is complete.

3.4 CORROSION EVALUATION

Results, conclusions, and recommendations for the corrosion evaluation will be submitted under separate cover.

3.5 REHABILITATION

Is the rehabilitation of Pier 7 considered Phase 5 or 6?

Mitigating the corrosion occurring in the top slab of the bridge should be addressed in the near future. The testing already performed will aide the bridge rehabilitation consultant in developing repair alternatives. Mitigating this corrosion in the top slab as soon as possible is imperative as the top slab is a vital component to the bridge's structural system.

URS recommends addressing two structural deficiencies in the bridge immediately. These are:

(1) Active spalling at top of Piers 7-7' (refer to October 2006 Phase 1 Report by URS Corporation and report by SCS regarding the corrosion evaluation)
(2) Deterioration of Tendon 12 in Ramp D (refer to April 2005 Report by Ken Herceg and Associates)

Item 1 is a "time of the essence" issue that requires a solution to restore the structural integrity as soon as possible. For Item 2, the consequence of full or partial loss of Tendon 12 should be mitigated before it causes future, more significant and expensive problems.

4.0 REFERENCES

- Corven Engineering, Inc. "Condition Inspection and Maintenance of Florida Post-Tensioned Bridges." New Directions for Florida Post-Tensioned Bridges. Vol. 9. Florida Department of Transportation. 22 Mar 2002 <http://www.dot.state.fl.us/structures/posttensioning/NewDirectionsPostTensioningVol9.pdf>.

- URS Corporation, "Bridge Inspection Report – Phase 1, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", October 2006.

- URS Corporation, "Bridge Inspection Report – Phase 2, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", April 2007.

- URS Corporation, "Bridge Inspection Report – Phase 3, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", February 2008.

- URS Corporation, "Bridge Inspection Report – Phase 4, SR 912 over the Indiana Harbor Canal at East Chicago, Lake County, Indiana", March 2008.

The Appendices of this Report

Are not Included

In the Calculation Book

URS **EXHIBIT 4.7-2**

CALCULATION COVER SHEET

Client: Indiana DOT

Project Name: Cline Avenue
LRFR Load Rating

Project/Calculation Number: Section 2.0

Title: LONGITUDINAL ANALYSIS

Total Number of Pages (including cover sheet): 309

Total Number of Computer Runs: See Section 2.0

Prepared by: Daniel Mariscal DEM Date: 2/9/2009

Checked by: Independent Check by Patricia Thaesler PT Date: 2/9/2009

Description and Purpose:
Includes geometry, post-tensioning layout, construction sequence, loads, and RM computer models.

Design Basis/References/Assumptions
Job Specific Criteria - See Section 1.2.

Remarks/Conclusions/Results:
None.

Calculation Approved by: _____
Project Manager/Date

Revision No.: Description of Revision: Approved by: _____
Project Manager/Date

2.0 Longitudinal Analysis

2.1 Design Criteria and Parameters

2.1 General Modeling Criteria

The Structural modeling of the Cline Avenue Bridge was done in RM Spaceframe 2006 (Bentley Systems). This program is a 3-D finite element modeling software, with capability of modeling construction sequences and time-dependent analysis. Given the capabilities of the analysis software, the mainline bridge and the four ramps were incorporated into one single structural model.

2.2 Bridge Geometry

2.2 Bridge Geometry

The bridge geometry is based on the provided drawings. All of the geometry was created within the Geometry Preprocessor (GP) of the RM Spaceframe software.

The entire bridge, including both mainline and ramps, is modeled together in one single global model. Structurally, the model uses beam elements assigned to "spines" for each of the different types of box girders. In order to facilitate the modeling and post processing, the bridge model was divided into several parts coinciding with the mainline segments and ramps:

Segment 1, three spines: Girders 1, 2 and 3
From Pier 2 to EJ 2

Segment 2, three spines: Eastbound, Westbound, part Ramp A
From EJ 2 to EJ 3

Segment 3, four spines: Eastbound, Westbound, parts Ramp A and C
From EJ 3 to EJ 5 in Mainline
From EJ 3 to EJ 4 in Ramp A
From EJ 3 to EJ 6 in Ramp C

Segment 4, three spines: Eastbound, Westbound, part Ramp C
From EJ 5 to EJ 7 in Mainline
From EJ 5 to EJ 6 in Ramp C

Segment 5, two spines: Eastbound and Westbound
From EJ 7 to EJ 8

Segment 6, four spines: Eastbound, Westbound parts Ramp B and D
From EJ 8 to Pier 29/30 in Mainline
From STA 20+06.38 to Pier 29/30 in Ramp B
From EJ 9 to Pier 29/30 in Ramp D

Ramp A, single spine:
From EJ 4 to Abutment 200

Ramp B, single spine:
From Abutment 301 to STA 20+06.38

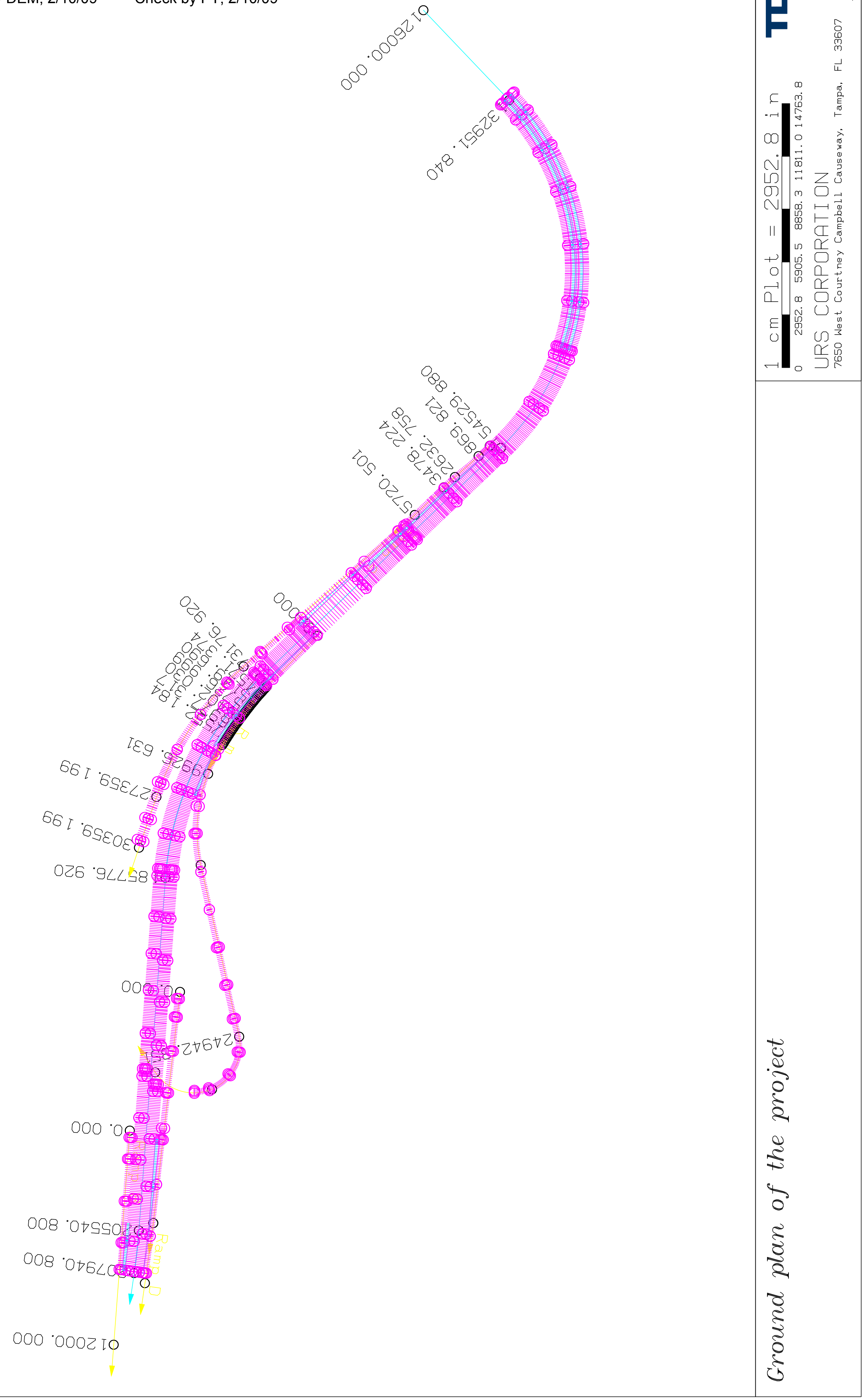
Ramp C, single spine:
From EJ 6 to Abutment 400

Ramp D, single spine:
From Abutment 101 to EJ 9

The spines' element divisions for the mainline were made to match the dimension from drawings 401, 420, 430, 440, 441, 450, 451, 460 and 461. For the ramps, the element divisions were made randomly.

To incorporate the transverse effect of box girders top slabs joined together, transverse elements were modeled at the appropriate elements.

Design by DEM, 2/10/09 Check by PT, 2/10/09



2.2.1 Mainline

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBOUND

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
			BEGIN BRIDGE							132789.875		0.000				
1	SEGMENT 1	1	1	ABUTMENT 2	21.625	21.6250	1001	**1002**	Y	132789.875	**132811.500**	0.0000	1.8021			
		2	1	ABUTMENT 2	8.375	8.3750	1002	1003		132811.500	132819.875	1.8021	2.5000			
		3	1	ABUTMENT 2	115.250	115.2500	1003	1004		132819.875	132935.125	2.5000	12.1042			
		4	7	TYPICAL	93.625	655.3750	1004	1011		132935.125	133590.500	12.1042	66.7188			
		11	0	SPECIAL	0.000	0.0000	1011	1011		133590.500	133590.500	66.7188	66.7188			
		11	1	C-I-P	61.000	61.0000	1011	1012		133590.500	133651.500	66.7188	71.8021	1225.500	102.125	102' 1 1/2"
		12	0	SPECIAL	0.000	0.0000	1012	1012		133651.500	133651.500	71.8021	71.8021			
		12	3	TYPICAL	87.292	261.8750	1012	1015		133651.500	133913.375	71.8021	93.6250			
		15	1	PIER 3	93.625	93.6250	1015	1016		133913.375	134007.000	93.6250	101.4271			
		16	1	PIER 3	30.000	30.0000	1016	**1017**	Y	134007.000	134037.000	101.4271	103.9271			
2		17	1	PIER 3	30.000	30.0000	1017	1018		134037.000	134067.000	103.9271	106.4271			
		18	1	PIER 3	93.625	93.6250	1018	1019		134067.000	134160.625	106.4271	114.2292			
		19	11	TYPICAL	93.625	1029.8750	1019	1030		134160.625	135190.500	114.2292	200.0521			
		30	0	SPECIAL	0.000	0.0000	1030	1030		135190.500	135190.500	200.0521	200.0521			
		30	1	C-I-P	69.625	69.6250	1030	1031		135190.500	135260.125	200.0521	205.8542	2283.000	190.250	190' 3"
		31	0	SPECIAL	0.000	0.0000	1031	1031		135260.125	135260.125	205.8542	205.8542			
		31	10	TYPICAL	93.625	936.2500	1031	1041		135260.125	136196.375	205.8542	283.8750			
		41	1	PIER 4	93.625	93.6250	1041	1042		136196.375	136290.000	283.8750	291.6771			
		42	1	PIER 4	30.000	30.0000	1042	**1043**	Y	136290.000	136320.000	291.6771	294.1771			
3		43	1	PIER 4	30.000	30.0000	1043	1044		136320.000	136350.000	294.1771	296.6771			
		44	1	PIER 4	93.625	93.6250	1044	1045		136350.000	136443.625	296.6771	304.4792			
		45	10	TYPICAL	93.625	936.2500	1045	1055		136443.625	137379.875	304.4792	382.5000			
		55	0	SPECIAL	0.000	0.0000	1055	1055		137379.875	137379.875	382.5000	382.5000			
		55	1	C-I-P	83.375	83.3750	1055	1056		137379.875	137463.250	382.5000	389.4479	2484.000	207.000	207' 0"
		56	0	SPECIAL	0.000	0.0000	1056	1056		137463.250	137463.250	389.4479	389.4479			
		56	13	TYPICAL	93.625	1217.1250	1056	1069		137463.250	138680.375	389.4479	490.8750			
		69	1	PIER 5	93.625	93.6250	1069	1070		138680.375	138774.000	490.8750	498.6771			
		70	1	PIER 5	30.000	30.0000	1070	**1071**	Y	138774.000	138804.000	498.6771	501.1771			
4		71	1	PIER 5	30.000	30.0000	1071	1072		138804.000	138834.000	501.1771	503.6771			
		72	1	PIER 5	93.625	93.6250	1072	1073		138834.000	138927.625	503.6771	511.4792			
		73	14	TYPICAL	93.625	1310.7500	1073	1087		138927.625	140238.375	511.4792	620.7083			
		87	0	SPECIAL	0.000	0.0000	1087	1087		140238.375	140238.375	620.7083	620.7083			
		87	1	C-I-P	39.375	39.3750	1087	1088		140238.375	140277.750	620.7083	623.9896	3189.000	265.750	265' 9"
		88	0	SPECIAL	0.000	0.0000	1088	1088		140277.750	140277.750	623.9896	623.9896			
		88	17	TYPICAL	93.625	1591.6250	1088	1105		140277.750	141869.375	623.9896	756.6250			
		105	1	PIER 6	93.625	93.6250	1105	1106		141869.375	141963.000	756.6250	764.4271			
		106	1	PIER 6	30.000	30.0000	1106	**1107**	Y	141963.000	141993.000	764.4271	766.9271			

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBOUND

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		107	1	PIER 6	30.000	30.0000	1107	1108		141993.000	142023.000	766.9271	769.4271			
		108	1	PIER 6	93.625	93.6250	1108	1109		142023.000	142116.625	769.4271	777.2292			
		109	16	TYPICAL	93.625	1498.0000	1109	1125		142116.625	143614.625	777.2292	902.0625			
		125	0	SPECIAL	0.000	0.0000	1125	1125		143614.625	143614.625	902.0625	902.0625			
5		125	1	C-I-P	39.375	39.3750	1125	1126		143614.625	143654.000	902.0625	905.3438	3189.000	265.750	265' 9"
		126	0	SPECIAL	0.000	0.0000	1126	1126		143654.000	143654.000	905.3438	905.3438			
		126	15	TYPICAL	93.625	1404.3750	1126	1141		143654.000	145058.375	905.3438	1022.3750			
		141	1	PIER 7	93.625	93.6250	1141	1142		145058.375	145152.000	1022.3750	1030.1771			
		142	1	PIER 7	30.000	30.0000	1142	**1143**	Y	145152.000	145182.000	1030.1771	1032.6771			
		143	1	PIER 7	30.000	30.0000	1143	1144		145182.000	145212.000	1032.6771	1035.1771			
		144	1	PIER 7	93.625	93.6250	1144	1145		145212.000	145305.625	1035.1771	1042.9792			
		145	15	TYPICAL	93.625	1404.3750	1145	1160		145305.625	146710.000	1042.9792	1160.0104			
		160	0	SPECIAL	6.000	0.0000	1160	1160		146710.000	146710.000	1160.0104	1160.0104			
		160	1	C-I-P	39.500	39.5000	1160	1161		146710.000	146749.500	1160.0104	1163.3021			
6		161	12	TYPICAL	93.625	1123.5000	1161	1173		146749.500	147873.000	1163.3021	1256.9271	3189.000	265.750	265' 9"
		173	1	EXP. JT 2	0.000	0.0000	1173	1174		147873.000	147873.000	1256.9271	1256.9271			
		1	4	TYPICAL	93.625	374.5000	1174	1178		147873.000	148247.500	1256.9271	1288.1354			
		5	1	PIER 8	93.500	93.5000	1178	1179		148247.500	148341.000	1288.1354	1295.9271			
		6	1	PIER 8	30.000	30.0000	1179	**1180**	Y	148341.000	148371.000	1295.9271	1298.4271			
		7	1	PIER 8	30.000	30.0000	1180	1181		148371.000	148401.000	1298.4271	1300.9271			
		8	1	PIER 8	93.625	93.6250	1181	1182		148401.000	148494.625	1300.9271	1308.7292			
		9	15	TYPICAL	93.625	1404.3750	1182	1197		148494.625	149899.000	1308.7292	1425.7604			
		24	0	SPECIAL	0.000	0.0000	1197	1197		149899.000	149899.000	1425.7604	1425.7604			
7		24	1	C-I-P	39.375	39.3750	1197	1198		149899.000	149938.375	1425.7604	1429.0417	3095.375	257.948	257' 11 3/8"
		25	0	SPECIAL	0.000	0.0000	1198	1198		149938.375	149938.375	1429.0417	1429.0417			
		25	15	TYPICAL	93.625	1404.3750	1198	1213		149938.375	151342.750	1429.0417	1546.0729			
		40	1	PIER 9	93.625	93.6250	1213	1214		151342.750	151436.375	1546.0729	1553.8750			
		41	1	PIER 9	30.000	30.0000	1214	**1215**	Y	151436.375	151466.375	1553.8750	1556.3750			
		42	1	PIER 9	30.000	30.0000	1215	1216		151466.375	151496.375	1556.3750	1558.8750			
		43	1	PIER 9	93.625	93.6250	1216	1217		151496.375	151590.000	1558.8750	1566.6771			
		44	16	TYPICAL	93.625	1498.0000	1217	1233		151590.000	153088.000	1566.6771	1691.5104			
		60	0	SPECIAL	0.000	0.0000	1233	1233		153088.000	153088.000	1691.5104	1691.5104			
8		60	1	C-I-P	75.875	75.8750	1233	1234		153088.000	153163.875	1691.5104	1697.8333	3412.750	284.396	284' 4 3/4"
		61	0	SPECIAL	0.000	0.0000	1234	1234		153163.875	153163.875	1697.8333	1697.8333			
		61	17	TYPICAL	93.625	1591.6250	1234	1251		153163.875	154755.500	1697.8333	1830.4688			
		78	1	PIER 10	93.625	93.6250	1251	1252		154755.500	154849.125	1830.4688	1838.2708			
		79	1	PIER 10	30.000	30.0000	1252	**1253**	Y	154849.125	154879.125	1838.2708	1840.7708			

SEGMENT 2

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBOUND — CHECKED BY: IC BY PT — DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		80	1	PIER 10	30.000	30.0000	1253	1254		154879.125	154909.125	1840.7708	1843.2708			
		81	1	PIER 10	93.625	93.6250	1254	1255		154909.125	155002.750	1843.2708	1851.0729			
		82	17	TYPICAL	93.625	1591.6250	1255	1272		155002.750	156594.375	1851.0729	1983.7083			
		99	0	SPECIAL	0.000	0.0000	1272	1272		156594.375	156594.375	1983.7083	1983.7083			
9		99	1	C-I-P	75.875	75.8750	1272	1273		156594.375	156670.250	1983.7083	1990.0313	3506.375	292.198	292' 2 3/8"
		100	0	SPECIAL	0.000	0.0000	1273	1273		156670.250	156670.250	1990.0313	1990.0313			
		100	17	TYPICAL	93.625	1591.6250	1273	1290		156670.250	158261.875	1990.0313	2122.6667			
		117	1	PIER 11	93.625	93.6250	1290	1291		158261.875	158355.500	2122.6667	2130.4688			
		118	1	PIER 11	30.000	30.0000	1291	**1292**	Y	158355.500	158385.500	2130.4688	2132.9688			
		119	1	PIER 11	30.000	30.0000	1292	1293		158385.500	158415.500	2132.9688	2135.4688			
		120	1	PIER 11	93.625	93.6250	1293	1294		158415.500	158509.125	2135.4688	2143.2708			
		121	18	TYPICAL	93.625	1685.2500	1294	1312		158509.125	160194.375	2143.2708	2283.7083			
		139	0	SPECIAL	0.000	0.0000	1312	1312		160194.375	160194.375	2283.7083	2283.7083			
10		139	1	C-I-P	75.875	75.8750	1312	1313		160194.375	160270.250	2283.7083	2290.0313	3506.375	292.198	292' 2 3/8"
		140	11	TYPICAL	93.625	1029.8750	1313	1324		160270.250	161300.125	2290.0313	2375.8542			
		151	1	EXP. JT 3	0.000	0.0000	1324	1325		161300.125	161300.125	2375.8542	2375.8542			
		1	5	TYPICAL	93.625	468.1250	1325	1330		161300.125	161768.250	2375.8542	2414.8646			
		6	1	PIER 12	93.625	93.6250	1330	1331		161768.250	161861.875	2414.8646	2422.6667			
		7	1	PIER 12	30.000	30.0000	1331	**1332**	Y	161861.875	161891.875	2422.6667	2425.1667			
		8	1	PIER 12	30.000	30.0000	1332	1333		161891.875	161921.875	2425.1667	2427.6667			
		9	1	PIER 12	93.625	93.6250	1333	1334		161921.875	162015.500	2427.6667	2435.4688			
		10	17	TYPICAL	93.625	1591.6250	1334	1351		162015.500	163607.125	2435.4688	2568.1042			
		27	0	SPECIAL	0.000	0.0000	1351	1351		163607.125	163607.125	2568.1042	2568.1042			
11		27	1	C-I-P	75.875	75.8750	1351	1352		163607.125	163683.000	2568.1042	2574.4271	3506.375	292.198	292' 2 3/8"
		28	0	SPECIAL	0.000	0.0000	1352	1352		163683.000	163683.000	2574.4271	2574.4271			
		28	17	TYPICAL	93.625	1591.6250	1352	1369		163683.000	165274.625	2574.4271	2707.0625			
		45	1	PIER 13	93.625	93.6250	1369	1370		165274.625	165368.250	2707.0625	2714.8646			
		46	1	PIER 13	30.000	30.0000	1370	**1371**	Y	165368.250	165398.250	2714.8646	2717.3646			
		47	1	PIER 13	30.000	30.0000	1371	1372		165398.250	165428.250	2717.3646	2719.8646			
		48	1	PIER 13	90.000	90.0000	1372	1373		165428.250	165518.250	2719.8646	2727.3646			
		49	10	TYPICAL	174.000	1740.0000	1373	1383		165518.250	167258.250	2727.3646	2872.3646			
		59	0	SPECIAL	0.000	0.0000	1383	1383		167258.250	167258.250	2872.3646	2872.3646			
12	SEGMENT 3	59	1	C-I-P	67.250	67.2500	1383	1384		167258.250	167325.500	2872.3646	2877.9688	3787.250	315.604	315' 7 1/4"
		60	0	SPECIAL	0.000	0.0000	1384	1384		167325.500	167325.500	2877.9688	2877.9688			
		60	10	TYPICAL	174.000	1740.0000	1384	1394		167325.500	169065.500	2877.9688	3022.9688			
		70	1	PIER 14	90.000	90.0000	1394	1395		169065.500	169155.500	3022.9688	3030.4688			
		71	1	PIER 14	30.000	30.0000	1395	**1396**	Y	169155.500	169185.500	3030.4688	3032.9688			
		72	1	PIER 14	30.000	30.0000	1396	1397		169185.500	169215.500	3032.9688	3035.4688			
		73	1	PIER 14	93.625	93.6250	1397	1398		169215.500	169309.125	3035.4688	3043.2708			
		74	18	TYPICAL	93.625	1685.2500	1398	1416		169309.125	170994.375	3043.2708	3183.7083			
		92	0	SPECIAL	0.000	0.0000	1416	1416		170994.375	170994.375	3183.7083	3183.7083			

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBOUND

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RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
13		92	1	C-I-P	56.750	56.7500	1416	1417		170994.375	171051.125	3183.7083	3188.4375	3487.250	290.604	290' 7 1/4"
		93	0	SPECIAL	0.000	0.0000	1417	1417		171051.125	171051.125	3188.4375	3188.4375			
		93	16	TYPICAL	93.625	1498.0000	1417	1433		171051.125	172549.125	3188.4375	3313.2708			
		109	1	PIER 15	93.625	93.6250	1433	1434		172549.125	172642.750	3313.2708	3321.0729			
		110	1	PIER 15	30.000	30.0000	1434	**1435**	Y	172642.750	172672.750	3321.0729	3323.5729			
		111	1	PIER 15	30.000	30.0000	1435	1436		172672.750	172702.750	3323.5729	3326.0729			
		112	1	PIER 15	93.625	93.6250	1436	1437		172702.750	172796.375	3326.0729	3333.8750			
		113	4	TYPICAL	93.625	374.5000	1437	1441		172796.375	173170.875	3333.8750	3365.0833			
		117	1	EXP. JT 5	0.000	0.0000	1441	1442		173170.875	173170.875	3365.0833	3365.0833			
14	SEGMENT 4	1	2	TYPICAL	93.625	187.2500	1442	1444		173170.875	173358.125	3365.0833	3380.6875			
		3	2	SPECIAL	74.375	148.7500	1444	1446		173358.125	173506.875	3380.6875	3393.0833	2947.250	245.604	245' 7 1/4"
		5	8	TYPICAL	93.625	749.0000	1446	1454		173506.875	174255.875	3393.0833	3455.5000			
		13	1	C-I-P	23.375	23.3750	1454	1455		174255.875	174279.250	3455.5000	3457.4479			
		14	0	SPECIAL	0.000	0.0000	1455	1455		174279.250	174279.250	3457.4479	3457.4479			
		14	13	TYPICAL	93.625	1217.1250	1455	1468		174279.250	175496.375	3457.4479	3558.8750			
		27	1	PIER 16	93.625	93.6250	1468	1469		175496.375	175590.000	3558.8750	3566.6771			
		28	1	PIER 16	30.000	30.0000	1469	**1470**	Y	175590.000	175620.000	3566.6771	3569.1771			
		29	1	PIER 16	30.000	30.0000	1470	1471		175620.000	175650.000	3569.1771	3571.6771			
		30	1	PIER 16	93.625	93.6250	1471	1472		175650.000	175743.625	3571.6771	3579.4792			
		31	12	TYPICAL	93.625	1123.5000	1472	1484		175743.625	176867.125	3579.4792	3673.1042			
		43	0	SPECIAL	0.000	0.0000	1484	1484		176867.125	176867.125	3673.1042	3673.1042			
15		43	1	C-I-P	85.750	85.7500	1484	1485		176867.125	176952.875	3673.1042	3680.2500	2580.000	215.000	215' 0"
		44	0	SPECIAL	0.000	0.0000	1485	1485		176952.875	176952.875	3680.2500	3680.2500			
		44	12	TYPICAL	93.625	1123.5000	1485	1497		176952.875	178076.375	3680.2500	3773.8750			
		56	1	PIER 17	93.625	93.6250	1497	1498		178076.375	178170.000	3773.8750	3781.6771			
		57	1	PIER 17	30.000	30.0000	1498	**1499**	Y	178170.000	178200.000	3781.6771	3784.1771			
		58	1	PIER 17	30.000	30.0000	1499	1500		178200.000	178230.000	3784.1771	3786.6771			
		59	1	PIER 17	93.625	93.6250	1500	1501		178230.000	178323.625	3786.6771	3794.4792			
		60	12	TYPICAL	93.625	1123.5000	1501	1513		178323.625	179447.125	3794.4792	3888.1042			
		72	0	SPECIAL	0.000	0.0000	1513	1513		179447.125	179447.125	3888.1042	3888.1042			
16		72	1	C-I-P	85.750	85.7500	1513	1514		179447.125	179532.875	3888.1042	3895.2500	2580.000	215.000	215' 0"
		73	0	SPECIAL	0.000	0.0000	1514	1514		179532.875	179532.875	3895.2500	3895.2500			
		73	12	TYPICAL	93.625	1123.5000	1514	1526		179532.875	180656.375	3895.2500	3988.8750			
		85	1	PIER 18	93.625	93.6250	1526	1527		180656.375	180750.000	3988.8750	3996.6771			
		86	1	PIER 18	30.000	30.0000	1527	**1528**	Y	180750.000	180780.000	3996.6771	3999.1771			
		87	1	PIER 18	30.000	30.0000	1528	1529		180780.000	180810.000	3999.1771	4001.6771			
		88	1	PIER 18	93.625	93.6250	1529	1530		180810.000	180903.625	4001.6771	4009.4792			
		89	12	TYPICAL	93.625	1123.5000	1530	1542		180903.625	182027.125	4009.4792	4103.1042			
		101	0	SPECIAL	0.000	0.0000	1542	1542		182027.125	182027.125	4103.1042	4103.1042			
17		101	1	C-I-P	85.750	85.7500	1542	1543		182027.125	182112.875	4103.1042	4110.2500	2580.000	215.000	215' 0"
		102	0	SPECIAL	0.000	0.0000	1543	1543		182112.875	182112.875	4110.2500	4110.2500			

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBOUND

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		102	12	TYPICAL	93.625	1123.5000	1543	1555		182112.875	183236.375	4110.2500	4203.8750			
		114	1	PIER 19	93.625	93.6250	1555	1556		183236.375	183330.000	4203.8750	4211.6771			
		115	1	PIER 19	30.000	30.0000	1556	**1557**	Y	183330.000	183360.000	4211.6771	4214.1771			
		116	1	PIER 19	30.000	30.0000	1557	1558		183360.000	183390.000	4214.1771	4216.6771			
		117	1	PIER 19	93.625	93.6250	1558	1559		183390.000	183483.625	4216.6771	4224.4792			
		118	11	TYPICAL	93.625	1029.8750	1559	1570		183483.625	184513.500	4224.4792	4310.3021			
		129	0	SPECIAL	0.000	0.0000	1570	1570		184513.500	184513.500	4310.3021	4310.3021			
18		129	1	C-I-P	33.000	33.0000	1570	1571		184513.500	184546.500	4310.3021	4313.0521	2340.000	195.000	195' 0"
		130	8	TYPICAL	93.625	749.0000	1571	1579		184546.500	185295.500	4313.0521	4375.4688			
		138	1	EXP. JT 6	0.000	0.0000	1579	1580		185295.500	185295.500	4375.4688	4375.4688			
		1	3	TYPICAL	93.625	280.8750	1580	1583		185295.500	185576.375	4375.4688	4398.8750			
		4	1	PIER 20	93.625	93.6250	1583	1584		185576.375	185670.000	4398.8750	4406.6771			
		5	1	PIER 20	30.000	30.0000	1584	**1585**	Y	185670.000	185700.000	4406.6771	4409.1771			
		6	1	PIER 20	30.000	30.0000	1585	1586		185700.000	185730.000	4409.1771	4411.6771			
		7	1	PIER 20	93.625	93.6250	1586	1587		185730.000	185823.625	4411.6771	4419.4792			
		8	11	TYPICAL	93.625	1029.8750	1587	1598		185823.625	186853.500	4419.4792	4505.3021			
		19	0	SPECIAL	0.000	0.0000	1598	1598		186853.500	186853.500	4505.3021	4505.3021			
19		19	1	C-I-P	33.000	33.0000	1598	1599		186853.500	186886.500	4505.3021	4508.0521	2340.000	195.000	195' 0"
		20	0	SPECIAL	0.000	0.0000	1599	1599		186886.500	186886.500	4508.0521	4508.0521			
		20	11	TYPICAL	93.625	1029.8750	1599	1610		186886.500	187916.375	4508.0521	4593.8750			
		31	1	PIER 21	93.625	93.6250	1610	1611		187916.375	188010.000	4593.8750	4601.6771			
		32	1	PIER 21	30.000	30.0000	1611	**1612**	Y	188010.000	188040.000	4601.6771	4604.1771			
		33	1	PIER 21	30.000	30.0000	1612	1613		188040.000	188070.000	4604.1771	4606.6771			
		34	1	PIER 21	93.625	93.6250	1613	1614		188070.000	188163.625	4606.6771	4614.4792			
		35	11	TYPICAL	93.625	1029.8750	1614	1625		188163.625	189193.500	4614.4792	4700.3021			
		46	0	SPECIAL	0.000	0.0000	1625	1625		189193.500	189193.500	4700.3021	4700.3021			
20		46	1	C-I-P	33.000	33.0000	1625	1626		189193.500	189226.500	4700.3021	4703.0521	2340.000	195.000	195' 0"
		47	0	SPECIAL	0.000	0.0000	1626	1626		189226.500	189226.500	4703.0521	4703.0521			
		47	11	TYPICAL	93.625	1029.8750	1626	1637		189226.500	190256.375	4703.0521	4788.8750			
		58	1	PIER 22	93.625	93.6250	1637	1638		190256.375	190350.000	4788.8750	4796.6771			
		59	1	PIER 22	30.000	30.0000	1638	**1639**	Y	190350.000	190380.000	4796.6771	4799.1771			
		60	1	PIER 22	30.000	30.0000	1639	1640		190380.000	190410.000	4799.1771	4801.6771			
		61	1	PIER 22	93.625	93.6250	1640	1641		190410.000	190503.625	4801.6771	4809.4792			
		62	11	TYPICAL	93.625	1029.8750	1641	1652		190503.625	191533.500	4809.4792	4895.3021			
		73	0	SPECIAL	0.000	0.0000	1652	1652		191533.500	191533.500	4895.3021	4895.3021			
21	SEGMENT 5	73	1	C-I-P	33.000	33.0000	1652	1653		191533.500	191566.500	4895.3021	4898.0521	2340.000	195.000	195' 0"
		74	0	SPECIAL	0.000	0.0000	1653	1653		191566.500	191566.500	4898.0521	4898.0521			
		74	11	TYPICAL	93.625	1029.8750	1653	1664		191566.500	192596.375	4898.0521	4983.8750			
		85	1	PIER 23	93.625	93.6250	1664	1665		192596.375	192690.000	4983.8750	4991.6771			
		86	1	PIER 23	30.000	30.0000	1665	**1666**	Y	192690.000	192720.000	4991.6771	4994.1771			
		87	1	PIER 23	30.000	30.0000	1666	1667		192720.000	192750.000	4994.1771	4996.6771			

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBOUND — CHECKED BY: IC BY PT — DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		88	1	PIER 23	93.625	93.6250	1667	1668		192750.000	192843.625	4996.6771	5004.4792			
		89	11	TYPICAL	93.625	1029.8750	1668	1679		192843.625	193873.500	5004.4792	5090.3021			
		100	0	SPECIAL	0.000	0.0000	1679	1679		193873.500	193873.500	5090.3021	5090.3021			
22		100	1	C-I-P	33.000	33.0000	1679	1680		193873.500	193906.500	5090.3021	5093.0521	2433.625	202.802	202' 9 5/8"
		101	0	SPECIAL	0.000	0.0000	1680	1680		193906.500	193906.500	5093.0521	5093.0521			
		101	12	TYPICAL	93.625	1123.5000	1680	1692		193906.500	195030.000	5093.0521	5186.6771			
		113	1	PIER 24	93.625	93.6250	1692	1693		195030.000	195123.625	5186.6771	5194.4792			
		114	1	PIER 24	30.000	30.0000	1693	**1694**	Y	195123.625	195153.625	5194.4792	5196.9792			
		115	1	PIER 24	30.000	30.0000	1694	1695		195153.625	195183.625	5196.9792	5199.4792			
		116	1	PIER 24	93.625	93.6250	1695	1696		195183.625	195277.250	5199.4792	5207.2813			
		117	11	TYPICAL	93.625	1029.8750	1696	1707		195277.250	196307.125	5207.2813	5293.1042			
		128	0	SPECIAL	0.000	0.0000	1707	1707		196307.125	196307.125	5293.1042	5293.1042			
		128	1	C-I-P	114.625	114.6250	1707	1708		196307.125	196421.750	5293.1042	5302.6563			
23		129	5	TYPICAL	93.625	468.1250	1708	1713		196421.750	196889.875	5302.6563	5341.6667	2570.375	214.198	214' 2 3/8"
		134	1	SPECIAL	148.750	148.7500	1713	1714		196889.875	197038.625	5341.6667	5354.0625			
		135	3	TYPICAL	93.625	280.8750	1714	1717		197038.625	197319.500	5354.0625	5377.4688			
		138	1	EXP. JT 7	0.000	0.0000	1717	1718		197319.500	197319.500	5377.4688	5377.4688			
		1	3	TYPICAL	93.625	280.8750	1718	1721		197319.500	197600.375	5377.4688	5400.8750			
		4	1	PIER 25	93.625	93.6250	1721	1722		197600.375	197694.000	5400.8750	5408.6771			
		5	1	PIER 25	30.000	30.0000	1722	**1723**	Y	197694.000	197724.000	5408.6771	5411.1771			
		6	1	PIER 25	30.000	30.0000	1723	1724		197724.000	197754.000	5411.1771	5413.6771			
		7	1	PIER 25	93.625	93.6250	1724	1725		197754.000	197847.625	5413.6771	5421.4792			
		8	12	TYPICAL	93.625	1123.5000	1725	1737		197847.625	198971.125	5421.4792	5515.1042			
		20	0	SPECIAL	0.000	0.0000	1737	1737		198971.125	198971.125	5515.1042	5515.1042			
24		20	1	C-I-P	76.125	76.1250	1737	1738		198971.125	199047.250	5515.1042	5521.4479	2664.000	222.000	222' 0"
		21	0	SPECIAL	0.000	0.0000	1738	1738		199047.250	199047.250	5521.4479	5521.4479			
		21	13	TYPICAL	93.625	1217.1250	1738	1751		199047.250	200264.375	5521.4479	5622.8750			
		34	1	PIER 26	93.625	93.6250	1751	1752		200264.375	200358.000	5622.8750	5630.6771			
		35	1	PIER 26	30.000	30.0000	1752	**1753**	Y	200358.000	200388.000	5630.6771	5633.1771			
		36	1	PIER 26	30.000	30.0000	1753	1754		200388.000	200418.000	5633.1771	5635.6771			
		37	1	PIER 26	93.625	93.6250	1754	1755		200418.000	200511.625	5635.6771	5643.4792			
		38	13	TYPICAL	93.625	1217.1250	1755	1768		200511.625	201728.750	5643.4792	5744.9063			
		51	0	SPECIAL	0.000	0.0000	1768	1768		201728.750	201728.750	5744.9063	5744.9063			
25		51	1	C-I-P	76.125	76.1250	1768	1769		201728.750	201804.875	5744.9063	5751.2500	2664.000	222.000	222' 0"
	SEGMENT 6	52	0	SPECIAL	0.000	0.0000	1769	1769		201804.875	201804.875	5751.2500	5751.2500			
		52	12	TYPICAL	93.625	1123.5000	1769	1781		201804.875	202928.375	5751.2500	5844.8750			
		64	1	PIER 27	93.625	93.6250	1781	1782		202928.375	203022.000	5844.8750	5852.6771			
		65	1	PIER 27	30.000	30.0000	1782	**1783**	Y	203022.000	203052.000	5852.6771	5855.1771			
		66	1	PIER 27	30.000	30.0000	1783	1784		203052.000	203082.000	5855.1771	5857.6771			
		67	1	PIER 27	93.625	93.6250	1784	1785		203082.000	203175.625	5857.6771	5865.4792			
		68	12	TYPICAL	93.625	1123.5000	1785	1797		203175.625	204299.125	5865.4792	5959.1042			

URS CORPORATION

JOB: CLINE AVENUE
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COMPUTED BY: DEM
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STATION EQUATIONS

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END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
26		80	0	SPECIAL	0.000	0.0000	1797	1797		204299.125	204299.125	5959.1042	5959.1042	2664.000	222.000	222' 0"
		80	1	C-I-P	76.125	76.1250	1797	1798		204299.125	204375.250	5959.1042	5965.4479			
		81	0	SPECIAL	0.000	0.0000	1798	1798		204375.250	204375.250	5965.4479	5965.4479			
		81	13	TYPICAL	93.625	1217.1250	1798	1811		204375.250	205592.375	5965.4479	6066.8750			
		94	1	PIER 28	93.625	93.6250	1811	1812		205592.375	205686.000	6066.8750	6074.6771			
		95	1	PIER 28	30.000	30.0000	1812	**1813**	Y	205686.000	205716.000	6074.6771	6077.1771			
27		96	1	PIER 28	30.000	30.0000	1813	1814		205716.000	205746.000	6077.1771	6079.6771	2136.000	178.000	178' 0"
		97	1	PIER 28	93.625	93.6250	1814	1815		205746.000	205839.625	6079.6771	6087.4792			
		98	13	TYPICAL	93.625	1217.1250	1815	1828		205839.625	207056.750	6087.4792	6188.9063			
		111	0	SPECIAL	0.000	0.0000	1828	1828		207056.750	207056.750	6188.9063	6188.9063			
		111	1	C-I-P	16.250	16.2500	1828	1829		207056.750	207073.000	6188.9063	6190.2604			
		112	0	SPECIAL	0.000	0.0000	1829	1829		207073.000	207073.000	6190.2604	6190.2604			
		112	7	TYPICAL	93.625	655.3750	1829	1836		207073.000	207728.375	6190.2604	6244.8750			
		119	1	ABUT 29	114.625	114.6250	1836	1837		207728.375	207843.000	6244.8750	6254.4271			
		120	1	ABUT 29	9.000	9.0000	1837	1838		207843.000	207852.000	6254.4271	6255.1771			
		121	1	ABUT 29	21.625	21.6250	1838	**1839**	Y	207852.000	207873.625	6255.1771	6256.9792			

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750									
1	0.000	132789.8750	SPABS	132789.8750	AS		p10	0.0000	1.8021	1	
2	21.6250	132811.5000	SPREL	21.6250	AS		p20	1.8021	2.5000	2	
3	8.3750	132819.8750	SPREL	8.3750	AS		p30	2.5000	12.1042	3	
4	115.2500	132935.1250	SPREL	115.2500	AS		p40	12.1042	19.9063	4	
5	93.6250	133028.7500	SPREL	93.6250	AS		p50	19.9063	27.7083	5	
6	93.6250	133122.3750	SPREL	93.6250	AS		p60	27.7083	35.5104	6	
7	93.6250	133216.0000	SPREL	93.6250	AS		p70	35.5104	43.3125	7	
8	93.6250	133309.6250	SPREL	93.6250	AS		p80	43.3125	51.1146	8	
9	93.6250	133403.2500	SPREL	93.6250	AS		p90	51.1146	58.9167	9	
10	93.6250	133496.8750	SPREL	93.6250	AS		p100	58.9167	66.7188	10	
11	93.6250	133590.5000	SPREL	93.6250	AS		p110	66.7188	71.8021	11	
12	61.0000	133651.5000	SPREL	61.0000	AS		p120	71.8021	79.0764	12	
13	87.2917	133738.7917	SPREL	87.2917	AS		p130	79.0764	86.3507	13	
14	87.2917	133826.0833	SPREL	87.2917	AS		p140	86.3507	93.6250	14	
15	87.2917	133913.3750	SPREL	87.2917	AS		p150	93.6250	101.4271	15	
16	93.6250	134007.0000	SPREL	93.6250	AS		p160	101.4271	103.9271	16	
17	30.0000	134037.0000	SPREL	30.0000	AS		p170	103.9271	106.4271	17	
18	30.0000	134067.0000	SPREL	30.0000	AS		p180	106.4271	114.2292	18	PIER 3
19	93.6250	134160.6250	SPREL	93.6250	AS		p190	114.2292	122.0313	19	
20	93.6250	134254.2500	SPREL	93.6250	AS		p200	122.0313	129.8333	20	
21	93.6250	134347.8750	SPREL	93.6250	AS		p210	129.8333	137.6354	21	
22	93.6250	134441.5000	SPREL	93.6250	AS		p220	137.6354	145.4375	22	
23	93.6250	134535.1250	SPREL	93.6250	AS		p230	145.4375	153.2396	23	
24	93.6250	134628.7500	SPREL	93.6250	AS		p240	153.2396	161.0417	24	
25	93.6250	134722.3750	SPREL	93.6250	AS		p250	161.0417	168.8438	25	
26	93.6250	134816.0000	SPREL	93.6250	AS		p260	168.8438	176.6458	26	
27	93.6250	134909.6250	SPREL	93.6250	AS		p270	176.6458	184.4479	27	
28	93.6250	135003.2500	SPREL	93.6250	AS		p280	184.4479	192.2500	28	
29	93.6250	135096.8750	SPREL	93.6250	AS		p290	192.2500	200.0521	29	
30	93.6250	135190.5000	SPREL	93.6250	AS		p300	200.0521	205.8542	30	
31	69.6250	135260.1250	SPREL	69.6250	AS		p310	205.8542	213.6563	31	
32	93.6250	135353.7500	SPREL	93.6250	AS		p320	213.6563	221.4583	32	
33	93.6250	135447.3750	SPREL	93.6250	AS		p330	221.4583	229.2604	33	
34	93.6250	135541.0000	SPREL	93.6250	AS		p340	229.2604	237.0625	34	
35	93.6250	135634.6250	SPREL	93.6250	AS		p350	237.0625	244.8646	35	
36	93.6250	135728.2500	SPREL	93.6250	AS		p360	244.8646	252.6667	36	
37	93.6250	135821.8750	SPREL	93.6250	AS		p370	252.6667	260.4688	37	
38	93.6250	135915.5000	SPREL	93.6250	AS		p380	260.4688	268.2708	38	
39	93.6250	136009.1250	SPREL	93.6250	AS		p390	268.2708	276.0729	39	
40	93.6250	136102.7500	SPREL	93.6250	AS		p400	276.0729	283.8750	40	
41	93.6250	136196.3750	SPREL	93.6250	AS		p410	283.8750	291.6771	41	
42	93.6250	136290.0000	SPREL	93.6250	AS		p420	291.6771	294.1771	42	
43	30.0000	136320.0000	SPREL	30.0000	AS		p430	294.1771	296.6771	43	
44	30.0000	136350.0000	SPREL	30.0000	AS		p440	296.6771	304.4792	44	PIER 4
45	93.6250	136443.6250	SPREL	93.6250	AS		p450	304.4792	312.2813	45	
46	93.6250	136537.2500	SPREL	93.6250	AS		p460	312.2813	320.0833	46	
47	93.6250	136630.8750	SPREL	93.6250	AS		p470	320.0833	327.8854	47	
48	93.6250	136724.5000	SPREL	93.6250	AS		p480	327.8854	335.6875	48	
49	93.6250	136818.1250	SPREL	93.6250	AS		p490	335.6875	343.4896	49	
50	93.6250	136911.7500	SPREL	93.6250	AS		p500	343.4896	351.2917	50	
51	93.6250	137005.3750	SPREL	93.6250	AS		p510	351.2917	359.0938	51	
52	93.6250	137099.0000	SPREL	93.6250	AS		p520	359.0938	366.8958	52	

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JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
53	93.6250	137192.6250	SPREL	93.6250	AS	p530	366.8958	374.6979	53	
54	93.6250	137286.2500	SPREL	93.6250	AS	p540	374.6979	382.5000	54	
55	93.6250	137379.8750	SPREL	93.6250	AS	p550	382.5000	389.4479	55	
56	83.3750	137463.2500	SPREL	83.3750	AS	p560	389.4479	397.2500	56	
57	93.6250	137556.8750	SPREL	93.6250	AS	p570	397.2500	405.0521	57	
58	93.6250	137650.5000	SPREL	93.6250	AS	p580	405.0521	412.8542	58	
59	93.6250	137744.1250	SPREL	93.6250	AS	p590	412.8542	420.6563	59	
60	93.6250	137837.7500	SPREL	93.6250	AS	p600	420.6563	428.4583	60	
61	93.6250	137931.3750	SPREL	93.6250	AS	p610	428.4583	436.2604	61	
62	93.6250	138025.0000	SPREL	93.6250	AS	p620	436.2604	444.0625	62	
63	93.6250	138118.6250	SPREL	93.6250	AS	p630	444.0625	451.8646	63	
64	93.6250	138212.2500	SPREL	93.6250	AS	p640	451.8646	459.6667	64	
65	93.6250	138305.8750	SPREL	93.6250	AS	p650	459.6667	467.4688	65	
66	93.6250	138399.5000	SPREL	93.6250	AS	p660	467.4688	475.2708	66	
67	93.6250	138493.1250	SPREL	93.6250	AS	p670	475.2708	483.0729	67	
68	93.6250	138586.7500	SPREL	93.6250	AS	p680	483.0729	490.8750	68	
69	93.6250	138680.3750	SPREL	93.6250	AS	p690	490.8750	498.6771	69	
70	93.6250	138774.0000	SPREL	93.6250	AS	p700	498.6771	501.1771	70	
71	30.0000	138804.0000	SPREL	30.0000	AS	p710	501.1771	503.6771	71	PIER 5
72	30.0000	138834.0000	SPREL	30.0000	AS	p720	503.6771	511.4792	72	
73	93.6250	138927.6250	SPREL	93.6250	AS	p730	511.4792	519.2813	73	
74	93.6250	139021.2500	SPREL	93.6250	AS	p740	519.2813	527.0833	74	
75	93.6250	139114.8750	SPREL	93.6250	AS	p750	527.0833	534.8854	75	
76	93.6250	139208.5000	SPREL	93.6250	AS	p760	534.8854	542.6875	76	
77	93.6250	139302.1250	SPREL	93.6250	AS	p770	542.6875	550.4896	77	
78	93.6250	139395.7500	SPREL	93.6250	AS	p780	550.4896	558.2917	78	
79	93.6250	139489.3750	SPREL	93.6250	AS	p790	558.2917	566.0938	79	
80	93.6250	139583.0000	SPREL	93.6250	AS	p800	566.0938	573.8958	80	
81	93.6250	139676.6250	SPREL	93.6250	AS	p810	573.8958	581.6979	81	
82	93.6250	139770.2500	SPREL	93.6250	AS	p820	581.6979	589.5000	82	
83	93.6250	139863.8750	SPREL	93.6250	AS	p830	589.5000	597.3021	83	
84	93.6250	139957.5000	SPREL	93.6250	AS	p840	597.3021	605.1042	84	
85	93.6250	140051.1250	SPREL	93.6250	AS	p850	605.1042	612.9063	85	
86	93.6250	140144.7500	SPREL	93.6250	AS	p860	612.9063	620.7083	86	
87	93.6250	140238.3750	SPREL	93.6250	AS	p870	620.7083	623.9896	87	
88	39.3750	140277.7500	SPREL	39.3750	AS	p880	623.9896	631.7917	88	
89	93.6250	140371.3750	SPREL	93.6250	AS	p890	631.7917	639.5938	89	
90	93.6250	140465.0000	SPREL	93.6250	AS	p900	639.5938	647.3958	90	
91	93.6250	140558.6250	SPREL	93.6250	AS	p910	647.3958	655.1979	91	
92	93.6250	140652.2500	SPREL	93.6250	AS	p920	655.1979	663.0000	92	
93	93.6250	140745.8750	SPREL	93.6250	AS	p930	663.0000	670.8021	93	
94	93.6250	140839.5000	SPREL	93.6250	AS	p940	670.8021	678.6042	94	
95	93.6250	140933.1250	SPREL	93.6250	AS	p950	678.6042	686.4063	95	
96	93.6250	141026.7500	SPREL	93.6250	AS	p960	686.4063	694.2083	96	
97	93.6250	141120.3750	SPREL	93.6250	AS	p970	694.2083	702.0104	97	
98	93.6250	141214.0000	SPREL	93.6250	AS	p980	702.0104	709.8125	98	
99	93.6250	141307.6250	SPREL	93.6250	AS	p990	709.8125	717.6146	99	
100	93.6250	141401.2500	SPREL	93.6250	AS	p1000	717.6146	725.4167	100	
101	93.6250	141494.8750	SPREL	93.6250	AS	p1010	725.4167	733.2188	101	
102	93.6250	141588.5000	SPREL	93.6250	AS	p1020	733.2188	741.0208	102	
103	93.6250	141682.1250	SPREL	93.6250	AS	p1030	741.0208	748.8229	103	
104	93.6250	141775.7500	SPREL	93.6250	AS	p1040	748.8229	756.6250	104	

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NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.	
105	93.6250	141869.3750	SPREL	93.6250	AS	p1050	756.6250	764.4271	105	
106	93.6250	141963.0000	SPREL	93.6250	AS	p1060	764.4271	766.9271	106	
107	30.0000	141993.0000	SPREL	30.0000	AS	p1070	766.9271	769.4271	107	
108	30.0000	142023.0000	SPREL	30.0000	AS	p1080	769.4271	777.2292	108	PIER 6
109	93.6250	142116.6250	SPREL	93.6250	AS	p1090	777.2292	785.0313	109	
110	93.6250	142210.2500	SPREL	93.6250	AS	p1100	785.0313	792.8333	110	
111	93.6250	142303.8750	SPREL	93.6250	AS	p1110	792.8333	800.6354	111	
112	93.6250	142397.5000	SPREL	93.6250	AS	p1120	800.6354	808.4375	112	
113	93.6250	142491.1250	SPREL	93.6250	AS	p1130	808.4375	816.2396	113	
114	93.6250	142584.7500	SPREL	93.6250	AS	p1140	816.2396	824.0417	114	
115	93.6250	142678.3750	SPREL	93.6250	AS	p1150	824.0417	831.8438	115	
116	93.6250	142772.0000	SPREL	93.6250	AS	p1160	831.8438	839.6458	116	
117	93.6250	142865.6250	SPREL	93.6250	AS	p1170	839.6458	847.4479	117	
118	93.6250	142959.2500	SPREL	93.6250	AS	p1180	847.4479	855.2500	118	
119	93.6250	143052.8750	SPREL	93.6250	AS	p1190	855.2500	863.0521	119	
120	93.6250	143146.5000	SPREL	93.6250	AS	p1200	863.0521	870.8542	120	
121	93.6250	143240.1250	SPREL	93.6250	AS	p1210	870.8542	878.6563	121	
122	93.6250	143333.7500	SPREL	93.6250	AS	p1220	878.6563	886.4583	122	
123	93.6250	143427.3750	SPREL	93.6250	AS	p1230	886.4583	894.2604	123	
124	93.6250	143521.0000	SPREL	93.6250	AS	p1240	894.2604	902.0625	124	
125	93.6250	143614.6250	SPREL	93.6250	AS	p1250	902.0625	905.3438	125	
126	39.3750	143654.0000	SPREL	39.3750	AS	p1260	905.3438	913.1458	126	
127	93.6250	143747.6250	SPREL	93.6250	AS	p1270	913.1458	920.9479	127	
128	93.6250	143841.2500	SPREL	93.6250	AS	p1280	920.9479	928.7500	128	
129	93.6250	143934.8750	SPREL	93.6250	AS	p1290	928.7500	936.5521	129	
130	93.6250	144028.5000	SPREL	93.6250	AS	p1300	936.5521	944.3542	130	
131	93.6250	144122.1250	SPREL	93.6250	AS	p1310	944.3542	952.1563	131	
132	93.6250	144215.7500	SPREL	93.6250	AS	p1320	952.1563	959.9583	132	
133	93.6250	144309.3750	SPREL	93.6250	AS	p1330	959.9583	967.7604	133	
134	93.6250	144403.0000	SPREL	93.6250	AS	p1340	967.7604	975.5625	134	
135	93.6250	144496.6250	SPREL	93.6250	AS	p1350	975.5625	983.3646	135	
136	93.6250	144590.2500	SPREL	93.6250	AS	p1360	983.3646	991.1667	136	
137	93.6250	144683.8750	SPREL	93.6250	AS	p1370	991.1667	998.9688	137	
138	93.6250	144777.5000	SPREL	93.6250	AS	p1380	998.9688	1006.7708	138	
139	93.6250	144871.1250	SPREL	93.6250	AS	p1390	1006.7708	1014.5729	139	
140	93.6250	144964.7500	SPREL	93.6250	AS	p1400	1014.5729	1022.3750	140	
141	93.6250	145058.3750	SPREL	93.6250	AS	p1410	1022.3750	1030.1771	141	
142	93.6250	145152.0000	SPREL	93.6250	AS	p1420	1030.1771	1032.6771	142	
143	30.0000	145182.0000	SPREL	30.0000	AS	p1430	1032.6771	1035.1771	143	
144	30.0000	145212.0000	SPREL	30.0000	AS	p1440	1035.1771	1042.9792	144	PIER 7
145	93.6250	145305.6250	SPREL	93.6250	AS	p1450	1042.9792	1050.7813	145	
146	93.6250	145399.2500	SPREL	93.6250	AS	p1460	1050.7813	1058.5833	146	
147	93.6250	145492.8750	SPREL	93.6250	AS	p1470	1058.5833	1066.3854	147	
148	93.6250	145586.5000	SPREL	93.6250	AS	p1480	1066.3854	1074.1875	148	
149	93.6250	145680.1250	SPREL	93.6250	AS	p1490	1074.1875	1081.9896	149	
150	93.6250	145773.7500	SPREL	93.6250	AS	p1500	1081.9896	1089.7917	150	
151	93.6250	145867.3750	SPREL	93.6250	AS	p1510	1089.7917	1097.5938	151	
152	93.6250	145961.0000	SPREL	93.6250	AS	p1520	1097.5938	1105.3958	152	
153	93.6250	146054.6250	SPREL	93.6250	AS	p1530	1105.3958	1113.1979	153	
154	93.6250	146148.2500	SPREL	93.6250	AS	p1540	1113.1979	1121.0000	154	
155	93.6250	146241.8750	SPREL	93.6250	AS	p1550	1121.0000	1128.8021	155	
156	93.6250	146335.5000	SPREL	93.6250	AS	p1560	1128.8021	1136.6042	156	

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NODE	DX	STATION 132789.8750						ELEM BEGIN	ELEM END	ELEM NO.			
157	93.6250	146429.1250	SPREL	93.6250	AS	p1570		1136.6042	1144.4063	157			
158	93.6250	146522.7500	SPREL	93.6250	AS	p1580		1144.4063	1152.2083	158			
159	93.6250	146616.3750	SPREL	93.6250	AS	p1590		1152.2083	1160.0104	159			
160	93.6250	146710.0000	SPREL	93.6250	AS	p1600		1160.0104	1163.3021	160			
161	39.5000	146749.5000	SPREL	39.5000	AS	p1610		1163.3021	1171.1042	161			
162	93.6250	146843.1250	SPREL	93.6250	AS	p1620		1171.1042	1178.9063	162			
163	93.6250	146936.7500	SPREL	93.6250	AS	p1630		1178.9063	1186.7083	163			
164	93.6250	147030.3750	SPREL	93.6250	AS	p1640		1186.7083	1194.5104	164			
165	93.6250	147124.0000	SPREL	93.6250	AS	p1650		1194.5104	1202.3125	165			
166	93.6250	147217.6250	SPREL	93.6250	AS	p1660		1202.3125	1210.1146	166			
167	93.6250	147311.2500	SPREL	93.6250	AS	p1670		1210.1146	1217.9167	167			
168	93.6250	147404.8750	SPREL	93.6250	AS	p1680		1217.9167	1225.7188	168			
169	93.6250	147498.5000	SPREL	93.6250	AS	p1690		1225.7188	1233.5208	169			
170	93.6250	147592.1250	SPREL	93.6250	AS	p1700		1233.5208	1241.3229	170			
171	93.6250	147685.7500	SPREL	93.6250	AS	p1710		1241.3229	1249.1250	171			
172	93.6250	147779.3750	SPREL	93.6250	AS	p1720		1249.1250	1256.9271	172			
173	93.6250	147873.0000	SPABS	147873.0000	AS	p1730		1256.9271	1256.9271	173	SEGMENT 1	EJ 2	Change in C.S. at 147873.0000
1	0.0000	147873.0000	SPABS	147873.0000	AS	p10		1256.9271	1264.7292	174	SEGMENT 2		
2	93.6250	147966.6250	SPREL	93.6250	AS	p20		1264.7292	1272.5313	175			
3	93.6250	148060.2500	SPREL	93.6250	AS	p30		1272.5313	1280.3333	176			
4	93.6250	148153.8750	SPREL	93.6250	AS	p40		1280.3333	1288.1354	177			
5	93.6250	148247.5000	SPREL	93.6250	AS	p50		1288.1354	1295.9271	178			
6	93.5000	148341.0000	SPREL	93.5000	AS	p60		1295.9271	1298.4271	179			
7	30.0000	148371.0000	SPREL	30.0000	AS	p70		1298.4271	1300.9271	180		PIER 8	
8	30.0000	148401.0000	SPREL	30.0000	AS	p80		1300.9271	1308.7292	181			
9	93.6250	148494.6250	SPREL	93.6250	AS	p90		1308.7292	1316.5313	182			
10	93.6250	148588.2500	SPREL	93.6250	AS	p100		1316.5313	1324.3333	183			
11	93.6250	148681.8750	SPREL	93.6250	AS	p110		1324.3333	1332.1354	184			
12	93.6250	148775.5000	SPREL	93.6250	AS	p120		1332.1354	1339.9375	185			
13	93.6250	148869.1250	SPREL	93.6250	AS	p130		1339.9375	1347.7396	186			
14	93.6250	148962.7500	SPREL	93.6250	AS	p140		1347.7396	1355.5417	187			
15	93.6250	149056.3750	SPREL	93.6250	AS	p150		1355.5417	1363.3438	188			
16	93.6250	149150.0000	SPREL	93.6250	AS	p160		1363.3438	1371.1458	189			
17	93.6250	149243.6250	SPREL	93.6250	AS	p170		1371.1458	1378.9479	190			
18	93.6250	149337.2500	SPREL	93.6250	AS	p180		1378.9479	1386.7500	191			
19	93.6250	149430.8750	SPREL	93.6250	AS	p190		1386.7500	1394.5521	192			
20	93.6250	149524.5000	SPREL	93.6250	AS	p200		1394.5521	1402.3542	193			
21	93.6250	149618.1250	SPREL	93.6250	AS	p210		1402.3542	1410.1563	194			
22	93.6250	149711.7500	SPREL	93.6250	AS	p220		1410.1563	1417.9583	195			
23	93.6250	149805.3750	SPREL	93.6250	AS	p230		1417.9583	1425.7604	196			
24	93.6250	149899.0000	SPREL	93.6250	AS	p240		1425.7604	1429.0417	197			
25	39.3750	149938.3750	SPREL	39.3750	AS	p250		1429.0417	1436.8438	198			
26	93.6250	150032.0000	SPREL	93.6250	AS	p260		1436.8438	1444.6458	199			
27	93.6250	150125.6250	SPREL	93.6250	AS	p270		1444.6458	1452.4479	200			
28	93.6250	150219.2500	SPREL	93.6250	AS	p280		1452.4479	1460.2500	201			
29	93.6250	150312.8750	SPREL	93.6250	AS	p290		1460.2500	1468.0521	202			
30	93.6250	150406.5000	SPREL	93.6250	AS	p300		1468.0521	1475.8542	203			
31	93.6250	150500.1250	SPREL	93.6250	AS	p310		1475.8542	1483.6563	204			
32	93.6250	150593.7500	SPREL	93.6250	AS	p320		1483.6563	1491.4583	205			
33	93.6250	150687.3750	SPREL	93.6250	AS	p330		1491.4583	1499.2604	206			
34	93.6250	150781.0000	SPREL	93.6250	AS	p340		1499.2604	1507.0625	207			
35	93.6250	150874.6250	SPREL	93.6250	AS	p350		1507.0625	1514.8646	208			

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NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
36	93.6250	150968.2500	SPREL	93.6250	AS	p360	1514.8646	1522.6667	209	
37	93.6250	151061.8750	SPREL	93.6250	AS	p370	1522.6667	1530.4688	210	
38	93.6250	151155.5000	SPREL	93.6250	AS	p380	1530.4688	1538.2708	211	
39	93.6250	151249.1250	SPREL	93.6250	AS	p390	1538.2708	1546.0729	212	
40	93.6250	151342.7500	SPREL	93.6250	AS	p400	1546.0729	1553.8750	213	
41	93.6250	151436.3750	SPREL	93.6250	AS	p410	1553.8750	1556.3750	214	
42	30.0000	151466.3750	SPREL	30.0000	AS	p420	1556.3750	1558.8750	215	
43	30.0000	151496.3750	SPREL	30.0000	AS	p430	1558.8750	1566.6771	216	PIER 9
44	93.6250	151590.0000	SPREL	93.6250	AS	p440	1566.6771	1574.4792	217	
45	93.6250	151683.6250	SPREL	93.6250	AS	p450	1574.4792	1582.2813	218	
46	93.6250	151777.2500	SPREL	93.6250	AS	p460	1582.2813	1590.0833	219	
47	93.6250	151870.8750	SPREL	93.6250	AS	p470	1590.0833	1597.8854	220	
48	93.6250	151964.5000	SPREL	93.6250	AS	p480	1597.8854	1605.6875	221	
49	93.6250	152058.1250	SPREL	93.6250	AS	p490	1605.6875	1613.4896	222	
50	93.6250	152151.7500	SPREL	93.6250	AS	p500	1613.4896	1621.2917	223	
51	93.6250	152245.3750	SPREL	93.6250	AS	p510	1621.2917	1629.0938	224	
52	93.6250	152339.0000	SPREL	93.6250	AS	p520	1629.0938	1636.8958	225	
53	93.6250	152432.6250	SPREL	93.6250	AS	p530	1636.8958	1644.6979	226	
54	93.6250	152526.2500	SPREL	93.6250	AS	p540	1644.6979	1652.5000	227	
55	93.6250	152619.8750	SPREL	93.6250	AS	p550	1652.5000	1660.3021	228	
56	93.6250	152713.5000	SPREL	93.6250	AS	p560	1660.3021	1668.1042	229	
57	93.6250	152807.1250	SPREL	93.6250	AS	p570	1668.1042	1675.9063	230	
58	93.6250	152900.7500	SPREL	93.6250	AS	p580	1675.9063	1683.7083	231	
59	93.6250	152994.3750	SPREL	93.6250	AS	p590	1683.7083	1691.5104	232	
60	93.6250	153088.0000	SPREL	93.6250	AS	p600	1691.5104	1697.8333	233	
61	75.8750	153163.8750	SPREL	75.8750	AS	p610	1697.8333	1705.6354	234	
62	93.6250	153257.5000	SPREL	93.6250	AS	p620	1705.6354	1713.4375	235	
63	93.6250	153351.1250	SPREL	93.6250	AS	p630	1713.4375	1721.2396	236	
64	93.6250	153444.7500	SPREL	93.6250	AS	p640	1721.2396	1729.0417	237	
65	93.6250	153538.3750	SPREL	93.6250	AS	p650	1729.0417	1736.8438	238	
66	93.6250	153632.0000	SPREL	93.6250	AS	p660	1736.8438	1744.6458	239	
67	93.6250	153725.6250	SPREL	93.6250	AS	p670	1744.6458	1752.4479	240	
68	93.6250	153819.2500	SPREL	93.6250	AS	p680	1752.4479	1760.2500	241	
69	93.6250	153912.8750	SPREL	93.6250	AS	p690	1760.2500	1768.0521	242	
70	93.6250	154006.5000	SPREL	93.6250	AS	p700	1768.0521	1775.8542	243	
71	93.6250	154100.1250	SPREL	93.6250	AS	p710	1775.8542	1783.6563	244	
72	93.6250	154193.7500	SPREL	93.6250	AS	p720	1783.6563	1791.4583	245	
73	93.6250	154287.3750	SPREL	93.6250	AS	p730	1791.4583	1799.2604	246	
74	93.6250	154381.0000	SPREL	93.6250	AS	p740	1799.2604	1807.0625	247	
75	93.6250	154474.6250	SPREL	93.6250	AS	p750	1807.0625	1814.8646	248	
76	93.6250	154568.2500	SPREL	93.6250	AS	p760	1814.8646	1822.6667	249	
77	93.6250	154661.8750	SPREL	93.6250	AS	p770	1822.6667	1830.4687	250	
78	93.6250	154755.5000	SPREL	93.6250	AS	p780	1830.4687	1838.2708	251	
79	93.6250	154849.1250	SPREL	93.6250	AS	p790	1838.2708	1840.7708	252	
80	30.0000	154879.1250	SPREL	30.0000	AS	p800	1840.7708	1843.2708	253	
81	30.0000	154909.1250	SPREL	30.0000	AS	p810	1843.2708	1851.0729	254	PIER 10
82	93.6250	155002.7500	SPREL	93.6250	AS	p820	1851.0729	1858.8750	255	
83	93.6250	155096.3750	SPREL	93.6250	AS	p830	1858.8750	1866.6771	256	
84	93.6250	155190.0000	SPREL	93.6250	AS	p840	1866.6771	1874.4792	257	
85	93.6250	155283.6250	SPREL	93.6250	AS	p850	1874.4792	1882.2812	258	
86	93.6250	155377.2500	SPREL	93.6250	AS	p860	1882.2812	1890.0833	259	
87	93.6250	155470.8750	SPREL	93.6250	AS	p870	1890.0833	1897.8854	260	

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JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.
88	93.6250	155564.5000	SPREL	93.6250	AS	p880	1897.8854	1905.6875	261
89	93.6250	155658.1250	SPREL	93.6250	AS	p890	1905.6875	1913.4896	262
90	93.6250	155751.7500	SPREL	93.6250	AS	p900	1913.4896	1921.2917	263
91	93.6250	155845.3750	SPREL	93.6250	AS	p910	1921.2917	1929.0937	264
92	93.6250	155939.0000	SPREL	93.6250	AS	p920	1929.0937	1936.8958	265
93	93.6250	156032.6250	SPREL	93.6250	AS	p930	1936.8958	1944.6979	266
94	93.6250	156126.2500	SPREL	93.6250	AS	p940	1944.6979	1952.5000	267
95	93.6250	156219.8750	SPREL	93.6250	AS	p950	1952.5000	1960.3021	268
96	93.6250	156313.5000	SPREL	93.6250	AS	p960	1960.3021	1968.1042	269
97	93.6250	156407.1250	SPREL	93.6250	AS	p970	1968.1042	1975.9062	270
98	93.6250	156500.7500	SPREL	93.6250	AS	p980	1975.9062	1983.7083	271
99	93.6250	156594.3750	SPREL	93.6250	AS	p990	1983.7083	1990.0312	272
100	75.8750	156670.2500	SPREL	75.8750	AS	p1000	1990.0312	1997.8333	273
101	93.6250	156763.8750	SPREL	93.6250	AS	p1010	1997.8333	2005.6354	274
102	93.6250	156857.5000	SPREL	93.6250	AS	p1020	2005.6354	2013.4375	275
103	93.6250	156951.1250	SPREL	93.6250	AS	p1030	2013.4375	2021.2396	276
104	93.6250	157044.7500	SPREL	93.6250	AS	p1040	2021.2396	2029.0417	277
105	93.6250	157138.3750	SPREL	93.6250	AS	p1050	2029.0417	2036.8437	278
106	93.6250	157232.0000	SPREL	93.6250	AS	p1060	2036.8437	2044.6458	279
107	93.6250	157325.6250	SPREL	93.6250	AS	p1070	2044.6458	2052.4479	280
108	93.6250	157419.2500	SPREL	93.6250	AS	p1080	2052.4479	2060.2500	281
109	93.6250	157512.8750	SPREL	93.6250	AS	p1090	2060.2500	2068.0521	282
110	93.6250	157606.5000	SPREL	93.6250	AS	p1100	2068.0521	2075.8542	283
111	93.6250	157700.1250	SPREL	93.6250	AS	p1110	2075.8542	2083.6562	284
112	93.6250	157793.7500	SPREL	93.6250	AS	p1120	2083.6562	2091.4583	285
113	93.6250	157887.3750	SPREL	93.6250	AS	p1130	2091.4583	2099.2604	286
114	93.6250	157981.0000	SPREL	93.6250	AS	p1140	2099.2604	2107.0625	287
115	93.6250	158074.6250	SPREL	93.6250	AS	p1150	2107.0625	2114.8646	288
116	93.6250	158168.2500	SPREL	93.6250	AS	p1160	2114.8646	2122.6667	289
117	93.6250	158261.8750	SPREL	93.6250	AS	p1170	2122.6667	2130.4687	290
118	93.6250	158355.5000	SPREL	93.6250	AS	p1180	2130.4687	2132.9687	291
119	30.0000	158385.5000	SPREL	30.0000	AS	p1190	2132.9687	2135.4687	292
120	30.0000	158415.5000	SPREL	30.0000	AS	p1200	2135.4687	2143.2708	293
121	93.6250	158509.1250	SPREL	93.6250	AS	p1210	2143.2708	2151.0729	294
122	93.6250	158602.7500	SPREL	93.6250	AS	p1220	2151.0729	2158.8750	295
123	93.6250	158696.3750	SPREL	93.6250	AS	p1230	2158.8750	2166.6771	296
124	93.6250	158790.0000	SPREL	93.6250	AS	p1240	2166.6771	2174.4792	297
125	93.6250	158883.6250	SPREL	93.6250	AS	p1250	2174.4792	2182.2813	298
126	93.6250	158977.2500	SPREL	93.6250	AS	p1260	2182.2813	2190.0833	299
127	93.6250	159070.8750	SPREL	93.6250	AS	p1270	2190.0833	2197.8854	300
128	93.6250	159164.5000	SPREL	93.6250	AS	p1280	2197.8854	2205.6875	301
129	93.6250	159258.1250	SPREL	93.6250	AS	p1290	2205.6875	2213.4896	302
130	93.6250	159351.7500	SPREL	93.6250	AS	p1300	2213.4896	2221.2917	303
131	93.6250	159445.3750	SPREL	93.6250	AS	p1310	2221.2917	2229.0938	304
132	93.6250	159539.0000	SPREL	93.6250	AS	p1320	2229.0938	2236.8958	305
133	93.6250	159632.6250	SPREL	93.6250	AS	p1330	2236.8958	2244.6979	306
134	93.6250	159726.2500	SPREL	93.6250	AS	p1340	2244.6979	2252.5000	307
135	93.6250	159819.8750	SPREL	93.6250	AS	p1350	2252.5000	2260.3021	308
136	93.6250	159913.5000	SPREL	93.6250	AS	p1360	2260.3021	2268.1042	309
137	93.6250	160007.1250	SPREL	93.6250	AS	p1370	2268.1042	2275.9063	310
138	93.6250	160100.7500	SPREL	93.6250	AS	p1380	2275.9063	2283.7083	311
139	93.6250	160194.3750	SPREL	93.6250	AS	p1390	2283.7083	2290.0313	312

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URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.					
		132789.8750													
140	75.8750	160270.2500	SPREL	75.8750	AS	p1400		2290.0313	2297.8333	313					
141	93.6250	160363.8750	SPREL	93.6250	AS	p1410		2297.8333	2305.6354	314					
142	93.6250	160457.5000	SPREL	93.6250	AS	p1420		2305.6354	2313.4375	315					
143	93.6250	160551.1250	SPREL	93.6250	AS	p1430		2313.4375	2321.2396	316					
144	93.6250	160644.7500	SPREL	93.6250	AS	p1440		2321.2396	2329.0417	317					
145	93.6250	160738.3750	SPREL	93.6250	AS	p1450		2329.0417	2336.8438	318					
146	93.6250	160832.0000	SPREL	93.6250	AS	p1460		2336.8438	2344.6458	319					
147	93.6250	160925.6250	SPREL	93.6250	AS	p1470		2344.6458	2352.4479	320					
148	93.6250	161019.2500	SPREL	93.6250	AS	p1480		2352.4479	2360.2500	321					
149	93.6250	161112.8750	SPREL	93.6250	AS	p1490		2360.2500	2368.0521	322					
150	93.6250	161206.5000	SPREL	93.6250	AS	p1500		2368.0521	2375.8542	323					
151	93.6250	161300.1250	SPABS	161300.1250	AS	p1510		2375.8542	2375.8542	324	SEGMENT 2				
1	0.0000	161300.1250	SPABS	161300.1250	AS	p10		2375.8542	2383.6563	325	SEGMENT 3		EJ 3		0
2	93.6250	161393.7500	SPREL	93.6250	AS	p20		2383.6563	2391.4583	326					7.802083
3	93.6250	161487.3750	SPREL	93.6250	AS	p30		2391.4583	2399.2604	327					7.802083
4	93.6250	161581.0000	SPREL	93.6250	AS	p40		2399.2604	2407.0625	328					7.802083
5	93.6250	161674.6250	SPREL	93.6250	AS	p50		2407.0625	2414.8646	329					7.802083
6	93.6250	161768.2500	SPREL	93.6250	AS	p60		2414.8646	2422.6667	330					7.802083
7	93.6250	161861.8750	SPREL	93.6250	AS	p70		2422.6667	2425.1667	331					7.802083
8	30.0000	161891.8750	SPREL	30.0000	AS	p80		2425.1667	2427.6667	332			PIER 12		2.5
9	30.0000	161921.8750	SPREL	30.0000	AS	p90		2427.6667	2434.8021	333	30.0000				2.5
10	85.6250	162007.5000	SPREL	85.6250	AS	p100		2434.8021	2442.6042	334	115.6250	180	56.375		7.135417
11	93.6250	162101.1250	SPREL	93.6250	AS	p110		2442.6042	2450.4063	335	209.2500				7.802083
12	93.6250	162194.7500	SPREL	93.6250	AS	p120		2450.4063	2458.2083	336	302.8750	360	49.125		7.802083
13	93.6250	162288.3750	SPREL	93.6250	AS	p130		2458.2083	2466.0104	337	396.5000				7.802083
14	93.6250	162382.0000	SPREL	93.6250	AS	p140		2466.0104	2473.8125	338	490.1250	540	41.875		7.802083
15	93.6250	162475.6250	SPREL	93.6250	AS	p150		2473.8125	2481.6146	339	583.7500				7.802083
16	93.6250	162569.2500	SPREL	93.6250	AS	p160		2481.6146	2489.4167	340	677.3750				7.802083
17	93.6250	162662.8750	SPREL	93.6250	AS	p170		2489.4167	2497.2188	341	771				7.802083
18	**93.6250**	**162756.5000**	**SPREL**	**93.6250**	**AS**	**p180**		**2497.2188**	**2505.0208**	**342**	**864.625**				7.802083
19	93.6250	162850.1250	SPREL	93.6250	AS	p190		2505.0208	2512.8229	343	958.25				7.802083
20	93.6250	162943.7500	SPREL	93.6250	AS	p200		2512.8229	2520.6250	344	1051.875				7.802083
21	93.6250	163037.3750	SPREL	93.6250	AS	p210		2520.6250	2526.6979	345	1145.5				7.802083
22	72.8750	163110.2500	SPREL	72.8750	AS	p220		2526.6979	2532.6979	346	1218.375	1226.375			6.072917
23	72.0000	163182.2500	SPREL	72.0000	AS	p230		2532.6979	2544.0313	347					6
24	136.0000	163318.2500	SPREL	136.0000	AS	p240		2544.0313	2551.8333	348	2208.0000	2208	42.375		11.33333
25	93.6250	163411.8750	SPREL	93.6250	AS	p250		2551.8333	2559.6354	349	2072.0000				7.802083
26	93.6250	163505.5000	SPREL	93.6250	AS	p260		2559.6354	2567.4375	350	1978.3750				7.802083
27	93.6250	163599.1250	SPREL	93.6250	AS	p270		2567.4375	2570.6979	351	1884.7500				7.802083
28	**39.1250**	**163638.2500**	**SPREL**	**39.1250**	**AS**	**p280**		**2570.6979**	**2573.7604**	**352**	1791.1250				3.260417
29	36.7500	163675.0000	SPREL	36.7500	AS	p290		2573.7604	2581.5625	353	1752.0000	1752	36.75		3.0625
30	93.6250	163768.6250	SPREL	93.6250	AS	p300		2581.5625	2589.3646	354	1715.2500		1715.25		7.802083
31	93.6250	163862.2500	SPREL	93.6250	AS	p310		2589.3646	2597.1667	355	1621.6250				7.802083
32	93.6250	163955.8750	SPREL	93.6250	AS	p320		2597.1667	2608.6979	356	1528.0000				7.802083
33	138.3750	164094.2500	SPREL	138.3750	AS	p330		2608.6979	2620.5729	357	1434.3750				11.53125
34	142.5000	164236.7500	SPREL	142.5000	AS	p340		2620.5729	2628.3750	358	1296.0000	1296	48.875		11.875
35	93.6250	164330.3750	SPREL	93.6250	AS	p350		2628.3750	2640.6979	359	1153.5000				7.802083
36	147.8750	164478.2500	SPREL	147.8750	AS	p360		2640.6979	2643.9792	360	1059.8750				12.32292
37	39.3750	164517.6250	SPREL	39.3750	AS	p370		2643.9792	2651.7813	361	912.0000	912	54.25		3.28125
38	**93.6250**	**164611.2500**	**SPREL**	**93.6250**	**AS**	**p380**		**2651.7813**	**2659.5833**	**362**	**872.6250**				
39	93.6250	164704.8750	SPREL	93.6250	AS	p390		2659.5833	2667.3854	363	779.0000				
40	93.6250	164798.5000	SPREL	93.6250	AS	p400		2667.3854	2672.6979	364	685.3750				

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JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.					
41	63.7500	164862.2500	SPREL	63.7500	AS	p410	2672.6979	2682.9896	365	591.7500				
42	123.5000	164985.7500	SPREL	123.5000	AS	p420	2682.9896	2690.7917	366	528.0000	528	29.875		
43	93.6250	165079.3750	SPREL	93.6250	AS	p430	2690.7917	2698.5938	367	404.5000				
44	93.6250	165173.0000	SPREL	93.6250	AS	p440	2698.5938	2706.3958	368	310.8750				
45	93.6250	165266.6250	SPREL	93.6250	AS	p450	2706.3958	2714.1979	369	217.2500				
46	93.6250	165360.2500	SPREL	93.6250	AS	p460	2714.1979	2716.6979	370	123.6250				
47	30.0000	165390.2500	SPREL	30.0000	AS	p470	2716.6979	2719.1979	371	30.0000		PIER 13		
48	30.0000	165420.2500	SPREL	30.0000	AS	p480	2719.1979	2726.6979	372					
49	90.0000	165510.2500	SPREL	90.0000	AS	p490	2726.6979	2741.1979	373					
50	174.0000	165684.2500	SPREL	174.0000	AS	p500	2741.1979	2755.6979	374					
51	174.0000	165858.2500	SPREL	174.0000	AS	p510	2755.6979	2770.1979	375					
52	174.0000	166032.2500	SPREL	174.0000	AS	p520	2770.1979	2784.6979	376					
53	174.0000	166206.2500	SPREL	174.0000	AS	p530	2784.6979	2799.1979	377					
54	174.0000	166380.2500	SPREL	174.0000	AS	p540	2799.1979	2813.6979	378					
55	174.0000	166554.2500	SPREL	174.0000	AS	p550	2813.6979	2828.1979	379					
56	174.0000	166728.2500	SPREL	174.0000	AS	p560	2828.1979	2842.6979	380					
57	174.0000	166902.2500	SPREL	174.0000	AS	p570	2842.6979	2857.1979	381					
58	174.0000	167076.2500	SPREL	174.0000	AS	p580	2857.1979	2871.6979	382					
59	174.0000	167250.2500	SPREL	174.0000	AS	p590	2871.6979	2877.3021	383					
60	67.2500	167317.5000	SPREL	67.2500	AS	p600	2877.3021	2891.8021	384					
61	174.0000	167491.5000	SPREL	174.0000	AS	p610	2891.8021	2906.3021	385					
62	174.0000	167665.5000	SPREL	174.0000	AS	p620	2906.3021	2920.8021	386					
63	174.0000	167839.5000	SPREL	174.0000	AS	p630	2920.8021	2935.3021	387					
64	174.0000	168013.5000	SPREL	174.0000	AS	p640	2935.3021	2949.8021	388					
65	174.0000	168187.5000	SPREL	174.0000	AS	p650	2949.8021	2964.3021	389					
66	174.0000	168361.5000	SPREL	174.0000	AS	p660	2964.3021	2978.8021	390					
67	174.0000	168535.5000	SPREL	174.0000	AS	p670	2978.8021	2993.3021	391					
68	174.0000	168709.5000	SPREL	174.0000	AS	p680	2993.3021	3007.8021	392					
69	174.0000	168883.5000	SPREL	174.0000	AS	p690	3007.8021	3022.3021	393					
70	174.0000	169057.5000	SPREL	174.0000	AS	p700	3022.3021	3029.8021	394					
71	90.0000	169147.5000	SPREL	90.0000	AS	p710	3029.8021	3032.3021	395					
72	30.0000	169177.5000	SPREL	30.0000	AS	p720	3032.3021	3034.8021	396			PIER 14	Change in C.S. at 169185.5	
73	30.0000	169207.5000	SPREL	30.0000	AS	p730	3034.8021	3042.6042	397					
74	93.6250	169301.1250	SPREL	93.6250	AS	p740	3042.6042	3050.4063	398					
75	93.6250	169394.7500	SPREL	93.6250	AS	p750	3050.4063	3058.2083	399					
76	93.6250	169488.3750	SPREL	93.6250	AS	p760	3058.2083	3066.0104	400					
77	93.6250	169582.0000	SPREL	93.6250	AS	p770	3066.0104	3073.8125	401					
78	93.6250	169675.6250	SPREL	93.6250	AS	p780	3073.8125	3081.6146	402					
79	93.6250	169769.2500	SPREL	93.6250	AS	p790	3081.6146	3089.4167	403					
80	93.6250	169862.8750	SPREL	93.6250	AS	p800	3089.4167	3097.2188	404					
81	93.6250	169956.5000	SPREL	93.6250	AS	p810	3097.2188	3105.0208	405					
82	93.6250	170050.1250	SPREL	93.6250	AS	p820	3105.0208	3112.8229	406					
83	93.6250	170143.7500	SPREL	93.6250	AS	p830	3112.8229	3120.6250	407					
84	93.6250	170237.3750	SPREL	93.6250	AS	p840	3120.6250	3128.4271	408					
85	93.6250	170331.0000	SPREL	93.6250	AS	p850	3128.4271	3136.2292	409					
86	93.6250	170424.6250	SPREL	93.6250	AS	p860	3136.2292	3144.0313	410					
87	93.6250	170518.2500	SPREL	93.6250	AS	p870	3144.0313	3151.8333	411					
88	93.6250	170611.8750	SPREL	93.6250	AS	p880	3151.8333	3159.6354	412					
89	93.6250	170705.5000	SPREL	93.6250	AS	p890	3159.6354	3167.4375	413					
90	93.6250	170799.1250	SPREL	93.6250	AS	p900	3167.4375	3175.2396	414					
91	93.6250	170892.7500	SPREL	93.6250	AS	p910	3175.2396	3183.0417	415					
92	93.6250	170986.3750	SPREL	93.6250	AS	p920	3183.0417	3187.7708	416					

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		132789.8750									
93	56.7500	171043.1250	SPREL	56.7500	AS	p930	3187.7708	3195.5729	417		
94	93.6250	171136.7500	SPREL	93.6250	AS	p940	3195.5729	3203.3750	418		
95	93.6250	171230.3750	SPREL	93.6250	AS	p950	3203.3750	3211.1771	419		
96	93.6250	171324.0000	SPREL	93.6250	AS	p960	3211.1771	3218.9792	420		
97	93.6250	171417.6250	SPREL	93.6250	AS	p970	3218.9792	3226.7813	421		
98	93.6250	171511.2500	SPREL	93.6250	AS	p980	3226.7813	3234.5833	422		
99	93.6250	171604.8750	SPREL	93.6250	AS	p990	3234.5833	3242.3854	423		
100	93.6250	171698.5000	SPREL	93.6250	AS	p1000	3242.3854	3250.1875	424		
101	93.6250	171792.1250	SPREL	93.6250	AS	p1010	3250.1875	3257.9896	425		
102	93.6250	171885.7500	SPREL	93.6250	AS	p1020	3257.9896	3265.7917	426		
103	93.6250	171979.3750	SPREL	93.6250	AS	p1030	3265.7917	3273.5938	427		
104	93.6250	172073.0000	SPREL	93.6250	AS	p1040	3273.5938	3281.3958	428		
105	93.6250	172166.6250	SPREL	93.6250	AS	p1050	3281.3958	3289.1979	429		
106	93.6250	172260.2500	SPREL	93.6250	AS	p1060	3289.1979	3297.0000	430		
107	93.6250	172353.8750	SPREL	93.6250	AS	p1070	3297.0000	3304.8021	431		
108	93.6250	172447.5000	SPREL	93.6250	AS	p1080	3304.8021	3312.6042	432		
109	93.6250	172541.1250	SPREL	93.6250	AS	p1090	3312.6042	3320.4063	433		
110	93.6250	172634.7500	SPREL	93.6250	AS	p1100	3320.4063	3322.9063	434		
111	30.0000	172664.7500	SPREL	30.0000	AS	p1110	3322.9063	3325.4063	435		
112	30.0000	172694.7500	SPREL	30.0000	AS	p1120	3325.4063	3333.2083	436		PIER 15
113	93.6250	172788.3750	SPREL	93.6250	AS	p1130	3333.2083	3341.0104	437		
114	93.6250	172882.0000	SPREL	93.6250	AS	p1140	3341.0104	3348.8125	438		
115	93.6250	172975.6250	SPREL	93.6250	AS	p1150	3348.8125	3356.6146	439		
116	93.6250	173069.2500	SPREL	93.6250	AS	p1160	3356.6146	3364.4167	440		
117	93.6250	173162.8750	SPABS	173162.8750	AS	p1170	3364.4167	3364.4167	441	SEGMENT 3	
1	0.0000	173162.8750	SPABS	173162.8750	AS	p10	3364.4167	3372.2188	442	SEGMENT 4	EJ 5
2	93.6250	173256.5000	SPREL	93.6250	AS	p20	3372.2188	3380.0208	443		
3	93.6250	173350.1250	SPREL	93.6250	AS	p30	3380.0208	3386.2188	444		
4	74.3750	173424.5000	SPREL	74.3750	AS	p40	3386.2188	3392.4167	445		
5	74.3750	173498.8750	SPREL	74.3750	AS	p50	3392.4167	3400.2188	446		
6	93.6250	173592.5000	SPREL	93.6250	AS	p60	3400.2188	3408.0208	447		
7	93.6250	173686.1250	SPREL	93.6250	AS	p70	3408.0208	3415.8229	448		
8	93.6250	173779.7500	SPREL	93.6250	AS	p80	3415.8229	3423.6250	449		
9	93.6250	173873.3750	SPREL	93.6250	AS	p90	3423.6250	3431.4271	450		
10	93.6250	173967.0000	SPREL	93.6250	AS	p100	3431.4271	3439.2292	451		
11	93.6250	174060.6250	SPREL	93.6250	AS	p110	3439.2292	3447.0313	452		Change in C.S. at around 174000
12	93.6250	174154.2500	SPREL	93.6250	AS	p120	3447.0313	3454.8333	453		
13	93.6250	174247.8750	SPREL	93.6250	AS	p130	3454.8333	3456.7813	454		
14	23.3750	174271.2500	SPREL	23.3750	AS	p140	3456.7813	3464.5833	455		
15	93.6250	174364.8750	SPREL	93.6250	AS	p150	3464.5833	3472.3854	456		
16	93.6250	174458.5000	SPREL	93.6250	AS	p160	3472.3854	3480.1875	457		
17	93.6250	174552.1250	SPREL	93.6250	AS	p170	3480.1875	3487.9896	458		
18	93.6250	174645.7500	SPREL	93.6250	AS	p180	3487.9896	3495.7917	459		
19	93.6250	174739.3750	SPREL	93.6250	AS	p190	3495.7917	3503.5938	460		
20	93.6250	174833.0000	SPREL	93.6250	AS	p200	3503.5938	3511.3958	461		
21	93.6250	174926.6250	SPREL	93.6250	AS	p210	3511.3958	3519.1979	462		
22	93.6250	175020.2500	SPREL	93.6250	AS	p220	3519.1979	3527.0000	463		
23	93.6250	175113.8750	SPREL	93.6250	AS	p230	3527.0000	3534.8021	464		
24	93.6250	175207.5000	SPREL	93.6250	AS	p240	3534.8021	3542.6042	465		
25	93.6250	175301.1250	SPREL	93.6250	AS	p250	3542.6042	3550.4063	466		
26	93.6250	175394.7500	SPREL	93.6250	AS	p260	3550.4063	3558.2083	467		
27	93.6250	175488.3750	SPREL	93.6250	AS	p270	3558.2083	3566.0104	468		

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JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
28	93.6250	175582.0000	SPREL	93.6250	AS	p280	3566.0104	3568.5104	469	
29	30.0000	175612.0000	SPREL	30.0000	AS	p290	3568.5104	3571.0104	470	
30	30.0000	175642.0000	SPREL	30.0000	AS	p300	3571.0104	3578.8125	471	PIER 16
31	93.6250	175735.6250	SPREL	93.6250	AS	p310	3578.8125	3586.6146	472	
32	93.6250	175829.2500	SPREL	93.6250	AS	p320	3586.6146	3594.4167	473	
33	93.6250	175922.8750	SPREL	93.6250	AS	p330	3594.4167	3602.2188	474	
34	93.6250	176016.5000	SPREL	93.6250	AS	p340	3602.2188	3610.0208	475	
35	93.6250	176110.1250	SPREL	93.6250	AS	p350	3610.0208	3617.8229	476	
36	93.6250	176203.7500	SPREL	93.6250	AS	p360	3617.8229	3625.6250	477	
37	93.6250	176297.3750	SPREL	93.6250	AS	p370	3625.6250	3633.4271	478	
38	93.6250	176391.0000	SPREL	93.6250	AS	p380	3633.4271	3641.2292	479	
39	93.6250	176484.6250	SPREL	93.6250	AS	p390	3641.2292	3649.0313	480	
40	93.6250	176578.2500	SPREL	93.6250	AS	p400	3649.0313	3656.8333	481	
41	93.6250	176671.8750	SPREL	93.6250	AS	p410	3656.8333	3664.6354	482	
42	93.6250	176765.5000	SPREL	93.6250	AS	p420	3664.6354	3672.4375	483	
43	93.6250	176859.1250	SPREL	93.6250	AS	p430	3672.4375	3679.5833	484	
44	85.7500	176944.8750	SPREL	85.7500	AS	p440	3679.5833	3687.3854	485	
45	93.6250	177038.5000	SPREL	93.6250	AS	p450	3687.3854	3695.1875	486	
46	93.6250	177132.1250	SPREL	93.6250	AS	p460	3695.1875	3702.9896	487	
47	93.6250	177225.7500	SPREL	93.6250	AS	p470	3702.9896	3710.7917	488	
48	93.6250	177319.3750	SPREL	93.6250	AS	p480	3710.7917	3718.5938	489	
49	93.6250	177413.0000	SPREL	93.6250	AS	p490	3718.5938	3726.3958	490	
50	93.6250	177506.6250	SPREL	93.6250	AS	p500	3726.3958	3734.1979	491	
51	93.6250	177600.2500	SPREL	93.6250	AS	p510	3734.1979	3742.0000	492	
52	93.6250	177693.8750	SPREL	93.6250	AS	p520	3742.0000	3749.8021	493	
53	93.6250	177787.5000	SPREL	93.6250	AS	p530	3749.8021	3757.6042	494	
54	93.6250	177881.1250	SPREL	93.6250	AS	p540	3757.6042	3765.4063	495	Change in C.S. at 177795.5
55	93.6250	177974.7500	SPREL	93.6250	AS	p550	3765.4063	3773.2083	496	
56	93.6250	178068.3750	SPREL	93.6250	AS	p560	3773.2083	3781.0104	497	
57	93.6250	178162.0000	SPREL	93.6250	AS	p570	3781.0104	3783.5104	498	
58	30.0000	178192.0000	SPREL	30.0000	AS	p580	3783.5104	3786.0104	499	
59	30.0000	178222.0000	SPREL	30.0000	AS	p590	3786.0104	3793.8125	500	PIER 17
60	93.6250	178315.6250	SPREL	93.6250	AS	p600	3793.8125	3801.6146	501	
61	93.6250	178409.2500	SPREL	93.6250	AS	p610	3801.6146	3809.4167	502	
62	93.6250	178502.8750	SPREL	93.6250	AS	p620	3809.4167	3817.2188	503	
63	93.6250	178596.5000	SPREL	93.6250	AS	p630	3817.2188	3825.0208	504	
64	93.6250	178690.1250	SPREL	93.6250	AS	p640	3825.0208	3832.8229	505	
65	93.6250	178783.7500	SPREL	93.6250	AS	p650	3832.8229	3840.6250	506	
66	93.6250	178877.3750	SPREL	93.6250	AS	p660	3840.6250	3848.4271	507	
67	93.6250	178971.0000	SPREL	93.6250	AS	p670	3848.4271	3856.2292	508	
68	93.6250	179064.6250	SPREL	93.6250	AS	p680	3856.2292	3864.0313	509	
69	93.6250	179158.2500	SPREL	93.6250	AS	p690	3864.0313	3871.8333	510	
70	93.6250	179251.8750	SPREL	93.6250	AS	p700	3871.8333	3879.6354	511	
71	93.6250	179345.5000	SPREL	93.6250	AS	p710	3879.6354	3887.4375	512	
72	93.6250	179439.1250	SPREL	93.6250	AS	p720	3887.4375	3894.5833	513	
73	85.7500	179524.8750	SPREL	85.7500	AS	p730	3894.5833	3902.3854	514	
74	93.6250	179618.5000	SPREL	93.6250	AS	p740	3902.3854	3910.1875	515	
75	93.6250	179712.1250	SPREL	93.6250	AS	p750	3910.1875	3917.9896	516	Change in cross section at 179699.76
76	93.6250	179805.7500	SPREL	93.6250	AS	p760	3917.9896	3925.7917	517	
77	93.6250	179899.3750	SPREL	93.6250	AS	p770	3925.7917	3933.5938	518	
78	93.6250	179993.0000	SPREL	93.6250	AS	p780	3933.5938	3941.3958	519	
79	93.6250	180086.6250	SPREL	93.6250	AS	p790	3941.3958	3949.1979	520	

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JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.	
80	93.6250	180180.2500	SPREL	93.6250	AS	p800	3949.1979	3957.0000	521	
81	93.6250	180273.8750	SPREL	93.6250	AS	p810	3957.0000	3964.8021	522	
82	93.6250	180367.5000	SPREL	93.6250	AS	p820	3964.8021	3972.6042	523	
83	93.6250	180461.1250	SPREL	93.6250	AS	p830	3972.6042	3980.4063	524	
84	93.6250	180554.7500	SPREL	93.6250	AS	p840	3980.4063	3988.2083	525	
85	93.6250	180648.3750	SPREL	93.6250	AS	p850	3988.2083	3996.0104	526	
86	93.6250	180742.0000	SPREL	93.6250	AS	p860	3996.0104	3998.5104	527	
87	30.0000	180772.0000	SPREL	30.0000	AS	p870	3998.5104	4001.0104	528	
88	30.0000	180802.0000	SPREL	30.0000	AS	p880	4001.0104	4008.8125	529	PIER 18
89	93.6250	180895.6250	SPREL	93.6250	AS	p890	4008.8125	4016.6146	530	
90	93.6250	180989.2500	SPREL	93.6250	AS	p900	4016.6146	4024.4167	531	
91	93.6250	181082.8750	SPREL	93.6250	AS	p910	4024.4167	4032.2188	532	
92	93.6250	181176.5000	SPREL	93.6250	AS	p920	4032.2188	4040.0208	533	
93	93.6250	181270.1250	SPREL	93.6250	AS	p930	4040.0208	4047.8229	534	
94	93.6250	181363.7500	SPREL	93.6250	AS	p940	4047.8229	4055.6250	535	
95	93.6250	181457.3750	SPREL	93.6250	AS	p950	4055.6250	4063.4271	536	
96	93.6250	181551.0000	SPREL	93.6250	AS	p960	4063.4271	4071.2292	537	
97	93.6250	181644.6250	SPREL	93.6250	AS	p970	4071.2292	4079.0313	538	
98	93.6250	181738.2500	SPREL	93.6250	AS	p980	4079.0313	4086.8333	539	
99	93.6250	181831.8750	SPREL	93.6250	AS	p990	4086.8333	4094.6354	540	
100	93.6250	181925.5000	SPREL	93.6250	AS	p1000	4094.6354	4102.4375	541	
101	93.6250	182019.1250	SPREL	93.6250	AS	p1010	4102.4375	4109.5833	542	
102	85.7500	182104.8750	SPREL	85.7500	AS	p1020	4109.5833	4117.3854	543	
103	93.6250	182198.5000	SPREL	93.6250	AS	p1030	4117.3854	4125.1875	544	
104	93.6250	182292.1250	SPREL	93.6250	AS	p1040	4125.1875	4132.9896	545	
105	93.6250	182385.7500	SPREL	93.6250	AS	p1050	4132.9896	4140.7917	546	
106	93.6250	182479.3750	SPREL	93.6250	AS	p1060	4140.7917	4148.5938	547	
107	93.6250	182573.0000	SPREL	93.6250	AS	p1070	4148.5938	4156.3958	548	
108	93.6250	182666.6250	SPREL	93.6250	AS	p1080	4156.3958	4164.1979	549	
109	93.6250	182760.2500	SPREL	93.6250	AS	p1090	4164.1979	4172.0000	550	
110	93.6250	182853.8750	SPREL	93.6250	AS	p1100	4172.0000	4179.8021	551	
111	93.6250	182947.5000	SPREL	93.6250	AS	p1110	4179.8021	4187.6042	552	
112	93.6250	183041.1250	SPREL	93.6250	AS	p1120	4187.6042	4195.4063	553	
113	93.6250	183134.7500	SPREL	93.6250	AS	p1130	4195.4063	4203.2083	554	
114	93.6250	183228.3750	SPREL	93.6250	AS	p1140	4203.2083	4211.0104	555	
115	93.6250	183322.0000	SPREL	93.6250	AS	p1150	4211.0104	4213.5104	556	
116	30.0000	183352.0000	SPREL	30.0000	AS	p1160	4213.5104	4216.0104	557	
117	30.0000	183382.0000	SPREL	30.0000	AS	p1170	4216.0104	4223.8125	558	PIER 19
118	93.6250	183475.6250	SPREL	93.6250	AS	p1180	4223.8125	4231.6146	559	
119	93.6250	183569.2500	SPREL	93.6250	AS	p1190	4231.6146	4239.4167	560	
120	93.6250	183662.8750	SPREL	93.6250	AS	p1200	4239.4167	4247.2188	561	
121	93.6250	183756.5000	SPREL	93.6250	AS	p1210	4247.2188	4255.0208	562	
122	93.6250	183850.1250	SPREL	93.6250	AS	p1220	4255.0208	4262.8229	563	
123	93.6250	183943.7500	SPREL	93.6250	AS	p1230	4262.8229	4270.6250	564	
124	93.6250	184037.3750	SPREL	93.6250	AS	p1240	4270.6250	4278.4271	565	
125	93.6250	184131.0000	SPREL	93.6250	AS	p1250	4278.4271	4286.2292	566	
126	93.6250	184224.6250	SPREL	93.6250	AS	p1260	4286.2292	4294.0313	567	
127	93.6250	184318.2500	SPREL	93.6250	AS	p1270	4294.0313	4301.8333	568	
128	93.6250	184411.8750	SPREL	93.6250	AS	p1280	4301.8333	4309.6354	569	
129	93.6250	184505.5000	SPREL	93.6250	AS	p1290	4309.6354	4312.3854	570	
130	33.0000	184538.5000	SPREL	33.0000	AS	p1300	4312.3854	4320.1875	571	
131	93.6250	184632.1250	SPREL	93.6250	AS	p1310	4320.1875	4327.9896	572	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.		
		132789.8750										
132	93.6250	184725.7500	SPREL	93.6250	AS	p1320		4327.9896	4335.7917	573		
133	93.6250	184819.3750	SPREL	93.6250	AS	p1330		4335.7917	4343.5938	574		
134	93.6250	184913.0000	SPREL	93.6250	AS	p1340		4343.5938	4351.3958	575		
135	93.6250	185006.6250	SPREL	93.6250	AS	p1350		4351.3958	4359.1979	576		
136	93.6250	185100.2500	SPREL	93.6250	AS	p1360		4359.1979	4367.0000	577		
137	93.6250	185193.8750	SPREL	93.6250	AS	p1370		4367.0000	4374.8021	578		
138	93.6250	185287.5000	SPABS	185287.5000	AS	p1380		4374.8021	4374.8021	579	SEGMENT 4	EJ 7
1	0.0000	185287.5000	SPABS	185287.5000	AS	p10		4374.8021	4382.6042	580	SEGMENT 5	
2	93.6250	185381.1250	SPREL	93.6250	AS	p20		4382.6042	4390.4063	581		
3	93.6250	185474.7500	SPREL	93.6250	AS	p30		4390.4063	4398.2083	582		
4	93.6250	185568.3750	SPREL	93.6250	AS	p40		4398.2083	4406.0104	583		
5	93.6250	185662.0000	SPREL	93.6250	AS	p50		4406.0104	4408.5104	584		
6	30.0000	185692.0000	SPREL	30.0000	AS	p60		4408.5104	4411.0104	585		PIER 20
7	30.0000	185722.0000	SPREL	30.0000	AS	p70		4411.0104	4418.8125	586		
8	93.6250	185815.6250	SPREL	93.6250	AS	p80		4418.8125	4426.6146	587		
9	93.6250	185909.2500	SPREL	93.6250	AS	p90		4426.6146	4434.4167	588		
10	93.6250	186002.8750	SPREL	93.6250	AS	p100		4434.4167	4442.2188	589		
11	93.6250	186096.5000	SPREL	93.6250	AS	p110		4442.2188	4450.0208	590		
12	93.6250	186190.1250	SPREL	93.6250	AS	p120		4450.0208	4457.8229	591		
13	93.6250	186283.7500	SPREL	93.6250	AS	p130		4457.8229	4465.6250	592		
14	93.6250	186377.3750	SPREL	93.6250	AS	p140		4465.6250	4473.4271	593		
15	93.6250	186471.0000	SPREL	93.6250	AS	p150		4473.4271	4481.2292	594		
16	93.6250	186564.6250	SPREL	93.6250	AS	p160		4481.2292	4489.0313	595		
17	93.6250	186658.2500	SPREL	93.6250	AS	p170		4489.0313	4496.8333	596		
18	93.6250	186751.8750	SPREL	93.6250	AS	p180		4496.8333	4504.6354	597		
19	93.6250	186845.5000	SPREL	93.6250	AS	p190		4504.6354	4507.3854	598		
20	33.0000	186878.5000	SPREL	33.0000	AS	p200		4507.3854	4515.1875	599		
21	93.6250	186972.1250	SPREL	93.6250	AS	p210		4515.1875	4522.9896	600		
22	93.6250	187065.7500	SPREL	93.6250	AS	p220		4522.9896	4530.7917	601		
23	93.6250	187159.3750	SPREL	93.6250	AS	p230		4530.7917	4538.5938	602		
24	93.6250	187253.0000	SPREL	93.6250	AS	p240		4538.5938	4546.3958	603		
25	93.6250	187346.6250	SPREL	93.6250	AS	p250		4546.3958	4554.1979	604		
26	93.6250	187440.2500	SPREL	93.6250	AS	p260		4554.1979	4562.0000	605		
27	93.6250	187533.8750	SPREL	93.6250	AS	p270		4562.0000	4569.8021	606		
28	93.6250	187627.5000	SPREL	93.6250	AS	p280		4569.8021	4577.6042	607		
29	93.6250	187721.1250	SPREL	93.6250	AS	p290		4577.6042	4585.4063	608		
30	93.6250	187814.7500	SPREL	93.6250	AS	p300		4585.4063	4593.2083	609		
31	93.6250	187908.3750	SPREL	93.6250	AS	p310		4593.2083	4601.0104	610		
32	93.6250	188002.0000	SPREL	93.6250	AS	p320		4601.0104	4603.5104	611		
33	30.0000	188032.0000	SPREL	30.0000	AS	p330		4603.5104	4606.0104	612		PIER 21
34	30.0000	188062.0000	SPREL	30.0000	AS	p340		4606.0104	4613.8125	613		
35	93.6250	188155.6250	SPREL	93.6250	AS	p350		4613.8125	4621.6146	614		
36	93.6250	188249.2500	SPREL	93.6250	AS	p360		4621.6146	4629.4167	615		
37	93.6250	188342.8750	SPREL	93.6250	AS	p370		4629.4167	4637.2188	616		
38	93.6250	188436.5000	SPREL	93.6250	AS	p380		4637.2188	4645.0208	617		
39	93.6250	188530.1250	SPREL	93.6250	AS	p390		4645.0208	4652.8229	618		
40	93.6250	188623.7500	SPREL	93.6250	AS	p400		4652.8229	4660.6250	619		
41	93.6250	188717.3750	SPREL	93.6250	AS	p410		4660.6250	4668.4271	620		
42	93.6250	188811.0000	SPREL	93.6250	AS	p420		4668.4271	4676.2292	621		
43	93.6250	188904.6250	SPREL	93.6250	AS	p430		4676.2292	4684.0313	622		
44	93.6250	188998.2500	SPREL	93.6250	AS	p440		4684.0313	4691.8333	623		
45	93.6250	189091.8750	SPREL	93.6250	AS	p450		4691.8333	4699.6354	624		

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JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
46	93.6250	189185.5000	SPREL	93.6250	AS	p460	4699.6354	4702.3854	625	
47	33.0000	189218.5000	SPREL	33.0000	AS	p470	4702.3854	4710.1875	626	
48	93.6250	189312.1250	SPREL	93.6250	AS	p480	4710.1875	4717.9896	627	
49	93.6250	189405.7500	SPREL	93.6250	AS	p490	4717.9896	4725.7917	628	
50	93.6250	189499.3750	SPREL	93.6250	AS	p500	4725.7917	4733.5938	629	
51	93.6250	189593.0000	SPREL	93.6250	AS	p510	4733.5938	4741.3958	630	
52	93.6250	189686.6250	SPREL	93.6250	AS	p520	4741.3958	4749.1979	631	
53	93.6250	189780.2500	SPREL	93.6250	AS	p530	4749.1979	4757.0000	632	
54	93.6250	189873.8750	SPREL	93.6250	AS	p540	4757.0000	4764.8021	633	
55	93.6250	189967.5000	SPREL	93.6250	AS	p550	4764.8021	4772.6042	634	
56	93.6250	190061.1250	SPREL	93.6250	AS	p560	4772.6042	4780.4063	635	
57	93.6250	190154.7500	SPREL	93.6250	AS	p570	4780.4063	4788.2083	636	
58	93.6250	190248.3750	SPREL	93.6250	AS	p580	4788.2083	4796.0104	637	
59	93.6250	190342.0000	SPREL	93.6250	AS	p590	4796.0104	4798.5104	638	
60	30.0000	190372.0000	SPREL	30.0000	AS	p600	4798.5104	4801.0104	639	
61	30.0000	190402.0000	SPREL	30.0000	AS	p610	4801.0104	4808.8125	640	PIER 22
62	93.6250	190495.6250	SPREL	93.6250	AS	p620	4808.8125	4816.6146	641	
63	93.6250	190589.2500	SPREL	93.6250	AS	p630	4816.6146	4824.4167	642	
64	93.6250	190682.8750	SPREL	93.6250	AS	p640	4824.4167	4832.2187	643	
65	93.6250	190776.5000	SPREL	93.6250	AS	p650	4832.2187	4840.0208	644	
66	93.6250	190870.1250	SPREL	93.6250	AS	p660	4840.0208	4847.8229	645	
67	93.6250	190963.7500	SPREL	93.6250	AS	p670	4847.8229	4855.6250	646	
68	93.6250	191057.3750	SPREL	93.6250	AS	p680	4855.6250	4863.4271	647	
69	93.6250	191151.0000	SPREL	93.6250	AS	p690	4863.4271	4871.2292	648	
70	93.6250	191244.6250	SPREL	93.6250	AS	p700	4871.2292	4879.0312	649	
71	93.6250	191338.2500	SPREL	93.6250	AS	p710	4879.0312	4886.8333	650	
72	93.6250	191431.8750	SPREL	93.6250	AS	p720	4886.8333	4894.6354	651	
73	93.6250	191525.5000	SPREL	93.6250	AS	p730	4894.6354	4897.3854	652	
74	33.0000	191558.5000	SPREL	33.0000	AS	p740	4897.3854	4905.1875	653	
75	93.6250	191652.1250	SPREL	93.6250	AS	p750	4905.1875	4912.9896	654	
76	93.6250	191745.7500	SPREL	93.6250	AS	p760	4912.9896	4920.7917	655	
77	93.6250	191839.3750	SPREL	93.6250	AS	p770	4920.7917	4928.5937	656	
78	93.6250	191933.0000	SPREL	93.6250	AS	p780	4928.5937	4936.3958	657	
79	93.6250	192026.6250	SPREL	93.6250	AS	p790	4936.3958	4944.1979	658	
80	93.6250	192120.2500	SPREL	93.6250	AS	p800	4944.1979	4952.0000	659	
81	93.6250	192213.8750	SPREL	93.6250	AS	p810	4952.0000	4959.8021	660	
82	93.6250	192307.5000	SPREL	93.6250	AS	p820	4959.8021	4967.6042	661	
83	93.6250	192401.1250	SPREL	93.6250	AS	p830	4967.6042	4975.4062	662	
84	93.6250	192494.7500	SPREL	93.6250	AS	p840	4975.4062	4983.2083	663	
85	93.6250	192588.3750	SPREL	93.6250	AS	p850	4983.2083	4991.0104	664	
86	93.6250	192682.0000	SPREL	93.6250	AS	p860	4991.0104	4993.5104	665	
87	30.0000	192712.0000	SPREL	30.0000	AS	p870	4993.5104	4996.0104	666	
88	30.0000	192742.0000	SPREL	30.0000	AS	p880	4996.0104	5003.8125	667	PIER 23
89	93.6250	192835.6250	SPREL	93.6250	AS	p890	5003.8125	5011.6146	668	
90	93.6250	192929.2500	SPREL	93.6250	AS	p900	5011.6146	5019.4167	669	
91	93.6250	193022.8750	SPREL	93.6250	AS	p910	5019.4167	5027.2187	670	
92	93.6250	193116.5000	SPREL	93.6250	AS	p920	5027.2187	5035.0208	671	
93	93.6250	193210.1250	SPREL	93.6250	AS	p930	5035.0208	5042.8229	672	
94	93.6250	193303.7500	SPREL	93.6250	AS	p940	5042.8229	5050.6250	673	
95	93.6250	193397.3750	SPREL	93.6250	AS	p950	5050.6250	5058.4271	674	
96	93.6250	193491.0000	SPREL	93.6250	AS	p960	5058.4271	5066.2292	675	
97	93.6250	193584.6250	SPREL	93.6250	AS	p970	5066.2292	5074.0312	676	

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NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.		
98	93.6250	193678.2500	SPREL	93.6250	AS	p980	5074.0312	5081.8333	677		
99	93.6250	193771.8750	SPREL	93.6250	AS	p990	5081.8333	5089.6354	678		
100	93.6250	193865.5000	SPREL	93.6250	AS	p1000	5089.6354	5092.3854	679		
101	33.0000	193898.5000	SPREL	33.0000	AS	p1010	5092.3854	5100.1875	680		
102	93.6250	193992.1250	SPREL	93.6250	AS	p1020	5100.1875	5107.9896	681		
103	93.6250	194085.7500	SPREL	93.6250	AS	p1030	5107.9896	5115.7917	682		
104	93.6250	194179.3750	SPREL	93.6250	AS	p1040	5115.7917	5123.5937	683		
105	93.6250	194273.0000	SPREL	93.6250	AS	p1050	5123.5937	5131.3958	684		
106	93.6250	194366.6250	SPREL	93.6250	AS	p1060	5131.3958	5139.1979	685		
107	93.6250	194460.2500	SPREL	93.6250	AS	p1070	5139.1979	5147.0000	686		
108	93.6250	194553.8750	SPREL	93.6250	AS	p1080	5147.0000	5154.8021	687		
109	93.6250	194647.5000	SPREL	93.6250	AS	p1090	5154.8021	5162.6042	688		
110	93.6250	194741.1250	SPREL	93.6250	AS	p1100	5162.6042	5170.4062	689		
111	93.6250	194834.7500	SPREL	93.6250	AS	p1110	5170.4062	5178.2083	690		
112	93.6250	194928.3750	SPREL	93.6250	AS	p1120	5178.2083	5186.0104	691		
113	93.6250	195022.0000	SPREL	93.6250	AS	p1130	5186.0104	5193.8125	692		
114	93.6250	195115.6250	SPREL	93.6250	AS	p1140	5193.8125	5196.3125	693		
115	30.0000	195145.6250	SPREL	30.0000	AS	p1150	5196.3125	5198.8125	694		PIER 24
116	30.0000	195175.6250	SPREL	30.0000	AS	p1160	5198.8125	5206.6146	695		
117	93.6250	195269.2500	SPREL	93.6250	AS	p1170	5206.6146	5214.4167	696		
118	93.6250	195362.8750	SPREL	93.6250	AS	p1180	5214.4167	5222.2187	697		
119	93.6250	195456.5000	SPREL	93.6250	AS	p1190	5222.2187	5230.0208	698		
120	93.6250	195550.1250	SPREL	93.6250	AS	p1200	5230.0208	5237.8229	699		
121	93.6250	195643.7500	SPREL	93.6250	AS	p1210	5237.8229	5245.6250	700		
122	93.6250	195737.3750	SPREL	93.6250	AS	p1220	5245.6250	5253.4271	701		
123	93.6250	195831.0000	SPREL	93.6250	AS	p1230	5253.4271	5261.2292	702		
124	93.6250	195924.6250	SPREL	93.6250	AS	p1240	5261.2292	5269.0312	703		
125	93.6250	196018.2500	SPREL	93.6250	AS	p1250	5269.0312	5276.8333	704		
126	93.6250	196111.8750	SPREL	93.6250	AS	p1260	5276.8333	5284.6354	705		
127	93.6250	196205.5000	SPREL	93.6250	AS	p1270	5284.6354	5292.4375	706		
128	93.6250	196299.1250	SPREL	93.6250	AS	p1280	5292.4375	5301.9896	707		
129	114.6250	196413.7500	SPREL	114.6250	AS	p1290	5301.9896	5309.7917	708		
130	93.6250	196507.3750	SPREL	93.6250	AS	p1300	5309.7917	5317.5937	709		
131	93.6250	196601.0000	SPREL	93.6250	AS	p1310	5317.5937	5325.3958	710		
132	93.6250	196694.6250	SPREL	93.6250	AS	p1320	5325.3958	5333.1979	711		
133	93.6250	196788.2500	SPREL	93.6250	AS	p1330	5333.1979	5341.0000	712		
134	93.6250	196881.8750	SPREL	93.6250	AS	p1340	5341.0000	5353.3958	713		
135	148.7500	197030.6250	SPREL	148.7500	AS	p1350	5353.3958	5361.1979	714		
136	93.6250	197124.2500	SPREL	93.6250	AS	p1360	5361.1979	5369.0000	715		
137	93.6250	197217.8750	SPREL	93.6250	AS	p1370	5369.0000	5376.8021	716		
138	93.6250	197311.5000	SPABS	197311.5000	AS	p1380	5376.8021	5376.8021	717	SEGMENT 5	EJ 8
1	0.0000	197311.5000	SPABS	197311.5000	AS	p10	5376.8021	5384.6042	718	SEGMENT 6	
2	93.6250	197405.1250	SPREL	93.6250	AS	p20	5384.6042	5392.4062	719		
3	93.6250	197498.7500	SPREL	93.6250	AS	p30	5392.4062	5400.2083	720		
4	93.6250	197592.3750	SPREL	93.6250	AS	p40	5400.2083	5408.0104	721		
5	93.6250	197686.0000	SPREL	93.6250	AS	p50	5408.0104	5410.5104	722		
6	30.0000	197716.0000	SPREL	30.0000	AS	p60	5410.5104	5413.0104	723		PIER 25
7	30.0000	197746.0000	SPREL	30.0000	AS	p70	5413.0104	5420.8125	724		
8	93.6250	197839.6250	SPREL	93.6250	AS	p80	5420.8125	5428.6146	725		
9	93.6250	197933.2500	SPREL	93.6250	AS	p90	5428.6146	5436.4167	726		
10	93.6250	198026.8750	SPREL	93.6250	AS	p100	5436.4167	5444.2187	727		
11	93.6250	198120.5000	SPREL	93.6250	AS	p110	5444.2187	5452.0208	728		

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NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.
12	93.6250	198214.1250	SPREL	93.6250	AS	p120	5452.0208	5459.8229	729
13	93.6250	198307.7500	SPREL	93.6250	AS	p130	5459.8229	5467.6250	730
14	93.6250	198401.3750	SPREL	93.6250	AS	p140	5467.6250	5475.4271	731
15	93.6250	198495.0000	SPREL	93.6250	AS	p150	5475.4271	5483.2292	732
16	93.6250	198588.6250	SPREL	93.6250	AS	p160	5483.2292	5491.0312	733
17	93.6250	198682.2500	SPREL	93.6250	AS	p170	5491.0312	5498.8333	734
18	93.6250	198775.8750	SPREL	93.6250	AS	p180	5498.8333	5506.6354	735
19	93.6250	198869.5000	SPREL	93.6250	AS	p190	5506.6354	5514.4375	736
20	93.6250	198963.1250	SPREL	93.6250	AS	p200	5514.4375	5520.7812	737
21	76.1250	199039.2500	SPREL	76.1250	AS	p210	5520.7812	5528.5833	738
22	93.6250	199132.8750	SPREL	93.6250	AS	p220	5528.5833	5536.3854	739
23	93.6250	199226.5000	SPREL	93.6250	AS	p230	5536.3854	5544.1875	740
24	93.6250	199320.1250	SPREL	93.6250	AS	p240	5544.1875	5551.9896	741
25	93.6250	199413.7500	SPREL	93.6250	AS	p250	5551.9896	5559.7917	742
26	93.6250	199507.3750	SPREL	93.6250	AS	p260	5559.7917	5567.5937	743
27	93.6250	199601.0000	SPREL	93.6250	AS	p270	5567.5937	5575.3958	744
28	93.6250	199694.6250	SPREL	93.6250	AS	p280	5575.3958	5583.1979	745
29	93.6250	199788.2500	SPREL	93.6250	AS	p290	5583.1979	5591.0000	746
30	93.6250	199881.8750	SPREL	93.6250	AS	p300	5591.0000	5598.8021	747
31	93.6250	199975.5000	SPREL	93.6250	AS	p310	5598.8021	5606.6042	748
32	93.6250	200069.1250	SPREL	93.6250	AS	p320	5606.6042	5614.4062	749
33	93.6250	200162.7500	SPREL	93.6250	AS	p330	5614.4062	5622.2083	750
34	93.6250	200256.3750	SPREL	93.6250	AS	p340	5622.2083	5630.0104	751
35	93.6250	200350.0000	SPREL	93.6250	AS	p350	5630.0104	5632.5104	752
36	30.0000	200380.0000	SPREL	30.0000	AS	p360	5632.5104	5635.0104	753
37	30.0000	200410.0000	SPREL	30.0000	AS	p370	5635.0104	5642.8125	754
38	93.6250	200503.6250	SPREL	93.6250	AS	p380	5642.8125	5650.6146	755
39	93.6250	200597.2500	SPREL	93.6250	AS	p390	5650.6146	5658.4167	756
40	93.6250	200690.8750	SPREL	93.6250	AS	p400	5658.4167	5666.2187	757
41	93.6250	200784.5000	SPREL	93.6250	AS	p410	5666.2187	5674.0208	758
42	93.6250	200878.1250	SPREL	93.6250	AS	p420	5674.0208	5681.8229	759
43	93.6250	200971.7500	SPREL	93.6250	AS	p430	5681.8229	5689.6250	760
44	93.6250	201065.3750	SPREL	93.6250	AS	p440	5689.6250	5697.4271	761
45	93.6250	201159.0000	SPREL	93.6250	AS	p450	5697.4271	5705.2292	762
46	93.6250	201252.6250	SPREL	93.6250	AS	p460	5705.2292	5713.0312	763
47	93.6250	201346.2500	SPREL	93.6250	AS	p470	5713.0312	5720.8333	764
48	93.6250	201439.8750	SPREL	93.6250	AS	p480	5720.8333	5728.6354	765
49	93.6250	201533.5000	SPREL	93.6250	AS	p490	5728.6354	5736.4375	766
50	93.6250	201627.1250	SPREL	93.6250	AS	p500	5736.4375	5744.2396	767
51	93.6250	201720.7500	SPREL	93.6250	AS	p510	5744.2396	5750.5833	768
52	76.1250	201796.8750	SPREL	76.1250	AS	p520	5750.5833	5758.3854	769
53	93.6250	201890.5000	SPREL	93.6250	AS	p530	5758.3854	5766.1875	770
54	93.6250	201984.1250	SPREL	93.6250	AS	p540	5766.1875	5773.9896	771
55	93.6250	202077.7500	SPREL	93.6250	AS	p550	5773.9896	5781.7917	772
56	93.6250	202171.3750	SPREL	93.6250	AS	p560	5781.7917	5789.5937	773
57	93.6250	202265.0000	SPREL	93.6250	AS	p570	5789.5937	5797.3958	774
58	93.6250	202358.6250	SPREL	93.6250	AS	p580	5797.3958	5805.1979	775
59	93.6250	202452.2500	SPREL	93.6250	AS	p590	5805.1979	5813.0000	776
60	93.6250	202545.8750	SPREL	93.6250	AS	p600	5813.0000	5820.8021	777
61	93.6250	202639.5000	SPREL	93.6250	AS	p610	5820.8021	5828.6042	778
62	93.6250	202733.1250	SPREL	93.6250	AS	p620	5828.6042	5836.4062	779
63	93.6250	202826.7500	SPREL	93.6250	AS	p630	5836.4062	5844.2083	780

PIER 26

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.	
64	93.6250	202920.3750	SPREL	93.6250	AS	p640	5844.2083	5852.0104	781	
65	93.6250	203014.0000	SPREL	93.6250	AS	p650	5852.0104	5854.5104	782	
66	30.0000	203044.0000	SPREL	30.0000	AS	p660	5854.5104	5857.0104	783	
67	30.0000	203074.0000	SPREL	30.0000	AS	p670	5857.0104	5864.8125	784	PIER 27
68	93.6250	203167.6250	SPREL	93.6250	AS	p680	5864.8125	5872.6146	785	
69	93.6250	203261.2500	SPREL	93.6250	AS	p690	5872.6146	5880.4167	786	
70	93.6250	203354.8750	SPREL	93.6250	AS	p700	5880.4167	5888.2187	787	
71	93.6250	203448.5000	SPREL	93.6250	AS	p710	5888.2187	5896.0208	788	
72	93.6250	203542.1250	SPREL	93.6250	AS	p720	5896.0208	5903.8229	789	Change in C.S. at 203470.3125
73	93.6250	203635.7500	SPREL	93.6250	AS	p730	5903.8229	5911.6250	790	
74	93.6250	203729.3750	SPREL	93.6250	AS	p740	5911.6250	5919.4271	791	
75	93.6250	203823.0000	SPREL	93.6250	AS	p750	5919.4271	5927.2292	792	
76	93.6250	203916.6250	SPREL	93.6250	AS	p760	5927.2292	5935.0312	793	
77	93.6250	204010.2500	SPREL	93.6250	AS	p770	5935.0312	5942.8333	794	
78	93.6250	204103.8750	SPREL	93.6250	AS	p780	5942.8333	5950.6354	795	
79	93.6250	204197.5000	SPREL	93.6250	AS	p790	5950.6354	5958.4375	796	
80	93.6250	204291.1250	SPREL	93.6250	AS	p800	5958.4375	5964.7812	797	
81	76.1250	204367.2500	SPREL	76.1250	AS	p810	5964.7812	5972.5833	798	
82	93.6250	204460.8750	SPREL	93.6250	AS	p820	5972.5833	5980.3854	799	
83	93.6250	204554.5000	SPREL	93.6250	AS	p830	5980.3854	5988.1875	800	
84	93.6250	204648.1250	SPREL	93.6250	AS	p840	5988.1875	5995.9896	801	
85	93.6250	204741.7500	SPREL	93.6250	AS	p850	5995.9896	6003.7917	802	
86	93.6250	204835.3750	SPREL	93.6250	AS	p860	6003.7917	6011.5937	803	
87	93.6250	204929.0000	SPREL	93.6250	AS	p870	6011.5937	6019.3958	804	
88	93.6250	205022.6250	SPREL	93.6250	AS	p880	6019.3958	6027.1979	805	
89	93.6250	205116.2500	SPREL	93.6250	AS	p890	6027.1979	6035.0000	806	
90	93.6250	205209.8750	SPREL	93.6250	AS	p900	6035.0000	6042.8021	807	
91	93.6250	205303.5000	SPREL	93.6250	AS	p910	6042.8021	6050.6042	808	
92	93.6250	205397.1250	SPREL	93.6250	AS	p920	6050.6042	6058.4062	809	
93	93.6250	205490.7500	SPREL	93.6250	AS	p930	6058.4062	6066.2083	810	
94	93.6250	205584.3750	SPREL	93.6250	AS	p940	6066.2083	6074.0104	811	
95	93.6250	205678.0000	SPREL	93.6250	AS	p950	6074.0104	6076.5104	812	
96	30.0000	205708.0000	SPREL	30.0000	AS	p960	6076.5104	6079.0104	813	
97	30.0000	205738.0000	SPREL	30.0000	AS	p970	6079.0104	6086.8125	814	PIER 28
98	93.6250	205831.6250	SPREL	93.6250	AS	p980	6086.8125	6094.6146	815	
99	93.6250	205925.2500	SPREL	93.6250	AS	p990	6094.6146	6102.4167	816	
100	93.6250	206018.8750	SPREL	93.6250	AS	p1000	6102.4167	6110.2187	817	
101	93.6250	206112.5000	SPREL	93.6250	AS	p1010	6110.2187	6118.0208	818	
102	93.6250	206206.1250	SPREL	93.6250	AS	p1020	6118.0208	6125.8229	819	
103	93.6250	206299.7500	SPREL	93.6250	AS	p1030	6125.8229	6133.6250	820	
104	93.6250	206393.3750	SPREL	93.6250	AS	p1040	6133.6250	6141.4271	821	
105	93.6250	206487.0000	SPREL	93.6250	AS	p1050	6141.4271	6149.2292	822	
106	93.6250	206580.6250	SPREL	93.6250	AS	p1060	6149.2292	6157.0312	823	
107	93.6250	206674.2500	SPREL	93.6250	AS	p1070	6157.0312	6164.8333	824	
108	93.6250	206767.8750	SPREL	93.6250	AS	p1080	6164.8333	6172.6354	825	
109	93.6250	206861.5000	SPREL	93.6250	AS	p1090	6172.6354	6180.4375	826	
110	93.6250	206955.1250	SPREL	93.6250	AS	p1100	6180.4375	6188.2396	827	
111	93.6250	207048.7500	SPREL	93.6250	AS	p1110	6188.2396	6189.5937	828	
112	16.2500	207065.0000	SPREL	16.2500	AS	p1120	6189.5937	6197.3958	829	
113	93.6250	207158.6250	SPREL	93.6250	AS	p1130	6197.3958	6205.1979	830	
114	93.6250	207252.2500	SPREL	93.6250	AS	p1140	6205.1979	6213.0000	831	
115	93.6250	207345.8750	SPREL	93.6250	AS	p1150	6213.0000	6220.8021	832	

URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE EASTBO CHECKED BY: IC BY PT DATE: 2/9/2009

NODE	DX	STATION 132789.8750						ELEM BEGIN	ELEM END	ELEM NO.
116	93.6250	207439.5000	SPREL	93.6250	AS	p1160		6220.8021	6228.6042	833
117	93.6250	207533.1250	SPREL	93.6250	AS	p1170		6228.6042	6236.4062	834
118	93.6250	207626.7500	SPREL	93.6250	AS	p1180		6236.4062	6244.2083	835
119	93.6250	207720.3750	SPREL	93.6250	AS	p1190		6244.2083	6253.7604	836
120	114.6250	207835.0000	SPREL	114.6250	AS	p1200		6253.7604	6254.5104	837
121	9.0000	207844.0000	SPREL	9.0000	AS	p1210		6254.5104	6256.3125	838
122	21.6250	207865.6250	SPABS	207865.6250	AS	p1220		6256.3125	6256.3125	

PIER 29

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOUND — CHECKED BY: IC BY PT — DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 =	132756.000	BEGIN BRIDGE FFBW END BENT 1 =	132756.000
Front Face Backwall =	55.500	BEGIN SEGMENT =	132789.875
Distance to CL Bearing =	21.625	CL BEARING @ END BENT 1 =	132811.500
		CL BEARING @ END BENT 2 =	1755+98.3750
		END SEGMENT =	1756+20.0000
		END BRIDGE FFBW END BENT 1 =	1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
			BEGIN BRIDGE							132789.875		0.000				
		1	1	ABUTMENT 2	21.625	21.6250	2001	**2002**	Y	132789.875	**132811.500**	0.0000	**1.8021**			
		2	1	ABUTMENT 2	8.375	8.3750	2002	2003		132811.500	132819.875	1.8021	2.5000			
		3	1	ABUTMENT 2	115.250	115.2500	2003	2004		132819.875	132935.125	2.5000	12.1042			
		4	7	TYPICAL	93.625	655.3750	2004	2011		132935.125	133590.500	12.1042	66.7188			
1		11	0	SPECIAL	0.000	0.0000	2011	2011		133590.500	133590.500	66.7188	66.7188			
		11	1	C-I-P	61.000	61.0000	2011	2012		133590.500	133651.500	66.7188	71.8021	1225.500	102.125	102' 1 1/2"
		12	0	SPECIAL	0.000	0.0000	2012	2012		133651.500	133651.500	71.8021	71.8021			
		12	3	TYPICAL	87.292	261.8750	2012	2015		133651.500	133913.375	71.8021	93.6250			
		15	1	PIER 3	93.625	93.6250	2015	2016		133913.375	134007.000	93.6250	101.4271			
		16	1	PIER 3	30.000	30.0000	2016	**2017**	Y	134007.000	134037.000	101.4271	103.9271			
		17	1	PIER 3	30.000	30.0000	2017	2018		134037.000	134067.000	103.9271	106.4271			
		18	1	PIER 3	93.625	93.6250	2018	2019		134067.000	134160.625	106.4271	114.2292			
		19	11	TYPICAL	93.625	1029.8750	2019	2030		134160.625	135190.500	114.2292	200.0521			
		30	0	SPECIAL	0.000	0.0000	2030	2030		135190.500	135190.500	200.0521	200.0521			
2		30	1	C-I-P	69.625	69.6250	2030	2031		135190.500	135260.125	200.0521	205.8542	2283.000	190.250	190' 3"
		31	0	SPECIAL	0.000	0.0000	2031	2031		135260.125	135260.125	205.8542	205.8542			
		31	10	TYPICAL	93.625	936.2500	2031	2041		135260.125	136196.375	205.8542	283.8750			
		41	1	PIER 4	93.625	93.6250	2041	2042		136196.375	136290.000	283.8750	291.6771			
		42	1	PIER 4	30.000	30.0000	2042	**2043**	Y	136290.000	136320.000	291.6771	294.1771			
		43	1	PIER 4	30.000	30.0000	2043	2044		136320.000	136350.000	294.1771	296.6771			
		44	1	PIER 4	93.625	93.6250	2044	2045		136350.000	136443.625	296.6771	304.4792			
		45	10	TYPICAL	93.625	936.2500	2045	2055		136443.625	137379.875	304.4792	382.5000			
		55	0	SPECIAL	0.000	0.0000	2055	2055		137379.875	137379.875	382.5000	382.5000			
3	SEGMENT 1	55	1	C-I-P	83.375	83.3750	2055	2056		137379.875	137463.250	382.5000	389.4479	2484.000	207.000	207' 0"
		56	0	SPECIAL	0.000	0.0000	2056	2056		137463.250	137463.250	389.4479	389.4479			
		56	13	TYPICAL	93.625	1217.1250	2056	2069		137463.250	138680.375	389.4479	490.8750			
		69	1	PIER 5	93.625	93.6250	2069	2070		138680.375	138774.000	490.8750	498.6771			
		70	1	PIER 5	30.000	30.0000	2070	**2071**	Y	138774.000	138804.000	498.6771	501.1771			
		71	1	PIER 5	30.000	30.0000	2071	2072		138804.000	138834.000	501.1771	503.6771			
		72	1	PIER 5	93.625	93.6250	2072	2073		138834.000	138927.625	503.6771	511.4792			
		73	14	TYPICAL	93.625	1310.7500	2073	2087		138927.625	140238.375	511.4792	620.7083			
		87	0	SPECIAL	0.000	0.0000	2087	2087		140238.375	140238.375	620.7083	620.7083			
4		87	1	C-I-P	39.375	39.3750	2087	2088		140238.375	140277.750	620.7083	623.9896	3189.000	265.750	265' 9"
		88	0	SPECIAL	0.000	0.0000	2088	2088		140277.750	140277.750	623.9896	623.9896			
		88	17	TYPICAL	93.625	1591.6250	2088	2105		140277.750	141869.375	623.9896	756.6250			
		105	1	PIER 6	93.625	93.6250	2105	2106		141869.375	141963.000	756.6250	764.4271			
		106	1	PIER 6	30.000	30.0000	2106	**2107**	Y	141963.000	141993.000	764.4271	766.9271			
		107	1	PIER 6	30.000	30.0000	2107	2108		141993.000	142023.000	766.9271	769.4271			
		108	1	PIER 6	93.625	93.6250	2108	2109		142023.000	142116.625	769.4271	777.2292			
		109	16	TYPICAL	93.625	1498.0000	2109	2125		142116.625	143614.625	777.2292	902.0625			

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOUND

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		125	0	SPECIAL	0.000	0.0000	2125	2125		143614.625	143614.625	902.0625	902.0625			
5		125	1	C-I-P	39.375	39.3750	2125	2126		143614.625	143654.000	902.0625	905.3438	3189.000	265.750	265' 9"
		126	0	SPECIAL	0.000	0.0000	2126	2126		143654.000	143654.000	905.3438	905.3438			
		126	15	TYPICAL	93.625	1404.3750	2126	2141		143654.000	145058.375	905.3438	1022.3750			
		141	1	PIER 7	93.625	93.6250	2141	2142		145058.375	145152.000	1022.3750	1030.1771			
		142	1	PIER 7	30.000	30.0000	2142	**2143**	Y	145152.000	145182.000	1030.1771	1032.6771			
		143	1	PIER 7	30.000	30.0000	2143	2144		145182.000	145212.000	1032.6771	1035.1771			
		144	1	PIER 7	93.625	93.6250	2144	2145		145212.000	145305.625	1035.1771	1042.9792			
		145	15	TYPICAL	93.625	1404.3750	2145	2160		145305.625	146710.000	1042.9792	1160.0104			
		160	0	SPECIAL	6.000	0.0000	2160	2160		146710.000	146710.000	1160.0104	1160.0104			
		160	1	C-I-P	39.500	39.5000	2160	2161		146710.000	146749.500	1160.0104	1163.3021			
6		161	12	TYPICAL	93.625	1123.5000	2161	2173		146749.500	147873.000	1163.3021	1256.9271	3189.000	265.750	265' 9"
		173	1	EXP. JT 2	0.000	0.0000	2173	2174		147873.000	147873.000	1256.9271	1256.9271			
		1	4	TYPICAL	93.625	374.5000	2174	2178		147873.000	148247.500	1256.9271	1288.1354			
		5	1	PIER 8	93.500	93.5000	2178	2179		148247.500	148341.000	1288.1354	1295.9271			
		6	1	PIER 8	30.000	30.0000	2179	**2180**	Y	148341.000	148371.000	1295.9271	1298.4271			
		7	1	PIER 8	30.000	30.0000	2180	2181		148371.000	148401.000	1298.4271	1300.9271			
		8	1	PIER 8	93.625	93.6250	2181	2182		148401.000	148494.625	1300.9271	1308.7292			
		9	15	TYPICAL	93.625	1404.3750	2182	2197		148494.625	149899.000	1308.7292	1425.7604			
		24	0	SPECIAL	0.000	0.0000	2197	2197		149899.000	149899.000	1425.7604	1425.7604			
7		24	1	C-I-P	39.375	39.3750	2197	2198		149899.000	149938.375	1425.7604	1429.0417	3095.375	257.948	257' 11 3/8"
		25	0	SPECIAL	0.000	0.0000	2198	2198		149938.375	149938.375	1429.0417	1429.0417			
		25	15	TYPICAL	93.625	1404.3750	2198	2213		149938.375	151342.750	1429.0417	1546.0729			
		40	1	PIER 9	93.625	93.6250	2213	2214		151342.750	151436.375	1546.0729	1553.8750			
		41	1	PIER 9	30.000	30.0000	2214	**2215**	Y	151436.375	151466.375	1553.8750	1556.3750			

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOUND

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
Front Face Backwall = 55.500
Distance to CL Bearing = 21.625

BEGIN BRIDGE FFBW END BENT 1 = 132756.000
BEGIN SEGMENT = 132789.875
CL BEARING @ END BENT 1 = 132811.500

CL BEARING @ END BENT 2 = 1755+98.3750
END SEGMENT = 1756+20.0000
END BRIDGE FFBW END BENT 1 = 1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		42	1	PIER 9	30.000	30.0000	2215	2216		151466.375	151496.375	1556.3750	1558.8750			
		43	1	PIER 9	93.625	93.6250	2216	2217		151496.375	151590.000	1558.8750	1566.6771			
		44	16	TYPICAL	93.625	1498.0000	2217	2233		151590.000	153088.000	1566.6771	1691.5104			
		60	0	SPECIAL	0.000	0.0000	2233	2233		153088.000	153088.000	1691.5104	1691.5104			
8	SEGMENT 2	60	1	C-I-P	75.875	75.8750	2233	2234		153088.000	153163.875	1691.5104	1697.8333	3412.750	284.396	284' 4 3/4"
		61	0	SPECIAL	0.000	0.0000	2234	2234		153163.875	153163.875	1697.8333	1697.8333			
		61	17	TYPICAL	93.625	1591.6250	2234	2251		153163.875	154755.500	1697.8333	1830.4688			
		78	1	PIER 10	93.625	93.6250	2251	2252		154755.500	154849.125	1830.4688	1838.2708			
		79	1	PIER 10	30.000	30.0000	2252	**2253**	Y	154849.125	154879.125	1838.2708	1840.7708			
		80	1	PIER 10	30.000	30.0000	2253	2254		154879.125	154909.125	1840.7708	1843.2708			
		81	1	PIER 10	93.625	93.6250	2254	2255		154909.125	155002.750	1843.2708	1851.0729			
		82	17	TYPICAL	93.625	1591.6250	2255	2272		155002.750	156594.375	1851.0729	1983.7083			
		99	0	SPECIAL	0.000	0.0000	2272	2272		156594.375	156594.375	1983.7083	1983.7083			
9		99	1	C-I-P	75.875	75.8750	2272	2273		156594.375	156670.250	1983.7083	1990.0313	3506.375	292.198	292' 2 3/8"
		100	0	SPECIAL	0.000	0.0000	2273	2273		156670.250	156670.250	1990.0313	1990.0313			
		100	17	TYPICAL	93.625	1591.6250	2273	2290		156670.250	158261.875	1990.0313	2122.6667			
		117	1	PIER 11	93.625	93.6250	2290	2291		158261.875	158355.500	2122.6667	2130.4688			
		118	1	PIER 11	30.000	30.0000	2291	**2292**	Y	158355.500	158385.500	2130.4688	2132.9688			
		119	1	PIER 11	30.000	30.0000	2292	2293		158385.500	158415.500	2132.9688	2135.4688			
		120	1	PIER 11	93.625	93.6250	2293	2294		158415.500	158509.125	2135.4688	2143.2708			
		121	18	TYPICAL	93.625	1685.2500	2294	2312		158509.125	160194.375	2143.2708	2283.7083			
		139	0	SPECIAL	0.000	0.0000	2312	2312		160194.375	160194.375	2283.7083	2283.7083			
		139	1	C-I-P	75.875	75.8750	2312	2313		160194.375	160270.250	2283.7083	2290.0313			
10		140	11	TYPICAL	93.625	1029.8750	2313	2324		160270.250	161300.125	2290.0313	2375.8542	3506.375	292.198	292' 2 3/8"
		151	1	EXP. JT 3	0.000	0.0000	2324	2325		161300.125	161300.125	2375.8542	2375.8542			
		1	5	TYPICAL	93.625	468.1250	2325	2330		161300.125	161768.250	2375.8542	2414.8646			
		6	1	PIER 12	93.625	93.6250	2330	2331		161768.250	161861.875	2414.8646	2422.6667			
		7	1	PIER 12	30.000	30.0000	2331	**2332**	Y	161861.875	161891.875	2422.6667	2425.1667			
		8	1	PIER 12	30.000	30.0000	2332	2333		161891.875	161921.875	2425.1667	2427.6667			
		9	1	PIER 12	93.625	93.6250	2333	2334		161921.875	162015.500	2427.6667	2435.4688			
		10	17	TYPICAL	93.625	1591.6250	2334	2351		162015.500	163607.125	2435.4688	2568.1042			
		27	0	SPECIAL	0.000	0.0000	2351	2351		163607.125	163607.125	2568.1042	2568.1042			
11		27	1	C-I-P	75.875	75.8750	2351	2352		163607.125	163683.000	2568.1042	2574.4271	3506.375	292.198	292' 2 3/8"
		28	0	SPECIAL	0.000	0.0000	2352	2352		163683.000	163683.000	2574.4271	2574.4271			
		28	17	TYPICAL	93.625	1591.6250	2352	2369		163683.000	165274.625	2574.4271	2707.0625			
		45	1	PIER 13	93.625	93.6250	2369	2370		165274.625	165368.250	2707.0625	2714.8646			
		46	1	PIER 13	30.000	30.0000	2370	**2371**	Y	165368.250	165398.250	2714.8646	2717.3646			
		47	1	PIER 13	30.000	30.0000	2371	2372		165398.250	165428.250	2717.3646	2719.8646			
		48	1	PIER 13	90.000	90.0000	2372	2373		165428.250	165518.250	2719.8646	2727.3646			
	NT 3	49	10	TYPICAL	174.000	1740.0000	2373	2383		165518.250	167258.250	2727.3646	2872.3646			
		59	0	SPECIAL	0.000	0.0000	2383	2383		167258.250	167258.250	2872.3646	2872.3646			

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOUND — CHECKED BY: IC BY PT — DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 =	132756.000
Front Face Backwall =	55.500
Distance to CL Bearing =	21.625

BEGIN BRIDGE FFBW END BENT 1 =	132756.000
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CL BEARING @ END BENT 1 =	132811.500
CL BEARING @ END BENT 2 =	1755+98.3750
END SEGMENT =	1756+20.0000
END BRIDGE FFBW END BENT 1 =	1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
12	SEGME	59	1	C-I-P	67.250	67.2500	2383	2384		167258.250	167325.500	2872.3646	2877.9688	3787.250	315.604	315' 7 1/4"
		60	0	SPECIAL	0.000	0.0000	2384	2384		167325.500	167325.500	2877.9688	2877.9688			
		60	10	TYPICAL	174.000	1740.0000	2384	2394		167325.500	169065.500	2877.9688	3022.9688			
		70	1	PIER 14	90.000	90.0000	2394	2395		169065.500	169155.500	3022.9688	3030.4688			
		71	1	PIER 14	30.000	30.0000	2395	**2396**	Y	169155.500	169185.500	3030.4688	3032.9688			
13		72	1	PIER 14	30.000	30.0000	2396	2397		169185.500	169215.500	3032.9688	3035.4688	3487.250	290.604	290' 7 1/4"
		73	1	PIER 14	93.625	93.6250	2397	2398		169215.500	169309.125	3035.4688	3043.2708			
		74	18	TYPICAL	93.625	1685.2500	2398	2416		169309.125	170994.375	3043.2708	3183.7083			
		92	0	SPECIAL	0.000	0.0000	2416	2416		170994.375	170994.375	3183.7083	3183.7083			
		92	1	C-I-P	56.750	56.7500	2416	2417		170994.375	171051.125	3183.7083	3188.4375			
		93	0	SPECIAL	0.000	0.0000	2417	2417		171051.125	171051.125	3188.4375	3188.4375			
		93	16	TYPICAL	93.625	1498.0000	2417	2433		171051.125	172549.125	3188.4375	3313.2708			
		109	1	PIER 15	93.625	93.6250	2433	2434		172549.125	172642.750	3313.2708	3321.0729			
		110	1	PIER 15	30.000	30.0000	2434	**2435**	Y	172642.750	172672.750	3321.0729	3323.5729			
14		111	1	PIER 15	30.000	30.0000	2435	2436		172672.750	172702.750	3323.5729	3326.0729	2947.250	245.604	245' 7 1/4"
		112	1	PIER 15	93.625	93.6250	2436	2437		172702.750	172796.375	3326.0729	3333.8750			
		113	4	TYPICAL	93.625	374.5000	2437	2441		172796.375	173170.875	3333.8750	3365.0833			
		117	1	EXP. JT 5	0.000	0.0000	2441	2442		173170.875	173170.875	3365.0833	3365.0833			
	SEGMENT 4	1	2	TYPICAL	93.625	187.2500	2442	2444		173170.875	173358.125	3365.0833	3380.6875			
		3	2	SPECIAL	74.375	148.7500	2444	2446		173358.125	173506.875	3380.6875	3393.0833			
		5	8	TYPICAL	93.625	749.0000	2446	2454		173506.875	174255.875	3393.0833	3455.5000			
		13	1	C-I-P	23.375	23.3750	2454	2455		174255.875	174279.250	3455.5000	3457.4479			
		14	0	TYPICAL	0.000	0.0000	2455	2455		174279.250	174279.250	3457.4479	3457.4479			
		14	13	TYPICAL	93.625	1217.1250	2455	2468		174279.250	175496.375	3457.4479	3558.8750			
		27	1	PIER 16	93.625	93.6250	2468	2469		175496.375	175590.000	3558.8750	3566.6771			
		28	1	PIER 16	30.000	30.0000	2469	**2470**	Y	175590.000	175620.000	3566.6771	3569.1771			
15		29	1	PIER 16	30.000	30.0000	2470	2471		175620.000	175650.000	3569.1771	3571.6771	2580.000	215.000	215' 0"
		30	1	PIER 16	93.625	93.6250	2471	2472		175650.000	175743.625	3571.6771	3579.4792			
		31	12	TYPICAL	93.625	1123.5000	2472	2484		175743.625	176867.125	3579.4792	3673.1042			
		43	0	SPECIAL	0.000	0.0000	2484	2484		176867.125	176867.125	3673.1042	3673.1042			
		43	1	C-I-P	85.750	85.7500	2484	2485		176867.125	176952.875	3673.1042	3680.2500			
		44	0	SPECIAL	0.000	0.0000	2485	2485		176952.875	176952.875	3680.2500	3680.2500			
		44	12	TYPICAL	93.625	1123.5000	2485	2497		176952.875	178076.375	3680.2500	3773.8750			
		56	1	PIER 17	93.625	93.6250	2497	2498		178076.375	178170.000	3773.8750	3781.6771			
		57	1	PIER 17	30.000	30.0000	2498	**2499**	Y	178170.000	178200.000	3781.6771	3784.1771			
16		58	1	PIER 17	30.000	30.0000	2499	2500		178200.000	178230.000	3784.1771	3786.6771	2580.000	215.000	215' 0"
		59	1	PIER 17	93.625	93.6250	2500	2501		178230.000	178323.625	3786.6771	3794.4792			
		60	12	TYPICAL	93.625	1123.5000	2501	2513		178323.625	179447.125	3794.4792	3888.1042			
		72	0	SPECIAL	0.000	0.0000	2513	2513		179447.125	179447.125	3888.1042	3888.1042			
		72	1	C-I-P	85.750	85.7500	2513	2514		179447.125	179532.875	3888.1042	3895.2500			
		73	0	SPECIAL	0.000	0.0000	2514	2514		179532.875	179532.875	3895.2500	3895.2500			
		73	12	TYPICAL	93.625	1123.5000	2514	2526		179532.875	180656.375	3895.2500	3988.8750			

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RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
		85	1	PIER 18	93.625	93.6250	2526	2527		180656.375	180750.000	3988.8750	3996.6771			
		86	1	PIER 18	30.000	30.0000	2527	**2528**	Y	180750.000	180780.000	3996.6771	3999.1771			
		87	1	PIER 18	30.000	30.0000	2528	2529		180780.000	180810.000	3999.1771	4001.6771			
		88	1	PIER 18	93.625	93.6250	2529	2530		180810.000	180903.625	4001.6771	4009.4792			
		89	12	TYPICAL	93.625	1123.5000	2530	2542		180903.625	182027.125	4009.4792	4103.1042			
		101	0	SPECIAL	0.000	0.0000	2542	2542		182027.125	182027.125	4103.1042	4103.1042			
17		101	1	C-I-P	85.750	85.7500	2542	2543		182027.125	182112.875	4103.1042	4110.2500	2580.000	215.000	215' 0"
		102	0	SPECIAL	0.000	0.0000	2543	2543		182112.875	182112.875	4110.2500	4110.2500			
		102	12	TYPICAL	93.625	1123.5000	2543	2555		182112.875	183236.375	4110.2500	4203.8750			
		114	1	PIER 19	93.625	93.6250	2555	2556		183236.375	183330.000	4203.8750	4211.6771			
		115	1	PIER 19	30.000	30.0000	2556	**2557**	Y	183330.000	183360.000	4211.6771	4214.1771			
		116	1	PIER 19	30.000	30.0000	2557	2558		183360.000	183390.000	4214.1771	4216.6771			
		117	1	PIER 19	93.625	93.6250	2558	2559		183390.000	183483.625	4216.6771	4224.4792			
		118	11	TYPICAL	93.625	1029.8750	2559	2570		183483.625	184513.500	4224.4792	4310.3021			
		129	0	SPECIAL	0.000	0.0000	2570	2570		184513.500	184513.500	4310.3021	4310.3021			
		129	1	C-I-P	33.000	33.0000	2570	2571		184513.500	184546.500	4310.3021	4313.0521			
18		130	8	TYPICAL	93.625	749.0000	2571	2579		184546.500	185295.500	4313.0521	4375.4688	2340.000	195.000	195' 0"
		138	1	EXP. JT 6	0.000	0.0000	2579	2580		185295.500	185295.500	4375.4688	4375.4688			
		1	3	TYPICAL	93.625	280.8750	2580	2583		185295.500	185576.375	4375.4688	4398.8750			
		4	1	PIER 20'	93.625	93.6250	2583	2584		185576.375	185670.000	4398.8750	4406.6771			
		5	1	PIER 20'	30.000	30.0000	2584	**2585**	Y	185670.000	185700.000	4406.6771	4409.1771			
		6	1	PIER 20'	30.000	30.0000	2585	2586		185700.000	185730.000	4409.1771	4411.6771			
		7	1	PIER 20'	93.625	93.6250	2586	2587		185730.000	185823.625	4411.6771	4419.4792			
		8	11	TYPICAL	93.625	1029.8750	2587	2598		185823.625	186853.500	4419.4792	4505.3021			
		19	0	SPECIAL	0.000	0.0000	2598	2598		186853.500	186853.500	4505.3021	4505.3021			
19		19	1	C-I-P	66.625	66.6250	2598	2599		186853.500	186920.125	4505.3021	4510.8542	2280.000	190.000	190' 0"
		20	0	SPECIAL	0.000	0.0000	2599	2599		186920.125	186920.125	4510.8542	4510.8542			
		20	10	TYPICAL	93.625	936.2500	2599	2609		186920.125	187856.375	4510.8542	4588.8750			
		30	1	PIER 21'	93.625	93.6250	2609	2610		187856.375	187950.000	4588.8750	4596.6771			
		31	1	PIER 21'	30.000	30.0000	2610	**2611**	Y	187950.000	187980.000	4596.6771	4599.1771			
		32	1	PIER 21'	30.000	30.0000	2611	2612		187980.000	188010.000	4599.1771	4601.6771			
		33	1	PIER 21'	93.625	93.6250	2612	2613		188010.000	188103.625	4601.6771	4609.4792			
		34	10	TYPICAL	93.625	936.2500	2613	2623		188103.625	189039.875	4609.4792	4687.5000			
		44	0	SPECIAL	0.000	0.0000	2623	2623		189039.875	189039.875	4687.5000	4687.5000			
20		44	1	C-I-P	43.875	43.8750	2623	2624		189039.875	189083.750	4687.5000	4691.1563	2070.000	172.500	172' 6"
		45	0	SPECIAL	0.000	0.0000	2624	2624		189083.750	189083.750	4691.1563	4691.1563			
		45	9	TYPICAL	93.625	842.6250	2624	2633		189083.750	189926.375	4691.1563	4761.3750			
		54	1	PIER 22'	93.625	93.6250	2633	2634		189926.375	190020.000	4761.3750	4769.1771			
		55	1	PIER 22'	30.000	30.0000	2634	**2635**	Y	190020.000	190050.000	4769.1771	4771.6771			
	NT 5	56	1	PIER 22'	30.000	30.0000	2635	2636		190050.000	190080.000	4771.6771	4774.1771			
		57	1	PIER 22'	93.625	93.6250	2636	2637		190080.000	190173.625	4774.1771	4781.9792			

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21	SEGME	58	8	TYPICAL	93.625	749.0000	2637	2645		190173.625	190922.625	4781.9792	4844.3958	2070.000	172.500	172' 6"
		66	0	SPECIAL	0.000	0.0000	2645	2645		190922.625	190922.625	4844.3958	4844.3958			
		66	1	C-I-P	43.875	43.8750	2645	2646		190922.625	190966.500	4844.3958	4848.0521			
		67	0	SPECIAL	0.000	0.0000	2646	2646		190966.500	190966.500	4848.0521	4848.0521			
		67	11	TYPICAL	93.625	1029.8750	2646	2657		190966.500	191996.375	4848.0521	4933.8750			
		78	1	PIER 23'	93.625	93.6250	2657	2658		191996.375	192090.000	4933.8750	4941.6771			
		79	1	PIER 23'	30.000	30.0000	2658	**2659**	Y	192090.000	192120.000	4941.6771	4944.1771			
22		80	1	PIER 23'	30.000	30.0000	2659	2660		192120.000	192150.000	4944.1771	4946.6771	2400.000	200.000	200' 0"
		81	1	PIER 23'	93.625	93.6250	2660	2661		192150.000	192243.625	4946.6771	4954.4792			
		82	11	TYPICAL	93.625	1029.8750	2661	2672		192243.625	193273.500	4954.4792	5040.3021			
		93	0	SPECIAL	0.000	0.0000	2672	2672		193273.500	193273.500	5040.3021	5040.3021			
		93	1	C-I-P	93.000	93.0000	2672	2673		193273.500	193366.500	5040.3021	5048.0521			
		94	0	SPECIAL	0.000	0.0000	2673	2673		193366.500	193366.500	5048.0521	5048.0521			
		94	11	TYPICAL	93.625	1029.8750	2673	2684		193366.500	194396.375	5048.0521	5133.8750			
		105	1	PIER 24'	93.625	93.6250	2684	2685		194396.375	194490.000	5133.8750	5141.6771			
		106	1	PIER 24'	30.000	30.0000	2685	**2686**	Y	194490.000	194520.000	5141.6771	5144.1771			
23		107	1	PIER 24'	30.000	30.0000	2686	2687		194520.000	194550.000	5144.1771	5146.6771	2400.000	200.000	200' 0"
		108	1	PIER 24'	93.625	93.6250	2687	2688		194550.000	194643.625	5146.6771	5154.4792			
		109	11	TYPICAL	93.625	1029.8750	2688	2699		194643.625	195673.500	5154.4792	5240.3021			
		120	0	SPECIAL	0.000	0.0000	2699	2699		195673.500	195673.500	5240.3021	5240.3021			
		120	1	C-I-P	132.000	132.0000	2699	2700		195673.500	195805.500	5240.3021	5251.3021			
		121	4	TYPICAL	93.625	374.5000	2700	2704		195805.500	196180.000	5251.3021	5282.5104			
		125	1	SPECIAL	148.250	148.2500	2704	2705		196180.000	196328.250	5282.5104	5294.8646			
		126	2	TYPICAL	93.625	187.2500	2705	2707		196328.250	196515.500	5294.8646	5310.4688			
		128	1	EXP. JT 7	0.000	0.0000	2707	2708		196515.500	196515.500	5310.4688	5310.4688			
		1	3	TYPICAL	93.625	280.8750	2708	2711		196515.500	196796.375	5310.4688	5333.8750			
		4	1	PIER 25'	93.625	93.6250	2711	2712		196796.375	196890.000	5333.8750	5341.6771			
		5	1	PIER 25'	30.000	30.0000	2712	**2713**	Y	196890.000	196920.000	5341.6771	5344.1771			
24		6	1	PIER 25'	30.000	30.0000	2713	2714		196920.000	196950.000	5344.1771	5346.6771	2340.000	195.000	195' 0"
		7	1	PIER 25'	93.625	93.6250	2714	2715		196950.000	197043.625	5346.6771	5354.4792			
		8	11	TYPICAL	93.625	1029.8750	2715	2726		197043.625	198073.500	5354.4792	5440.3021			
		19	0	SPECIAL	0.000	0.0000	2726	2726		198073.500	198073.500	5440.3021	5440.3021			
		19	1	C-I-P	33.000	33.0000	2726	2727		198073.500	198106.500	5440.3021	5443.0521			
		20	0	SPECIAL	0.000	0.0000	2727	2727		198106.500	198106.500	5443.0521	5443.0521			
		20	11	TYPICAL	93.625	1029.8750	2727	2738		198106.500	199136.375	5443.0521	5528.8750			
		31	1	PIER 26'	93.625	93.6250	2738	2739		199136.375	199230.000	5528.8750	5536.6771			
		32	1	PIER 26'	30.000	30.0000	2739	**2740**	Y	199230.000	199260.000	5536.6771	5539.1771			
		33	1	PIER 26'	30.000	30.0000	2740	2741		199260.000	199290.000	5539.1771	5541.6771			
		34	1	PIER 26'	93.625	93.6250	2741	2742		199290.000	199383.625	5541.6771	5549.4792			
		35	11	TYPICAL	93.625	1029.8750	2742	2753		199383.625	200413.500	5549.4792	5635.3021			
		46	0	SPECIAL	0.000	0.0000	2753	2753		200413.500	200413.500	5635.3021	5635.3021			

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOUND — CHECKED BY: IC BY PT — DATE: 2/9/2009

STATION EQUATIONS

BEGIN BRIDGE FFBW END BENT 1 =	132756.000	BEGIN BRIDGE FFBW END BENT 1 =	132756.000
Front Face Backwall =	55.500	BEGIN SEGMENT =	132789.875
Distance to CL Bearing =	21.625	CL BEARING @ END BENT 1 =	132811.500
		CL BEARING @ END BENT 2 =	1755+98.3750
		END SEGMENT =	1756+20.0000
		END BRIDGE FFBW END BENT 1 =	1756+75.5000

RM SEGMENT STATIONING BASED ON BOX CL

SPAN			NO. OF RM SEGMENTS	SEGMENT TYPE	SEGMENT LENGTH	TOTAL LENGTH	NODE START	NODE END	SUPPORT @ END NODE	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	STATIONS RAMP N-E STATION START	STATIONS RAMP N-E STATION END	SPAN LENGTH IN	SPAN LENGTH FT	SPAN LENGTH
25	SEGMENT 6	46	1	C-I-P	33.000	33.0000	2753	2754		200413.500	200446.500	5635.3021	5638.0521	2340.000	195.000	195' 0"
		47	0	SPECIAL	0.000	0.0000	2754	2754		200446.500	200446.500	5638.0521	5638.0521			
		47	11	TYPICAL	93.625	1029.8750	2754	2765		200446.500	201476.375	5638.0521	5723.8750			
		58	1	PIER 27'	93.625	93.6250	2765	2766		201476.375	201570.000	5723.8750	5731.6771			
		59	1	PIER 27'	30.000	30.0000	2766	**2767**	Y	201570.000	201600.000	5731.6771	5734.1771			
26		60	1	PIER 27'	30.000	30.0000	2767	2768		201600.000	201630.000	5734.1771	5736.6771	2196.000	183.000	183' 0"
		61	1	PIER 27'	93.625	93.6250	2768	2769		201630.000	201723.625	5736.6771	5744.4792			
		62	10	TYPICAL	93.625	936.2500	2769	2779		201723.625	202659.875	5744.4792	5822.5000			
		72	0	SPECIAL	0.000	0.0000	2779	2779		202659.875	202659.875	5822.5000	5822.5000			
		72	1	C-I-P	76.250	76.2500	2779	2780		202659.875	202736.125	5822.5000	5828.8542			
		73	0	SPECIAL	0.000	0.0000	2780	2780		202736.125	202736.125	5828.8542	5828.8542			
		73	10	TYPICAL	93.625	936.2500	2780	2790		202736.125	203672.375	5828.8542	5906.8750			
		83	1	PIER 28'	93.625	93.6250	2790	2791		203672.375	203766.000	5906.8750	5914.6771			
		84	1	PIER 28'	30.000	30.0000	2791	**2792**	Y	203766.000	203796.000	5914.6771	5917.1771			
27		85	1	PIER 28'	30.000	30.0000	2792	2793		203796.000	203826.000	5917.1771	5919.6771	2376.000	198.000	198' 0"
		86	1	PIER 28'	93.625	93.6250	2793	2794		203826.000	203919.625	5919.6771	5927.4792			
		87	11	TYPICAL	93.625	1029.8750	2794	2805		203919.625	204949.500	5927.4792	6013.3021			
		98	0	SPECIAL	0.000	0.0000	2805	2805		204949.500	204949.500	6013.3021	6013.3021			
		98	1	C-I-P	69.000	69.0000	2805	2806		204949.500	205018.500	6013.3021	6019.0521			
		99	0	SPECIAL	0.000	0.0000	2806	2806		205018.500	205018.500	6019.0521	6019.0521			
		99	11	TYPICAL	93.625	1029.8750	2806	2817		205018.500	206048.375	6019.0521	6104.8750			
		110	1	PIER 29'	93.625	93.6250	2817	2818		206048.375	206142.000	6104.8750	6112.6771			
		111	1	PIER 29'	30.000	30.0000	2818	**2819**	Y	206142.000	206172.000	6112.6771	6115.1771			
28		112	1	PIER 29'	30.000	30.0000	2819	2820		206172.000	206202.000	6115.1771	6117.6771	1680.000	140.000	140' 0"
		113	1	PIER 29'	93.625	93.6250	2820	2821		206202.000	206295.625	6117.6771	6125.4792			
		114	11	TYPICAL	93.625	1029.8750	2821	2832		206295.625	207325.500	6125.4792	6211.3021			
		125	0	SPECIAL	0.000	0.0000	2832	2832		207325.500	207325.500	6211.3021	6211.3021			
		125	1	C-I-P	28.375	28.3750	2832	2833		207325.500	207353.875	6211.3021	6213.6667			
		126	0	SPECIAL	0.000	0.0000	2833	2833		207353.875	207353.875	6213.6667	6213.6667			
		126	4	TYPICAL	93.625	374.5000	2833	2837		207353.875	207728.375	6213.6667	6244.8750			
		130	1	ABUT 30'	114.625	114.6250	2837	2838		207728.375	207843.000	6244.8750	6254.4271			
		131	1	ABUT 30'	9.000	9.0000	2838	2839		207843.000	207852.000	6254.4271	6255.1771			
		132	1	ABUT 30'	21.625	21.6250	2839	**2840**	Y	207852.000	207873.625	6255.1771	6256.9792			

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750									
1	0.000	132789.8750	SPABS	132789.8750	AS		p10	0.0000	1.8021	1	
2	21.6250	132811.5000	SPREL	21.6250	AS		p20	1.8021	2.5000	2	
3	8.3750	132819.8750	SPREL	8.3750	AS		p30	2.5000	12.1042	3	
4	115.2500	132935.1250	SPREL	115.2500	AS		p40	12.1042	19.9063	4	
5	93.6250	133028.7500	SPREL	93.6250	AS		p50	19.9063	27.7083	5	
6	93.6250	133122.3750	SPREL	93.6250	AS		p60	27.7083	35.5104	6	
7	93.6250	133216.0000	SPREL	93.6250	AS		p70	35.5104	43.3125	7	
8	93.6250	133309.6250	SPREL	93.6250	AS		p80	43.3125	51.1146	8	
9	93.6250	133403.2500	SPREL	93.6250	AS		p90	51.1146	58.9167	9	
10	93.6250	133496.8750	SPREL	93.6250	AS		p100	58.9167	66.7188	10	
11	93.6250	133590.5000	SPREL	93.6250	AS		p110	66.7188	71.8021	11	
12	61.0000	133651.5000	SPREL	61.0000	AS		p120	71.8021	79.0764	12	
13	87.2917	133738.7917	SPREL	87.2917	AS		p130	79.0764	86.3507	13	
14	87.2917	133826.0834	SPREL	87.2917	AS		p140	86.3507	93.6250	14	
15	87.2916	133913.3750	SPREL	87.2916	AS		p150	93.6250	101.4271	15	
16	93.6250	134007.0000	SPREL	93.6250	AS		p160	101.4271	103.9271	16	
17	30.0000	134037.0000	SPREL	30.0000	AS		p170	103.9271	106.4271	17	
18	30.0000	134067.0000	SPREL	30.0000	AS		p180	106.4271	114.2292	18	PIER 3
19	93.6250	134160.6250	SPREL	93.6250	AS		p190	114.2292	122.0313	19	
20	93.6250	134254.2500	SPREL	93.6250	AS		p200	122.0313	129.8333	20	
21	93.6250	134347.8750	SPREL	93.6250	AS		p210	129.8333	137.6354	21	
22	93.6250	134441.5000	SPREL	93.6250	AS		p220	137.6354	145.4375	22	
23	93.6250	134535.1250	SPREL	93.6250	AS		p230	145.4375	153.2396	23	
24	93.6250	134628.7500	SPREL	93.6250	AS		p240	153.2396	161.0417	24	
25	93.6250	134722.3750	SPREL	93.6250	AS		p250	161.0417	168.8438	25	
26	93.6250	134816.0000	SPREL	93.6250	AS		p260	168.8438	176.6458	26	
27	93.6250	134909.6250	SPREL	93.6250	AS		p270	176.6458	184.4479	27	
28	93.6250	135003.2500	SPREL	93.6250	AS		p280	184.4479	192.2500	28	
29	93.6250	135096.8750	SPREL	93.6250	AS		p290	192.2500	200.0521	29	
30	93.6250	135190.5000	SPREL	93.6250	AS		p300	200.0521	205.8542	30	
31	69.6250	135260.1250	SPREL	69.6250	AS		p310	205.8542	213.6563	31	
32	93.6250	135353.7500	SPREL	93.6250	AS		p320	213.6563	221.4583	32	
33	93.6250	135447.3750	SPREL	93.6250	AS		p330	221.4583	229.2604	33	
34	93.6250	135541.0000	SPREL	93.6250	AS		p340	229.2604	237.0625	34	
35	93.6250	135634.6250	SPREL	93.6250	AS		p350	237.0625	244.8646	35	
36	93.6250	135728.2500	SPREL	93.6250	AS		p360	244.8646	252.6667	36	
37	93.6250	135821.8750	SPREL	93.6250	AS		p370	252.6667	260.4688	37	
38	93.6250	135915.5000	SPREL	93.6250	AS		p380	260.4688	268.2708	38	
39	93.6250	136009.1250	SPREL	93.6250	AS		p390	268.2708	276.0729	39	
40	93.6250	136102.7500	SPREL	93.6250	AS		p400	276.0729	283.8750	40	
41	93.6250	136196.3750	SPREL	93.6250	AS		p410	283.8750	291.6771	41	
42	93.6250	136290.0000	SPREL	93.6250	AS		p420	291.6771	294.1771	42	
43	30.0000	136320.0000	SPREL	30.0000	AS		p430	294.1771	296.6771	43	
44	30.0000	136350.0000	SPREL	30.0000	AS		p440	296.6771	304.4792	44	PIER 4
45	93.6250	136443.6250	SPREL	93.6250	AS		p450	304.4792	312.2813	45	
46	93.6250	136537.2500	SPREL	93.6250	AS		p460	312.2813	320.0833	46	
47	93.6250	136630.8750	SPREL	93.6250	AS		p470	320.0833	327.8854	47	
48	93.6250	136724.5000	SPREL	93.6250	AS		p480	327.8854	335.6875	48	
49	93.6250	136818.1250	SPREL	93.6250	AS		p490	335.6875	343.4896	49	
50	93.6250	136911.7500	SPREL	93.6250	AS		p500	343.4896	351.2917	50	
51	93.6250	137005.3750	SPREL	93.6250	AS		p510	351.2917	359.0938	51	
52	93.6250	137099.0000	SPREL	93.6250	AS		p520	359.0938	366.8958	52	

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.
		132789.8750							
53	93.6250	137192.6250	SPREL	93.6250	AS	p530	366.8958	374.6979	53
54	93.6250	137286.2500	SPREL	93.6250	AS	p540	374.6979	382.5000	54
55	93.6250	137379.8750	SPREL	93.6250	AS	p550	382.5000	389.4479	55
56	83.3750	137463.2500	SPREL	83.3750	AS	p560	389.4479	397.2500	56
57	93.6250	137556.8750	SPREL	93.6250	AS	p570	397.2500	405.0521	57
58	93.6250	137650.5000	SPREL	93.6250	AS	p580	405.0521	412.8542	58
59	93.6250	137744.1250	SPREL	93.6250	AS	p590	412.8542	420.6563	59
60	93.6250	137837.7500	SPREL	93.6250	AS	p600	420.6563	428.4583	60
61	93.6250	137931.3750	SPREL	93.6250	AS	p610	428.4583	436.2604	61
62	93.6250	138025.0000	SPREL	93.6250	AS	p620	436.2604	444.0625	62
63	93.6250	138118.6250	SPREL	93.6250	AS	p630	444.0625	451.8646	63
64	93.6250	138212.2500	SPREL	93.6250	AS	p640	451.8646	459.6667	64
65	93.6250	138305.8750	SPREL	93.6250	AS	p650	459.6667	467.4688	65
66	93.6250	138399.5000	SPREL	93.6250	AS	p660	467.4688	475.2708	66
67	93.6250	138493.1250	SPREL	93.6250	AS	p670	475.2708	483.0729	67
68	93.6250	138586.7500	SPREL	93.6250	AS	p680	483.0729	490.8750	68
69	93.6250	138680.3750	SPREL	93.6250	AS	p690	490.8750	498.6771	69
70	93.6250	138774.0000	SPREL	93.6250	AS	p700	498.6771	501.1771	70
71	30.0000	138804.0000	SPREL	30.0000	AS	p710	501.1771	503.6771	71
72	30.0000	138834.0000	SPREL	30.0000	AS	p720	503.6771	511.4792	72
73	93.6250	138927.6250	SPREL	93.6250	AS	p730	511.4792	519.2813	73
74	93.6250	139021.2500	SPREL	93.6250	AS	p740	519.2813	527.0833	74
75	93.6250	139114.8750	SPREL	93.6250	AS	p750	527.0833	534.8854	75
76	93.6250	139208.5000	SPREL	93.6250	AS	p760	534.8854	542.6875	76
77	93.6250	139302.1250	SPREL	93.6250	AS	p770	542.6875	550.4896	77
78	93.6250	139395.7500	SPREL	93.6250	AS	p780	550.4896	558.2917	78
79	93.6250	139489.3750	SPREL	93.6250	AS	p790	558.2917	566.0938	79
80	93.6250	139583.0000	SPREL	93.6250	AS	p800	566.0938	573.8958	80
81	93.6250	139676.6250	SPREL	93.6250	AS	p810	573.8958	581.6979	81
82	93.6250	139770.2500	SPREL	93.6250	AS	p820	581.6979	589.5000	82
83	93.6250	139863.8750	SPREL	93.6250	AS	p830	589.5000	597.3021	83
84	93.6250	139957.5000	SPREL	93.6250	AS	p840	597.3021	605.1042	84
85	93.6250	140051.1250	SPREL	93.6250	AS	p850	605.1042	612.9063	85
86	93.6250	140144.7500	SPREL	93.6250	AS	p860	612.9063	620.7083	86
87	93.6250	140238.3750	SPREL	93.6250	AS	p870	620.7083	623.9896	87
88	39.3750	140277.7500	SPREL	39.3750	AS	p880	623.9896	631.7917	88
89	93.6250	140371.3750	SPREL	93.6250	AS	p890	631.7917	639.5938	89
90	93.6250	140465.0000	SPREL	93.6250	AS	p900	639.5938	647.3958	90
91	93.6250	140558.6250	SPREL	93.6250	AS	p910	647.3958	655.1979	91
92	93.6250	140652.2500	SPREL	93.6250	AS	p920	655.1979	663.0000	92
93	93.6250	140745.8750	SPREL	93.6250	AS	p930	663.0000	670.8021	93
94	93.6250	140839.5000	SPREL	93.6250	AS	p940	670.8021	678.6042	94
95	93.6250	140933.1250	SPREL	93.6250	AS	p950	678.6042	686.4063	95
96	93.6250	141026.7500	SPREL	93.6250	AS	p960	686.4063	694.2083	96
97	93.6250	141120.3750	SPREL	93.6250	AS	p970	694.2083	702.0104	97
98	93.6250	141214.0000	SPREL	93.6250	AS	p980	702.0104	709.8125	98
99	93.6250	141307.6250	SPREL	93.6250	AS	p990	709.8125	717.6146	99
100	93.6250	141401.2500	SPREL	93.6250	AS	p1000	717.6146	725.4167	100
101	93.6250	141494.8750	SPREL	93.6250	AS	p1010	725.4167	733.2188	101
102	93.6250	141588.5000	SPREL	93.6250	AS	p1020	733.2188	741.0208	102
103	93.6250	141682.1250	SPREL	93.6250	AS	p1030	741.0208	748.8229	103
104	93.6250	141775.7500	SPREL	93.6250	AS	p1040	748.8229	756.6250	104

PIER 5

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
105	93.6250	141869.3750	SPREL	93.6250	AS	p1050	756.6250	764.4271	105	
106	93.6250	141963.0000	SPREL	93.6250	AS	p1060	764.4271	766.9271	106	
107	30.0000	141993.0000	SPREL	30.0000	AS	p1070	766.9271	769.4271	107	
108	30.0000	142023.0000	SPREL	30.0000	AS	p1080	769.4271	777.2292	108	PIER 6
109	93.6250	142116.6250	SPREL	93.6250	AS	p1090	777.2292	785.0313	109	
110	93.6250	142210.2500	SPREL	93.6250	AS	p1100	785.0313	792.8333	110	
111	93.6250	142303.8750	SPREL	93.6250	AS	p1110	792.8333	800.6354	111	
112	93.6250	142397.5000	SPREL	93.6250	AS	p1120	800.6354	808.4375	112	
113	93.6250	142491.1250	SPREL	93.6250	AS	p1130	808.4375	816.2396	113	
114	93.6250	142584.7500	SPREL	93.6250	AS	p1140	816.2396	824.0417	114	
115	93.6250	142678.3750	SPREL	93.6250	AS	p1150	824.0417	831.8438	115	
116	93.6250	142772.0000	SPREL	93.6250	AS	p1160	831.8438	839.6458	116	
117	93.6250	142865.6250	SPREL	93.6250	AS	p1170	839.6458	847.4479	117	
118	93.6250	142959.2500	SPREL	93.6250	AS	p1180	847.4479	855.2500	118	
119	93.6250	143052.8750	SPREL	93.6250	AS	p1190	855.2500	863.0521	119	
120	93.6250	143146.5000	SPREL	93.6250	AS	p1200	863.0521	870.8542	120	
121	93.6250	143240.1250	SPREL	93.6250	AS	p1210	870.8542	878.6563	121	
122	93.6250	143333.7500	SPREL	93.6250	AS	p1220	878.6563	886.4583	122	
123	93.6250	143427.3750	SPREL	93.6250	AS	p1230	886.4583	894.2604	123	
124	93.6250	143521.0000	SPREL	93.6250	AS	p1240	894.2604	902.0625	124	
125	93.6250	143614.6250	SPREL	93.6250	AS	p1250	902.0625	905.3438	125	
126	39.3750	143654.0000	SPREL	39.3750	AS	p1260	905.3438	913.1458	126	
127	93.6250	143747.6250	SPREL	93.6250	AS	p1270	913.1458	920.9479	127	
128	93.6250	143841.2500	SPREL	93.6250	AS	p1280	920.9479	928.7500	128	
129	93.6250	143934.8750	SPREL	93.6250	AS	p1290	928.7500	936.5521	129	
130	93.6250	144028.5000	SPREL	93.6250	AS	p1300	936.5521	944.3542	130	
131	93.6250	144122.1250	SPREL	93.6250	AS	p1310	944.3542	952.1563	131	
132	93.6250	144215.7500	SPREL	93.6250	AS	p1320	952.1563	959.9583	132	
133	93.6250	144309.3750	SPREL	93.6250	AS	p1330	959.9583	967.7604	133	
134	93.6250	144403.0000	SPREL	93.6250	AS	p1340	967.7604	975.5625	134	
135	93.6250	144496.6250	SPREL	93.6250	AS	p1350	975.5625	983.3646	135	
136	93.6250	144590.2500	SPREL	93.6250	AS	p1360	983.3646	991.1667	136	
137	93.6250	144683.8750	SPREL	93.6250	AS	p1370	991.1667	998.9688	137	
138	93.6250	144777.5000	SPREL	93.6250	AS	p1380	998.9688	1006.7708	138	
139	93.6250	144871.1250	SPREL	93.6250	AS	p1390	1006.7708	1014.5729	139	
140	93.6250	144964.7500	SPREL	93.6250	AS	p1400	1014.5729	1022.3750	140	
141	93.6250	145058.3750	SPREL	93.6250	AS	p1410	1022.3750	1030.1771	141	
142	93.6250	145152.0000	SPREL	93.6250	AS	p1420	1030.1771	1032.6771	142	
143	30.0000	145182.0000	SPREL	30.0000	AS	p1430	1032.6771	1035.1771	143	
144	30.0000	145212.0000	SPREL	30.0000	AS	p1440	1035.1771	1042.9792	144	PIER 7'
145	93.6250	145305.6250	SPREL	93.6250	AS	p1450	1042.9792	1050.7813	145	
146	93.6250	145399.2500	SPREL	93.6250	AS	p1460	1050.7813	1058.5833	146	
147	93.6250	145492.8750	SPREL	93.6250	AS	p1470	1058.5833	1066.3854	147	
148	93.6250	145586.5000	SPREL	93.6250	AS	p1480	1066.3854	1074.1875	148	
149	93.6250	145680.1250	SPREL	93.6250	AS	p1490	1074.1875	1081.9896	149	
150	93.6250	145773.7500	SPREL	93.6250	AS	p1500	1081.9896	1089.7917	150	
151	93.6250	145867.3750	SPREL	93.6250	AS	p1510	1089.7917	1097.5938	151	
152	93.6250	145961.0000	SPREL	93.6250	AS	p1520	1097.5938	1105.3958	152	
153	93.6250	146054.6250	SPREL	93.6250	AS	p1530	1105.3958	1113.1979	153	
154	93.6250	146148.2500	SPREL	93.6250	AS	p1540	1113.1979	1121.0000	154	
155	93.6250	146241.8750	SPREL	93.6250	AS	p1550	1121.0000	1128.8021	155	
156	93.6250	146335.5000	SPREL	93.6250	AS	p1560	1128.8021	1136.6042	156	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.			
		132789.8750										
157	93.6250	146429.1250	SPREL	93.6250	AS	p1570	1136.6042	1144.4063	157			
158	93.6250	146522.7500	SPREL	93.6250	AS	p1580	1144.4063	1152.2083	158			
159	93.6250	146616.3750	SPREL	93.6250	AS	p1590	1152.2083	1160.0104	159			
160	93.6250	146710.0000	SPREL	93.6250	AS	p1600	1160.0104	1163.3021	160			
161	39.5000	146749.5000	SPREL	39.5000	AS	p1610	1163.3021	1171.1042	161			
162	93.6250	146843.1250	SPREL	93.6250	AS	p1620	1171.1042	1178.9063	162			
163	93.6250	146936.7500	SPREL	93.6250	AS	p1630	1178.9063	1186.7083	163			
164	93.6250	147030.3750	SPREL	93.6250	AS	p1640	1186.7083	1194.5104	164			
165	93.6250	147124.0000	SPREL	93.6250	AS	p1650	1194.5104	1202.3125	165			
166	93.6250	147217.6250	SPREL	93.6250	AS	p1660	1202.3125	1210.1146	166			
167	93.6250	147311.2500	SPREL	93.6250	AS	p1670	1210.1146	1217.9167	167			
168	93.6250	147404.8750	SPREL	93.6250	AS	p1680	1217.9167	1225.7188	168			
169	93.6250	147498.5000	SPREL	93.6250	AS	p1690	1225.7188	1233.5208	169			
170	93.6250	147592.1250	SPREL	93.6250	AS	p1700	1233.5208	1241.3229	170			
171	93.6250	147685.7500	SPREL	93.6250	AS	p1710	1241.3229	1249.1250	171			
172	93.6250	147779.3750	SPREL	93.6250	AS	p1720	1249.1250	1256.9271	172			
173	93.6250	147873.0000	SPABS	147873.0000	AS	p1730	1256.9271	1256.9271	173	SEGMENT 1	EJ 2	Change in C.S. at 147873.0000
1	0.0000	147873.0000	SPABS	147873.0000	AS	p10	1256.9271	1264.7292	174	SEGMENT 2		
2	93.6250	147966.6250	SPREL	93.6250	AS	p20	1264.7292	1272.5313	175			
3	93.6250	148060.2500	SPREL	93.6250	AS	p30	1272.5313	1280.3333	176			
4	93.6250	148153.8750	SPREL	93.6250	AS	p40	1280.3333	1288.1354	177			
5	93.6250	148247.5000	SPREL	93.6250	AS	p50	1288.1354	1295.9271	178			
6	93.5000	148341.0000	SPREL	93.5000	AS	p60	1295.9271	1298.4271	179			
7	30.0000	148371.0000	SPREL	30.0000	AS	p70	1298.4271	1300.9271	180		PIER 8'	
8	30.0000	148401.0000	SPREL	30.0000	AS	p80	1300.9271	1308.7292	181			
9	93.6250	148494.6250	SPREL	93.6250	AS	p90	1308.7292	1316.5313	182			
10	93.6250	148588.2500	SPREL	93.6250	AS	p100	1316.5313	1324.3333	183			
11	93.6250	148681.8750	SPREL	93.6250	AS	p110	1324.3333	1332.1354	184			
12	93.6250	148775.5000	SPREL	93.6250	AS	p120	1332.1354	1339.9375	185			
13	93.6250	148869.1250	SPREL	93.6250	AS	p130	1339.9375	1347.7396	186			
14	93.6250	148962.7500	SPREL	93.6250	AS	p140	1347.7396	1355.5417	187			
15	93.6250	149056.3750	SPREL	93.6250	AS	p150	1355.5417	1363.3438	188			
16	93.6250	149150.0000	SPREL	93.6250	AS	p160	1363.3438	1371.1458	189			
17	93.6250	149243.6250	SPREL	93.6250	AS	p170	1371.1458	1378.9479	190			
18	93.6250	149337.2500	SPREL	93.6250	AS	p180	1378.9479	1386.7500	191			
19	93.6250	149430.8750	SPREL	93.6250	AS	p190	1386.7500	1394.5521	192			
20	93.6250	149524.5000	SPREL	93.6250	AS	p200	1394.5521	1402.3542	193			
21	93.6250	149618.1250	SPREL	93.6250	AS	p210	1402.3542	1410.1563	194			
22	93.6250	149711.7500	SPREL	93.6250	AS	p220	1410.1563	1417.9583	195			
23	93.6250	149805.3750	SPREL	93.6250	AS	p230	1417.9583	1425.7604	196			
24	93.6250	149899.0000	SPREL	93.6250	AS	p240	1425.7604	1429.0417	197			
25	39.3750	149938.3750	SPREL	39.3750	AS	p250	1429.0417	1436.8438	198			
26	93.6250	150032.0000	SPREL	93.6250	AS	p260	1436.8438	1444.6458	199			
27	93.6250	150125.6250	SPREL	93.6250	AS	p270	1444.6458	1452.4479	200			
28	93.6250	150219.2500	SPREL	93.6250	AS	p280	1452.4479	1460.2500	201			
29	93.6250	150312.8750	SPREL	93.6250	AS	p290	1460.2500	1468.0521	202			
30	93.6250	150406.5000	SPREL	93.6250	AS	p300	1468.0521	1475.8542	203			
31	93.6250	150500.1250	SPREL	93.6250	AS	p310	1475.8542	1483.6563	204			
32	93.6250	150593.7500	SPREL	93.6250	AS	p320	1483.6563	1491.4583	205			
33	93.6250	150687.3750	SPREL	93.6250	AS	p330	1491.4583	1499.2604	206			
34	93.6250	150781.0000	SPREL	93.6250	AS	p340	1499.2604	1507.0625	207			
35	93.6250	150874.6250	SPREL	93.6250	AS	p350	1507.0625	1514.8646	208			

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JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.			
		132789.8750										
36	93.6250	150968.2500	SPREL	93.6250	AS	p360	1514.8646	1522.6667	209			
37	93.6250	151061.8750	SPREL	93.6250	AS	p370	1522.6667	1530.4688	210			
38	93.6250	151155.5000	SPREL	93.6250	AS	p380	1530.4688	1538.2708	211			
39	93.6250	151249.1250	SPREL	93.6250	AS	p390	1538.2708	1546.0729	212			
40	93.6250	151342.7500	SPREL	93.6250	AS	p400	1546.0729	1553.8750	213			
41	93.6250	151436.3750	SPREL	93.6250	AS	p410	1553.8750	1556.3750	214			
42	30.0000	151466.3750	SPREL	30.0000	AS	p420	1556.3750	1558.8750	215			
43	30.0000	151496.3750	SPREL	30.0000	AS	p430	1558.8750	1566.6771	216		PIER 9'	
44	93.6250	151590.0000	SPREL	93.6250	AS	p440	1566.6771	1574.4792	217			
45	93.6250	151683.6250	SPREL	93.6250	AS	p450	1574.4792	1582.2813	218			
46	93.6250	151777.2500	SPREL	93.6250	AS	p460	1582.2813	1590.0833	219			
47	93.6250	151870.8750	SPREL	93.6250	AS	p470	1590.0833	1597.8854	220			
48	93.6250	151964.5000	SPREL	93.6250	AS	p480	1597.8854	1605.6875	221			
49	93.6250	152058.1250	SPREL	93.6250	AS	p490	1605.6875	1613.4896	222			
50	93.6250	152151.7500	SPREL	93.6250	AS	p500	1613.4896	1621.2917	223			
51	93.6250	152245.3750	SPREL	93.6250	AS	p510	1621.2917	1629.0938	224			
52	93.6250	152339.0000	SPREL	93.6250	AS	p520	1629.0938	1636.8958	225			
53	93.6250	152432.6250	SPREL	93.6250	AS	p530	1636.8958	1644.6979	226			
54	93.6250	152526.2500	SPREL	93.6250	AS	p540	1644.6979	1652.5000	227			
55	93.6250	152619.8750	SPREL	93.6250	AS	p550	1652.5000	1660.3021	228			
56	93.6250	152713.5000	SPREL	93.6250	AS	p560	1660.3021	1668.1042	229			
57	93.6250	152807.1250	SPREL	93.6250	AS	p570	1668.1042	1675.9063	230			
58	93.6250	152900.7500	SPREL	93.6250	AS	p580	1675.9063	1683.7083	231			
59	93.6250	152994.3750	SPREL	93.6250	AS	p590	1683.7083	1691.5104	232			
60	93.6250	153088.0000	SPREL	93.6250	AS	p600	1691.5104	1697.8333	233			
61	75.8750	153163.8750	SPREL	75.8750	AS	p610	1697.8333	1705.6354	234			
62	93.6250	153257.5000	SPREL	93.6250	AS	p620	1705.6354	1713.4375	235			
63	93.6250	153351.1250	SPREL	93.6250	AS	p630	1713.4375	1721.2396	236			
64	93.6250	153444.7500	SPREL	93.6250	AS	p640	1721.2396	1729.0417	237			
65	93.6250	153538.3750	SPREL	93.6250	AS	p650	1729.0417	1736.8438	238			
66	93.6250	153632.0000	SPREL	93.6250	AS	p660	1736.8438	1744.6458	239			
67	93.6250	153725.6250	SPREL	93.6250	AS	p670	1744.6458	1752.4479	240			
68	93.6250	153819.2500	SPREL	93.6250	AS	p680	1752.4479	1760.2500	241			
69	93.6250	153912.8750	SPREL	93.6250	AS	p690	1760.2500	1768.0521	242			
70	93.6250	154006.5000	SPREL	93.6250	AS	p700	1768.0521	1775.8542	243			
71	93.6250	154100.1250	SPREL	93.6250	AS	p710	1775.8542	1783.6563	244			
72	93.6250	154193.7500	SPREL	93.6250	AS	p720	1783.6563	1791.4583	245			
73	93.6250	154287.3750	SPREL	93.6250	AS	p730	1791.4583	1799.2604	246			
74	93.6250	154381.0000	SPREL	93.6250	AS	p740	1799.2604	1807.0625	247			
75	93.6250	154474.6250	SPREL	93.6250	AS	p750	1807.0625	1814.8646	248			
76	93.6250	154568.2500	SPREL	93.6250	AS	p760	1814.8646	1822.6667	249			
77	93.6250	154661.8750	SPREL	93.6250	AS	p770	1822.6667	1830.4687	250			
78	93.6250	154755.5000	SPREL	93.6250	AS	p780	1830.4687	1838.2708	251			
79	93.6250	154849.1250	SPREL	93.6250	AS	p790	1838.2708	1840.7708	252			
80	30.0000	154879.1250	SPREL	30.0000	AS	p800	1840.7708	1843.2708	253			
81	30.0000	154909.1250	SPREL	30.0000	AS	p810	1843.2708	1851.0729	254	START SEG. 2A	PIER 10'	Change in C.S. at 15489.125
82	93.6250	155002.7500	SPREL	93.6250	AS	p820	1851.0729	1858.8750	255	ELEM 4001		
83	93.6250	155096.3750	SPREL	93.6250	AS	p830	1858.8750	1866.6771	256			
84	93.6250	155190.0000	SPREL	93.6250	AS	p840	1866.6771	1874.4792	257			
85	93.6250	155283.6250	SPREL	93.6250	AS	p850	1874.4792	1882.2812	258			
86	93.6250	155377.2500	SPREL	93.6250	AS	p860	1882.2812	1890.0833	259			
87	93.6250	155470.8750	SPREL	93.6250	AS	p870	1890.0833	1897.8854	260			

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.
		132789.8750							
88	93.6250	155564.5000	SPREL	93.6250	AS	p880	1897.8854	1905.6875	261
89	93.6250	155658.1250	SPREL	93.6250	AS	p890	1905.6875	1913.4896	262
90	93.6250	155751.7500	SPREL	93.6250	AS	p900	1913.4896	1921.2917	263
91	93.6250	155845.3750	SPREL	93.6250	AS	p910	1921.2917	1929.0937	264
92	93.6250	155939.0000	SPREL	93.6250	AS	p920	1929.0937	1936.8958	265
93	93.6250	156032.6250	SPREL	93.6250	AS	p930	1936.8958	1944.6979	266
94	93.6250	156126.2500	SPREL	93.6250	AS	p940	1944.6979	1952.5000	267
95	93.6250	156219.8750	SPREL	93.6250	AS	p950	1952.5000	1960.3021	268
96	93.6250	156313.5000	SPREL	93.6250	AS	p960	1960.3021	1968.1042	269
97	93.6250	156407.1250	SPREL	93.6250	AS	p970	1968.1042	1975.9062	270
98	93.6250	156500.7500	SPREL	93.6250	AS	p980	1975.9062	1983.7083	271
99	93.6250	156594.3750	SPREL	93.6250	AS	p990	1983.7083	1990.0312	272
100	75.8750	156670.2500	SPREL	75.8750	AS	p1000	1990.0312	1997.8333	273
101	93.6250	156763.8750	SPREL	93.6250	AS	p1010	1997.8333	2005.6354	274
102	93.6250	156857.5000	SPREL	93.6250	AS	p1020	2005.6354	2013.4375	275
103	93.6250	156951.1250	SPREL	93.6250	AS	p1030	2013.4375	2021.2396	276
104	93.6250	157044.7500	SPREL	93.6250	AS	p1040	2021.2396	2029.0417	277
105	93.6250	157138.3750	SPREL	93.6250	AS	p1050	2029.0417	2036.8437	278
106	93.6250	157232.0000	SPREL	93.6250	AS	p1060	2036.8437	2044.6458	279
107	93.6250	157325.6250	SPREL	93.6250	AS	p1070	2044.6458	2052.4479	280
108	93.6250	157419.2500	SPREL	93.6250	AS	p1080	2052.4479	2060.2500	281
109	93.6250	157512.8750	SPREL	93.6250	AS	p1090	2060.2500	2068.0521	282
110	93.6250	157606.5000	SPREL	93.6250	AS	p1100	2068.0521	2075.8542	283
111	93.6250	157700.1250	SPREL	93.6250	AS	p1110	2075.8542	2083.6562	284
112	93.6250	157793.7500	SPREL	93.6250	AS	p1120	2083.6562	2091.4583	285
113	93.6250	157887.3750	SPREL	93.6250	AS	p1130	2091.4583	2099.2604	286
114	93.6250	157981.0000	SPREL	93.6250	AS	p1140	2099.2604	2107.0625	287
115	93.6250	158074.6250	SPREL	93.6250	AS	p1150	2107.0625	2114.8646	288
116	93.6250	158168.2500	SPREL	93.6250	AS	p1160	2114.8646	2122.6667	289
117	93.6250	158261.8750	SPREL	93.6250	AS	p1170	2122.6667	2130.4687	290
118	93.6250	158355.5000	SPREL	93.6250	AS	p1180	2130.4687	2132.9687	291
119	30.0000	158385.5000	SPREL	30.0000	AS	p1190	2132.9687	2135.4687	292
120	30.0000	158415.5000	SPREL	30.0000	AS	p1200	2135.4687	2143.2708	293
121	93.6250	158509.1250	SPREL	93.6250	AS	p1210	2143.2708	2151.0729	294
122	93.6250	158602.7500	SPREL	93.6250	AS	p1220	2151.0729	2158.8750	295
123	93.6250	158696.3750	SPREL	93.6250	AS	p1230	2158.8750	2166.6771	296
124	93.6250	158790.0000	SPREL	93.6250	AS	p1240	2166.6771	2174.4792	297
125	93.6250	158883.6250	SPREL	93.6250	AS	p1250	2174.4792	2182.2813	298
126	93.6250	158977.2500	SPREL	93.6250	AS	p1260	2182.2813	2190.0833	299
127	93.6250	159070.8750	SPREL	93.6250	AS	p1270	2190.0833	2197.8854	300
128	93.6250	159164.5000	SPREL	93.6250	AS	p1280	2197.8854	2205.6875	301
129	93.6250	159258.1250	SPREL	93.6250	AS	p1290	2205.6875	2213.4896	302
130	93.6250	159351.7500	SPREL	93.6250	AS	p1300	2213.4896	2221.2917	303
131	93.6250	159445.3750	SPREL	93.6250	AS	p1310	2221.2917	2229.0938	304
132	93.6250	159539.0000	SPREL	93.6250	AS	p1320	2229.0938	2236.8958	305
133	93.6250	159632.6250	SPREL	93.6250	AS	p1330	2236.8958	2244.6979	306
134	93.6250	159726.2500	SPREL	93.6250	AS	p1340	2244.6979	2252.5000	307
135	93.6250	159819.8750	SPREL	93.6250	AS	p1350	2252.5000	2260.3021	308
136	93.6250	159913.5000	SPREL	93.6250	AS	p1360	2260.3021	2268.1042	309
137	93.6250	160007.1250	SPREL	93.6250	AS	p1370	2268.1042	2275.9063	310
138	93.6250	160100.7500	SPREL	93.6250	AS	p1380	2275.9063	2283.7083	311
139	93.6250	160194.3750	SPREL	93.6250	AS	p1390	2283.7083	2290.0313	312

PIER 11'

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.		
		132789.8750										
140	75.8750	160270.2500	SPREL	75.8750	AS	p1400		2290.0313	2297.8333	313		
141	93.6250	160363.8750	SPREL	93.6250	AS	p1410		2297.8333	2305.6354	314		
142	93.6250	160457.5000	SPREL	93.6250	AS	p1420		2305.6354	2313.4375	315		
143	93.6250	160551.1250	SPREL	93.6250	AS	p1430		2313.4375	2321.2396	316		
144	93.6250	160644.7500	SPREL	93.6250	AS	p1440		2321.2396	2329.0417	317		
145	93.6250	160738.3750	SPREL	93.6250	AS	p1450		2329.0417	2336.8438	318		
146	93.6250	160832.0000	SPREL	93.6250	AS	p1460		2336.8438	2344.6458	319		Change in C.S. at 160772.5675
147	93.6250	160925.6250	SPREL	93.6250	AS	p1470		2344.6458	2352.4479	320		
148	93.6250	161019.2500	SPREL	93.6250	AS	p1480		2352.4479	2360.2500	321		
149	93.6250	161112.8750	SPREL	93.6250	AS	p1490		2360.2500	2368.0521	322		
150	93.6250	161206.5000	SPREL	93.6250	AS	p1500		2368.0521	2375.8542	323		
151	93.6250	161300.1250	SPABS	161300.1250	AS	p1510		2375.8542	2375.8542	324	SEGMENT 2	
1	0.0000	161300.1250	SPABS	161300.1250	AS	p10		2375.8542	2383.6563	325	SEGMENT 3	EJ 3
2	93.6250	161393.7500	SPREL	93.6250	AS	p20		2383.6563	2391.4583	326		
3	93.6250	161487.3750	SPREL	93.6250	AS	p30		2391.4583	2399.2604	327		
4	93.6250	161581.0000	SPREL	93.6250	AS	p40		2399.2604	2407.0625	328		
5	93.6250	161674.6250	SPREL	93.6250	AS	p50		2407.0625	2414.8646	329		
6	93.6250	161768.2500	SPREL	93.6250	AS	p60		2414.8646	2422.6667	330		
7	93.6250	161861.8750	SPREL	93.6250	AS	p70		2422.6667	2425.1667	331		
8	30.0000	161891.8750	SPREL	30.0000	AS	p80		2425.1667	2427.6667	332		PIER 12'
9	30.0000	161921.8750	SPREL	30.0000	AS	p90		2427.6667	2435.4688	333		
10	93.6250	162015.5000	SPREL	93.6250	AS	p100		2435.4688	2443.2708	334		
11	93.6250	162109.1250	SPREL	93.6250	AS	p110		2443.2708	2451.0729	335		
12	93.6250	162202.7500	SPREL	93.6250	AS	p120		2451.0729	2458.8750	336		
13	93.6250	162296.3750	SPREL	93.6250	AS	p130		2458.8750	2466.6771	337		
14	93.6250	162390.0000	SPREL	93.6250	AS	p140		2466.6771	2474.4792	338		
15	93.6250	162483.6250	SPREL	93.6250	AS	p150		2474.4792	2482.2813	339		
16	93.6250	162577.2500	SPREL	93.6250	AS	p160		2482.2813	2490.0833	340		
17	93.6250	162670.8750	SPREL	93.6250	AS	p170		2490.0833	2497.8854	341		
18	93.6250	162764.5000	SPREL	93.6250	AS	p180		2497.8854	2505.6875	342		
19	93.6250	162858.1250	SPREL	93.6250	AS	p190		2505.6875	2513.4896	343		
20	93.6250	162951.7500	SPREL	93.6250	AS	p200		2513.4896	2521.2917	344		
21	93.6250	163045.3750	SPREL	93.6250	AS	p210		2521.2917	2529.0938	345		
22	93.6250	163139.0000	SPREL	93.6250	AS	p220		2529.0938	2536.8958	346		
23	93.6250	163232.6250	SPREL	93.6250	AS	p230		2536.8958	2544.6979	347		
24	93.6250	163326.2500	SPREL	93.6250	AS	p240		2544.6979	2552.5000	348		
25	93.6250	163419.8750	SPREL	93.6250	AS	p250		2552.5000	2560.3021	349		
26	93.6250	163513.5000	SPREL	93.6250	AS	p260		2560.3021	2568.1042	350		
27	93.6250	163607.1250	SPREL	93.6250	AS	p270		2568.1042	2574.4271	351		
28	75.8750	163683.0000	SPREL	75.8750	AS	p280		2574.4271	2582.2292	352		
29	93.6250	163776.6250	SPREL	93.6250	AS	p290		2582.2292	2590.0313	353		
30	93.6250	163870.2500	SPREL	93.6250	AS	p300		2590.0313	2597.8333	354		
31	93.6250	163963.8750	SPREL	93.6250	AS	p310		2597.8333	2605.6354	355		
32	93.6250	164057.5000	SPREL	93.6250	AS	p320		2605.6354	2613.4375	356		
33	93.6250	164151.1250	SPREL	93.6250	AS	p330		2613.4375	2621.2396	357		
34	93.6250	164244.7500	SPREL	93.6250	AS	p340		2621.2396	2629.0417	358		
35	93.6250	164338.3750	SPREL	93.6250	AS	p350		2629.0417	2636.8438	359		
36	93.6250	164432.0000	SPREL	93.6250	AS	p360		2636.8438	2644.6458	360		Change in C.S. at 164444.28
37	93.6250	164525.6250	SPREL	93.6250	AS	p370		2644.6458	2652.4479	361		
38	93.6250	164619.2500	SPREL	93.6250	AS	p380		2652.4479	2660.2500	362		
39	93.6250	164712.8750	SPREL	93.6250	AS	p390		2660.2500	2668.0521	363		
40	93.6250	164806.5000	SPREL	93.6250	AS	p400		2668.0521	2675.8542	364		

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750									
41	93.6250	164900.1250	SPREL	93.6250	AS	p410		2675.8542	2683.6563	365	
42	93.6250	164993.7500	SPREL	93.6250	AS	p420		2683.6563	2691.4583	366	
43	93.6250	165087.3750	SPREL	93.6250	AS	p430		2691.4583	2699.2604	367	
44	93.6250	165181.0000	SPREL	93.6250	AS	p440		2699.2604	2707.0625	368	
45	93.6250	165274.6250	SPREL	93.6250	AS	p450		2707.0625	2714.8646	369	
46	93.6250	165368.2500	SPREL	93.6250	AS	p460		2714.8646	2717.3646	370	
47	30.0000	165398.2500	SPREL	30.0000	AS	p470		2717.3646	2719.8646	371	
48	30.0000	165428.2500	SPREL	30.0000	AS	p480	PIER 13'	2719.8646	2727.3646	372	
49	90.0000	165518.2500	SPREL	90.0000	AS	p490		2727.3646	2741.8646	373	
50	174.0000	165692.2500	SPREL	174.0000	AS	p500		2741.8646	2756.3646	374	
51	174.0000	165866.2500	SPREL	174.0000	AS	p510		2756.3646	2770.8646	375	
52	174.0000	166040.2500	SPREL	174.0000	AS	p520		2770.8646	2785.3646	376	
53	174.0000	166214.2500	SPREL	174.0000	AS	p530		2785.3646	2799.8646	377	
54	174.0000	166388.2500	SPREL	174.0000	AS	p540	Change in C.S. at 166382.9675	2799.8646	2814.3646	378	
55	174.0000	166562.2500	SPREL	174.0000	AS	p550		2814.3646	2828.8646	379	
56	174.0000	166736.2500	SPREL	174.0000	AS	p560		2828.8646	2843.3646	380	
57	174.0000	166910.2500	SPREL	174.0000	AS	p570		2843.3646	2857.8646	381	
58	174.0000	167084.2500	SPREL	174.0000	AS	p580		2857.8646	2872.3646	382	
59	174.0000	167258.2500	SPREL	174.0000	AS	p590		2872.3646	2877.9688	383	
60	67.2500	167325.5000	SPREL	67.2500	AS	p600		2877.9688	2892.4688	384	
61	174.0000	167499.5000	SPREL	174.0000	AS	p610		2892.4688	2906.9688	385	
62	174.0000	167673.5000	SPREL	174.0000	AS	p620		2906.9688	2921.4688	386	
63	174.0000	167847.5000	SPREL	174.0000	AS	p630		2921.4688	2935.9688	387	
64	174.0000	168021.5000	SPREL	174.0000	AS	p640		2935.9688	2950.4688	388	
65	174.0000	168195.5000	SPREL	174.0000	AS	p650		2950.4688	2964.9688	389	
66	174.0000	168369.5000	SPREL	174.0000	AS	p660		2964.9688	2979.4688	390	
67	174.0000	168543.5000	SPREL	174.0000	AS	p670		2979.4688	2993.9688	391	
68	174.0000	168717.5000	SPREL	174.0000	AS	p680		2993.9688	3008.4688	392	
69	174.0000	168891.5000	SPREL	174.0000	AS	p690		3008.4688	3022.9688	393	
70	174.0000	169065.5000	SPREL	174.0000	AS	p700		3022.9688	3030.4688	394	
71	90.0000	169155.5000	SPREL	90.0000	AS	p710		3030.4688	3032.9688	395	
72	30.0000	169185.5000	SPREL	30.0000	AS	p720		3032.9688	3035.4688	396	
73	30.0000	169215.5000	SPREL	30.0000	AS	p730	PIER 14'	3035.4688	3043.2708	397	
74	93.6250	169309.1250	SPREL	93.6250	AS	p740		3043.2708	3051.0729	398	
75	93.6250	169402.7500	SPREL	93.6250	AS	p750		3051.0729	3058.8750	399	
76	93.6250	169496.3750	SPREL	93.6250	AS	p760		3058.8750	3066.6771	400	
77	93.6250	169590.0000	SPREL	93.6250	AS	p770		3066.6771	3074.4792	401	
78	93.6250	169683.6250	SPREL	93.6250	AS	p780		3074.4792	3082.2813	402	
79	93.6250	169777.2500	SPREL	93.6250	AS	p790		3082.2813	3090.0833	403	
80	93.6250	169870.8750	SPREL	93.6250	AS	p800		3090.0833	3097.8854	404	
81	93.6250	169964.5000	SPREL	93.6250	AS	p810		3097.8854	3105.6875	405	
82	93.6250	170058.1250	SPREL	93.6250	AS	p820		3105.6875	3113.4896	406	
83	93.6250	170151.7500	SPREL	93.6250	AS	p830		3113.4896	3121.2917	407	
84	93.6250	170245.3750	SPREL	93.6250	AS	p840		3121.2917	3129.0938	408	
85	93.6250	170339.0000	SPREL	93.6250	AS	p850		3129.0938	3136.8958	409	
86	93.6250	170432.6250	SPREL	93.6250	AS	p860		3136.8958	3144.6979	410	
87	93.6250	170526.2500	SPREL	93.6250	AS	p870		3144.6979	3152.5000	411	
88	93.6250	170619.8750	SPREL	93.6250	AS	p880		3152.5000	3160.3021	412	
89	93.6250	170713.5000	SPREL	93.6250	AS	p890		3160.3021	3168.1042	413	
90	93.6250	170807.1250	SPREL	93.6250	AS	p900		3168.1042	3175.9063	414	
91	93.6250	170900.7500	SPREL	93.6250	AS	p910		3175.9063	3183.7083	415	
92	93.6250	170994.3750	SPREL	93.6250	AS	p920		3183.7083	3188.4375	416	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.		
		132789.8750										
93	56.7500	171051.1250	SPREL	56.7500	AS	p930		3188.4375	3196.2396	417		
94	93.6250	171144.7500	SPREL	93.6250	AS	p940		3196.2396	3204.0417	418		
95	93.6250	171238.3750	SPREL	93.6250	AS	p950		3204.0417	3211.8438	419		
96	93.6250	171332.0000	SPREL	93.6250	AS	p960		3211.8438	3219.6458	420		
97	93.6250	171425.6250	SPREL	93.6250	AS	p970		3219.6458	3227.4479	421		
98	93.6250	171519.2500	SPREL	93.6250	AS	p980		3227.4479	3235.2500	422		
99	93.6250	171612.8750	SPREL	93.6250	AS	p990		3235.2500	3243.0521	423		
100	93.6250	171706.5000	SPREL	93.6250	AS	p1000		3243.0521	3250.8542	424		
101	93.6250	171800.1250	SPREL	93.6250	AS	p1010		3250.8542	3258.6563	425		
102	93.6250	171893.7500	SPREL	93.6250	AS	p1020		3258.6563	3266.4583	426		
103	93.6250	171987.3750	SPREL	93.6250	AS	p1030		3266.4583	3274.2604	427		
104	93.6250	172081.0000	SPREL	93.6250	AS	p1040		3274.2604	3282.0625	428		
105	93.6250	172174.6250	SPREL	93.6250	AS	p1050		3282.0625	3289.8646	429		
106	93.6250	172268.2500	SPREL	93.6250	AS	p1060		3289.8646	3297.6667	430		
107	93.6250	172361.8750	SPREL	93.6250	AS	p1070		3297.6667	3305.4688	431		
108	93.6250	172455.5000	SPREL	93.6250	AS	p1080		3305.4688	3313.2708	432		
109	93.6250	172549.1250	SPREL	93.6250	AS	p1090		3313.2708	3321.0729	433		
110	93.6250	172642.7500	SPREL	93.6250	AS	p1100		3321.0729	3323.5729	434		
111	30.0000	172672.7500	SPREL	30.0000	AS	p1110		3323.5729	3326.0729	435		
112	30.0000	172702.7500	SPREL	30.0000	AS	p1120		3326.0729	3333.8750	436		PIER 15'
113	93.6250	172796.3750	SPREL	93.6250	AS	p1130		3333.8750	3341.6771	437		
114	93.6250	172890.0000	SPREL	93.6250	AS	p1140		3341.6771	3349.4792	438		
115	93.6250	172983.6250	SPREL	93.6250	AS	p1150		3349.4792	3357.2813	439		
116	93.6250	173077.2500	SPREL	93.6250	AS	p1160		3357.2813	3365.0833	440		
117	93.6250	173170.8750	SPABS	173170.8750	AS	p1170		3365.0833	3365.0833	441	SEGMENT 3	
1	0.0000	173170.8750	SPABS	173170.8750	AS	p10		3365.0833	3372.8854	442	SEGMENT 4	EJ 5
2	93.6250	173264.5000	SPREL	93.6250	AS	p20		3372.8854	3380.6875	443		
3	93.6250	173358.1250	SPREL	93.6250	AS	p30		3380.6875	3386.8854	444		
4	74.3750	173432.5000	SPREL	74.3750	AS	p40		3386.8854	3393.0833	445		
5	74.3750	173506.8750	SPREL	74.3750	AS	p50		3393.0833	3400.8854	446		
6	93.6250	173600.5000	SPREL	93.6250	AS	p60		3400.8854	3408.6875	447		
7	93.6250	173694.1250	SPREL	93.6250	AS	p70		3408.6875	3416.4896	448		
8	93.6250	173787.7500	SPREL	93.6250	AS	p80		3416.4896	3424.2917	449		
9	93.6250	173881.3750	SPREL	93.6250	AS	p90		3424.2917	3432.0938	450		
10	93.6250	173975.0000	SPREL	93.6250	AS	p100		3432.0938	3439.8958	451		
11	93.6250	174068.6250	SPREL	93.6250	AS	p110		3439.8958	3447.6979	452		
12	93.6250	174162.2500	SPREL	93.6250	AS	p120		3447.6979	3455.5000	453		
13	93.6250	174255.8750	SPREL	93.6250	AS	p130		3455.5000	3457.4479	454		
14	23.3750	174279.2500	SPREL	23.3750	AS	p140		3457.4479	3465.2500	455		
15	93.6250	174372.8750	SPREL	93.6250	AS	p150		3465.2500	3473.0521	456		
16	93.6250	174466.5000	SPREL	93.6250	AS	p160		3473.0521	3480.8542	457		
17	93.6250	174560.1250	SPREL	93.6250	AS	p170		3480.8542	3488.6563	458		
18	93.6250	174653.7500	SPREL	93.6250	AS	p180		3488.6563	3496.4583	459		
19	93.6250	174747.3750	SPREL	93.6250	AS	p190		3496.4583	3504.2604	460		
20	93.6250	174841.0000	SPREL	93.6250	AS	p200		3504.2604	3512.0625	461		
21	93.6250	174934.6250	SPREL	93.6250	AS	p210		3512.0625	3519.8646	462		
22	93.6250	175028.2500	SPREL	93.6250	AS	p220		3519.8646	3527.6667	463		
23	93.6250	175121.8750	SPREL	93.6250	AS	p230		3527.6667	3535.4688	464		
24	93.6250	175215.5000	SPREL	93.6250	AS	p240		3535.4688	3543.2708	465		
25	93.6250	175309.1250	SPREL	93.6250	AS	p250		3543.2708	3551.0729	466		
26	93.6250	175402.7500	SPREL	93.6250	AS	p260		3551.0729	3558.8750	467		
27	93.6250	175496.3750	SPREL	93.6250	AS	p270		3558.8750	3566.6771	468		

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
28	93.6250	175590.0000	SPREL	93.6250	AS	p280	3566.6771	3569.1771	469	
29	30.0000	175620.0000	SPREL	30.0000	AS	p290	3569.1771	3571.6771	470	PIER 16'
30	30.0000	175650.0000	SPREL	30.0000	AS	p300	3571.6771	3579.4792	471	
31	93.6250	175743.6250	SPREL	93.6250	AS	p310	3579.4792	3587.2813	472	
32	93.6250	175837.2500	SPREL	93.6250	AS	p320	3587.2813	3595.0833	473	
33	93.6250	175930.8750	SPREL	93.6250	AS	p330	3595.0833	3602.8854	474	
34	93.6250	176024.5000	SPREL	93.6250	AS	p340	3602.8854	3610.6875	475	
35	93.6250	176118.1250	SPREL	93.6250	AS	p350	3610.6875	3618.4896	476	
36	93.6250	176211.7500	SPREL	93.6250	AS	p360	3618.4896	3626.2917	477	
37	93.6250	176305.3750	SPREL	93.6250	AS	p370	3626.2917	3634.0938	478	
38	93.6250	176399.0000	SPREL	93.6250	AS	p380	3634.0938	3641.8958	479	
39	93.6250	176492.6250	SPREL	93.6250	AS	p390	3641.8958	3649.6979	480	
40	93.6250	176586.2500	SPREL	93.6250	AS	p400	3649.6979	3657.5000	481	
41	93.6250	176679.8750	SPREL	93.6250	AS	p410	3657.5000	3665.3021	482	
42	93.6250	176773.5000	SPREL	93.6250	AS	p420	3665.3021	3673.1042	483	
43	93.6250	176867.1250	SPREL	93.6250	AS	p430	3673.1042	3680.2500	484	
44	85.7500	176952.8750	SPREL	85.7500	AS	p440	3680.2500	3688.0521	485	
45	93.6250	177046.5000	SPREL	93.6250	AS	p450	3688.0521	3695.8542	486	
46	93.6250	177140.1250	SPREL	93.6250	AS	p460	3695.8542	3703.6563	487	
47	93.6250	177233.7500	SPREL	93.6250	AS	p470	3703.6563	3711.4583	488	
48	93.6250	177327.3750	SPREL	93.6250	AS	p480	3711.4583	3719.2604	489	
49	93.6250	177421.0000	SPREL	93.6250	AS	p490	3719.2604	3727.0625	490	
50	93.6250	177514.6250	SPREL	93.6250	AS	p500	3727.0625	3734.8646	491	
51	93.6250	177608.2500	SPREL	93.6250	AS	p510	3734.8646	3742.6667	492	
52	93.6250	177701.8750	SPREL	93.6250	AS	p520	3742.6667	3750.4688	493	
53	93.6250	177795.5000	SPREL	93.6250	AS	p530	3750.4688	3758.2708	494	
54	93.6250	177889.1250	SPREL	93.6250	AS	p540	3758.2708	3766.0729	495	
55	93.6250	177982.7500	SPREL	93.6250	AS	p550	3766.0729	3773.8750	496	
56	93.6250	178076.3750	SPREL	93.6250	AS	p560	3773.8750	3781.6771	497	
57	93.6250	178170.0000	SPREL	93.6250	AS	p570	3781.6771	3784.1771	498	
58	30.0000	178200.0000	SPREL	30.0000	AS	p580	3784.1771	3786.6771	499	PIER 17'
59	30.0000	178230.0000	SPREL	30.0000	AS	p590	3786.6771	3794.4792	500	
60	93.6250	178323.6250	SPREL	93.6250	AS	p600	3794.4792	3802.2813	501	
61	93.6250	178417.2500	SPREL	93.6250	AS	p610	3802.2813	3810.0833	502	
62	93.6250	178510.8750	SPREL	93.6250	AS	p620	3810.0833	3817.8854	503	
63	93.6250	178604.5000	SPREL	93.6250	AS	p630	3817.8854	3825.6875	504	
64	93.6250	178698.1250	SPREL	93.6250	AS	p640	3825.6875	3833.4896	505	
65	93.6250	178791.7500	SPREL	93.6250	AS	p650	3833.4896	3841.2917	506	
66	93.6250	178885.3750	SPREL	93.6250	AS	p660	3841.2917	3849.0938	507	
67	93.6250	178979.0000	SPREL	93.6250	AS	p670	3849.0938	3856.8958	508	
68	93.6250	179072.6250	SPREL	93.6250	AS	p680	3856.8958	3864.6979	509	
69	93.6250	179166.2500	SPREL	93.6250	AS	p690	3864.6979	3872.5000	510	
70	93.6250	179259.8750	SPREL	93.6250	AS	p700	3872.5000	3880.3021	511	
71	93.6250	179353.5000	SPREL	93.6250	AS	p710	3880.3021	3888.1042	512	
72	93.6250	179447.1250	SPREL	93.6250	AS	p720	3888.1042	3895.2500	513	
73	85.7500	179532.8750	SPREL	85.7500	AS	p730	3895.2500	3903.0521	514	
74	93.6250	179626.5000	SPREL	93.6250	AS	p740	3903.0521	3910.8542	515	
75	93.6250	179720.1250	SPREL	93.6250	AS	p750	3910.8542	3918.6563	516	
76	93.6250	179813.7500	SPREL	93.6250	AS	p760	3918.6563	3926.4583	517	
77	93.6250	179907.3750	SPREL	93.6250	AS	p770	3926.4583	3934.2604	518	
78	93.6250	180001.0000	SPREL	93.6250	AS	p780	3934.2604	3942.0625	519	
79	93.6250	180094.6250	SPREL	93.6250	AS	p790	3942.0625	3949.8646	520	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
80	93.6250	180188.2500	SPREL	93.6250	AS	p800	3949.8646	3957.6667	521	
81	93.6250	180281.8750	SPREL	93.6250	AS	p810	3957.6667	3965.4688	522	
82	93.6250	180375.5000	SPREL	93.6250	AS	p820	3965.4688	3973.2708	523	
83	93.6250	180469.1250	SPREL	93.6250	AS	p830	3973.2708	3981.0729	524	
84	93.6250	180562.7500	SPREL	93.6250	AS	p840	3981.0729	3988.8750	525	
85	93.6250	180656.3750	SPREL	93.6250	AS	p850	3988.8750	3996.6771	526	
86	93.6250	180750.0000	SPREL	93.6250	AS	p860	3996.6771	3999.1771	527	
87	30.0000	180780.0000	SPREL	30.0000	AS	p870	3999.1771	4001.6771	528	PIER 18'
88	30.0000	180810.0000	SPREL	30.0000	AS	p880	4001.6771	4009.4792	529	
89	93.6250	180903.6250	SPREL	93.6250	AS	p890	4009.4792	4017.2813	530	
90	93.6250	180997.2500	SPREL	93.6250	AS	p900	4017.2813	4025.0833	531	
91	93.6250	181090.8750	SPREL	93.6250	AS	p910	4025.0833	4032.8854	532	
92	93.6250	181184.5000	SPREL	93.6250	AS	p920	4032.8854	4040.6875	533	
93	93.6250	181278.1250	SPREL	93.6250	AS	p930	4040.6875	4048.4896	534	
94	93.6250	181371.7500	SPREL	93.6250	AS	p940	4048.4896	4056.2917	535	
95	93.6250	181465.3750	SPREL	93.6250	AS	p950	4056.2917	4064.0938	536	
96	93.6250	181559.0000	SPREL	93.6250	AS	p960	4064.0938	4071.8958	537	
97	93.6250	181652.6250	SPREL	93.6250	AS	p970	4071.8958	4079.6979	538	
98	93.6250	181746.2500	SPREL	93.6250	AS	p980	4079.6979	4087.5000	539	
99	93.6250	181839.8750	SPREL	93.6250	AS	p990	4087.5000	4095.3021	540	
100	93.6250	181933.5000	SPREL	93.6250	AS	p1000	4095.3021	4103.1042	541	
101	93.6250	182027.1250	SPREL	93.6250	AS	p1010	4103.1042	4110.2500	542	
102	85.7500	182112.8750	SPREL	85.7500	AS	p1020	4110.2500	4118.0521	543	
103	93.6250	182206.5000	SPREL	93.6250	AS	p1030	4118.0521	4125.8542	544	
104	93.6250	182300.1250	SPREL	93.6250	AS	p1040	4125.8542	4133.6563	545	
105	93.6250	182393.7500	SPREL	93.6250	AS	p1050	4133.6563	4141.4583	546	
106	93.6250	182487.3750	SPREL	93.6250	AS	p1060	4141.4583	4149.2604	547	
107	93.6250	182581.0000	SPREL	93.6250	AS	p1070	4149.2604	4157.0625	548	
108	93.6250	182674.6250	SPREL	93.6250	AS	p1080	4157.0625	4164.8646	549	
109	93.6250	182768.2500	SPREL	93.6250	AS	p1090	4164.8646	4172.6667	550	
110	93.6250	182861.8750	SPREL	93.6250	AS	p1100	4172.6667	4180.4688	551	
111	93.6250	182955.5000	SPREL	93.6250	AS	p1110	4180.4688	4188.2708	552	
112	93.6250	183049.1250	SPREL	93.6250	AS	p1120	4188.2708	4196.0729	553	
113	93.6250	183142.7500	SPREL	93.6250	AS	p1130	4196.0729	4203.8750	554	
114	93.6250	183236.3750	SPREL	93.6250	AS	p1140	4203.8750	4211.6771	555	
115	93.6250	183330.0000	SPREL	93.6250	AS	p1150	4211.6771	4214.1771	556	
116	30.0000	183360.0000	SPREL	30.0000	AS	p1160	4214.1771	4216.6771	557	PIER 19'
117	30.0000	183390.0000	SPREL	30.0000	AS	p1170	4216.6771	4224.4792	558	
118	93.6250	183483.6250	SPREL	93.6250	AS	p1180	4224.4792	4232.2813	559	
119	93.6250	183577.2500	SPREL	93.6250	AS	p1190	4232.2813	4240.0833	560	
120	93.6250	183670.8750	SPREL	93.6250	AS	p1200	4240.0833	4247.8854	561	
121	93.6250	183764.5000	SPREL	93.6250	AS	p1210	4247.8854	4255.6875	562	
122	93.6250	183858.1250	SPREL	93.6250	AS	p1220	4255.6875	4263.4896	563	
123	93.6250	183951.7500	SPREL	93.6250	AS	p1230	4263.4896	4271.2917	564	
124	93.6250	184045.3750	SPREL	93.6250	AS	p1240	4271.2917	4279.0938	565	
125	93.6250	184139.0000	SPREL	93.6250	AS	p1250	4279.0938	4286.8958	566	
126	93.6250	184232.6250	SPREL	93.6250	AS	p1260	4286.8958	4294.6979	567	
127	93.6250	184326.2500	SPREL	93.6250	AS	p1270	4294.6979	4302.5000	568	
128	93.6250	184419.8750	SPREL	93.6250	AS	p1280	4302.5000	4310.3021	569	
129	93.6250	184513.5000	SPREL	93.6250	AS	p1290	4310.3021	4313.0521	570	
130	33.0000	184546.5000	SPREL	33.0000	AS	p1300	4313.0521	4320.8542	571	
131	93.6250	184640.1250	SPREL	93.6250	AS	p1310	4320.8542	4328.6563	572	

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NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		132789.8750									
132	93.6250	184733.7500	SPREL	93.6250	AS	p1320	4328.6563	4336.4583	573		
133	93.6250	184827.3750	SPREL	93.6250	AS	p1330	4336.4583	4344.2604	574		
134	93.6250	184921.0000	SPREL	93.6250	AS	p1340	4344.2604	4352.0625	575		
135	93.6250	185014.6250	SPREL	93.6250	AS	p1350	4352.0625	4359.8646	576		
136	93.6250	185108.2500	SPREL	93.6250	AS	p1360	4359.8646	4367.6667	577		
137	93.6250	185201.8750	SPREL	93.6250	AS	p1370	4367.6667	4375.4688	578		
138	93.6250	185295.5000	SPABS	185295.5000	AS	p1380	4375.4688	4375.4688	579	SEGMENT 4	EJ 7
1	0.0000	185295.5000	SPABS	185295.5000	AS	p10	4375.4688	4383.2708	580	SEGMENT 5	
2	93.6250	185389.1250	SPREL	93.6250	AS	p20	4383.2708	4391.0729	581		
3	93.6250	185482.7500	SPREL	93.6250	AS	p30	4391.0729	4398.8750	582		
4	93.6250	185576.3750	SPREL	93.6250	AS	p40	4398.8750	4406.6771	583		
5	93.6250	185670.0000	SPREL	93.6250	AS	p50	4406.6771	4409.1771	584		
6	30.0000	185700.0000	SPREL	30.0000	AS	p60	4409.1771	4411.6771	585		PIER 20'
7	30.0000	185730.0000	SPREL	30.0000	AS	p70	4411.6771	4419.4792	586		
8	93.6250	185823.6250	SPREL	93.6250	AS	p80	4419.4792	4427.2813	587		
9	93.6250	185917.2500	SPREL	93.6250	AS	p90	4427.2813	4435.0833	588		
10	93.6250	186010.8750	SPREL	93.6250	AS	p100	4435.0833	4442.8854	589		
11	93.6250	186104.5000	SPREL	93.6250	AS	p110	4442.8854	4450.6875	590		
12	93.6250	186198.1250	SPREL	93.6250	AS	p120	4450.6875	4458.4896	591		
13	93.6250	186291.7500	SPREL	93.6250	AS	p130	4458.4896	4466.2917	592		
14	93.6250	186385.3750	SPREL	93.6250	AS	p140	4466.2917	4474.0938	593		
15	93.6250	186479.0000	SPREL	93.6250	AS	p150	4474.0938	4481.8958	594		
16	93.6250	186572.6250	SPREL	93.6250	AS	p160	4481.8958	4489.6979	595		
17	93.6250	186666.2500	SPREL	93.6250	AS	p170	4489.6979	4497.5000	596		
18	93.6250	186759.8750	SPREL	93.6250	AS	p180	4497.5000	4505.3021	597		
19	93.6250	186853.5000	SPREL	93.6250	AS	p190	4505.3021	4510.8542	598		
20	66.6250	186920.1250	SPREL	66.6250	AS	p200	4510.8542	4518.6563	599		
21	93.6250	187013.7500	SPREL	93.6250	AS	p210	4518.6563	4526.4583	600		
22	93.6250	187107.3750	SPREL	93.6250	AS	p220	4526.4583	4534.2604	601		
23	93.6250	187201.0000	SPREL	93.6250	AS	p230	4534.2604	4542.0625	602		
24	93.6250	187294.6250	SPREL	93.6250	AS	p240	4542.0625	4549.8646	603		
25	93.6250	187388.2500	SPREL	93.6250	AS	p250	4549.8646	4557.6667	604		
26	93.6250	187481.8750	SPREL	93.6250	AS	p260	4557.6667	4565.4688	605		
27	93.6250	187575.5000	SPREL	93.6250	AS	p270	4565.4688	4573.2708	606		
28	93.6250	187669.1250	SPREL	93.6250	AS	p280	4573.2708	4581.0729	607		
29	93.6250	187762.7500	SPREL	93.6250	AS	p290	4581.0729	4588.8750	608		
30	93.6250	187856.3750	SPREL	93.6250	AS	p300	4588.8750	4596.6771	609		
31	93.6250	187950.0000	SPREL	93.6250	AS	p310	4596.6771	4599.1771	610		
32	30.0000	187980.0000	SPREL	30.0000	AS	p320	4599.1771	4601.6771	611		PIER 21'
33	30.0000	188010.0000	SPREL	30.0000	AS	p330	4601.6771	4609.4792	612		
34	93.6250	188103.6250	SPREL	93.6250	AS	p340	4609.4792	4617.2813	613		
35	93.6250	188197.2500	SPREL	93.6250	AS	p350	4617.2813	4625.0833	614		
36	93.6250	188290.8750	SPREL	93.6250	AS	p360	4625.0833	4632.8854	615		
37	93.6250	188384.5000	SPREL	93.6250	AS	p370	4632.8854	4640.6875	616		
38	93.6250	188478.1250	SPREL	93.6250	AS	p380	4640.6875	4648.4896	617		
39	93.6250	188571.7500	SPREL	93.6250	AS	p390	4648.4896	4656.2917	618		
40	93.6250	188665.3750	SPREL	93.6250	AS	p400	4656.2917	4664.0938	619		
41	93.6250	188759.0000	SPREL	93.6250	AS	p410	4664.0938	4671.8958	620		
42	93.6250	188852.6250	SPREL	93.6250	AS	p420	4671.8958	4679.6979	621		
43	93.6250	188946.2500	SPREL	93.6250	AS	p430	4679.6979	4687.5000	622		
44	93.6250	189039.8750	SPREL	93.6250	AS	p440	4687.5000	4691.1563	623		
45	43.8750	189083.7500	SPREL	43.8750	AS	p450	4691.1563	4698.9583	624		

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NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
46	93.6250	189177.3750	SPREL	93.6250	AS	p460	4698.9583	4706.7604	625	
47	93.6250	189271.0000	SPREL	93.6250	AS	p470	4706.7604	4714.5625	626	
48	93.6250	189364.6250	SPREL	93.6250	AS	p480	4714.5625	4722.3646	627	
49	93.6250	189458.2500	SPREL	93.6250	AS	p490	4722.3646	4730.1667	628	
50	93.6250	189551.8750	SPREL	93.6250	AS	p500	4730.1667	4737.9688	629	
51	93.6250	189645.5000	SPREL	93.6250	AS	p510	4737.9688	4745.7708	630	
52	93.6250	189739.1250	SPREL	93.6250	AS	p520	4745.7708	4753.5729	631	
53	93.6250	189832.7500	SPREL	93.6250	AS	p530	4753.5729	4761.3750	632	
54	93.6250	189926.3750	SPREL	93.6250	AS	p540	4761.3750	4769.1771	633	
55	93.6250	190020.0000	SPREL	93.6250	AS	p550	4769.1771	4771.6771	634	
56	30.0000	190050.0000	SPREL	30.0000	AS	p560	4771.6771	4774.1771	635	PIER 22'
57	30.0000	190080.0000	SPREL	30.0000	AS	p570	4774.1771	4781.9792	636	
58	93.6250	190173.6250	SPREL	93.6250	AS	p580	4781.9792	4789.7813	637	
59	93.6250	190267.2500	SPREL	93.6250	AS	p590	4789.7813	4797.5833	638	
60	93.6250	190360.8750	SPREL	93.6250	AS	p600	4797.5833	4805.3854	639	
61	93.6250	190454.5000	SPREL	93.6250	AS	p610	4805.3854	4813.1875	640	
62	93.6250	190548.1250	SPREL	93.6250	AS	p620	4813.1875	4820.9896	641	
63	93.6250	190641.7500	SPREL	93.6250	AS	p630	4820.9896	4828.7917	642	
64	93.6250	190735.3750	SPREL	93.6250	AS	p640	4828.7917	4836.5938	643	
65	93.6250	190829.0000	SPREL	93.6250	AS	p650	4836.5938	4844.3958	644	
66	93.6250	190922.6250	SPREL	93.6250	AS	p660	4844.3958	4848.0521	645	
67	43.8750	190966.5000	SPREL	43.8750	AS	p670	4848.0521	4855.8542	646	
68	93.6250	191060.1250	SPREL	93.6250	AS	p680	4855.8542	4863.6563	647	
69	93.6250	191153.7500	SPREL	93.6250	AS	p690	4863.6563	4871.4583	648	
70	93.6250	191247.3750	SPREL	93.6250	AS	p700	4871.4583	4879.2604	649	
71	93.6250	191341.0000	SPREL	93.6250	AS	p710	4879.2604	4887.0625	650	
72	93.6250	191434.6250	SPREL	93.6250	AS	p720	4887.0625	4894.8646	651	
73	93.6250	191528.2500	SPREL	93.6250	AS	p730	4894.8646	4902.6667	652	
74	93.6250	191621.8750	SPREL	93.6250	AS	p740	4902.6667	4910.4687	653	
75	93.6250	191715.5000	SPREL	93.6250	AS	p750	4910.4687	4918.2708	654	
76	93.6250	191809.1250	SPREL	93.6250	AS	p760	4918.2708	4926.0729	655	
77	93.6250	191902.7500	SPREL	93.6250	AS	p770	4926.0729	4933.8750	656	
78	93.6250	191996.3750	SPREL	93.6250	AS	p780	4933.8750	4941.6771	657	
79	93.6250	192090.0000	SPREL	93.6250	AS	p790	4941.6771	4944.1771	658	
80	30.0000	192120.0000	SPREL	30.0000	AS	p800	4944.1771	4946.6771	659	PIER 23'
81	30.0000	192150.0000	SPREL	30.0000	AS	p810	4946.6771	4954.4792	660	
82	93.6250	192243.6250	SPREL	93.6250	AS	p820	4954.4792	4962.2812	661	
83	93.6250	192337.2500	SPREL	93.6250	AS	p830	4962.2812	4970.0833	662	
84	93.6250	192430.8750	SPREL	93.6250	AS	p840	4970.0833	4977.8854	663	
85	93.6250	192524.5000	SPREL	93.6250	AS	p850	4977.8854	4985.6875	664	
86	93.6250	192618.1250	SPREL	93.6250	AS	p860	4985.6875	4993.4896	665	
87	93.6250	192711.7500	SPREL	93.6250	AS	p870	4993.4896	5001.2917	666	
88	93.6250	192805.3750	SPREL	93.6250	AS	p880	5001.2917	5009.0937	667	
89	93.6250	192899.0000	SPREL	93.6250	AS	p890	5009.0937	5016.8958	668	
90	93.6250	192992.6250	SPREL	93.6250	AS	p900	5016.8958	5024.6979	669	
91	93.6250	193086.2500	SPREL	93.6250	AS	p910	5024.6979	5032.5000	670	
92	93.6250	193179.8750	SPREL	93.6250	AS	p920	5032.5000	5040.3021	671	
93	93.6250	193273.5000	SPREL	93.6250	AS	p930	5040.3021	5048.0521	672	
94	93.0000	193366.5000	SPREL	93.0000	AS	p940	5048.0521	5055.8542	673	
95	93.6250	193460.1250	SPREL	93.6250	AS	p950	5055.8542	5063.6562	674	
96	93.6250	193553.7500	SPREL	93.6250	AS	p960	5063.6562	5071.4583	675	
97	93.6250	193647.3750	SPREL	93.6250	AS	p970	5071.4583	5079.2604	676	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION 132789.8750						ELEM BEGIN	ELEM END	ELEM NO.		
98	93.6250	193741.0000	SPREL	93.6250	AS	p980		5079.2604	5087.0625	677		
99	93.6250	193834.6250	SPREL	93.6250	AS	p990		5087.0625	5094.8646	678		
100	93.6250	193928.2500	SPREL	93.6250	AS	p1000		5094.8646	5102.6667	679		
101	93.6250	194021.8750	SPREL	93.6250	AS	p1010		5102.6667	5110.4687	680		
102	93.6250	194115.5000	SPREL	93.6250	AS	p1020		5110.4687	5118.2708	681		
103	93.6250	194209.1250	SPREL	93.6250	AS	p1030		5118.2708	5126.0729	682		
104	93.6250	194302.7500	SPREL	93.6250	AS	p1040		5126.0729	5133.8750	683		
105	93.6250	194396.3750	SPREL	93.6250	AS	p1050		5133.8750	5141.6771	684		
106	93.6250	194490.0000	SPREL	93.6250	AS	p1060		5141.6771	5144.1771	685		
107	30.0000	194520.0000	SPREL	30.0000	AS	p1070		5144.1771	5146.6771	686		PIER 24'
108	30.0000	194550.0000	SPREL	30.0000	AS	p1080		5146.6771	5154.4792	687		
109	93.6250	194643.6250	SPREL	93.6250	AS	p1090		5154.4792	5162.2812	688		
110	93.6250	194737.2500	SPREL	93.6250	AS	p1100		5162.2812	5170.0833	689		
111	93.6250	194830.8750	SPREL	93.6250	AS	p1110		5170.0833	5177.8854	690		
112	93.6250	194924.5000	SPREL	93.6250	AS	p1120		5177.8854	5185.6875	691		
113	93.6250	195018.1250	SPREL	93.6250	AS	p1130		5185.6875	5193.4896	692		
114	93.6250	195111.7500	SPREL	93.6250	AS	p1140		5193.4896	5201.2917	693		
115	93.6250	195205.3750	SPREL	93.6250	AS	p1150		5201.2917	5209.0937	694		
116	93.6250	195299.0000	SPREL	93.6250	AS	p1160		5209.0937	5216.8958	695		
117	93.6250	195392.6250	SPREL	93.6250	AS	p1170		5216.8958	5224.6979	696		
118	93.6250	195486.2500	SPREL	93.6250	AS	p1180		5224.6979	5232.5000	697		
119	93.6250	195579.8750	SPREL	93.6250	AS	p1190		5232.5000	5240.3021	698		
120	93.6250	195673.5000	SPREL	93.6250	AS	p1200		5240.3021	5251.3021	699		
121	132.0000	195805.5000	SPREL	132.0000	AS	p1210		5251.3021	5259.1042	700		
122	93.6250	195899.1250	SPREL	93.6250	AS	p1220		5259.1042	5266.9062	701		
123	93.6250	195992.7500	SPREL	93.6250	AS	p1230		5266.9062	5274.7083	702		
124	93.6250	196086.3750	SPREL	93.6250	AS	p1240		5274.7083	5282.5104	703		
125	93.6250	196180.0000	SPREL	93.6250	AS	p1250		5282.5104	5294.8646	704		
126	148.2500	196328.2500	SPREL	148.2500	AS	p1260		5294.8646	5302.6667	705		
127	93.6250	196421.8750	SPREL	93.6250	AS	p1270		5302.6667	5310.4687	706		
128	93.6250	196515.5000	SPABS	196515.5000	AS	p1280		5310.4687	5310.4687	707	SEGMENT 5	EJ 8
1	0.0000	196515.5000	SPABS	196515.5000	AS	p10		5310.4687	5318.2708	708	SEGMENT 6	
2	93.6250	196609.1250	SPREL	93.6250	AS	p20		5318.2708	5326.0729	709		
3	93.6250	196702.7500	SPREL	93.6250	AS	p30		5326.0729	5333.8750	710		
4	93.6250	196796.3750	SPREL	93.6250	AS	p40		5333.8750	5341.6771	711		
5	93.6250	196890.0000	SPREL	93.6250	AS	p50		5341.6771	5344.1771	712		
6	30.0000	196920.0000	SPREL	30.0000	AS	p60		5344.1771	5346.6771	713		PIER 25'
7	30.0000	196950.0000	SPREL	30.0000	AS	p70		5346.6771	5354.4792	714		
8	93.6250	197043.6250	SPREL	93.6250	AS	p80		5354.4792	5362.2812	715		
9	93.6250	197137.2500	SPREL	93.6250	AS	p90		5362.2812	5370.0833	716		
10	93.6250	197230.8750	SPREL	93.6250	AS	p100		5370.0833	5377.8854	717		
11	93.6250	197324.5000	SPREL	93.6250	AS	p110		5377.8854	5385.6875	718		
12	93.6250	197418.1250	SPREL	93.6250	AS	p120		5385.6875	5393.4896	719		
13	93.6250	197511.7500	SPREL	93.6250	AS	p130		5393.4896	5401.2917	720		
14	93.6250	197605.3750	SPREL	93.6250	AS	p140		5401.2917	5409.0937	721		
15	93.6250	197699.0000	SPREL	93.6250	AS	p150		5409.0937	5416.8958	722		
16	93.6250	197792.6250	SPREL	93.6250	AS	p160		5416.8958	5424.6979	723		
17	93.6250	197886.2500	SPREL	93.6250	AS	p170		5424.6979	5432.5000	724		
18	93.6250	197979.8750	SPREL	93.6250	AS	p180		5432.5000	5440.3021	725		
19	93.6250	198073.5000	SPREL	93.6250	AS	p190		5440.3021	5443.0521	726		
20	33.0000	198106.5000	SPREL	33.0000	AS	p200		5443.0521	5450.8542	727		
21	93.6250	198200.1250	SPREL	93.6250	AS	p210		5450.8542	5458.6562	728		

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JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		132789.8750								
22	93.6250	198293.7500	SPREL	93.6250	AS	p220	5458.6562	5466.4583	729	
23	93.6250	198387.3750	SPREL	93.6250	AS	p230	5466.4583	5474.2604	730	
24	93.6250	198481.0000	SPREL	93.6250	AS	p240	5474.2604	5482.0625	731	
25	93.6250	198574.6250	SPREL	93.6250	AS	p250	5482.0625	5489.8646	732	
26	93.6250	198668.2500	SPREL	93.6250	AS	p260	5489.8646	5497.6667	733	
27	93.6250	198761.8750	SPREL	93.6250	AS	p270	5497.6667	5505.4687	734	
28	93.6250	198855.5000	SPREL	93.6250	AS	p280	5505.4687	5513.2708	735	
29	93.6250	198949.1250	SPREL	93.6250	AS	p290	5513.2708	5521.0729	736	
30	93.6250	199042.7500	SPREL	93.6250	AS	p300	5521.0729	5528.8750	737	
31	93.6250	199136.3750	SPREL	93.6250	AS	p310	5528.8750	5536.6771	738	
32	93.6250	199230.0000	SPREL	93.6250	AS	p320	5536.6771	5539.1771	739	
33	30.0000	199260.0000	SPREL	30.0000	AS	p330	5539.1771	5541.6771	740	
34	30.0000	199290.0000	SPREL	30.0000	AS	p340	5541.6771	5549.4792	741	PIER 26'
35	93.6250	199383.6250	SPREL	93.6250	AS	p350	5549.4792	5557.2812	742	
36	93.6250	199477.2500	SPREL	93.6250	AS	p360	5557.2812	5565.0833	743	
37	93.6250	199570.8750	SPREL	93.6250	AS	p370	5565.0833	5572.8854	744	
38	93.6250	199664.5000	SPREL	93.6250	AS	p380	5572.8854	5580.6875	745	
39	93.6250	199758.1250	SPREL	93.6250	AS	p390	5580.6875	5588.4896	746	
40	93.6250	199851.7500	SPREL	93.6250	AS	p400	5588.4896	5596.2917	747	
41	93.6250	199945.3750	SPREL	93.6250	AS	p410	5596.2917	5604.0937	748	
42	93.6250	200039.0000	SPREL	93.6250	AS	p420	5604.0937	5611.8958	749	
43	93.6250	200132.6250	SPREL	93.6250	AS	p430	5611.8958	5619.6979	750	
44	93.6250	200226.2500	SPREL	93.6250	AS	p440	5619.6979	5627.5000	751	
45	93.6250	200319.8750	SPREL	93.6250	AS	p450	5627.5000	5635.3021	752	
46	93.6250	200413.5000	SPREL	93.6250	AS	p460	5635.3021	5638.0521	753	
47	33.0000	200446.5000	SPREL	33.0000	AS	p470	5638.0521	5645.8542	754	
48	93.6250	200540.1250	SPREL	93.6250	AS	p480	5645.8542	5653.6562	755	
49	93.6250	200633.7500	SPREL	93.6250	AS	p490	5653.6562	5661.4583	756	
50	93.6250	200727.3750	SPREL	93.6250	AS	p500	5661.4583	5669.2604	757	
51	93.6250	200821.0000	SPREL	93.6250	AS	p510	5669.2604	5677.0625	758	
52	93.6250	200914.6250	SPREL	93.6250	AS	p520	5677.0625	5684.8646	759	
53	93.6250	201008.2500	SPREL	93.6250	AS	p530	5684.8646	5692.6667	760	
54	93.6250	201101.8750	SPREL	93.6250	AS	p540	5692.6667	5700.4687	761	
55	93.6250	201195.5000	SPREL	93.6250	AS	p550	5700.4687	5708.2708	762	
56	93.6250	201289.1250	SPREL	93.6250	AS	p560	5708.2708	5716.0729	763	
57	93.6250	201382.7500	SPREL	93.6250	AS	p570	5716.0729	5723.8750	764	
58	93.6250	201476.3750	SPREL	93.6250	AS	p580	5723.8750	5731.6771	765	
59	93.6250	201570.0000	SPREL	93.6250	AS	p590	5731.6771	5734.1771	766	
60	30.0000	201600.0000	SPREL	30.0000	AS	p600	5734.1771	5736.6771	767	
61	30.0000	201630.0000	SPREL	30.0000	AS	p610	5736.6771	5744.4792	768	PIER 27'
62	93.6250	201723.6250	SPREL	93.6250	AS	p620	5744.4792	5752.2812	769	
63	93.6250	201817.2500	SPREL	93.6250	AS	p630	5752.2812	5760.0833	770	
64	93.6250	201910.8750	SPREL	93.6250	AS	p640	5760.0833	5767.8854	771	
65	93.6250	202004.5000	SPREL	93.6250	AS	p650	5767.8854	5775.6875	772	
66	93.6250	202098.1250	SPREL	93.6250	AS	p660	5775.6875	5783.4896	773	
67	93.6250	202191.7500	SPREL	93.6250	AS	p670	5783.4896	5791.2917	774	
68	93.6250	202285.3750	SPREL	93.6250	AS	p680	5791.2917	5799.0937	775	
69	93.6250	202379.0000	SPREL	93.6250	AS	p690	5799.0937	5806.8958	776	
70	93.6250	202472.6250	SPREL	93.6250	AS	p700	5806.8958	5814.6979	777	
71	93.6250	202566.2500	SPREL	93.6250	AS	p710	5814.6979	5822.5000	778	
72	93.6250	202659.8750	SPREL	93.6250	AS	p720	5822.5000	5828.8542	779	
73	76.2500	202736.1250	SPREL	76.2500	AS	p730	5828.8542	5836.6562	780	

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NODE	DX	STATION 132789.8750					ELEM BEGIN	ELEM END	ELEM NO.	
74	93.6250	202829.7500	SPREL	93.6250	AS	p740	5836.6562	5844.4583	781	
75	93.6250	202923.3750	SPREL	93.6250	AS	p750	5844.4583	5852.2604	782	
76	93.6250	203017.0000	SPREL	93.6250	AS	p760	5852.2604	5860.0625	783	
77	93.6250	203110.6250	SPREL	93.6250	AS	p770	5860.0625	5867.8646	784	
78	93.6250	203204.2500	SPREL	93.6250	AS	p780	5867.8646	5875.6667	785	
79	93.6250	203297.8750	SPREL	93.6250	AS	p790	5875.6667	5883.4687	786	
80	93.6250	203391.5000	SPREL	93.6250	AS	p800	5883.4687	5891.2708	787	
81	93.6250	203485.1250	SPREL	93.6250	AS	p810	5891.2708	5899.0729	788	
82	93.6250	203578.7500	SPREL	93.6250	AS	p820	5899.0729	5906.8750	789	
83	93.6250	203672.3750	SPREL	93.6250	AS	p830	5906.8750	5914.6771	790	
84	93.6250	203766.0000	SPREL	93.6250	AS	p840	5914.6771	5917.1771	791	
85	30.0000	203796.0000	SPREL	30.0000	AS	p850	5917.1771	5919.6771	792	
86	30.0000	203826.0000	SPREL	30.0000	AS	p860	5919.6771	5927.4792	793	PIER 28'
87	93.6250	203919.6250	SPREL	93.6250	AS	p870	5927.4792	5935.2812	794	
88	93.6250	204013.2500	SPREL	93.6250	AS	p880	5935.2812	5943.0833	795	
89	93.6250	204106.8750	SPREL	93.6250	AS	p890	5943.0833	5950.8854	796	
90	93.6250	204200.5000	SPREL	93.6250	AS	p900	5950.8854	5958.6875	797	
91	93.6250	204294.1250	SPREL	93.6250	AS	p910	5958.6875	5966.4896	798	
92	93.6250	204387.7500	SPREL	93.6250	AS	p920	5966.4896	5974.2917	799	
93	93.6250	204481.3750	SPREL	93.6250	AS	p930	5974.2917	5982.0937	800	
94	93.6250	204575.0000	SPREL	93.6250	AS	p940	5982.0937	5989.8958	801	
95	93.6250	204668.6250	SPREL	93.6250	AS	p950	5989.8958	5997.6979	802	
96	93.6250	204762.2500	SPREL	93.6250	AS	p960	5997.6979	6005.5000	803	
97	93.6250	204855.8750	SPREL	93.6250	AS	p970	6005.5000	6013.3021	804	
98	93.6250	204949.5000	SPREL	93.6250	AS	p980	6013.3021	6019.0521	805	
99	69.0000	205018.5000	SPREL	69.0000	AS	p990	6019.0521	6026.8542	806	
100	93.6250	205112.1250	SPREL	93.6250	AS	p1000	6026.8542	6034.6562	807	
101	93.6250	205205.7500	SPREL	93.6250	AS	p1010	6034.6562	6042.4583	808	
102	93.6250	205299.3750	SPREL	93.6250	AS	p1020	6042.4583	6050.2604	809	
103	93.6250	205393.0000	SPREL	93.6250	AS	p1030	6050.2604	6058.0625	810	
104	93.6250	205486.6250	SPREL	93.6250	AS	p1040	6058.0625	6065.8646	811	
105	93.6250	205580.2500	SPREL	93.6250	AS	p1050	6065.8646	6073.6667	812	
106	93.6250	205673.8750	SPREL	93.6250	AS	p1060	6073.6667	6081.4687	813	
107	93.6250	205767.5000	SPREL	93.6250	AS	p1070	6081.4687	6089.2708	814	
108	93.6250	205861.1250	SPREL	93.6250	AS	p1080	6089.2708	6097.0729	815	
109	93.6250	205954.7500	SPREL	93.6250	AS	p1090	6097.0729	6104.8750	816	
110	93.6250	206048.3750	SPREL	93.6250	AS	p1100	6104.8750	6112.6771	817	
111	93.6250	206142.0000	SPREL	93.6250	AS	p1110	6112.6771	6115.1771	818	
112	30.0000	206172.0000	SPREL	30.0000	AS	p1120	6115.1771	6117.6771	819	
113	30.0000	206202.0000	SPREL	30.0000	AS	p1130	6117.6771	6125.4792	820	PIER 29'
114	93.6250	206295.6250	SPREL	93.6250	AS	p1140	6125.4792	6133.2812	821	
115	93.6250	206389.2500	SPREL	93.6250	AS	p1150	6133.2812	6141.0833	822	
116	93.6250	206482.8750	SPREL	93.6250	AS	p1160	6141.0833	6148.8854	823	
117	93.6250	206576.5000	SPREL	93.6250	AS	p1170	6148.8854	6156.6875	824	
118	93.6250	206670.1250	SPREL	93.6250	AS	p1180	6156.6875	6164.4896	825	
119	93.6250	206763.7500	SPREL	93.6250	AS	p1190	6164.4896	6172.2917	826	
120	93.6250	206857.3750	SPREL	93.6250	AS	p1200	6172.2917	6180.0937	827	
121	93.6250	206951.0000	SPREL	93.6250	AS	p1210	6180.0937	6187.8958	828	
122	93.6250	207044.6250	SPREL	93.6250	AS	p1220	6187.8958	6195.6979	829	
123	93.6250	207138.2500	SPREL	93.6250	AS	p1230	6195.6979	6203.5000	830	
124	93.6250	207231.8750	SPREL	93.6250	AS	p1240	6203.5000	6211.3021	831	
125	93.6250	207325.5000	SPREL	93.6250	AS	p1250	6211.3021	6213.6667	832	

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - MAINLINE WESTBOU | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.
		132789.8750								
126	28.3750	207353.8750	SPREL	28.3750	AS	p1260		6213.6667	6221.4687	833
127	93.6250	207447.5000	SPREL	93.6250	AS	p1270		6221.4687	6229.2708	834
128	93.6250	207541.1250	SPREL	93.6250	AS	p1280		6229.2708	6237.0729	835
129	93.6250	207634.7500	SPREL	93.6250	AS	p1290		6237.0729	6244.8750	836
130	93.6250	207728.3750	SPREL	93.6250	AS	p1300		6244.8750	6254.4271	837
131	114.6250	207843.0000	SPREL	114.6250	AS	p1310		6254.4271	6255.1771	838
132	9.0000	207852.0000	SPREL	9.0000	AS	p1320		6255.1771	6256.9792	839
133	21.6250	207873.6250	SPABS	207873.6250	AS	p1330		6256.9792	6256.9792	

PIER 30'

2.2.2 Ramps

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP A — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		0.0000								
1	0.000	0.0000	SPABS	0.0000	AS	p10	0.0000	2.5000		
2	30.0000	30.0000	SPREL	30.0000	AS	p20	2.5000	10.2757	4001	PIER 10
3	93.3086	123.3086	SPREL	93.3086	AS	p30	10.2757	18.0517	4002	
4	93.3119	216.6205	SPREL	93.3119	AS	p40	18.0517	25.8282	4003	
5	93.3174	309.9379	SPREL	93.3174	AS	p50	25.8282	33.6051	4004	
6	93.3227	403.2606	SPREL	93.3227	AS	p60	33.6051	41.3825	4005	
7	93.3298	496.5904	SPREL	93.3298	AS	p70	41.3825	49.1608	4006	
8	93.3386	589.9290	SPREL	93.3386	AS	p80	49.1608	56.9390	4007	
9	93.3387	683.2677	SPREL	93.3387	AS	p90	56.9390	64.7181	4008	
10	93.3493	776.6170	SPREL	93.3493	AS	p100	64.7181	72.4633	4009	
11	92.9426	869.5596	SPREL	92.9426	AS	p110	72.4633	80.2714	4010	
12	93.6970	963.2566	SPREL	93.6970	AS	p120	80.2714	88.0795	4011	
13	93.6977	1056.9543	SPREL	93.6977	AS	p130	88.0795	95.8877	4012	
14	93.6977	1150.6520	SPREL	93.6977	AS	p140	95.8877	103.6958	4013	
15	93.6970	1244.3490	SPREL	93.6970	AS	p150	103.6958	111.5038	4014	
16	93.6970	1338.0460	SPREL	93.6970	AS	p160	111.5038	119.3119	4015	
17	93.6970	1431.7430	SPREL	93.6970	AS	p170	119.3119	127.1200	4016	
18	93.6970	1525.4400	SPREL	93.6970	AS	p180	127.1200	134.9281	4017	
19	93.6970	1619.1370	SPREL	93.6970	AS	p190	134.9281	142.7362	4018	
20	93.6970	1712.8340	SPREL	93.6970	AS	p200	142.7362	149.0639	4019	
21	75.9331	1788.7671	SPREL	75.9331	AS	p210	149.0639	156.8720	4020	
22	93.6970	1882.4641	SPREL	93.6970	AS	p220	156.8720	164.6801	4021	
23	93.6970	1976.1611	SPREL	93.6970	AS	p230	164.6801	172.4882	4022	
24	93.6970	2069.8581	SPREL	93.6970	AS	p240	172.4882	180.2963	4023	
25	93.6970	2163.5551	SPREL	93.6970	AS	p250	180.2963	188.1043	4024	
26	93.6970	2257.2521	SPREL	93.6970	AS	p260	188.1043	195.9124	4025	
27	93.6970	2350.9491	SPREL	93.6970	AS	p270	195.9124	203.7205	4026	
28	93.6970	2444.6461	SPREL	93.6970	AS	p280	203.7205	211.5286	4027	
29	93.6970	2538.3431	SPREL	93.6970	AS	p290	211.5286	219.3367	4028	
30	93.6970	2632.0401	SPREL	93.6970	AS	p300	219.3367	227.1701	4029	
31	94.0009	2726.0410	SPREL	94.0009	AS	p310	227.1701	235.0025	4030	
32	93.9886	2820.0296	SPREL	93.9886	AS	p320	235.0025	242.8338	4031	
33	93.9761	2914.0057	SPREL	93.9761	AS	p330	242.8338	250.6643	4032	
34	93.9654	3007.9711	SPREL	93.9654	AS	p340	250.6643	258.4940	4033	
35	93.9565	3101.9276	SPREL	93.9565	AS	p350	258.4940	266.3231	4034	
36	93.9494	3195.8770	SPREL	93.9494	AS	p360	266.3231	274.1518	4035	
37	93.9441	3289.8211	SPREL	93.9441	AS	p370	274.1518	281.9801	4036	
38	93.9405	3383.7616	SPREL	93.9405	AS	p380	281.9801	289.8084	4037	
39	93.9388	3477.7004	SPREL	93.9388	AS	p390	289.8084	292.3085	4038	
40	30.0019	3507.7023	SPREL	30.0019	AS	p400	292.3085	294.8085	4039	
41	30.0000	3537.7023	SPREL	30.0000	AS	p410	294.8085	302.6106	4040	PIER 11'
42	93.6252	3631.3275	SPREL	93.6252	AS	p420	302.6106	310.4127	4041	
43	93.6252	3724.9527	SPREL	93.6252	AS	p430	310.4127	318.2148	4042	
44	93.6252	3818.5779	SPREL	93.6252	AS	p440	318.2148	326.0169	4043	
45	93.6252	3912.2031	SPREL	93.6252	AS	p450	326.0169	333.8190	4044	
46	93.6252	4005.8283	SPREL	93.6252	AS	p460	333.8190	341.6211	4045	
47	93.6252	4099.4535	SPREL	93.6252	AS	p470	341.6211	349.4232	4046	
48	93.6252	4193.0787	SPREL	93.6252	AS	p480	349.4232	357.2253	4047	
49	93.6252	4286.7039	SPREL	93.6252	AS	p490	357.2253	365.0274	4048	
50	93.6252	4380.3291	SPREL	93.6252	AS	p500	365.0274	372.8295	4049	
51	93.6252	4473.9543	SPREL	93.6252	AS	p510	372.8295	380.6316	4050	
52	93.6252	4567.5795	SPREL	93.6252	AS	p520	380.6316	388.4337	4051	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP A — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000									
53	93.6252	4661.2047	SPREL	93.6252	AS	p530	388.4337	396.2358	4052		
54	93.6252	4754.8299	SPREL	93.6252	AS	p540	396.2358	404.0379	4053		
55	93.6252	4848.4551	SPREL	93.6252	AS	p550	404.0379	411.8400	4054		
56	93.6252	4942.0803	SPREL	93.6252	AS	p560	411.8400	419.6421	4055		
57	93.6252	5035.7055	SPREL	93.6252	AS	p570	419.6421	427.4442	4056		
58	93.6252	5129.3307	SPREL	93.6252	AS	p580	427.4442	435.2463	4057		
59	93.6252	5222.9559	SPREL	93.6252	AS	p590	435.2463	443.0484	4058		
60	93.6252	5316.5811	SPREL	93.6252	AS	p600	443.0484	449.3713	4059		
61	75.8748	5392.4559	SPREL	75.8748	AS	p610	449.3713	457.1734	4060		
62	93.6252	5486.0811	SPREL	93.6252	AS	p620	457.1734	464.9755	4061		
63	93.6252	5579.7063	SPREL	93.6252	AS	p630	464.9755	472.7776	4062		
64	93.6252	5673.3315	SPREL	93.6252	AS	p640	472.7776	480.3522	4063		
65	90.8949	5764.2264	SPREL	90.8949	AS	p650	480.3522	488.1601	4064		
66	93.6948	5857.9212	SPREL	93.6948	AS	p660	488.1601	495.9680	4065		Change in C.S. at 160772.5675
67	93.6948	5951.6160	SPREL	93.6948	AS	p670	495.9680	503.7759	4066		
68	93.6948	6045.3108	SPREL	93.6948	AS	p680	503.7759	511.5838	4067		
69	93.6948	6139.0056	SPREL	93.6948	AS	p690	511.5838	519.3917	4068		
70	93.6948	6232.7004	SPREL	93.6948	AS	p700	519.3917	527.1996	4069		
71	93.6948	6326.3952	SPREL	93.6948	AS	p710	527.1996	535.0070	4070		
72	93.6888	6420.0840	SPABS	6420.0840	AS	p720	535.0070	535.0070	4071	SEGMENT 2	
1	0.0000	6420.0840	SPABS	6420.0840	AS	p10	535.0070	542.8143	4072	SEGMENT 3	EJ 3
2	93.6875	6513.7715	SPREL	93.6875	AS	p20	542.8143	550.6216	4073		
3	93.6875	6607.4590	SPREL	93.6875	AS	p30	550.6216	558.4289	4074		
4	93.6875	6701.1465	SPREL	93.6875	AS	p40	558.4289	566.2362	4075		
5	93.6875	6794.8340	SPREL	93.6875	AS	p50	566.2362	574.0435	4076		
6	93.6875	6888.5215	SPREL	93.6875	AS	p60	574.0435	581.8508	4077		
7	93.6875	6982.2090	SPREL	93.6875	AS	p70	581.8508	584.3508	4078		
8	30.0000	7012.2090	SPREL	30.0000	AS	p80	584.3508	586.8508	4079		PIER 12'
9	30.0000	7042.2090	SPREL	30.0000	AS	p90	586.8508	594.6580	4080		
10	93.6875	7135.8965	SPREL	93.6875	AS	p100	594.6580	602.4653	4081		
11	93.6875	7229.5840	SPREL	93.6875	AS	p110	602.4653	610.2726	4082		
12	93.6875	7323.2715	SPREL	93.6875	AS	p120	610.2726	618.0799	4083		
13	93.6875	7416.9590	SPREL	93.6875	AS	p130	618.0799	625.8872	4084		
14	93.6875	7510.6465	SPREL	93.6875	AS	p140	625.8872	633.6945	4085		
15	93.6875	7604.3340	SPREL	93.6875	AS	p150	633.6945	641.5018	4086		
16	93.6875	7698.0215	SPREL	93.6875	AS	p160	641.5018	649.3091	4087		
17	93.6875	7791.7090	SPREL	93.6875	AS	p170	649.3091	657.1164	4088		
18	93.6875	7885.3965	SPREL	93.6875	AS	p180	657.1164	664.9237	4089		
19	93.6875	7979.0840	SPREL	93.6875	AS	p190	664.9237	672.7310	4090		
20	93.6875	8072.7715	SPREL	93.6875	AS	p200	672.7310	680.5382	4091		
21	93.6875	8166.4590	SPREL	93.6875	AS	p210	680.5382	688.3455	4092		
22	93.6875	8260.1465	SPREL	93.6875	AS	p220	688.3455	696.1528	4093		
23	93.6875	8353.8340	SPREL	93.6875	AS	p230	696.1528	703.9601	4094		
24	93.6875	8447.5215	SPREL	93.6875	AS	p240	703.9601	711.7674	4095		
25	93.6875	8541.2090	SPREL	93.6875	AS	p250	711.7674	719.5747	4096		
26	93.6875	8634.8965	SPREL	93.6875	AS	p260	719.5747	727.3820	4097		
27	93.6875	8728.5840	SPREL	93.6875	AS	p270	727.3820	733.7049	4098		
28	75.8750	8804.4590	SPREL	75.8750	AS	p280	733.7049	741.5122	4099		
29	93.6875	8898.1465	SPREL	93.6875	AS	p290	741.5122	749.3195	4100		
30	93.6875	8991.8340	SPREL	93.6875	AS	p300	749.3195	757.1268	4101		
31	93.6875	9085.5215	SPREL	93.6875	AS	p310	757.1268	764.9341	4102		
32	93.6875	9179.2090	SPREL	93.6875	AS	p320	764.9341	772.7414	4103		

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP A — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000									
33	93.6875	9272.8965	SPREL	93.6875	AS	p330	772.7414	780.5487	4104		
34	93.6875	9366.5840	SPREL	93.6875	AS	p340	780.5487	788.3560	4105		
35	93.6875	9460.2715	SPREL	93.6875	AS	p350	788.3560	796.1632	4106		
36	93.6875	9553.9590	SPREL	93.6875	AS	p360	796.1632	803.9705	4107		
37	93.6875	9647.6465	SPREL	93.6875	AS	p370	803.9705	811.7778	4108		
38	93.6875	9741.3340	SPREL	93.6875	AS	p380	811.7778	819.5851	4109		
39	93.6875	9835.0215	SPREL	93.6875	AS	p390	819.5851	827.3924	4110		
40	93.6875	9928.7090	SPREL	93.6875	AS	p400	827.3924	835.1997	4111		
41	93.6875	10022.3965	SPREL	93.6875	AS	p410	835.1997	843.0070	4112		
42	93.6875	10116.0840	SPREL	93.6875	AS	p420	843.0070	850.8143	4113		
43	93.6875	10209.7715	SPREL	93.6875	AS	p430	850.8143	858.6216	4114		
44	93.6875	10303.4590	SPREL	93.6875	AS	p440	858.6216	866.4289	4115		
45	93.6875	10397.1465	SPREL	93.6875	AS	p450	866.4289	874.2362	4116		
46	93.6875	10490.8340	SPREL	93.6875	AS	p460	874.2362	876.7362	4117		
47	30.0000	10520.8340	SPREL	30.0000	AS	p470	876.7362	879.2362	4118		
48	30.0000	10550.8340	SPREL	30.0000	AS	p480	879.2362	886.7466	4119		PIER 13'
49	90.1250	10640.9590	SPREL	90.1250	AS	p490	886.7466	901.2570	4120		
50	174.1250	10815.0840	SPREL	174.1250	AS	p500	901.2570	915.7674	4121		
51	174.1250	10989.2090	SPREL	174.1250	AS	p510	915.7674	930.2778	4122		
52	174.1250	11163.3340	SPREL	174.1250	AS	p520	930.2778	944.7882	4123		
53	174.1250	11337.4590	SPREL	174.1250	AS	p530	944.7882	959.2987	4124		
54	174.1250	11511.5840	SPREL	174.1250	AS	p540	959.2987	973.8091	4125		
55	174.1250	11685.7090	SPREL	174.1250	AS	p550	973.8091	988.3195	4126		
56	174.1250	11859.8340	SPREL	174.1250	AS	p560	988.3195	1002.8299	4127		
57	174.1250	12033.9590	SPREL	174.1250	AS	p570	1002.8299	1017.3403	4128		
58	174.1250	12208.0840	SPREL	174.1250	AS	p580	1017.3403	1031.8508	4129		
59	174.1250	12382.2090	SPREL	174.1250	AS	p590	1031.8508	1036.6633	4130		
60	57.7500	12439.9590	SPREL	57.7500	AS	p600	1036.6633	1051.1737	4131		
61	174.1250	12614.0840	SPREL	174.1250	AS	p610	1051.1737	1065.6841	4132		
62	174.1250	12788.2090	SPREL	174.1250	AS	p620	1065.6841	1080.1945	4133		
63	174.1250	12962.3340	SPREL	174.1250	AS	p630	1080.1945	1094.7049	4134		
64	174.1250	13136.4590	SPREL	174.1250	AS	p640	1094.7049	1109.2153	4135		
65	174.1250	13310.5840	SPREL	174.1250	AS	p650	1109.2153	1123.7258	4136		
66	174.1250	13484.7090	SPREL	174.1250	AS	p660	1123.7258	1138.2362	4137		
67	174.1250	13658.8340	SPREL	174.1250	AS	p670	1138.2362	1152.7466	4138		
68	174.1250	13832.9590	SPREL	174.1250	AS	p680	1152.7466	1167.2570	4139		
69	174.1250	14007.0840	SPREL	174.1250	AS	p690	1167.2570	1181.7674	4140		
70	174.1250	14181.2090	SPREL	174.1250	AS	p700	1181.7674	1189.2778	4141		
71	90.1250	14271.3340	SPREL	90.1250	AS	p710	1189.2778	1191.7778	4142		
72	30.0000	14301.3340	SPREL	30.0000	AS	p720	1191.7778	1194.2778	4143		
73	30.0000	14331.3340	SPREL	30.0000	AS	p730	1194.2778	1202.0799	4144		PIER 207
74	93.6250	14424.9590	SPREL	93.6250	AS	p740	1202.0799	1209.8820	4145		
75	93.6250	14518.5840	SPREL	93.6250	AS	p750	1209.8820	1217.6841	4146		
76	93.6250	14612.2090	SPREL	93.6250	AS	p760	1217.6841	1225.4862	4147		
77	93.6250	14705.8340	SPREL	93.6250	AS	p770	1225.4862	1233.2883	4148		
78	93.6250	14799.4590	SPREL	93.6250	AS	p780	1233.2883	1241.0903	4149		
79	93.6250	14893.0840	SPREL	93.6250	AS	p790	1241.0903	1248.8924	4150		
80	93.6250	14986.7090	SPREL	93.6250	AS	p800	1248.8924	1256.6945	4151		
81	93.6250	15080.3340	SPREL	93.6250	AS	p810	1256.6945	1264.4966	4152		
82	93.6250	15173.9590	SPREL	93.6250	AS	p820	1264.4966	1267.7835	4153		
83	39.4427	15213.4017	SPABS	15213.4017	AS	p830	1267.7835	1267.7835	4154	SEGMENT 3	
1	0.0000	15213.4017	SPABS	15213.4017	AS	p10	1267.7835	1269.8875	4155	RAMP A 0+44.770	EJ 4

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP A — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000									
2	25.2480	15238.6497	SPREL	25.2480	AS	p20	1269.8875	1272.7835	4156	0+46.874	
3	34.7520	15273.4017	SPREL	34.7520	AS	p30	1272.7835	1282.7835	4157	0+49.770	
4	120.0000	15393.4017	SPREL	120.0000	AS	p40	1282.7835	1292.7835	4158	0+59.770	
5	120.0000	15513.4017	SPREL	120.0000	AS	p50	1292.7835	1302.7835	4159	0+69.770	
6	120.0000	15633.4017	SPREL	120.0000	AS	p60	1302.7835	1314.7835	4160	0+79.770	
7	144.0000	15777.4017	SPREL	144.0000	AS	p70	1314.7835	1326.6165	4161	0+91.770	
8	141.9960	15919.3977	SPREL	141.9960	AS	p80	1326.6165	1336.7835	4162	1+03.603	
9	122.0040	16041.4017	SPREL	122.0040	AS	p90	1336.7835	1338.7835	4163	1+13.770	
10	24.0000	16065.4017	SPREL	24.0000	AS	p100	1338.7835	1341.7835	4164	1+15.770	CJ 4
11	36.0000	16101.4017	SPREL	36.0000	AS	p110	1341.7835	1345.0805	4165	1+18.770	
12	39.5640	16140.9657	SPREL	39.5640	AS	p120	1345.0805	1355.0805	4166	1+22.067	
13	120.0000	16260.9657	SPREL	120.0000	AS	p130	1355.0805	1365.0805	4167	1+32.067	
14	120.0000	16380.9657	SPREL	120.0000	AS	p140	1365.0805	1375.0805	4168	1+42.067	
15	120.0000	16500.9657	SPREL	120.0000	AS	p150	1375.0805	1383.0805	4169	1+52.067	
16	96.0000	16596.9657	SPREL	96.0000	AS	p160	1383.0805	1393.0805	4170	1+60.067	
17	120.0000	16716.9657	SPREL	120.0000	AS	p170	1393.0805	1403.0805	4171	1+70.067	
18	120.0000	16836.9657	SPREL	120.0000	AS	p180	1403.0805	1413.0805	4172	1+80.067	
19	120.0000	16956.9657	SPREL	120.0000	AS	p190	1413.0805	1423.0805	4173	1+90.067	
20	120.0000	17076.9657	SPREL	120.0000	AS	p200	1423.0805	1434.8835	4174	2+00.067	
21	141.6360	17218.6017	SPREL	141.6360	AS	p210	1434.8835	1437.3835	4175	2+11.870	
22	30.0000	17248.6017	SPREL	30.0000	AS	p220	1437.3835	1439.8835	4176	2+14.370	PIER 206
23	30.0000	17278.6017	SPREL	30.0000	AS	p230	1439.8835	1452.7065	4177	2+16.870	
24	153.8760	17432.4777	SPREL	153.8760	AS	p240	1452.7065	1460.7065	4178	2+29.693	
25	96.0000	17528.4777	SPREL	96.0000	AS	p250	1460.7065	1468.9615	4179	2+37.693	
26	99.0600	17627.5377	SPREL	99.0600	AS	p260	1468.9615	1477.2165	4180	2+45.948	
27	99.0600	17726.5977	SPREL	99.0600	AS	p270	1477.2165	1478.8835	4181	2+54.203	
28	20.0040	17746.6017	SPREL	20.0040	AS	p280	1478.8835	1486.8835	4182	2+55.870	
29	96.0000	17842.6017	SPREL	96.0000	AS	p290	1486.8835	1489.3835	4183	2+63.870	
30	30.0000	17872.6017	SPREL	30.0000	AS	p300	1489.3835	1492.3835	4184	2+66.370	150.600 CJ 5
31	36.0000	17908.6017	SPREL	36.0000	AS	p310	1492.3835	1500.3635	4185	2+69.370	
32	95.7600	18004.3617	SPREL	95.7600	AS	p320	1500.3635	1510.3635	4186	2+77.350	
33	120.0000	18124.3617	SPREL	120.0000	AS	p330	1510.3635	1520.3635	4187	2+87.350	
34	120.0000	18244.3617	SPREL	120.0000	AS	p340	1520.3635	1530.3635	4188	2+97.350	
35	120.0000	18364.3617	SPREL	120.0000	AS	p350	1530.3635	1540.3635	4189	3+07.350	
36	120.0000	18484.3617	SPREL	120.0000	AS	p360	1540.3635	1550.3775	4190	3+17.350	
37	120.1678	18604.5295	SPREL	120.1678	AS	p370	1550.3775	1560.3914	4191	3+27.364	
38	120.1678	18724.6973	SPREL	120.1678	AS	p380	1560.3914	1570.4054	4192	3+37.378	
39	120.1678	18844.8651	SPREL	120.1678	AS	p390	1570.4054	1580.4194	4193	3+47.392	
40	120.1678	18965.0328	SPREL	120.1678	AS	p400	1580.4194	1589.4180	4194	3+57.406	
41	107.9828	19073.0156	SPREL	107.9828	AS	p410	1589.4180	1597.4292	4195	3+66.404	
42	96.1342	19169.1498	SPREL	96.1342	AS	p420	1597.4292	1606.0627	4196	3+74.416	
43	103.6027	19272.7525	SPREL	103.6027	AS	p430	1606.0627	1614.6963	4197	3+83.049	
44	103.6027	19376.3552	SPREL	103.6027	AS	p440	1614.6963	1622.7074	4198	3+91.683	
45	96.1342	19472.4894	SPREL	96.1342	AS	p450	1622.7074	1634.0984	4199	3+99.694	
46	136.6909	19609.1802	SPREL	136.6909	AS	p460	1634.0984	1645.4893	4200	4+11.085	
47	136.6909	19745.8711	SPREL	136.6909	AS	p470	1645.4893	1647.9928	4201	4+22.476	
48	30.0419	19775.9131	SPREL	30.0419	AS	p480	1647.9928	1650.4962	4202	4+24.979	PIER 205
49	30.0419	19805.9550	SPREL	30.0419	AS	p490	1650.4962	1659.1984	4203	4+27.483	
50	104.4258	19910.3808	SPREL	104.4258	AS	p500	1659.1984	1667.9006	4204	4+36.185	
51	104.4258	20014.8066	SPREL	104.4258	AS	p510	1667.9006	1675.9117	4205	4+44.887	
52	96.1342	20110.9408	SPREL	96.1342	AS	p520	1675.9117	1688.3121	4206	4+52.898	
53	148.8038	20259.7446	SPREL	148.8038	AS	p530	1688.3121	1689.9814	4207	4+65.299	

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP A — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.			
		0.0000										
54	20.0320	20279.7766	SPREL	20.0320	AS	p540	1689.9814	1697.9926	4208	4+66.968		
55	96.1342	20375.9108	SPREL	96.1342	AS	p550	1697.9926	1700.4961	4209	4+74.979		
56	30.0419	20405.9528	SPREL	30.0419	AS	p560	1700.4961	1702.9895	4210	4+77.483	211.113	CJ 6
57	29.9218	20435.8745	SPREL	29.9218	AS	p570	1702.9895	1711.8119	4211	4+79.976		CROSS RA_1
58	105.8678	20541.7424	SPREL	105.8678	AS	p580	1711.8119	1721.8258	4212	4+88.798		CROSS RA_2 (Start of Top Slab Taper)
59	120.1678	20661.9101	SPREL	120.1678	AS	p590	1721.8258	1731.8398	4213	4+98.812		
60	120.1678	20782.0779	SPREL	120.1678	AS	p600	1731.8398	1741.8538	4214	5+08.826		
61	120.1678	20902.2457	SPREL	120.1678	AS	p610	1741.8538	1751.8678	4215	5+18.840		
62	120.1678	21022.4135	SPREL	120.1678	AS	p620	1751.8678	1761.8818	4216	5+28.854		Start of Web Taper 5+30.00 (21039.3899)
63	120.1678	21142.5813	SPREL	120.1678	AS	p630	1761.8818	1771.8958	4217	5+38.868		
64	120.1678	21262.7491	SPREL	120.1678	AS	p640	1771.8958	1781.9097	4218	5+48.882		
65	120.1678	21382.9169	SPREL	120.1678	AS	p650	1781.9097	1789.9209	4219	5+58.896		
66	96.1342	21479.0511	SPREL	96.1342	AS	p660	1789.9209	1801.1867	4220	5+66.907		
67	135.1888	21614.2398	SPREL	135.1888	AS	p670	1801.1867	1812.4524	4221	5+78.173		
68	135.1888	21749.4286	SPREL	135.1888	AS	p680	1812.4524	1820.4636	4222	5+89.439		
69	96.1342	21845.5628	SPREL	96.1342	AS	p690	1820.4636	1830.4776	4223	5+97.450		
70	120.1678	21965.7306	SPREL	120.1678	AS	p700	1830.4776	1840.4915	4224	6+07.464		
71	120.1678	22085.8984	SPREL	120.1678	AS	p710	1840.4915	1842.9950	4225	6+17.478		
72	30.0419	22115.9404	SPREL	30.0419	AS	p720	1842.9950	1845.4985	4226	6+19.982		PIER 204
73	30.0419	22145.9823	SPREL	30.0419	AS	p730	1845.4985	1855.5125	4227	6+22.485		
74	120.1678	22266.1501	SPREL	120.1678	AS	p740	1855.5125	1860.5295	4228	6+32.499		
75	60.2041	22326.3542	SPREL	60.2041	AS	p750	1860.5295	1868.5407	4229	6+37.516		
76	96.1342	22422.4884	SPREL	96.1342	AS	p760	1868.5407	1879.5561	4230	6+45.527		
77	132.1846	22554.6729	SPREL	132.1846	AS	p770	1879.5561	1881.2254	4231	6+56.543		
78	20.0320	22574.7049	SPREL	20.0320	AS	p780	1881.2254	1889.2366	4232	6+58.212		
79	96.1342	22670.8391	SPREL	96.1342	AS	p790	1889.2366	1891.7401	4233	6+66.223		
80	30.0419	22700.8811	SPREL	30.0419	AS	p800	1891.7401	1894.7443	4234	6+68.727	191.244	CJ 7
81	36.0503	22736.9314	SPREL	36.0503	AS	p810	1894.7443	1902.1747	4235	6+71.731		
82	89.1645	22826.0959	SPREL	89.1645	AS	p820	1902.1747	1912.1886	4236	6+79.161		
83	120.1678	22946.2637	SPREL	120.1678	AS	p830	1912.1886	1922.2026	4237	6+89.175		
84	120.1678	23066.4315	SPREL	120.1678	AS	p840	1922.2026	1932.2166	4238	6+99.189		
85	120.1678	23186.5993	SPREL	120.1678	AS	p850	1932.2166	1942.2306	4239	7+09.203		
86	120.1678	23306.7671	SPREL	120.1678	AS	p860	1942.2306	1952.2446	4240	7+19.217		
87	120.1678	23426.9349	SPREL	120.1678	AS	p870	1952.2446	1962.2586	4241	7+29.231		
88	120.1678	23547.1026	SPREL	120.1678	AS	p880	1962.2586	1972.2725	4242	7+39.245		
89	120.1678	23667.2704	SPREL	120.1678	AS	p890	1972.2725	1982.2865	4243	7+49.259	START LANE 113 AT 7+55.00	
90	120.1678	23787.4382	SPREL	120.1678	AS	p900	1982.2865	1990.2977	4244	7+59.273		
91	96.1342	23883.5724	SPREL	96.1342	AS	p910	1990.2977	1997.3335	4245	7+67.284		
92	84.4299	23968.0023	SPREL	84.4299	AS	p920	1997.3335	2004.3694	4246	7+74.320		
93	84.4299	24052.4322	SPREL	84.4299	AS	p930	2004.3694	2012.3805	4247	7+81.356		
94	96.1342	24148.5664	SPREL	96.1342	AS	p940	2012.3805	2022.9984	4248	7+89.367		
95	127.4139	24275.9804	SPREL	127.4139	AS	p950	2022.9984	2035.5158	4249	7+99.985		
96	150.2097	24426.1901	SPREL	150.2097	AS	p960	2035.5158	2038.0193	4250	8+12.502		
97	30.0419	24456.2320	SPREL	30.0419	AS	p970	2038.0193	2040.5228	4251	8+15.006		PIER 203 — CROSS RA_2
98	30.0419	24486.2740	SPREL	30.0419	AS	p980	2040.5228	2049.0658	4252	8+17.509		CROSS RA_3 (start of 2-cell Cross Section)
99	102.5151	24588.7891	SPREL	102.5151	AS	p990	2049.0658	2057.6087	4253	8+26.052		
100	102.5151	24691.3043	SPREL	102.5151	AS	p1000	2057.6087	2065.6199	4254	8+34.595		
101	96.1342	24787.4385	SPREL	96.1342	AS	p1010	2065.6199	2075.0540	4255	8+42.606		
102	113.2101	24900.6486	SPREL	113.2101	AS	p1020	2075.0540	2078.7592	4256	8+52.041		
103	44.4621	24945.1106	SPREL	44.4621	AS	p1030	2078.7592	2086.7704	4257	8+55.746		
104	96.1342	25041.2449	SPREL	96.1342	AS	p1040	2086.7704	2089.7746	4258	8+63.757	195.030	CJ 8
105	36.0503	25077.2952	SPREL	36.0503	AS	p1050	2089.7746	2097.0648	4259	8+66.761		

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP A — CHECKED BY: **IC BY PT** — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.			
		0.0000										
106	87.4821	25164.7773	SPREL	87.4821	AS	p1060	2097.0648	2107.0788	4260	8+74.051		
107	120.1678	25284.9451	SPREL	120.1678	AS	p1070	2107.0788	2117.0927	4261	8+84.065		
108	120.1678	25405.1129	SPREL	120.1678	AS	p1080	2117.0927	2127.1067	4262	8+94.079		
109	120.1678	25525.2807	SPREL	120.1678	AS	p1090	2127.1067	2137.1207	4263	9+04.093		
110	120.1678	25645.4485	SPREL	120.1678	AS	p1100	2137.1207	2145.1319	4264	9+14.107		
111	96.1342	25741.5827	SPREL	96.1342	AS	p1110	2145.1319	2152.5222	4265	9+22.118		
112	88.6838	25830.2666	SPREL	88.6838	AS	p1120	2152.5222	2159.9125	4266	9+29.509		
113	88.6838	25918.9504	SPREL	88.6838	AS	p1130	2159.9125	2167.3029	4267	9+36.899		
114	88.6838	26007.6342	SPREL	88.6838	AS	p1140	2167.3029	2175.3140	4268	9+44.289		
115	96.1342	26103.7684	SPREL	96.1342	AS	p1150	2175.3140	2184.5489	4269	9+52.301		
116	110.8187	26214.5872	SPREL	110.8187	AS	p1160	2184.5489	2193.7838	4270	9+61.535		
117	110.8187	26325.4059	SPREL	110.8187	AS	p1170	2193.7838	2203.0187	4271	9+70.770		
118	110.8187	26436.2246	SPREL	110.8187	AS	p1180	2203.0187	2210.5092	4272	9+80.005		
119	89.8855	26526.1101	SPREL	89.8855	AS	p1190	2210.5092	2213.0127	4273	9+87.496	End of Web Taper 5+80.00	
120	**30.0419**	26556.1521	SPREL	30.0419	AS	p1200	2213.0127	2215.5162	4274	9+89.999		
121	**30.0419**	26586.1940	SPREL	30.0419	AS	p1210	2215.5162	2227.1003	4275	9+92.503	**PIER 202**	
122	139.0101	26725.2041	SPREL	139.0101	AS	p1220	2227.1003	2235.1115	4276	10+04.087		
123	96.1342	26821.3384	SPREL	96.1342	AS	p1230	2235.1115	2244.5597	4277	10+12.098		
124	113.3783	26934.7167	SPREL	113.3783	AS	p1240	2244.5597	2248.7325	4278	10+21.546		
125	50.0739	26984.7906	SPREL	50.0739	AS	p1250	2248.7325	2256.7437	4279	10+25.719		
126	96.1342	27080.9248	SPREL	96.1342	AS	p1260	2256.7437	2259.7479	4280	10+33.730	169.973	CJ 9
127	36.0503	27116.9751	SPREL	36.0503	AS	p1270	2259.7479	2268.8106	4281	10+36.734		
128	108.7518	27225.7270	SPREL	108.7518	AS	p1280	2268.8106	2278.8246	4282	10+45.797		
129	120.1678	27345.8948	SPREL	120.1678	AS	p1290	2278.8246	2288.8246	4283	10+55.811		
130	120.0000	27465.8948	SPREL	120.0000	AS	p1300	2288.8246	2298.8246	4284	10+65.811		
131	120.0000	27585.8948	SPREL	120.0000	AS	p1310	2298.8246	2308.8246	4285	10+75.811		
132	120.0000	27705.8948	SPREL	120.0000	AS	p1320	2308.8246	2318.8246	4286	10+85.811		
133	120.0000	27825.8948	SPREL	120.0000	AS	p1330	2318.8246	2328.8246	4287	10+95.811		
134	120.0000	27945.8948	SPREL	120.0000	AS	p1340	2328.8246	2332.3906	4288	11+05.811		
135	42.7920	27988.6868	SPREL	42.7920	AS	p1350	2332.3906	2340.3906	4289	11+09.377		
136	96.0000	28084.6868	SPREL	96.0000	AS	p1360	2340.3906	2352.9426	4290	11+17.377		
137	150.6240	28235.3108	SPREL	150.6240	AS	p1370	2352.9426	2365.4946	4291	11+29.929		
138	150.6240	28385.9348	SPREL	150.6240	AS	p1380	2365.4946	2373.4946	4292	11+42.481		
139	96.0000	28481.9348	SPREL	96.0000	AS	p1390	2373.4946	2385.4946	4293	11+50.481		
140	144.0000	28625.9348	SPREL	144.0000	AS	p1400	2385.4946	2387.9946	4294	11+62.481		
141	**30.0000**	28655.9348	SPREL	30.0000	AS	p1410	2387.9946	2390.4946	4295	11+64.981	**PIER 201**	
142	**30.0000**	28685.9348	SPREL	30.0000	AS	p1420	2390.4946	2399.5776	4296	11+67.481		
143	108.9960	28794.9308	SPREL	108.9960	AS	p1430	2399.5776	2409.5776	4297	11+76.564		
144	120.0000	28914.9308	SPREL	120.0000	AS	p1440	2409.5776	2419.5776	4298	11+86.564		
145	120.0000	29034.9308	SPREL	120.0000	AS	p1450	2419.5776	2431.7446	4299	11+96.564		
146	146.0040	29180.9348	SPREL	146.0040	AS	p1460	2431.7446	2434.7446	4300	12+08.731	175.001	CJ 10
147	36.0000	29216.9348	SPREL	36.0000	AS	p1470	2434.7446	2444.7446	4301	12+11.731		
148	120.0000	29336.9348	SPREL	120.0000	AS	p1480	2444.7446	2454.7446	4302	12+21.731		
149	120.0000	29456.9348	SPREL	120.0000	AS	p1490	2454.7446	2464.7446	4303	12+31.731		
150	120.0000	29576.9348	SPREL	120.0000	AS	p1500	2464.7446	2474.7446	4304	12+41.731		
151	120.0000	29696.9348	SPREL	120.0000	AS	p1510	2474.7446	2484.7446	4305	12+51.731		
152	120.0000	29816.9348	SPREL	120.0000	AS	p1520	2484.7446	2493.7446	4306	12+61.731		
153	108.0000	29924.9348	SPREL	108.0000	AS	p1530	2493.7446	2496.2446	4307	12+70.731		
154	30.0000	29954.9348	SPREL	30.0000	AS	p1540	2496.2446	2498.7446	4308	12+73.231	**PIER 200**	
155	30.0000	29984.9348	SPABS	29984.9348	AS	p1550	2498.7446	2498.7446	4309	12+75.731		

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP B — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.		
		360.0000										
1	0.000	360.0000	SPABS	360.0000	AS	p10		0.0000	2.0833			
2	25.0000	385.0000	SPREL	25.0000	AS	p20		2.0833	2.5000	4501		
3	5.0000	390.0000	SPREL	5.0000	AS	p30		2.5000	4.0000	4502		ABUTMENT 301
4	18.0000	408.0000	SPREL	18.0000	AS	p40		4.0000	13.5583	4503		
5	114.7000	522.7000	SPREL	114.7000	AS	p50		13.5583	23.1167	4504		
6	114.7000	637.4000	SPREL	114.7000	AS	p60		23.1167	32.6750	4505		
7	114.7000	752.1000	SPREL	114.7000	AS	p70		32.6750	42.2333	4506		
8	114.7000	866.8000	SPREL	114.7000	AS	p80		42.2333	51.7917	4507		
9	114.7000	981.5000	SPREL	114.7000	AS	p90		51.7917	61.3500	4508		
10	114.7000	1096.2000	SPREL	114.7000	AS	p100		61.3500	70.9083	4509		
11	114.7000	1210.9000	SPREL	114.7000	AS	p110		70.9083	80.4667	4510		
12	114.7000	1325.6000	SPREL	114.7000	AS	p120		80.4667	90.0250	4511		
13	114.7000	1440.3000	SPREL	114.7000	AS	p130		90.0250	99.5833	4512		
14	114.7000	1555.0000	SPREL	114.7000	AS	p140		99.5833	102.0833	4513		
15	30.0000	1585.0000	SPREL	30.0000	AS	p150		102.0833	104.5833	4514		PIER 302
16	30.0000	1615.0000	SPREL	30.0000	AS	p160		104.5833	114.1833	4515		
17	115.2000	1730.2000	SPREL	115.2000	AS	p170		114.1833	123.7833	4516		
18	115.2000	1845.4000	SPREL	115.2000	AS	p180		123.7833	133.3833	4517		
19	115.2000	1960.6000	SPREL	115.2000	AS	p190		133.3833	142.9833	4518		
20	115.2000	2075.8000	SPREL	115.2000	AS	p200		142.9833	152.5833	4519		
21	115.2000	2191.0000	SPREL	115.2000	AS	p210		152.5833	162.1833	4520		
22	115.2000	2306.2000	SPREL	115.2000	AS	p220		162.1833	171.7833	4521		
23	115.2000	2421.4000	SPREL	115.2000	AS	p230		171.7833	181.3833	4522		
24	115.2000	2536.6000	SPREL	115.2000	AS	p240		181.3833	190.9833	4523		
25	115.2000	2651.8000	SPREL	115.2000	AS	p250		190.9833	200.5833	4524		
26	115.2000	2767.0000	SPREL	115.2000	AS	p260		200.5833	210.1833	4525		
27	115.2000	2882.2000	SPREL	115.2000	AS	p270		210.1833	219.7833	4526		
28	115.2000	2997.4000	SPREL	115.2000	AS	p280		219.7833	229.3833	4527		
29	115.2000	3112.6000	SPREL	115.2000	AS	p290		229.3833	238.9833	4528		
30	115.2000	3227.8000	SPREL	115.2000	AS	p300		238.9833	248.5833	4529		
31	115.2000	3343.0000	SPREL	115.2000	AS	p310		248.5833	258.1833	4530		
32	115.2000	3458.2000	SPREL	115.2000	AS	p320		258.1833	267.7833	4531		
33	115.2000	3573.4000	SPREL	115.2000	AS	p330		267.7833	277.3833	4532		
34	115.2000	3688.6000	SPREL	115.2000	AS	p340		277.3833	286.9833	4533		
35	115.2000	3803.8000	SPREL	115.2000	AS	p350		286.9833	296.5833	4534		
36	115.2000	3919.0000	SPREL	115.2000	AS	p360		296.5833	299.0833	4535		
37	30.0000	3949.0000	SPREL	30.0000	AS	p370		299.0833	301.5833	4536		PIER 303
38	30.0000	3979.0000	SPREL	30.0000	AS	p380		301.5833	311.1307	4537		
39	114.5688	4093.5688	SPREL	114.5688	AS	p390		311.1307	320.6781	4538		
40	114.5688	4208.1375	SPREL	114.5688	AS	p400		320.6781	330.2255	4539		
41	114.5688	4322.7063	SPREL	114.5688	AS	p410		330.2255	339.7729	4540		
42	114.5688	4437.2750	SPREL	114.5688	AS	p420		339.7729	349.3203	4541		
43	114.5688	4551.8438	SPREL	114.5688	AS	p430		349.3203	358.8677	4542		
44	114.5688	4666.4125	SPREL	114.5688	AS	p440		358.8677	368.4151	4543		
45	114.5688	4780.9813	SPREL	114.5688	AS	p450		368.4151	377.9625	4544		
46	114.5688	4895.5500	SPREL	114.5688	AS	p460		377.9625	387.5099	4545		
47	114.5688	5010.1188	SPREL	114.5688	AS	p470		387.5099	397.0573	4546		
48	114.5688	5124.6875	SPREL	114.5688	AS	p480		397.0573	402.5833	4547	RAMP B	CJ
49	66.3120	5190.9995	SPREL	66.3120	AS	p490		402.5833	410.3854	4548	MAINSPAN	
50	93.6252	5284.6247	SPREL	93.6252	AS	p500		410.3854	418.1875	4549		THIS MATCHES THE
51	93.6252	5378.2499	SPREL	93.6252	AS	p510		418.1875	425.9896	4550		MAIN SPAN SEGMENTS
52	93.6252	5471.8751	SPREL	93.6252	AS	p520		425.9896	433.6998	4551		

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP B | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION 360.0000					ELEM BEGIN	ELEM END	ELEM NO.	
53	92.5224	5564.3975	SPREL	92.5224	AS	p530	433.6998	441.2922	4552	
54	91.1088	5655.5063	SPREL	91.1088	AS	p540	441.2922	448.8848	4553	
55	91.1112	5746.6175	SPREL	91.1112	AS	p550	448.8848	456.4777	4554	
56	91.1148	5837.7323	SPREL	91.1148	AS	p560	456.4777	464.0709	4555	
57	91.1184	5928.8507	SPREL	91.1184	AS	p570	464.0709	471.6646	4556	
58	91.1244	6019.9751	SPREL	91.1244	AS	p580	471.6646	479.5023	4557	
59	94.0524	6114.0275	SPREL	94.0524	AS	p590	479.5023	481.6925	4558	
60	26.2824	6140.3099	SPREL	26.2824	AS	p600	481.6925	483.8828	4559	
61	26.2836	6166.5935	SPREL	26.2836	AS	p610	483.8828	491.7218	4560	
62	94.0680	6260.6615	SPREL	94.0680	AS	p620	491.7218	492.9660	4561	
63	14.9304	6275.5919	SPREL	14.9304	AS	p630	492.9660	499.3183	4562	PIER 304
64	76.2276	6351.8195	SPREL	76.2276	AS	p640	499.3183	506.9158	4563	
65	91.1700	6442.9895	SPREL	91.1700	AS	p650	506.9158	514.5145	4564	
66	91.1844	6534.1739	SPREL	91.1844	AS	p660	514.5145	522.1144	4565	
67	91.1988	6625.3727	SPREL	91.1988	AS	p670	522.1144	529.7157	4566	
68	91.2156	6716.5883	SPREL	91.2156	AS	p680	529.7157	537.3185	4567	
69	91.2336	6807.8219	SPREL	91.2336	AS	p690	537.3185	544.9228	4568	
70	91.2516	6899.0735	SPREL	91.2516	AS	p700	544.9228	552.5288	4569	
71	91.2720	6990.3455	SPREL	91.2720	AS	p710	552.5288	560.1367	4570	
72	91.2948	7081.6403	SPREL	91.2948	AS	p720	560.1367	567.7465	4571	
73	91.3176	7172.9579	SPREL	91.3176	AS	p730	567.7465	575.3583	4572	
74	91.3416	7264.2995	SPREL	91.3416	AS	p740	575.3583	577.6656	4573	
75	27.6876	7291.9871	SPREL	27.6876	AS	p750	577.6656	585.2803	4574	
76	91.3764	7383.3635	SPREL	91.3764	AS	p760	585.2803	592.8973	4575	
77	91.4040	7474.7675	SPREL	91.4040	AS	p770	592.8973	600.5167	4576	
78	91.4328	7566.2003	SPREL	91.4328	AS	p780	600.5167	608.1386	4577	
79	91.4628	7657.6631	SPREL	91.4628	AS	p790	608.1386	617.4737	4578	
80	112.0212	7769.6843	SPREL	112.0212	AS	p800	617.4737	618.2166	4579	
81	8.9148	7778.5991	SPREL	8.9148	AS	p810	618.2166	619.9783	4580	
82	21.1404	7799.7395	SPABS	7799.7395	AS	p820				ABUTMENT 305

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000										
1	0.000	0.0000	SPABS	0.0000	AS	p10		0.0000	4.1675			
2	50.0100	50.0100	SPREL	50.0100	AS	p20		4.1675	10.3041	5001		
3	73.6392	123.6492	SPREL	73.6392	AS	p30		10.3041	18.1077	5002		
4	93.6432	217.2924	SPREL	93.6432	AS	p40		18.1077	25.9113	5003		
5	93.6432	310.9356	SPREL	93.6432	AS	p50		25.9113	33.7149	5004		
6	93.6432	404.5788	SPREL	93.6432	AS	p60		33.7149	41.5185	5005		
7	93.6432	498.2220	SPREL	93.6432	AS	p70		41.5185	49.3221	5006		
8	93.6432	591.8652	SPREL	93.6432	AS	p80		49.3221	57.1257	5007		
9	93.6432	685.5084	SPREL	93.6432	AS	p90		57.1257	64.9293	5008		
10	93.6432	779.1516	SPREL	93.6432	AS	p100		64.9293	72.7329	5009		
11	93.6432	872.7948	SPREL	93.6432	AS	p110		72.7329	80.5365	5010		
12	93.6432	966.4380	SPREL	93.6432	AS	p120		80.5365	88.3401	5011		
13	93.6432	1060.0812	SPREL	93.6432	AS	p130		88.3401	96.1437	5012		
14	93.6432	1153.7244	SPREL	93.6432	AS	p140		96.1437	103.9473	5013		
15	93.6432	1247.3676	SPREL	93.6432	AS	p150		103.9473	111.7509	5014		
16	93.6432	1341.0108	SPREL	93.6432	AS	p160		111.7509	119.5545	5015		
17	93.6432	1434.6540	SPREL	93.6432	AS	p170		119.5545	127.3581	5016		
18	93.6432	1528.2972	SPREL	93.6432	AS	p180		127.3581	135.1617	5017		
19	93.6432	1621.9404	SPREL	93.6432	AS	p190		135.1617	142.9653	5018		
20	93.6432	1715.5836	SPREL	93.6432	AS	p200		142.9653	150.7689	5019		
21	93.6432	1809.2268	SPREL	93.6432	AS	p210		150.7689	155.4990	5020		
22	56.7612	1865.9880	SPREL	56.7612	AS	p220		155.4990	163.3026	5021		
23	93.6432	1959.6312	SPREL	93.6432	AS	p230		163.3026	171.1062	5022		
24	93.6432	2053.2744	SPREL	93.6432	AS	p240		171.1062	178.9098	5023		
25	93.6432	2146.9176	SPREL	93.6432	AS	p250		178.9098	186.7134	5024		
26	93.6432	2240.5608	SPREL	93.6432	AS	p260		186.7134	194.5170	5025		
27	93.6432	2334.2040	SPREL	93.6432	AS	p270		194.5170	202.3206	5026		
28	93.6432	2427.8472	SPREL	93.6432	AS	p280		202.3206	210.1242	5027		
29	93.6432	2521.4904	SPREL	93.6432	AS	p290		210.1242	217.9278	5028		
30	93.6432	2615.1336	SPREL	93.6432	AS	p300		217.9278	225.7314	5029		
31	93.6432	2708.7768	SPREL	93.6432	AS	p310		225.7314	233.5350	5030		
32	93.6432	2802.4200	SPREL	93.6432	AS	p320		233.5350	241.3386	5031		
33	93.6432	2896.0632	SPREL	93.6432	AS	p330		241.3386	249.1422	5032		
34	93.6432	2989.7064	SPREL	93.6432	AS	p340		249.1422	256.9458	5033		
35	93.6432	3083.3496	SPREL	93.6432	AS	p350		256.9458	264.7494	5034		
36	93.6432	3176.9928	SPREL	93.6432	AS	p360		264.7494	272.5530	5035		
37	93.6432	3270.6360	SPREL	93.6432	AS	p370		272.5530	280.3566	5036		
38	93.6432	3364.2792	SPREL	93.6432	AS	p380		280.3566	287.4934	5037		
39	85.6416	3449.9208	SPREL	85.6416	AS	p390		287.4934	290.6607	5038		
40	38.0076	3487.9284	SPREL	38.0076	AS	p400		290.6607	293.8280	5039		PIER 15
41	38.0076	3525.9360	SPREL	38.0076	AS	p410		293.8280	300.9649	5040		
42	85.6428	3611.5788	SPREL	85.6428	AS	p420		300.9649	308.7686	5041		
43	93.6444	3705.2232	SPREL	93.6444	AS	p430		308.7686	316.5723	5042		
44	93.6444	3798.8676	SPREL	93.6444	AS	p440		316.5723	324.3760	5043		
45	93.6444	3892.5120	SPREL	93.6444	AS	p450		324.3760	332.1796	5044		
46	93.6432	3986.1552	SPABS	3986.1552	AS	p460		332.1796	332.1796	5045	SEGMENT 2	EJ [5]
1	0.0000	3986.1552	SPABS	3986.1552	AS	p10		332.1796	339.7254		SEGMENT 3	
2	90.5496	4076.7048	SPREL	90.5496	AS	p20		339.7254	347.2623	5047		
3	90.4428	4167.1476	SPREL	90.4428	AS	p30		347.2623	353.2478	5048		
4	71.8260	4238.9736	SPREL	71.8260	AS	p40		353.2478	359.2324	5049		
5	71.8152	4310.7888	SPREL	71.8152	AS	p50		359.2324	366.7641	5050		
6	90.3804	4401.1692	SPREL	90.3804	AS	p60		366.7641	374.2936	5051		Change in C.S.

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.	
		0.0000								
7	90.3540	4491.5232	SPREL	90.3540	AS	p70	374.2936	381.8208	5052	Change in C.S.
8	90.3264	4581.8496	SPREL	90.3264	AS	p80	381.8208	389.3463	5053	
9	90.3060	4672.1556	SPREL	90.3060	AS	p90	389.3463	396.8699	5054	
10	90.2832	4762.4388	SPREL	90.2832	AS	p100	396.8699	404.3913	5055	
11	90.2568	4852.6956	SPREL	90.2568	AS	p110	404.3913	411.9105	5056	
12	90.2304	4942.9260	SPREL	90.2304	AS	p120	411.9105	419.4275	5057	
13	90.2040	5033.1300	SPREL	90.2040	AS	p130	419.4275	421.3043	5058	
14	22.5216	5055.6516	SPREL	22.5216	AS	p140	421.3043	428.8188	5059	
15	90.1740	5145.8256	SPREL	90.1740	AS	p150	428.8188	436.3318	5060	
16	90.1560	5235.9816	SPREL	90.1560	AS	p160	436.3318	443.8425	5061	
17	90.1284	5326.1100	SPREL	90.1284	AS	p170	443.8425	451.3510	5062	
18	90.1020	5416.2120	SPREL	90.1020	AS	p180	451.3510	458.8573	5063	
19	90.0756	5506.2876	SPREL	90.0756	AS	p190	458.8573	466.3618	5064	
20	90.0540	5596.3416	SPREL	90.0540	AS	p200	466.3618	473.8644	5065	
21	90.0312	5686.3728	SPREL	90.0312	AS	p210	473.8644	481.3648	5066	
22	90.0048	5776.3776	SPREL	90.0048	AS	p220	481.3648	488.8539	5067	
23	89.8692	5866.2468	SPREL	89.8692	AS	p230	488.8539	496.3488	5068	
24	89.9388	5956.1856	SPREL	89.9388	AS	p240	496.3488	503.8360	5069	
25	89.8464	6046.0320	SPREL	89.8464	AS	p250	503.8360	511.3225	5070	
26	89.8380	6135.8700	SPREL	89.8380	AS	p260	511.3225	518.8081	5071	
27	89.8272	6225.6972	SPREL	89.8272	AS	p270	518.8081	526.5386	5072	
28	92.7660	6318.4632	SPREL	92.7660	AS	p280	526.5386	528.6969	5073	
29	25.8996	6344.3628	SPREL	25.8996	AS	p290	528.6969	530.8551	5074	PIER 16
30	25.8984	6370.2612	SPREL	25.8984	AS	p300	530.8551	538.5782	5075	
31	92.6772	6462.9384	SPREL	92.6772	AS	p310	538.5782	546.0606	5076	
32	89.7888	6552.7272	SPREL	89.7888	AS	p320	546.0606	553.5421	5077	
33	89.7780	6642.5052	SPREL	89.7780	AS	p330	553.5421	561.0228	5078	
34	89.7684	6732.2736	SPREL	89.7684	AS	p340	561.0228	568.5029	5079	
35	89.7612	6822.0348	SPREL	89.7612	AS	p350	568.5029	575.9820	5080	
36	89.7492	6911.7840	SPREL	89.7492	AS	p360	575.9820	583.4601	5081	
37	89.7372	7001.5212	SPREL	89.7372	AS	p370	583.4601	590.9373	5082	
38	89.7264	7091.2476	SPREL	89.7264	AS	p380	590.9373	598.4139	5083	
39	89.7192	7180.9668	SPREL	89.7192	AS	p390	598.4139	605.8896	5084	
40	89.7084	7270.6752	SPREL	89.7084	AS	p400	605.8896	613.3644	5085	
41	89.6976	7360.3728	SPREL	89.6976	AS	p410	613.3644	620.8382	5086	
42	89.6856	7450.0584	SPREL	89.6856	AS	p420	620.8382	628.3113	5087	
43	89.6772	7539.7356	SPREL	89.6772	AS	p430	628.3113	635.1552	5088	
44	82.1268	7621.8624	SPREL	82.1268	AS	p440	635.1552	642.6267	5089	
45	89.6580	7711.5204	SPREL	89.6580	AS	p450	642.6267	650.0972	5090	
46	89.6460	7801.1664	SPREL	89.6460	AS	p460	650.0972	657.5669	5091	
47	89.6364	7890.8028	SPREL	89.6364	AS	p470	657.5669	665.0360	5092	
48	89.6292	7980.4320	SPREL	89.6292	AS	p480	665.0360	672.5041	5093	
49	89.6172	8070.0492	SPREL	89.6172	AS	p490	672.5041	679.9713	5094	
50	89.6064	8159.6556	SPREL	89.6064	AS	p500	679.9713	687.4375	5095	
51	89.5944	8249.2500	SPREL	89.5944	AS	p510	687.4375	694.9028	5096	
52	89.5836	8338.8336	SPREL	89.5836	AS	p520	694.9028	702.3676	5097	
53	89.5776	8428.4112	SPREL	89.5776	AS	p530	702.3676	709.8319	5098	CL Diaphragm - Change in C.S.
54	89.5716	8517.9828	SPREL	89.5716	AS	p540	709.8319	717.2956	5099	
55	89.5644	8607.5472	SPREL	89.5644	AS	p550	717.2956	724.7587	5100	
56	89.5572	8697.1044	SPREL	89.5572	AS	p560	724.7587	732.0617	5101	
57	87.6360	8784.7404	SPREL	87.6360	AS	p570	732.0617	734.6121	5102	
58	30.6048	8815.3452	SPREL	30.6048	AS	p580	734.6121	737.1624	5103	PIER 17

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION 0.0000					ELEM BEGIN	ELEM END	ELEM NO.		
59	30.6036	8845.9488	SPREL	30.6036	AS	p590	737.1624	744.4642	5104		PIER 17
60	87.6216	8933.5704	SPREL	87.6216	AS	p600	744.4642	751.9245	5105		
61	89.5236	9023.0940	SPREL	89.5236	AS	p610	751.9245	759.3840	5106		
62	89.5140	9112.6080	SPREL	89.5140	AS	p620	759.3840	766.8425	5107		
63	89.5020	9202.1100	SPREL	89.5020	AS	p630	766.8425	774.3000	5108		
64	89.4900	9291.6000	SPREL	89.4900	AS	p640	774.3000	781.7565	5109		
65	89.4780	9381.0780	SPREL	89.4780	AS	p650	781.7565	789.2119	5110		
66	89.4648	9470.5428	SPREL	89.4648	AS	p660	789.2119	796.6661	5111		
67	89.4504	9559.9932	SPREL	89.4504	AS	p670	796.6661	804.1191	5112		
68	89.4360	9649.4292	SPREL	89.4360	AS	p680	804.1191	811.5709	5113		
69	89.4216	9738.8508	SPREL	89.4216	AS	p690	811.5709	819.0213	5114		
70	89.4048	9828.2556	SPREL	89.4048	AS	p700	819.0213	826.4704	5115		
71	89.3892	9917.6448	SPREL	89.3892	AS	p710	826.4704	833.9180	5116		
72	89.3712	10007.0160	SPREL	89.3712	AS	p720	833.9180	840.7337	5117		
73	81.7884	10088.8044	SPREL	81.7884	AS	p730	840.7337	848.1798	5118		
74	89.3532	10178.1576	SPREL	89.3532	AS	p740	848.1798	855.6256	5119		
75	89.3496	10267.5072	SPREL	89.3496	AS	p750	855.6256	863.0701	5120		
76	89.3340	10356.8412	SPREL	89.3340	AS	p760	863.0701	870.5153	5121		Change in C.S.
77	89.3424	10446.1836	SPREL	89.3424	AS	p770	870.5153	877.9602	5122		
78	89.3388	10535.5224	SPREL	89.3388	AS	p780	877.9602	885.4047	5123		
79	89.3340	10624.8564	SPREL	89.3340	AS	p790	885.4047	892.8489	5124		
80	89.3304	10714.1868	SPREL	89.3304	AS	p800	892.8489	900.2927	5125		
81	89.3256	10803.5124	SPREL	89.3256	AS	p810	900.2927	907.7361	5126		
82	89.3208	10892.8332	SPREL	89.3208	AS	p820	907.7361	915.1791	5127		
83	89.3160	10982.1492	SPREL	89.3160	AS	p830	915.1791	922.6216	5128		
84	89.3100	11071.4592	SPREL	89.3100	AS	p840	922.6216	930.0637	5129		
85	89.3052	11160.7644	SPREL	89.3052	AS	p850	930.0637	931.0844	5130		
86	12.2484	11173.0128	SPREL	12.2484	AS	p860	931.0844	937.3463	5131		PIER 410
87	75.1428	11248.1556	SPREL	75.1428	AS	p870	937.3463	939.8896	5132		
88	30.5196	11278.6752	SPREL	30.5196	AS	p880	939.8896	947.4047	5133		FROM HERE ON IT DOES NOT NEED TO MATCH THE MAINLINE
89	90.1813	11368.8565	SPREL	90.1813	AS	p890	947.4047	954.9198	5134		
90	90.1813	11459.0378	SPREL	90.1813	AS	p900	954.9198	962.4349	5135		
91	90.1813	11549.2191	SPREL	90.1813	AS	p910	962.4349	969.9500	5136		
92	90.1813	11639.4004	SPREL	90.1813	AS	p920	969.9500	977.4651	5137		
93	90.1813	11729.5817	SPREL	90.1813	AS	p930	977.4651	984.9803	5138		
94	90.1813	11819.7630	SPABS	11819.7630	AS	p940	984.9803	984.9803	5139	SEGMENT 4	EJ [6]
1	0.0000	11819.7630	SPABS	11819.7630	AS	p10	984.9803	993.3039		RAMP C	
2	99.8833	11919.6463	SPREL	99.8833	AS	p20	993.3039	1001.6275	5141		
3	99.8833	12019.5297	SPREL	99.8833	AS	p30	1001.6275	1009.9511	5142		
4	99.8833	12119.4130	SPREL	99.8833	AS	p40	1009.9511	1018.2747	5143		
5	99.8833	12219.2963	SPREL	99.8833	AS	p50	1018.2747	1026.5983	5144		
6	99.8833	12319.1797	SPREL	99.8833	AS	p60	1026.5983	1034.9219	5145		
7	99.8833	12419.0630	SPREL	99.8833	AS	p70	1034.9219	1043.2455	5146		
8	99.8833	12518.9463	SPREL	99.8833	AS	p80	1043.2455	1051.5691	5147		
9	99.8833	12618.8297	SPREL	99.8833	AS	p90	1051.5691	1059.8928	5148		
10	99.8833	12718.7130	SPREL	99.8833	AS	p100	1059.8928	1068.2164	5149		
11	99.8833	12818.5963	SPREL	99.8833	AS	p110	1068.2164	1076.5400	5150		
12	99.8833	12918.4797	SPREL	99.8833	AS	p120	1076.5400	1084.8636	5151		
13	99.8833	13018.3630	SPREL	99.8833	AS	p130	1084.8636	1093.1872	5152		
14	99.8833	13118.2463	SPREL	99.8833	AS	p140	1093.1872	1101.5108	5153		
15	99.8833	13218.1297	SPREL	99.8833	AS	p150	1101.5108	1109.8344	5154		
16	99.8833	13318.0130	SPREL	99.8833	AS	p160	1109.8344	1111.0844	5155		

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION						ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000										
17	15.0000	13333.0130		SPREL	15.0000	AS	p170	1111.0844	1112.3344	5156	126.1042	
18	15.0000	13348.0130		SPREL	15.0000	AS	p180	1112.3344	1121.2094	5157		PIER 409
19	106.5000	13454.5130		SPREL	106.5000	AS	p190	1121.2094	1130.0844	5158		
20	106.5000	13561.0130		SPREL	106.5000	AS	p200	1130.0844	1138.9594	5159		
21	106.5000	13667.5130		SPREL	106.5000	AS	p210	1138.9594	1147.8344	5160		
22	106.5000	13774.0130		SPREL	106.5000	AS	p220	1147.8344	1156.7094	5161		
23	106.5000	13880.5130		SPREL	106.5000	AS	p230	1156.7094	1165.5844	5162		
24	106.5000	13987.0130		SPREL	106.5000	AS	p240	1165.5844	1174.4594	5163		
25	106.5000	14093.5130		SPREL	106.5000	AS	p250	1174.4594	1183.3344	5164		
26	106.5000	14200.0130		SPREL	106.5000	AS	p260	1183.3344	1192.2094	5165		
27	106.5000	14306.5130		SPREL	106.5000	AS	p270	1192.2094	1201.0844	5166		
28	106.5000	14413.0130		SPREL	106.5000	AS	p280	1201.0844	1209.9594	5167		
29	106.5000	14519.5130		SPREL	106.5000	AS	p290	1209.9594	1218.8344	5168		
30	106.5000	14626.0130		SPREL	106.5000	AS	p300	1218.8344	1227.7094	5169		
31	106.5000	14732.5130		SPREL	106.5000	AS	p310	1227.7094	1236.5844	5170		
32	106.5000	14839.0130		SPREL	106.5000	AS	p320	1236.5844	1245.4594	5171		
33	106.5000	14945.5130		SPREL	106.5000	AS	p330	1245.4594	1254.3344	5172		
34	106.5000	15052.0130		SPREL	106.5000	AS	p340	1254.3344	1263.2094	5173		
35	106.5000	15158.5130		SPREL	106.5000	AS	p350	1263.2094	1272.0844	5174		
36	106.5000	15265.0130		SPREL	106.5000	AS	p360	1272.0844	1280.9594	5175		
37	106.5000	15371.5130		SPREL	106.5000	AS	p370	1280.9594	1289.8344	5176		
38	106.5000	15478.0130		SPREL	106.5000	AS	p380	1289.8344	1291.0844	5177		
39	15.0000	15493.0130		SPREL	15.0000	AS	p390	1291.0844	1292.3344	5178	180.0000	
40	15.0000	15508.0130		SPREL	15.0000	AS	p400	1292.3344	1301.2094	5179		PIER 408
41	106.5000	15614.5130		SPREL	106.5000	AS	p410	1301.2094	1310.0844	5180		
42	106.5000	15721.0130		SPREL	106.5000	AS	p420	1310.0844	1318.9594	5181		
43	106.5000	15827.5130		SPREL	106.5000	AS	p430	1318.9594	1327.8344	5182		
44	106.5000	15934.0130		SPREL	106.5000	AS	p440	1327.8344	1336.7094	5183		
45	106.5000	16040.5130		SPREL	106.5000	AS	p450	1336.7094	1345.5844	5184		
46	106.5000	16147.0130		SPREL	106.5000	AS	p460	1345.5844	1354.4594	5185		
47	106.5000	16253.5130		SPREL	106.5000	AS	p470	1354.4594	1363.3344	5186		
48	106.5000	16360.0130		SPREL	106.5000	AS	p480	1363.3344	1372.2094	5187		
49	106.5000	16466.5130		SPREL	106.5000	AS	p490	1372.2094	1381.0844	5188		
50	106.5000	16573.0130		SPREL	106.5000	AS	p500	1381.0844	1389.9594	5189		
51	106.5000	16679.5130		SPREL	106.5000	AS	p510	1389.9594	1398.8344	5190		
52	106.5000	16786.0130		SPREL	106.5000	AS	p520	1398.8344	1407.7094	5191		
53	106.5000	16892.5130		SPREL	106.5000	AS	p530	1407.7094	1416.5844	5192		
54	106.5000	16999.0130		SPREL	106.5000	AS	p540	1416.5844	1425.4594	5193		
55	106.5000	17105.5130		SPREL	106.5000	AS	p550	1425.4594	1434.3344	5194		
56	106.5000	17212.0130		SPREL	106.5000	AS	p560	1434.3344	1443.2094	5195		
57	106.5000	17318.5130		SPREL	106.5000	AS	p570	1443.2094	1452.0844	5196		
58	106.5000	17425.0130		SPREL	106.5000	AS	p580	1452.0844	1460.9594	5197		
59	106.5000	17531.5130		SPREL	106.5000	AS	p590	1460.9594	1469.8344	5198		
60	106.5000	17638.0130		SPREL	106.5000	AS	p600	1469.8344	1471.0844	5199		
61	15.0000	17653.0130		SPREL	15.0000	AS	p610	1471.0844	1472.3344	5200	180.0000	
62	15.0000	17668.0130		SPREL	15.0000	AS	p620	1472.3344	1481.2094	5201		PIER 407
63	106.5000	17774.5130		SPREL	106.5000	AS	p630	1481.2094	1490.0844	5202		
64	106.5000	17881.0130		SPREL	106.5000	AS	p640	1490.0844	1498.9594	5203		
65	106.5000	17987.5130		SPREL	106.5000	AS	p650	1498.9594	1507.8344	5204		
66	106.5000	18094.0130		SPREL	106.5000	AS	p660	1507.8344	1516.7094	5205		
67	106.5000	18200.5130		SPREL	106.5000	AS	p670	1516.7094	1525.5844	5206		
68	106.5000	18307.0130		SPREL	106.5000	AS	p680	1525.5844	1534.4594	5207		

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JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C — CHECKED BY: IC BY PT — DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000									
69	106.5000	18413.5130	SPREL	106.5000	AS	p690	1534.4594	1543.3344	5208		
70	106.5000	18520.0130	SPREL	106.5000	AS	p700	1543.3344	1552.2094	5209		
71	106.5000	18626.5130	SPREL	106.5000	AS	p710	1552.2094	1561.0844	5210		
72	106.5000	18733.0130	SPREL	106.5000	AS	p720	1561.0844	1569.9594	5211		
73	106.5000	18839.5130	SPREL	106.5000	AS	p730	1569.9594	1578.8344	5212		
74	106.5000	18946.0130	SPREL	106.5000	AS	p740	1578.8344	1587.7094	5213		
75	106.5000	19052.5130	SPREL	106.5000	AS	p750	1587.7094	1596.5844	5214		
76	106.5000	19159.0130	SPREL	106.5000	AS	p760	1596.5844	1605.4594	5215		
77	106.5000	19265.5130	SPREL	106.5000	AS	p770	1605.4594	1614.3344	5216		
78	106.5000	19372.0130	SPREL	106.5000	AS	p780	1614.3344	1623.2094	5217		
79	106.5000	19478.5130	SPREL	106.5000	AS	p790	1623.2094	1632.0844	5218		
80	106.5000	19585.0130	SPREL	106.5000	AS	p800	1632.0844	1640.9594	5219		
81	106.5000	19691.5130	SPREL	106.5000	AS	p810	1640.9594	1649.8344	5220		
82	106.5000	19798.0130	SPREL	106.5000	AS	p820	1649.8344	1651.0844	5221		
83	15.0000	19813.0130	SPREL	15.0000	AS	p830	1651.0844	1652.3344	5222	180.0000	PIER 406
84	15.0000	19828.0130	SPREL	15.0000	AS	p840	1652.3344	1661.2094	5223		
85	106.5000	19934.5130	SPREL	106.5000	AS	p850	1661.2094	1670.0844	5224		
86	106.5000	20041.0130	SPREL	106.5000	AS	p860	1670.0844	1678.9594	5225		
87	106.5000	20147.5130	SPREL	106.5000	AS	p870	1678.9594	1687.8344	5226		
88	106.5000	20254.0130	SPREL	106.5000	AS	p880	1687.8344	1696.7094	5227		
89	106.5000	20360.5130	SPREL	106.5000	AS	p890	1696.7094	1705.5844	5228		
90	106.5000	20467.0130	SPREL	106.5000	AS	p900	1705.5844	1714.4594	5229		
91	106.5000	20573.5130	SPREL	106.5000	AS	p910	1714.4594	1723.3344	5230		
92	106.5000	20680.0130	SPREL	106.5000	AS	p920	1723.3344	1732.2094	5231		
93	106.5000	20786.5130	SPREL	106.5000	AS	p930	1732.2094	1741.0844	5232		
94	106.5000	20893.0130	SPREL	106.5000	AS	p940	1741.0844	1749.9594	5233		
95	106.5000	20999.5130	SPREL	106.5000	AS	p950	1749.9594	1758.8344	5234		
96	106.5000	21106.0130	SPREL	106.5000	AS	p960	1758.8344	1767.7094	5235		
97	106.5000	21212.5130	SPREL	106.5000	AS	p970	1767.7094	1776.5844	5236		
98	106.5000	21319.0130	SPREL	106.5000	AS	p980	1776.5844	1785.4594	5237		
99	106.5000	21425.5130	SPREL	106.5000	AS	p990	1785.4594	1794.3344	5238		
100	106.5000	21532.0130	SPREL	106.5000	AS	p1000	1794.3344	1803.2094	5239		
101	106.5000	21638.5130	SPREL	106.5000	AS	p1010	1803.2094	1812.0844	5241		
102	106.5000	21745.0130	SPREL	106.5000	AS	p1020	1812.0844	1820.9594	5242		
103	106.5000	21851.5130	SPREL	106.5000	AS	p1030	1820.9594	1829.8344	5243		
104	106.5000	21958.0130	SPREL	106.5000	AS	p1040	1829.8344	1831.0844	5244		
105	15.0000	21973.0130	SPREL	15.0000	AS	p1050	1831.0844	1832.3344	5245	180.0000	PIER 405
106	15.0000	21988.0130	SPREL	15.0000	AS	p1060	1832.3344	1840.2094	5223		
107	94.5000	22082.5130	SPREL	94.5000	AS	p1070	1840.2094	1848.0844	5224		
108	94.5000	22177.0130	SPREL	94.5000	AS	p1080	1848.0844	1855.9594	5225		
109	94.5000	22271.5130	SPREL	94.5000	AS	p1090	1855.9594	1863.8344	5226		
110	94.5000	22366.0130	SPREL	94.5000	AS	p1100	1863.8344	1871.7094	5227		
111	94.5000	22460.5130	SPREL	94.5000	AS	p1110	1871.7094	1879.5844	5228		
112	94.5000	22555.0130	SPREL	94.5000	AS	p1120	1879.5844	1887.4594	5229		
113	94.5000	22649.5130	SPREL	94.5000	AS	p1130	1887.4594	1895.3344	5230		
114	94.5000	22744.0130	SPREL	94.5000	AS	p1140	1895.3344	1903.2094	5231		
115	94.5000	22838.5130	SPREL	94.5000	AS	p1150	1903.2094	1911.0844	5232		
116	94.5000	22933.0130	SPREL	94.5000	AS	p1160	1911.0844	1918.9594	5233		
117	94.5000	23027.5130	SPREL	94.5000	AS	p1170	1918.9594	1926.8344	5234		
118	94.5000	23122.0130	SPREL	94.5000	AS	p1180	1926.8344	1934.7094	5235		

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JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000									
119	94.5000	23216.5130	SPREL	94.5000	AS	p1190	1934.7094	1942.5844	5236		
120	94.5000	23311.0130	SPREL	94.5000	AS	p1200	1942.5844	1950.4594	5237		
121	94.5000	23405.5130	SPREL	94.5000	AS	p1210	1950.4594	1958.3344	5238		
122	94.5000	23500.0130	SPREL	94.5000	AS	p1220	1958.3344	1966.2094	5239		
123	94.5000	23594.5130	SPREL	94.5000	AS	p1230	1966.2094	1974.0844	5240		
124	94.5000	23689.0130	SPREL	94.5000	AS	p1240	1974.0844	1981.9594	5241		
125	94.5000	23783.5130	SPREL	94.5000	AS	p1250	1981.9594	1989.8344	5242		
126	94.5000	23878.0130	SPREL	94.5000	AS	p1260	1989.8344	1991.0844	5243		
127	15.0000	23893.0130	SPREL	15.0000	AS	p1270	1991.0844	1992.3344	5244	160.0000	PIER 404
128	15.0000	23908.0130	SPREL	15.0000	AS	p1280	1992.3344	2000.2094	5245		
129	94.5000	24002.5130	SPREL	94.5000	AS	p1290	2000.2094	2008.0844	5246		
130	94.5000	24097.0130	SPREL	94.5000	AS	p1300	2008.0844	2015.9594	5247		
131	94.5000	24191.5130	SPREL	94.5000	AS	p1310	2015.9594	2023.8344	5248		
132	94.5000	24286.0130	SPREL	94.5000	AS	p1320	2023.8344	2031.7094	5249		
133	94.5000	24380.5130	SPREL	94.5000	AS	p1330	2031.7094	2039.5844	5250		
134	94.5000	24475.0130	SPREL	94.5000	AS	p1340	2039.5844	2047.4594	5251		
135	94.5000	24569.5130	SPREL	94.5000	AS	p1350	2047.4594	2055.3344	5252		
136	94.5000	24664.0130	SPREL	94.5000	AS	p1360	2055.3344	2063.2094	5253		
137	94.5000	24758.5130	SPREL	94.5000	AS	p1370	2063.2094	2071.0844	5254		
138	94.5000	24853.0130	SPREL	94.5000	AS	p1380	2071.0844	2078.9594	5255		
139	94.5000	24947.5130	SPREL	94.5000	AS	p1390	2078.9594	2086.8344	5256		
140	94.5000	25042.0130	SPREL	94.5000	AS	p1400	2086.8344	2094.7094	5257		
141	94.5000	25136.5130	SPREL	94.5000	AS	p1410	2094.7094	2102.5844	5258		
142	94.5000	25231.0130	SPREL	94.5000	AS	p1420	2102.5844	2110.4594	5259		
143	94.5000	25325.5130	SPREL	94.5000	AS	p1430	2110.4594	2118.3344	5260		
144	94.5000	25420.0130	SPREL	94.5000	AS	p1440	2118.3344	2126.2094	5261		
145	94.5000	25514.5130	SPREL	94.5000	AS	p1450	2126.2094	2134.0844	5262		
146	94.5000	25609.0130	SPREL	94.5000	AS	p1460	2134.0844	2141.9594	5263		
147	94.5000	25703.5130	SPREL	94.5000	AS	p1470	2141.9594	2149.8344	5264		
148	94.5000	25798.0130	SPREL	94.5000	AS	p1480	2149.8344	2151.0844	5265		
149	15.0000	25813.0130	SPREL	15.0000	AS	p1490	2151.0844	2152.3344	5266	160.0000	PIER 403
150	15.0000	25828.0130	SPREL	15.0000	AS	p1500	2152.3344	2158.2094	5267		
151	70.5000	25898.5130	SPREL	70.5000	AS	p1510	2158.2094	2164.0844	5268		
152	70.5000	25969.0130	SPREL	70.5000	AS	p1520	2164.0844	2169.9594	5269		
153	70.5000	26039.5130	SPREL	70.5000	AS	p1530	2169.9594	2175.8344	5270		
154	70.5000	26110.0130	SPREL	70.5000	AS	p1540	2175.8344	2181.7094	5271		
155	70.5000	26180.5130	SPREL	70.5000	AS	p1550	2181.7094	2187.5844	5272		
156	70.5000	26251.0130	SPREL	70.5000	AS	p1560	2187.5844	2193.4594	5273		
157	70.5000	26321.5130	SPREL	70.5000	AS	p1570	2193.4594	2199.3344	5274		
158	70.5000	26392.0130	SPREL	70.5000	AS	p1580	2199.3344	2205.2094	5275		
159	70.5000	26462.5130	SPREL	70.5000	AS	p1590	2205.2094	2211.0844	5276		
160	70.5000	26533.0130	SPREL	70.5000	AS	p1600	2211.0844	2216.9594	5277		
161	70.5000	26603.5130	SPREL	70.5000	AS	p1610	2216.9594	2222.8344	5278		
162	70.5000	26674.0130	SPREL	70.5000	AS	p1620	2222.8344	2228.7094	5279		
163	70.5000	26744.5130	SPREL	70.5000	AS	p1630	2228.7094	2234.5844	5280		
164	70.5000	26815.0130	SPREL	70.5000	AS	p1640	2234.5844	2240.4594	5281		
165	70.5000	26885.5130	SPREL	70.5000	AS	p1650	2240.4594	2246.3344	5282		
166	70.5000	26956.0130	SPREL	70.5000	AS	p1660	2246.3344	2252.2094	5283		
167	70.5000	27026.5130	SPREL	70.5000	AS	p1670	2252.2094	2258.0844	5284		
168	70.5000	27097.0130	SPREL	70.5000	AS	p1680	2258.0844	2263.9594	5285		
169	70.5000	27167.5130	SPREL	70.5000	AS	p1690	2263.9594	2269.8344	5286		
170	70.5000	27238.0130	SPREL	70.5000	AS	p1700	2269.8344	2271.0844	5287		

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 2/9/2009

DESCRP: BRIDGE GEOMETRY - RAMP C | CHECKED BY: IC BY PT | DATE: 2/9/2009

NODE	DX	STATION					ELEM BEGIN	ELEM END	ELEM NO.		
		0.0000									
171	15.0000	27253.0130	SPREL	15.0000	AS	p1710	2271.0844	2272.3344	5288	120.0000	PIER 402
172	15.0000	27268.0130	SPREL	15.0000	AS	p1720	2272.3344	2278.2094	5289		
173	70.5000	27338.5130	SPREL	70.5000	AS	p1730	2278.2094	2284.0844	5290		
174	70.5000	27409.0130	SPREL	70.5000	AS	p1740	2284.0844	2289.9594	5291		
175	70.5000	27479.5130	SPREL	70.5000	AS	p1750	2289.9594	2295.8344	5292		
176	70.5000	27550.0130	SPREL	70.5000	AS	p1760	2295.8344	2301.7094	5293		
177	70.5000	27620.5130	SPREL	70.5000	AS	p1770	2301.7094	2307.5844	5294		
178	70.5000	27691.0130	SPREL	70.5000	AS	p1780	2307.5844	2313.4594	5295		
179	70.5000	27761.5130	SPREL	70.5000	AS	p1790	2313.4594	2319.3344	5296		
180	70.5000	27832.0130	SPREL	70.5000	AS	p1800	2319.3344	2325.2094	5297		
181	70.5000	27902.5130	SPREL	70.5000	AS	p1810	2325.2094	2331.0844	5298		
182	70.5000	27973.0130	SPREL	70.5000	AS	p1820	2331.0844	2336.9594	5299		
183	70.5000	28043.5130	SPREL	70.5000	AS	p1830	2336.9594	2342.8344	5300		
184	70.5000	28114.0130	SPREL	70.5000	AS	p1840	2342.8344	2348.7094	5301		
185	70.5000	28184.5130	SPREL	70.5000	AS	p1850	2348.7094	2354.5844	5302		
186	70.5000	28255.0130	SPREL	70.5000	AS	p1860	2354.5844	2360.4594	5303		
187	70.5000	28325.5130	SPREL	70.5000	AS	p1870	2360.4594	2366.3344	5304		
188	70.5000	28396.0130	SPREL	70.5000	AS	p1880	2366.3344	2372.2094	5305		
189	70.5000	28466.5130	SPREL	70.5000	AS	p1890	2372.2094	2378.0844	5306		
190	70.5000	28537.0130	SPREL	70.5000	AS	p1900	2378.0844	2383.9594	5307		
191	70.5000	28607.5130	SPREL	70.5000	AS	p1910	2383.9594	2389.8344	5308		
192	70.5000	28678.0130	SPREL	70.5000	AS	p1920	2389.8344	2391.0844	5309		
193	15.0000	28693.0130	SPREL	15.0000	AS	p1930	2391.0844	2392.3344	5310	120.0000	PIER 401
194	15.0000	28708.0130	SPREL	15.0000	AS	p1940	2392.3344	2399.3678	5311		
195	84.4000	28792.4130	SPREL	84.4000	AS	p1950	2399.3678	2406.4011	5312		
196	84.4000	28876.8130	SPREL	84.4000	AS	p1960	2406.4011	2413.4344	5313		
197	84.4000	28961.2130	SPREL	84.4000	AS	p1970	2413.4344	2420.4678	5314		
198	84.4000	29045.6130	SPREL	84.4000	AS	p1980	2420.4678	2427.5011	5315		
199	84.4000	29130.0130	SPREL	84.4000	AS	p1990	2427.5011	2434.5344	5316		
200	84.4000	29214.4130	SPREL	84.4000	AS	p2000	2434.5344	2441.5678	5317		
201	84.4000	29298.8130	SPREL	84.4000	AS	p2010	2441.5678	2448.6011	5318		
202	84.4000	29383.2130	SPREL	84.4000	AS	p2020	2448.6011	2455.6344	5319		
203	84.4000	29467.6130	SPREL	84.4000	AS	p2030	2455.6344	2462.6678	5320		
204	84.4000	29552.0130	SPREL	84.4000	AS	p2040	2462.6678	2463.0844	5321		
205	5.0000	29557.0130	SPREL	5.0000	AS	p2050	2463.0844	2465.1678	5322	72.0000	ABUTMENT 400
206	25.0000	29582.0130	SPABS	29582.0130	AS	p2060	2465.1678	2465.1678	5323		

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - RAMP D

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

NODE	DX	STATION 360.0000					ELEM BEGIN	ELEM END	ELEM NO.	
1	0.000	360.0000	SPABS	360.0000	AS	p10	0.0000	2.0833		
2	25.0000	385.0000	SPREL	25.0000	AS	p20	2.0833	2.5000	5501	ABUTMENT 101
3	5.0000	390.0000	SPREL	5.0000	AS	p30	2.5000	6.2500	5502	
4	45.0000	435.0000	SPREL	45.0000	AS	p40	6.2500	10.0000	5503	
5	45.0000	480.0000	SPREL	45.0000	AS	p50	10.0000	17.5583	5504	
6	90.7000	570.7000	SPREL	90.7000	AS	p60	17.5583	25.1167	5505	
7	90.7000	661.4000	SPREL	90.7000	AS	p70	25.1167	32.6750	5506	
8	90.7000	752.1000	SPREL	90.7000	AS	p80	32.6750	40.2333	5507	
9	90.7000	842.8000	SPREL	90.7000	AS	p90	40.2333	47.7917	5508	
10	90.7000	933.5000	SPREL	90.7000	AS	p100	47.7917	55.3500	5509	
11	90.7000	1024.2000	SPREL	90.7000	AS	p110	55.3500	62.9083	5510	
12	90.7000	1114.9000	SPREL	90.7000	AS	p120	62.9083	70.4667	5511	
13	90.7000	1205.6000	SPREL	90.7000	AS	p130	70.4667	78.0250	5512	
14	90.7000	1296.3000	SPREL	90.7000	AS	p140	78.0250	85.5833	5513	
15	90.7000	1387.0000	SPREL	90.7000	AS	p150	85.5833	88.0833	5514	
16	30.0000	1417.0000	SPREL	30.0000	AS	p160	88.0833	90.5833	5515	PIER 102
17	30.0000	1447.0000	SPREL	30.0000	AS	p170	90.5833	98.3333	5516	
18	93.0000	1540.0000	SPREL	93.0000	AS	p180	98.3333	106.0833	5517	
19	93.0000	1633.0000	SPREL	93.0000	AS	p190	106.0833	113.8333	5518	
20	93.0000	1726.0000	SPREL	93.0000	AS	p200	113.8333	121.5833	5519	
21	93.0000	1819.0000	SPREL	93.0000	AS	p210	121.5833	129.3333	5520	
22	93.0000	1912.0000	SPREL	93.0000	AS	p220	129.3333	137.0833	5521	
23	93.0000	2005.0000	SPREL	93.0000	AS	p230	137.0833	144.8333	5522	
24	93.0000	2098.0000	SPREL	93.0000	AS	p240	144.8333	152.5833	5523	
25	93.0000	2191.0000	SPREL	93.0000	AS	p250	152.5833	160.3333	5524	
26	93.0000	2284.0000	SPREL	93.0000	AS	p260	160.3333	168.0833	5525	
27	93.0000	2377.0000	SPREL	93.0000	AS	p270	168.0833	175.8333	5526	
28	93.0000	2470.0000	SPREL	93.0000	AS	p280	175.8333	183.5833	5527	
29	93.0000	2563.0000	SPREL	93.0000	AS	p290	183.5833	191.3333	5528	
30	93.0000	2656.0000	SPREL	93.0000	AS	p300	191.3333	199.0833	5529	
31	93.0000	2749.0000	SPREL	93.0000	AS	p310	199.0833	208.0833	5530	
32	108.0000	2857.0000	SPREL	108.0000	AS	p320	208.0833	214.5833	5531	UNIT 3
33	78.0000	2935.0000	SPREL	78.0000	AS	p330	214.5833	222.3333	5532	UNIT 2
34	93.0000	3028.0000	SPREL	93.0000	AS	p340	222.3333	230.0833	5533	
35	93.0000	3121.0000	SPREL	93.0000	AS	p350	230.0833	237.8333	5534	
36	93.0000	3214.0000	SPREL	93.0000	AS	p360	237.8333	245.5833	5535	
37	93.0000	3307.0000	SPREL	93.0000	AS	p370	245.5833	248.0833	5536	
38	30.0000	3337.0000	SPREL	30.0000	AS	p380	248.0833	250.5833	5537	PIER 103
39	30.0000	3367.0000	SPREL	30.0000	AS	p390	250.5833	260.0833	5538	
40	114.0000	3481.0000	SPREL	114.0000	AS	p400	260.0833	269.5833	5539	
41	114.0000	3595.0000	SPREL	114.0000	AS	p410	269.5833	279.0833	5540	
42	114.0000	3709.0000	SPREL	114.0000	AS	p420	279.0833	288.5833	5541	
43	114.0000	3823.0000	SPREL	114.0000	AS	p430	288.5833	298.0833	5542	
44	114.0000	3937.0000	SPREL	114.0000	AS	p440	298.0833	307.5833	5543	
45	114.0000	4051.0000	SPREL	114.0000	AS	p450	307.5833	317.0833	5544	
46	114.0000	4165.0000	SPREL	114.0000	AS	p460	317.0833	326.5833	5545	
47	114.0000	4279.0000	SPREL	114.0000	AS	p470	326.5833	336.0833	5546	
48	114.0000	4393.0000	SPREL	114.0000	AS	p480	336.0833	345.5833	5547	

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - RAMP D

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

NODE	DX	STATION 360.0000					ELEM BEGIN	ELEM END	ELEM NO.		
49	114.0000	4507.0000	SPREL	114.0000	AS	p490	345.5833	355.0833	5548		
50	114.0000	4621.0000	SPREL	114.0000	AS	p500	355.0833	364.5833	5549		
51	114.0000	4735.0000	SPREL	114.0000	AS	p510	364.5833	374.0833	5550		
52	114.0000	4849.0000	SPREL	114.0000	AS	p520	374.0833	383.5833	5551		
53	114.0000	4963.0000	SPREL	114.0000	AS	p530	383.5833	398.0833	5552		
54	174.0000	5137.0000	SPREL	174.0000	AS	p540	398.0833	402.5833	5553		UNIT 2
55	54.0000	5191.0000	SPREL	54.0000	AS	p550	402.5833	412.0833	5554		UNIT 1
56	114.0000	5305.0000	SPREL	114.0000	AS	p560	412.0833	421.5833	5555		
57	114.0000	5419.0000	SPREL	114.0000	AS	p570	421.5833	431.0833	5556		
58	114.0000	5533.0000	SPREL	114.0000	AS	p580	431.0833	440.5833	5557		
59	114.0000	5647.0000	SPREL	114.0000	AS	p590	440.5833	443.0833	5558		
60	30.0000	5677.0000	SPREL	30.0000	AS	p600	443.0833	445.5833	5559		
61	30.0000	5707.0000	SPREL	30.0000	AS	p610	445.5833	453.7750	5560	PIER 104	
62	98.3000	5805.3000	SPREL	98.3000	AS	p620	453.7750	461.9667	5561		
63	98.3000	5903.6000	SPREL	98.3000	AS	p630	461.9667	470.1583	5562		
64	98.3000	6001.9000	SPREL	98.3000	AS	p640	470.1583	478.3500	5563		
65	98.3000	6100.2000	SPREL	98.3000	AS	p650	478.3500	486.5417	5564		
66	98.3000	6198.5000	SPREL	98.3000	AS	p660	486.5417	494.7333	5565		
67	98.3000	6296.8000	SPREL	98.3000	AS	p670	494.7333	502.9250	5566		
68	98.3000	6395.1000	SPREL	98.3000	AS	p680	502.9250	511.1167	5567		
69	98.3000	6493.4000	SPREL	98.3000	AS	p690	511.1167	519.3083	5568		
70	98.3000	6591.7000	SPREL	98.3000	AS	p700	519.3083	527.5000	5569		
71	98.3000	6690.0000	SPREL	98.3000	AS	p710	527.5000	535.6917	5570		
72	98.3000	6788.3000	SPREL	98.3000	AS	p720	535.6917	543.8833	5571		
73	98.3000	6886.6000	SPREL	98.3000	AS	p730	543.8833	552.0750	5572		
74	98.3000	6984.9000	SPREL	98.3000	AS	p740	552.0750	560.2667	5573		
75	98.3000	7083.2000	SPREL	98.3000	AS	p750	560.2667	568.4583	5574		
76	98.3000	7181.5000	SPREL	98.3000	AS	p760	568.4583	576.6500	5575		
77	98.3000	7279.8000	SPREL	98.3000	AS	p770	576.6500	584.8417	5576		
78	98.3000	7378.1000	SPREL	98.3000	AS	p780	584.8417	593.0333	5577		
79	98.3000	7476.4000	SPREL	98.3000	AS	p790	593.0333	601.2250	5578		
80	98.3000	7574.7000	SPREL	98.3000	AS	p800	601.2250	609.4167	5579		
81	98.3000	7673.0000	SPREL	98.3000	AS	p810	609.4167	614.5583	5580	RAMP D	
82	61.7000	7734.7000	SPREL	61.7000	AS	p820	614.5583	619.7000		MAINSPAN	EJ [9]
83	61.7000	7796.4000	SPREL	61.7000	AS	p830	619.7000	624.8417	5582		
84	61.7000	7858.1000	SPREL	61.7000	AS	p840	624.8417	629.9833	5583		
85	61.7000	7919.8000	SPREL	61.7000	AS	p850	629.9833	635.1250	5584		
86	61.7000	7981.5000	SPREL	61.7000	AS	p860	635.1250	640.2667	5585		
87	61.7000	8043.2000	SPREL	61.7000	AS	p870	640.2667	645.4083	5586		
88	61.7000	8104.9000	SPREL	61.7000	AS	p880	645.4083	650.5500	5587		
89	61.7000	8166.6000	SPREL	61.7000	AS	p890	650.5500	655.6917	5588		
90	61.7000	8228.3000	SPREL	61.7000	AS	p900	655.6917	660.8333	5589		
91	61.7000	8290.0000	SPREL	61.7000	AS	p910	660.8333	663.0833	5590		
92	27.0000	8317.0000	SPREL	27.0000	AS	p920	663.0833	665.3343	5591		
93	27.0120	8344.0120	SPREL	27.0120	AS	p930	665.3343	673.3928	5592	PIER 105	
94	96.7020	8440.7140	SPREL	96.7020	AS	p940	673.3928	681.2011	5593	THIS MATCHES THE	
95	93.6996	8534.4136	SPREL	93.6996	AS	p950	681.2011	689.0094	5594	MAIN SPAN SEGMENTS	

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - RAMP D

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

NODE	DX	STATION 360.0000					ELEM BEGIN	ELEM END	ELEM NO.	
96	93.6996	8628.1132	SPREL	93.6996	AS	p960	689.0094	696.8177	5595	
97	93.6996	8721.8128	SPREL	93.6996	AS	p970	696.8177	704.6260	5596	
98	93.6996	8815.5124	SPREL	93.6996	AS	p980	704.6260	712.4343	5597	
99	93.6996	8909.2120	SPREL	93.6996	AS	p990	712.4343	720.2426	5598	
100	93.6996	9002.9116	SPREL	93.6996	AS	p1000	720.2426	728.0509	5599	
101	93.6996	9096.6112	SPREL	93.6996	AS	p1010	728.0509	735.8592	5600	
102	93.6996	9190.3108	SPREL	93.6996	AS	p1020	735.8592	743.6675	5601	
103	93.6996	9284.0104	SPREL	93.6996	AS	p1030	743.6675	751.4758	5602	
104	93.6996	9377.7100	SPREL	93.6996	AS	p1040	751.4758	759.2841	5603	
105	93.6996	9471.4096	SPREL	93.6996	AS	p1050	759.2841	767.0924	5604	
106	93.6996	9565.1092	SPREL	93.6996	AS	p1060	767.0924	774.9007	5605	
107	93.6996	9658.8088	SPREL	93.6996	AS	p1070	774.9007	781.2495	5606	
108	76.1856	9734.9944	SPREL	76.1856	AS	p1080	781.2495	789.0578	5607	
109	93.6996	9828.6940	SPREL	93.6996	AS	p1090	789.0578	796.8661	5608	
110	93.6996	9922.3936	SPREL	93.6996	AS	p1100	796.8661	804.6744	5609	
111	93.6996	10016.0932	SPREL	93.6996	AS	p1110	804.6744	812.4827	5610	
112	93.6996	10109.7928	SPREL	93.6996	AS	p1120	812.4827	820.2910	5611	
113	93.6996	10203.4924	SPREL	93.6996	AS	p1130	820.2910	828.0993	5612	
114	93.6996	10297.1920	SPREL	93.6996	AS	p1140	828.0993	835.9076	5613	
115	93.6996	10390.8916	SPREL	93.6996	AS	p1150	835.9076	843.7159	5614	
116	93.6996	10484.5912	SPREL	93.6996	AS	p1160	843.7159	851.5242	5615	
117	93.6996	10578.2908	SPREL	93.6996	AS	p1170	851.5242	859.3325	5616	
118	93.6996	10671.9904	SPREL	93.6996	AS	p1180	859.3325	867.1408	5617	
119	93.6996	10765.6900	SPREL	93.6996	AS	p1190	867.1408	873.0827	5618	
120	71.3028	10836.9928	SPREL	71.3028	AS	p1200	873.0827	874.9491	5619	**PIER 106** (no Cross Member here)
121	22.3968	10859.3896	SPREL	22.3968	AS	p1210	874.9491	882.8408	5620	
122	94.7004	10954.0900	SPREL	94.7004	AS	p1220	882.8408	885.2594	5621	
123	29.0232	10983.1132	SPREL	29.0232	AS	p1230	885.2594	887.6780	5622	
124	29.0232	11012.1364	SPREL	29.0232	AS	p1240	887.6780	895.5697	5623	
125	94.7004	11106.8368	SPREL	94.7004	AS	p1250	895.5697	903.3780	5624	
126	93.6996	11200.5364	SPREL	93.6996	AS	p1260	903.3780	911.1863	5625	
127	93.6996	11294.2360	SPREL	93.6996	AS	p1270	911.1863	918.9946	5626	
128	93.6996	11387.9356	SPREL	93.6996	AS	p1280	918.9946	926.8029	5627	**Change in C.S.**
129	93.6996	11481.6352	SPREL	93.6996	AS	p1290	926.8029	934.6112	5628	
130	93.6996	11575.3348	SPREL	93.6996	AS	p1300	934.6112	942.4195	5629	
131	93.6996	11669.0344	SPREL	93.6996	AS	p1310	942.4195	950.2278	5630	
132	93.6996	11762.7340	SPREL	93.6996	AS	p1320	950.2278	958.0361	5631	
133	93.6996	11856.4336	SPREL	93.6996	AS	p1330	958.0361	965.8444	5632	
134	93.6996	11950.1332	SPREL	93.6996	AS	p1340	965.8444	973.6527	5633	
135	93.6996	12043.8328	SPREL	93.6996	AS	p1350	973.6527	981.4610	5634	
136	93.6996	12137.5324	SPREL	93.6996	AS	p1360	981.4610	989.2693	5635	
137	93.6996	12231.2320	SPREL	93.6996	AS	p1370	989.2693	995.6181	5636	
138	76.1856	12307.4176	SPREL	76.1856	AS	p1380	995.6181	1003.4264	5637	
139	93.6996	12401.1172	SPREL	93.6996	AS	p1390	1003.4264	1011.2347	5638	
140	93.6996	12494.8168	SPREL	93.6996	AS	p1400	1011.2347	1019.0430	5639	
141	93.6996	12588.5164	SPREL	93.6996	AS	p1410	1019.0430	1026.8513	5640	
142	93.6996	12682.2160	SPREL	93.6996	AS	p1420	1026.8513	1034.6596	5641	
143	93.6996	12775.9156	SPREL	93.6996	AS	p1430	1034.6596	1042.4679	5642	

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: BRIDGE GEOMETRY - RAMP D

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

NODE	DX	STATION 360.0000					ELEM BEGIN	ELEM END	ELEM NO.	
144	93.6996	12869.6152	SPREL	93.6996	AS	p1440	1042.4679	1050.2762	5643	
145	93.6996	12963.3148	SPREL	93.6996	AS	p1450	1050.2762	1058.0845	5644	
146	93.6996	13057.0144	SPREL	93.6996	AS	p1460	1058.0845	1065.8928	5645	
147	93.6996	13150.7140	SPREL	93.6996	AS	p1470	1065.8928	1073.7011	5646	
148	93.6996	13244.4136	SPREL	93.6996	AS	p1480	1073.7011	1081.5094	5647	
149	93.6996	13338.1132	SPREL	93.6996	AS	p1490	1081.5094	1089.3260	5648	
150	93.7992	13431.9124	SPREL	93.7992	AS	p1500	1089.3260	1097.2364	5649	
151	94.9248	13526.8372	SPREL	94.9248	AS	p1510	1097.2364	1105.3094	5650	
152	96.8760	13623.7132	SPREL	96.8760	AS	p1520	1105.3094	1107.7830	5651	
153	29.6832	13653.3964	SPREL	29.6832	AS	p1530	1107.7830	1110.2563	5652	
154	29.6796	13683.0760	SPREL	29.6796	AS	p1540	1110.2563	1115.9695	5653	
155	68.5584	13751.6344	SPREL	68.5584	AS	p1550	1115.9695	1118.3248	5654	
156	28.2636	13779.8980	SPREL	28.2636	AS	p1560	1118.3248	1126.3055	5655	**PIER 107**
157	95.7684	13875.6664	SPREL	95.7684	AS	p1570	1126.3055	1134.2837	5656	
158	95.7384	13971.4048	SPREL	95.7384	AS	p1580	1134.2837	1142.2596	5657	
159	95.7108	14067.1156	SPREL	95.7108	AS	p1590	1142.2596	1150.2333	5658	
160	95.6844	14162.8000	SPREL	95.6844	AS	p1600	1150.2333	1158.2050	5659	
161	95.6604	14258.4604	SPREL	95.6604	AS	p1610	1158.2050	1166.1747	5660	
162	95.6364	14354.0968	SPREL	95.6364	AS	p1620	1166.1747	1174.1426	5661	
163	95.6148	14449.7116	SPREL	95.6148	AS	p1630	1174.1426	1182.1088	5662	
164	95.5944	14545.3060	SPREL	95.5944	AS	p1640	1182.1088	1190.0734	5663	
165	95.5752	14640.8812	SPREL	95.5752	AS	p1650	1190.0734	1198.0365	5664	
166	95.5572	14736.4384	SPREL	95.5572	AS	p1660	1198.0365	1205.9982	5665	
167	95.5404	14831.9788	SPREL	95.5404	AS	p1670	1205.9982	1213.9587	5666	
168	95.5260	14927.5048	SPREL	95.5260	AS	p1680	1213.9587	1221.9181	5667	
169	95.5128	15023.0176	SPREL	95.5128	AS	p1690	1221.9181	1223.2995	5668	
170	16.5768	15039.5944	SPREL	16.5768	AS	p1700	1223.2995	1231.2577	5669	
171	95.4984	15135.0928	SPREL	95.4984	AS	p1710	1231.2577	1239.2150	5670	
172	95.4876	15230.5804	SPREL	95.4876	AS	p1720	1239.2150	1247.1716	5671	
173	95.4792	15326.0596	SPREL	95.4792	AS	p1730	1247.1716	1255.1276	5672	
174	95.4720	15421.5316	SPREL	95.4720	AS	p1740	1255.1276	1263.0831	5673	
175	95.4660	15516.9976	SPREL	95.4660	AS	p1750	1263.0831	1271.0382	5674	
176	95.4612	15612.4588	SPREL	95.4612	AS	p1760	1271.0382	1278.9930	5675	
177	95.4576	15707.9164	SPREL	95.4576	AS	p1770	1278.9930	1288.7318	5676	
178	116.8656	15824.7820	SPREL	116.8656	AS	p1780	1288.7318	1289.5067	5677	
179	9.2988	15834.0808	SPREL	9.2988	AS	p1790	1289.5067	1291.3440	5678	
180	22.0476	15856.1284	SPABS	15856.1284	AS	p1800	1291.3440	1291.3440	5679	**PIER 108**

2.2.3 Piers

URS CORPORATION

JOB: CLINE AVENUE — DEM — DATE: 02/10/09

DESCRP: BRIDGE GEOMETRY - PIER CROSS SECTIONS — IC BY PT — DATE: 02/10/09

MAINLINE

		PIER		PIER CAP							
PIER No.	COL No.	D (long)	W (trans)	D (long)	W (trans)	ELEV L	ELEV R	AVG ELEV	ELEV FTG	COL HT	H DIST
3	#1	4.500	5.500			621.22		621.22	583	38.22	
	#2	4.500	5.500			619.12		619.12	583	36.12	
	#3	4.500	5.500			617.04		617.04	583	34.04	
4	#1	4.500	5.500			626.66		626.66	583.5	43.16	
	#2	4.500	5.500			623.72		623.72	583.5	40.22	
	#3	4.500	5.500			620.79		620.79	583.5	37.29	
5	#1	4.000	6.000			628.96	628.44	628.7	584.5	44.2	
	#2	4.000	6.000			626.12	625.6	625.86	584.5	41.36	
	#3	4.000	6.000			623.18	622.66	622.92	584.5	38.42	
6	#1	4.000	6.000			634.1	633.58	633.84	585.5	48.34	
	#2	4.000	6.000			631.16	630.64	630.9	585.5	45.4	
	#3	4.000	6.000			628.22	627.7	627.96	585.5	42.46	
7	#1	4.500	6.500			639.21		639.21	587	52.21	26.5
	#2	4.500	6.500			637.36		637.36	587	50.36	26.5
	#3	4.500	6.500			634.77		634.77	587	47.77	26.5
	#4	4.500	6.500			632.92		632.92	587	45.92	26.5
8	#1	5.000	6.500			644.79		644.79	587	57.79	29.5
	#2	5.000	6.500			642.95		642.95	587	55.95	29.5
	#3	5.000	6.500			640.35		640.35	587	53.35	29.5
	#4	5.000	6.500			638.51		638.51	587	51.51	29.5
9	#1	4.500	6.500			652.58	652.06	652.32	588.5	63.82	33.25
	#2	4.500	6.500			650.73	650.21	650.47	588.5	61.97	33.25
	#3	4.500	6.500			648.14	647.62	647.88	588.5	59.38	33.25
	#4	4.500	6.500			646.29	645.77	646.03	588.5	57.53	33.25
10	#1	4.500	6.500			656.86	656.6	656.73	587	69.73	33.25
	#2	4.500	6.500			655.92	655.66	655.79	587	68.79	33.25
	#3	4.500	6.500			654.43	654.09	654.26	587	67.26	33.25
	#4	4.500	6.500			653.2	652.86	653.03	587	66.03	33.25
11	#1	6.000	6.500			660.19		660.19	586	74.19	37.25
	#2	6.000	6.500			660.28		660.28	586	74.28	37.25
	#3	6.000	6.500			659.98		659.98	586	73.98	37.25
	#4	6.000	6.500			659.24		659.24	586	73.24	37.25
12	#1	6.000	6.500			668.01	668.11	668.06	586	82.06	41.25
	#2	6.000	6.500			668.37	668.47	668.42	586	82.42	41.25
	#3	6.000	7.000			668.48	668.38	668.43	586	82.43	41.25
	#4	6.000	7.000			667.91	667.81	667.86	586	81.86	41.25
13	#1	8.000	8.000			674.39	674.51	674.45	580	94.45	41
	#2	8.000	8.000			674.75	674.87	674.81	580	94.81	41
	#3	8.000	8.000			674.85	674.73	674.79	580	94.79	41
	#4	8.000	8.000			674.51	674.39	674.45	580	94.45	41
	#5	8.000	8.000			674.17	674.05	674.11	580	94.11	41
14	#1	8.000	8.000			675.56	675.69	675.625	580	95.625	41
	#2	8.000	8.000			675.93	676.06	675.995	580	95.995	41
	#3	8.000	8.000			676.03	675.91	675.97	580	95.97	41
	#4	8.000	8.000			675.6	675.47	675.535	580	95.535	41
15	#1	6.000	7.000			670.58	670.88	670.73	582	88.73	45.25
	#2	6.000	7.000			671.81	672.11	671.96	582	89.96	45.25
	#3	6.000	6.500			672.48	672.71	672.595	582	90.595	45.25
	#4	6.000	6.500			673.31	673.54	673.425	582	91.425	45.25
16	#1	6.000	6.000			667.31		667.31	586.5	80.81	41.5
	#2	6.000	6.000			668.54		668.54	586.5	82.04	41.5
	#3	6.000	6.000			669.77		669.77	586.5	83.27	41.5
	#4	6.000	6.000			670.93		670.93	586.5	84.43	41.5
	#5	6.000	6.000			672.71		672.71	586.5	86.21	41.5
17	#1	5.000	6.000			663.75	664.13	663.94	586.5	77.44	41.5
	#2	5.000	6.000			665.13	665.5	665.315	586.5	78.815	41.5
	#3	5.000	6.000			666.5	666.88	666.69	586.5	80.19	41.5
	#4	5.000	6.000			667.62	668.08	667.85	586.5	81.35	41.5
	#5	5.000	6.000			669.39	669.85	669.62	586.5	83.12	41.5
18	#1	5.000	6.000			660.43	660.81	660.62	586.5	74.12	41.5
	#2	5.000	6.000			661.87	662.25	662.06	586.5	75.56	41.5
18'	#3	5.000	6.000			663	663.46	663.23	586.5	76.73	41.5
	#4	5.000	6.000			664.78	665.24	665.01	586.5	78.51	41.5
19	#1	5.500	5.500			654.44		654.44	586.5	67.94	37.75
	#2	5.500	5.500			655.9		655.9	586.5	69.4	37.75
19'	#3	5.500	5.500			657.07		657.07	586.5	70.57	37.75
	#4	5.500	5.500			658.84		658.84	586.5	72.34	37.75
20, 20'	#1	5.500	5.500			650.72		650.72	586	64.72	33.75
	#2	5.500	5.500			651.83		651.83	586	65.83	33.75
	#3	5.500	5.500			652.61		652.61	586	66.61	33.75
	#4	5.500	5.500			653.71		653.71	586	67.71	33.75

URS CORPORATION

JOB: CLINE AVENUE — DEM — DATE: 02/10/09

DESCRP: BRIDGE GEOMETRY - PIER CROSS SECTIONS — IC BY PT — DATE: 02/10/09

MAINLINE

		PIER		PIER CAP							
PIER No.	COL No.	D (long)	W (trans)	D (long)	W (trans)	ELEV L	ELEV R	AVG ELEV	ELEV FTG	COL HT	H DIST
21, 21'	#1	4.500	5.500			648.59	648.75	648.67	585	63.67	33.75
	#2	4.500	5.500			649.25	649.41	649.33	585	64.33	33.75
	#3	4.500	5.500			649.73	649.79	649.76	585	64.76	33.75
	#4	4.500	5.500			649.97	650.03	650	585	65	33.75
22, 22'	#1	4.500	5.500			644.84	644.92	644.88	584	60.88	33.75
	#2	4.500	5.500			645.2	645.28	645.24	584	61.24	33.75
	#3	4.500	5.500			645.87	645.79	645.83	584	61.83	33.75
	#4	4.500	5.500			645.51	645.43	645.47	584	61.47	33.75
23, 23'	#1	5.000	5.500			639.15		639.15	584	55.15	48.5
	#2	5.000	5.500			639.5		639.5	584	55.5	48.5
	#3	5.000	5.500			640.58		640.58	583	57.58	48.5
	#4	5.000	5.500			640.22		640.22	583	57.22	48.5
24, 24'	#1	5.000	5.500			634.79		634.79	584	50.79	40.5
	#2	5.000	5.500			635.14		635.14	584	51.14	40.5
	#3	5.000	5.500			636.28		636.28	584.5	51.78	40.5
	#4	5.000	5.500			635.92		635.92	584.5	51.42	40.5
25, 25'	#1	5.000	5.000			630.18		630.18	585	45.18	28.5
	#2	5.000	5.000			630.54		630.54	585	45.54	28.5
	#3	5.000	5.000			631.62		631.62	585	46.62	28.5
	#4	5.000	5.000			631.98		631.98	585	46.98	28.5
26, 26'	#1	5.000	5.000			625.64		625.64	586	39.64	28.5
	#2	5.000	5.000			626		626	586	40	28.5
	#3	5.000	5.000			627.79		627.79	587	40.79	28.5
	#4	5.000	5.000			627.43		627.43	587	40.43	28.5
27, 27'	#1	4.500	6.500			621.16	621.28	621.22	584	37.22	28.5
	#2	4.500	6.500			621.51	621.63	621.57	584	37.57	28.5
	#3	4.500	6.500			625.23	625.13	625.18	584	41.18	28.5
	#4	4.500	6.500			624.87	624.77	624.82	584	40.82	28.5
28, 28'	#1	4.500	6.500			617.4	617.23	617.315	584	33.315	28.5
	#2	4.500	6.500			616.91	616.75	616.83	584	32.83	28.5
	#3	4.500	6.500			620.24	620.11	620.175	584	36.175	28.5
	#4	4.500	6.500			619.86	619.73	619.795	584	35.795	28.5
29'	#3	4.500	6.500			614.7		614.7	584	30.7	28.5
	#4	4.500	6.500			613.69		613.69	584	29.69	28.5

URS CORPORATION

JOB: CLINE AVENUE DEM DATE: 02/10/09

DESCRP: BRIDGE GEOMETRY - PIER CROSS SECTIONS **IC BY PT** DATE: 02/10/09

RAMPS

		PIER		PIER CAP							
PIER No.	COL No.	D (long)	W (trans)	D (long)	W (trans)	ELEV L	ELEV R	AVG ELEV	ELEV FTG	COL HT	H DIST
101		Abutment									
102		4.500	8.000	5.000	17.000	611.791		611.791	583.958	27.833	
103		4.500	8.000	5.000	17.000	618.335		618.335	583.918	34.417	
104		4.500	8.000	5.000	17.000	625.345		625.345	585.845	39.500	
105		4.500	8.000	5.000	18.000	624.430		624.430	584.000	40.430	
106		4.500	8.000			621.790	621.990	621.890	584.000	37.890	
107		4.500	8.000			618.640	618.400	618.520	584.000	34.520	
200											
201		4.000	18.000	5.000	35.000	611.620		611.620	586.450	25.170	
202		4.000	18.000	5.000	35.000	622.751	624.401	623.576	586.251	37.325	
203		4.000	14.000	5.000	28.500	635.030		635.030	586.490	48.540	
204		5.500	8.000	6.000	20.750	647.820		647.820	586.490	61.330	
205		5.500	8.000	6.000	17.000	659.960	660.810	660.385	581.960	78.425	
206		5.500	8.000	6.000	17.000	673.520		673.520	582.020	91.500	
207 (14)		8.000	8.000			675.150	675.020	675.085	590.000	85.085	
301		Abutment									
302		4.500	8.000	5.000	17.000	610.120		610.120	584.000	26.120	
303		4.500	8.000	5.000	17.000	616.670		616.670	584.000	32.670	
304		4.500	8.000	5.000	18.000	612.170	611.030	611.600	584.000	27.600	
400		Abutment									
401		4.500	8.000	5.000	17.000	605.780	607.140	606.460	583.950	22.510	
402		4.500	8.000	5.000	17.000	610.428		610.428	584.470	25.958	
403		4.500	8.000	5.000	17.000	614.395	615.756	615.076	583.895	31.180	
404		4.500	8.000	5.000	17.000	620.340		620.340	583.761	36.579	
405		4.500	8.000	5.000	17.000	626.150		626.150	583.980	42.170	
406		4.500	8.000	5.000	17.000	632.481		632.481	583.731	48.750	
407		4.500	8.000	5.000	17.000	639.600		639.600	583.930	55.670	
408		4.500	8.000	5.000	17.000	645.750		645.750	586.420	59.330	
409		4.500	8.000	5.000	17.000	650.881	652.241	651.561	585.711	65.850	
410 (18)		5.000	7.000			658.430	658.910	658.670	586.500	72.170	

2.3 Material Properties

2.3 Material Properties

2.3.1 Concrete

All concrete properties shall be in accordance with specified 28 day compressive strength (f'_c) as follows:

Element	f'_c
C.I.P. Box Girder Elements (Mainline)	5.0 ksi
C.I.P. Box Girder Elements (Ramps)	5.5 ksi

2.3.2 Reinforcement

Reinforcing steel is assumed to conform to ASTM A615, Grade 60 unless otherwise required.

2.3.3 Post-Tensioning

All strands are assumed to conform to the requirements of ASTM A416 Grade 270 for low relaxation strands.

Tensile Strength of Prestressing Strand: (f_{pu}) 270 ksi
Yield Strength of Prestressing Strand: (f_{py}) 243 ksi
Apparent modulus of elasticity: 28,500 ksi
Anchor Set: 3/8 in.
Friction Coefficient (μ):
Internal tendons in metal ducts 0.25
Wobble Coefficient (k) (Internal Tendons): 0.0002/ft.

Allowable Stresses:
Maximum jacking stress at anchorage: 0.80 f_{pu}
Maximum anchorage stress at anchorage immediately after anchorage: 0.70 f_{pu}
Max. anchorage stress at internal locations immediately after anchorage: 0.74 f_{pu}
Maximum jacking stress at anchorage: 0.80 f_{pu}

2.4 Section Properties

2.4 Cross Section Properties

Cross section properties are defined based on the provided drawings. All cross section properties are calculated within the RM Spaceframe program. Since several of the cross sections have variable dimensions: depth, bottom slab thickness, top slab width, the program allows for the use of *variables* to define these variable dimensions.

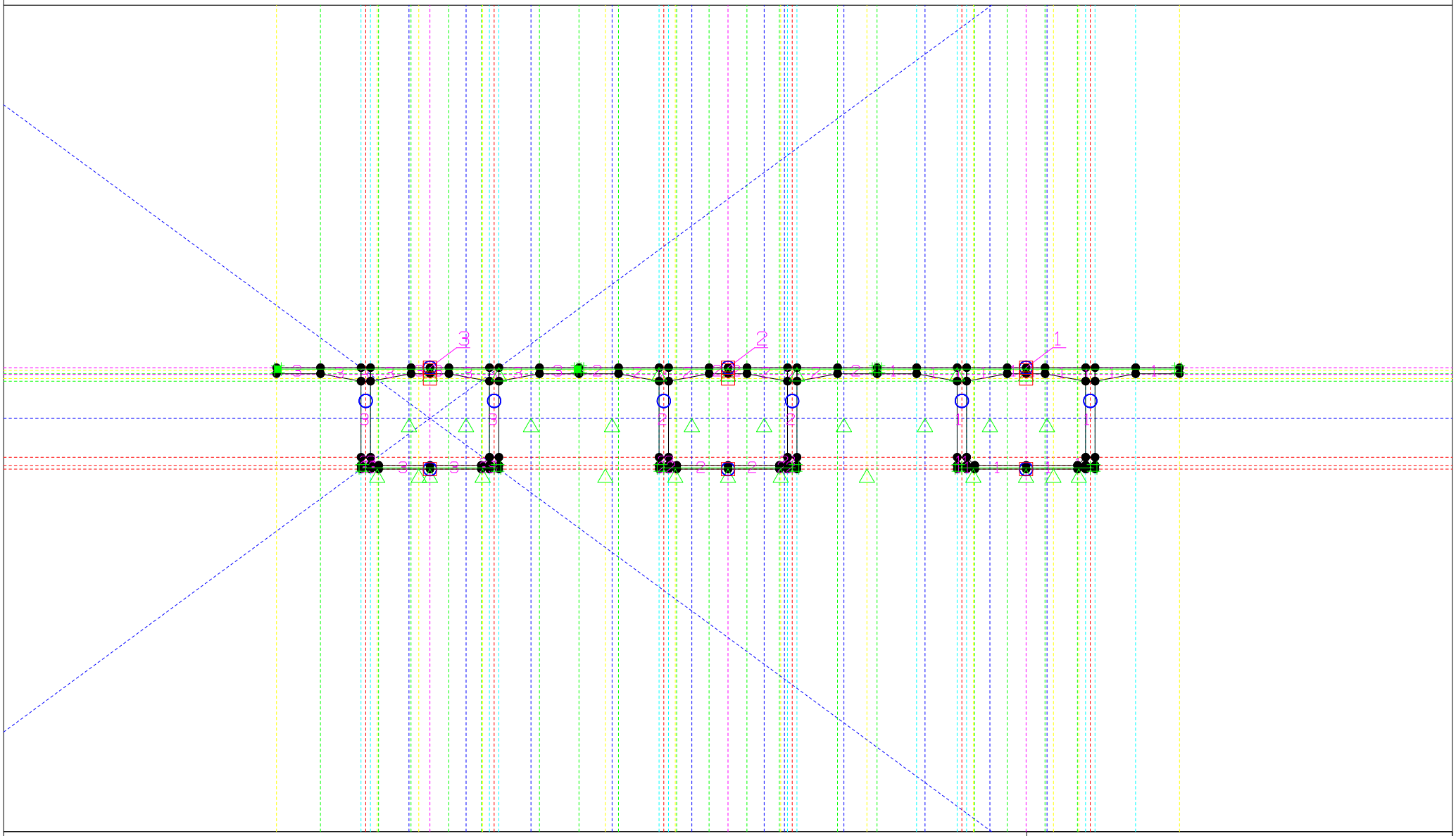
The cross section names assigned correspond to the type of box girder defined. Following is a legend for the cross section names:

SC – single cell box
SCs – single cell box with short wing
DC – double cell box
DCs – double cell box with short wing
RM_X – single cell box at mainline ramp
RM_Xs– single cell box at mainline ramp with short wing
R_X – single cell box at ramp

2.4.1 Mainline

2.4.1 Mainline

Segment		Element Nos.	Cross Section Name
Segment 1	Girder 1	1001-1172	M_SC-SC-SC
	Girder 2	2001-2172	M_SC-SC-SC
	Girder 3	3001-3172	M_SC-SC-SC
Segment 2	Eastbound	1174-1252	M_DC-DC
		1253-1318	M_DC-SCs
		1319-1323	M_DC-SC
	Westbound	2174-2252	M_DC-DC
		2253-2318	M_DC-SCs
		2319-2323	M_DC-SC
	Ramp A	4001-4066	RM_As
		4067-4071	RM_A
Segment 3	Eastbound	1325-1359	M_DC-SC
		1360-1377	M_DC-DCs
		1378-1395	M_DC-DC
		1396-1440	M_SCs-DC
	Westbound	2325-2359	M_DC-SC
		2360-2377	M_DC-DCs
		2378-2395	M_DC-DC
		2396-2440	M_SCs-DC
	Ramp A	4073-4107	RM_As
		4108-4125	RM_A
		4126-4154	RM_As
	Ramp C	5001-5045	RM_Cs
Segment 4	Eastbound	1442-1451	M_SCs-DC
		1452-1493	M_SC-DC
		1494-1516	M_DCs-DC
		1517-1578	M_DC-DC
	Westbound	2442-2451	M_SCs-DC
		2452-2493	M_SC-DC
		2494-2516	M_DCs-DC
		2517-2578	M_DC-DC
	Ramp C	5047-5052	RM_Cs
		5053-5098	RM_C
		5099-5121	RM_Cs
		5122-5139	RM_C
Segment 5	Eastbound	1580-1716	M_DC(E)
	Westbound	2580-2706	M_DC(W)
Segment 6	Eastbound	1718-1788	M_DC(E)
		1789-1838	M_DCs(E)
	Westbound	2708-2839	M_DC(W)
	Ramp B	4548-4581	RM_B
	Ramp D	5582-5629	RM_D
		5630-5680	RM_Ds



Cross Section MSC-SC-SC

1 cm Plot = 78.74 in

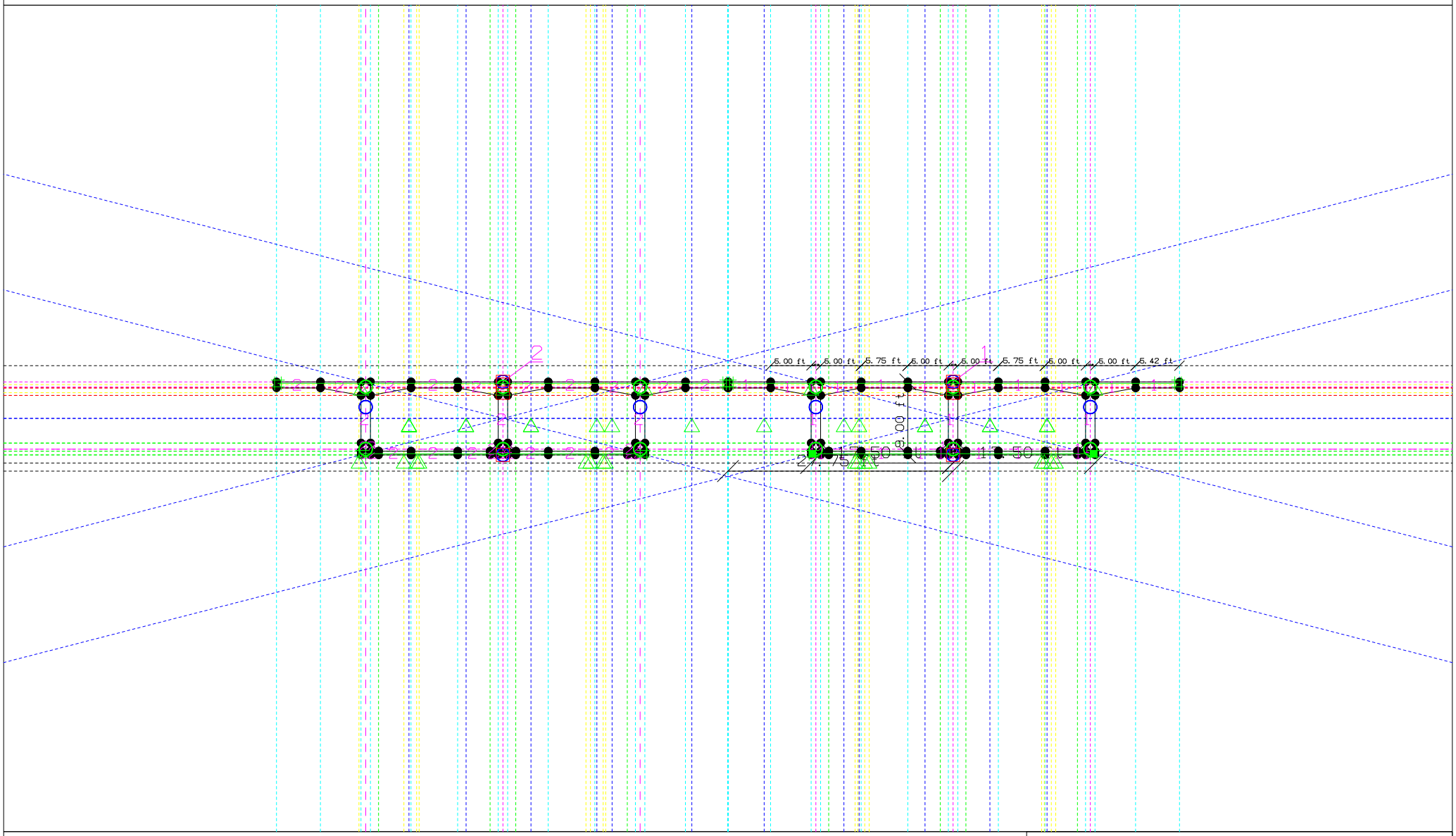
0 78.74 157.48 236.22 314.96 393.70

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+SC-SC-SC.pl

2.4.1/2



Cross Section MDC-DC

1 cm Plot = 78.74 in

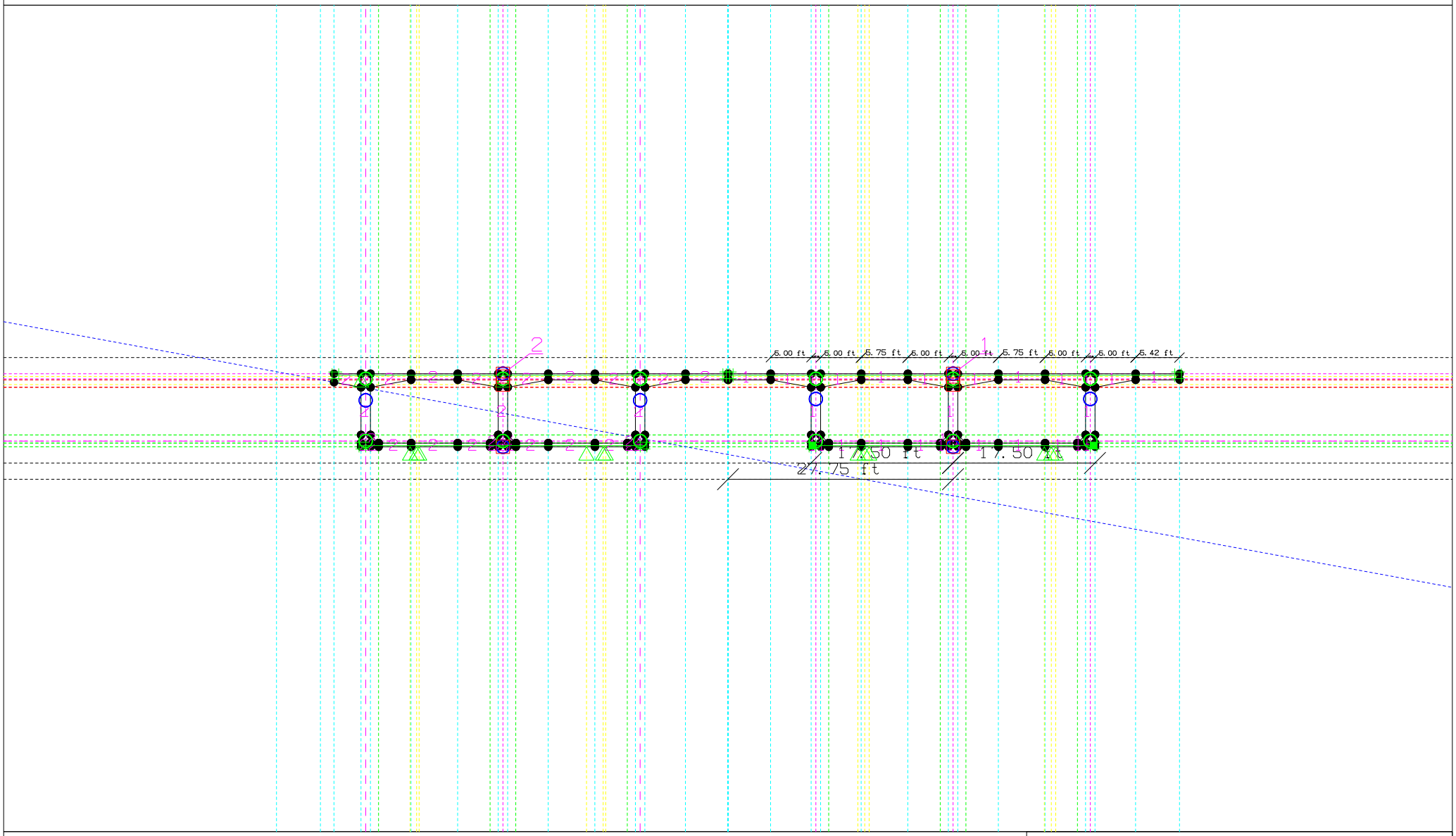
0 78.74 157.48 236.22 314.96 393.70

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC-DC.pl

2.4.1/3



Cross Section MDC-DCs

1 cm Plot = 78.74 in

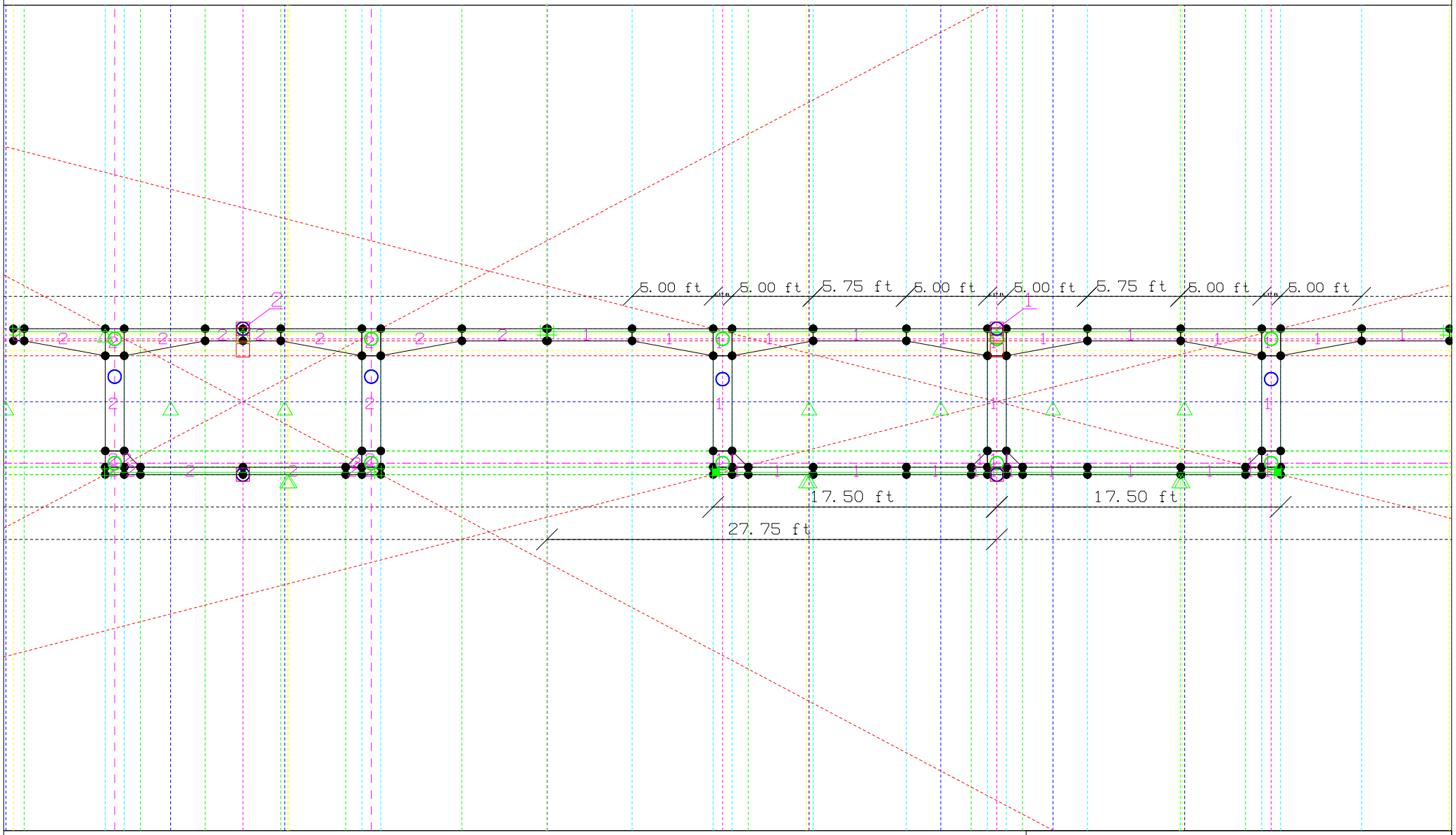
0 78.74 157.48 236.22 314.96 393.70

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC-DCs.pl

2.4.1/4



Cross Section MDC-SC

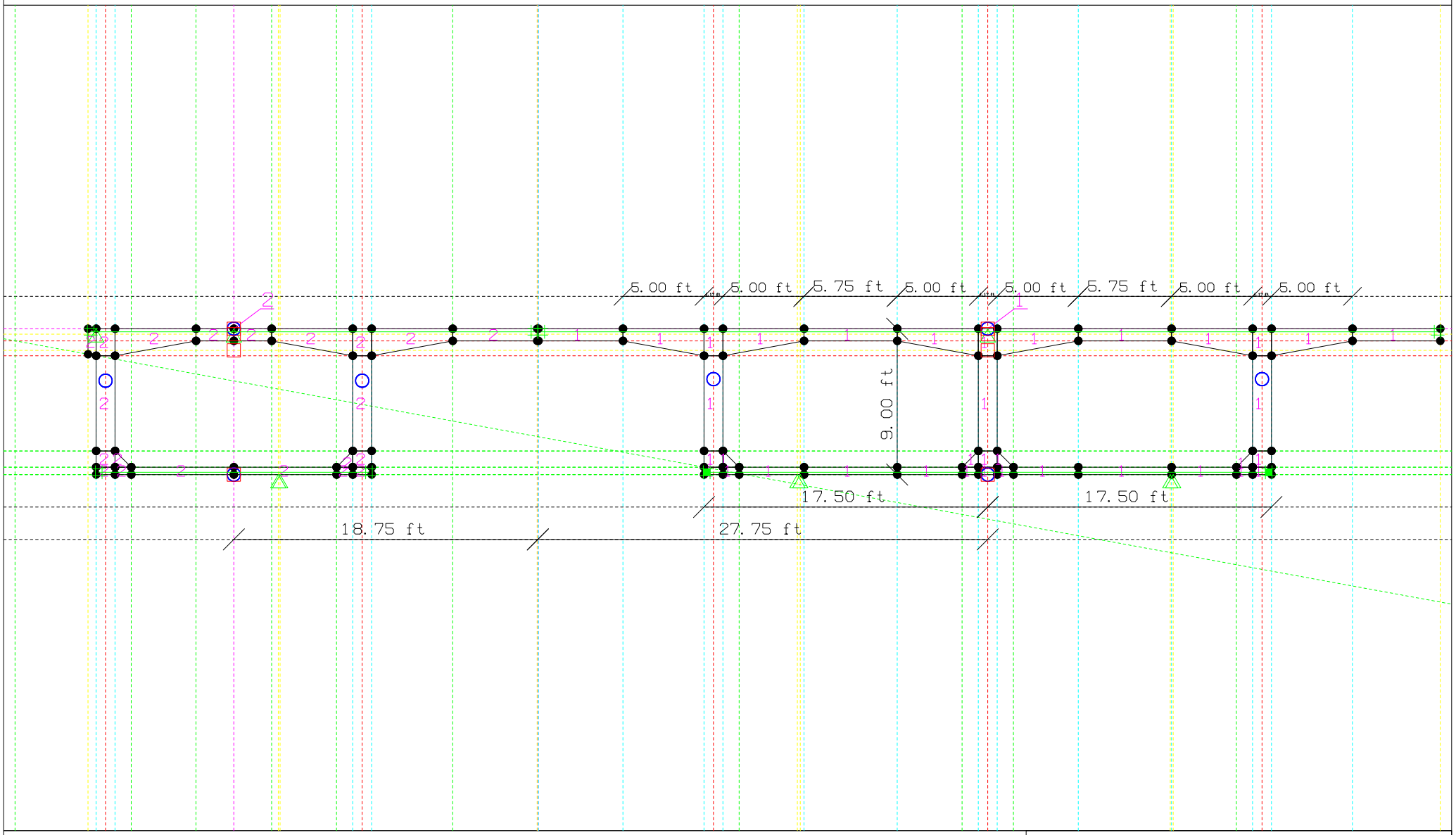
1 cm Plot = 39.37 in

0 39.37 78.74 118.11 157.48 196.85

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC-SC.pl



Cross Section MDC-SCs

1 cm Plot = 39.37 in

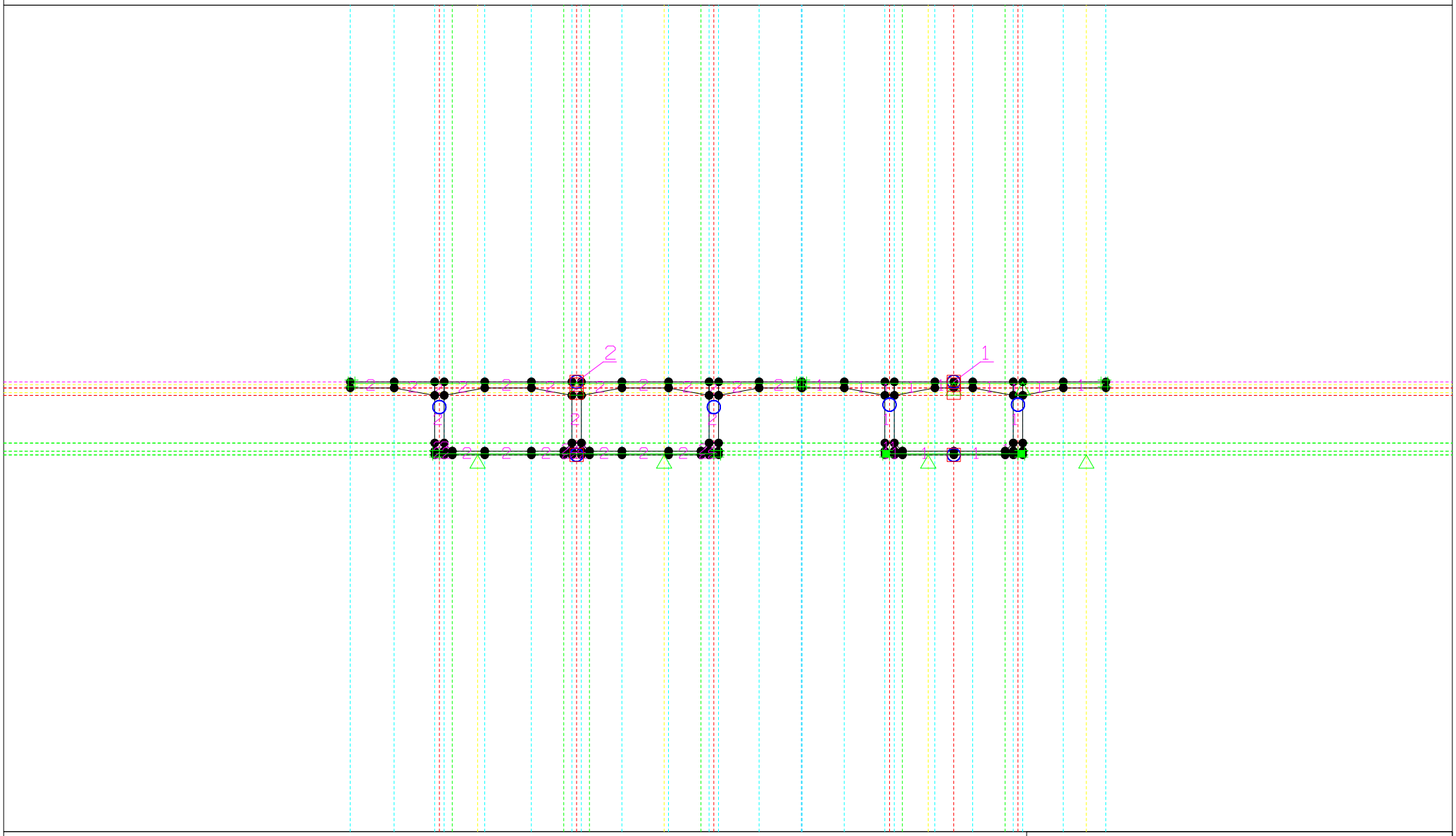
0 39.37 78.74 118.11 157.48 196.85

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC-SCs.pl

2.4.1/6



Cross Section MSC-DC

1 cm Plot = 78.74 in

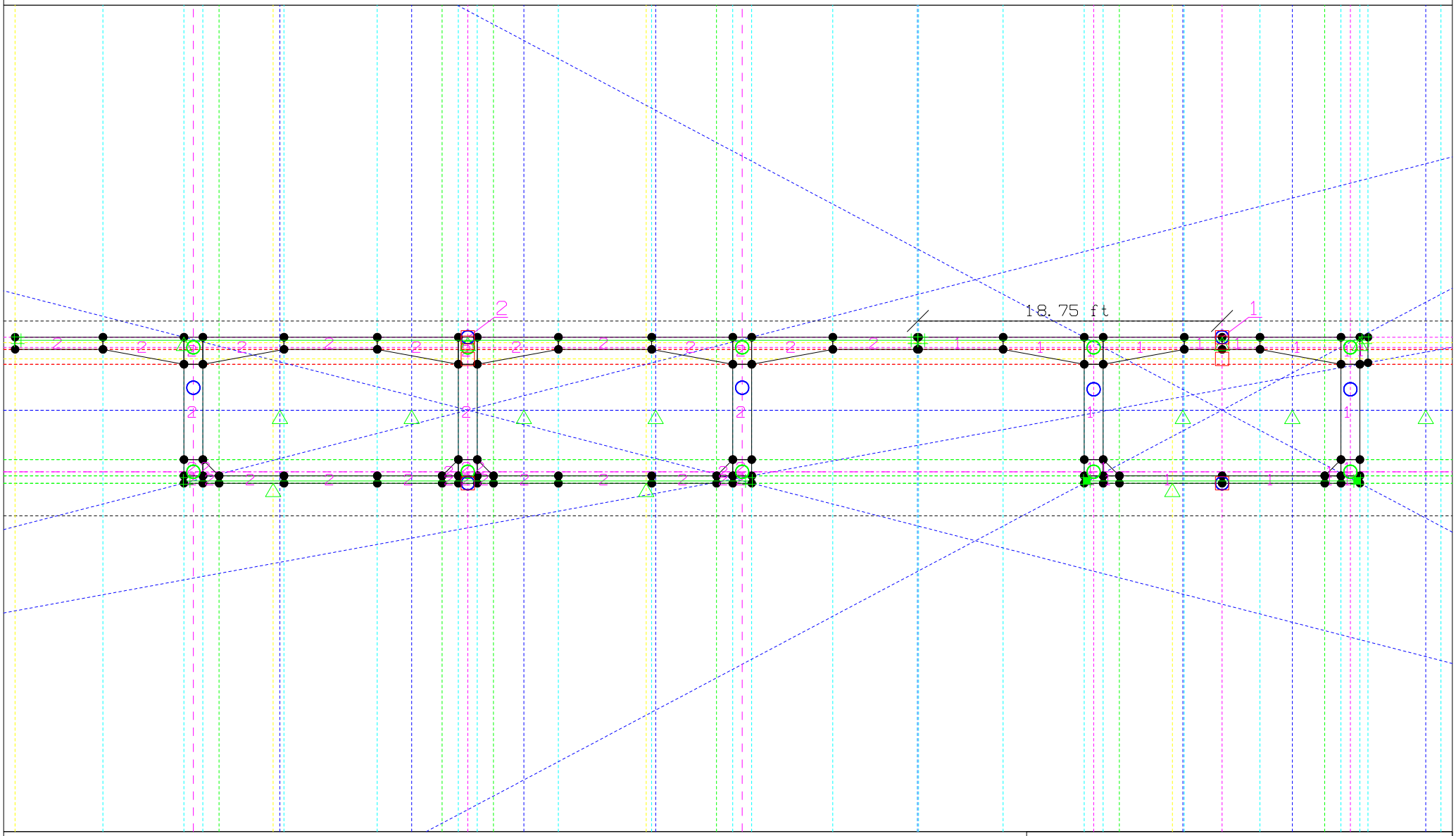
0 78.74 157.48 236.22 314.96 393.70

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+SC-DC.pl

TDV



Cross Section MSCs-DC

1 cm Plot = 39.37 in

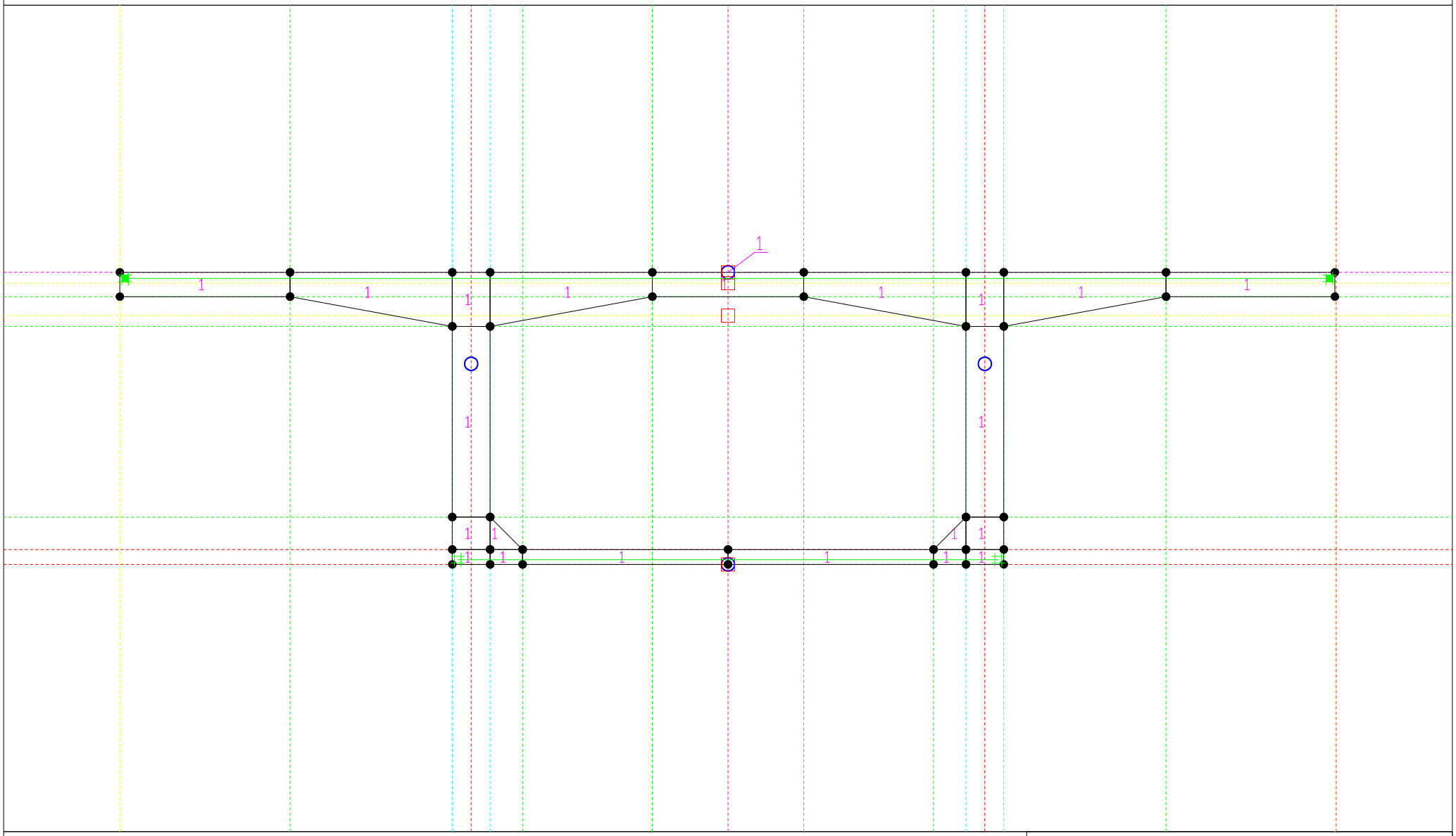
0 39.37 78.74 118.11 157.48 196.85

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+SCs-DC.pl

TDV



Cross Section MSC(W)

1 cm Plot = 19.69 in

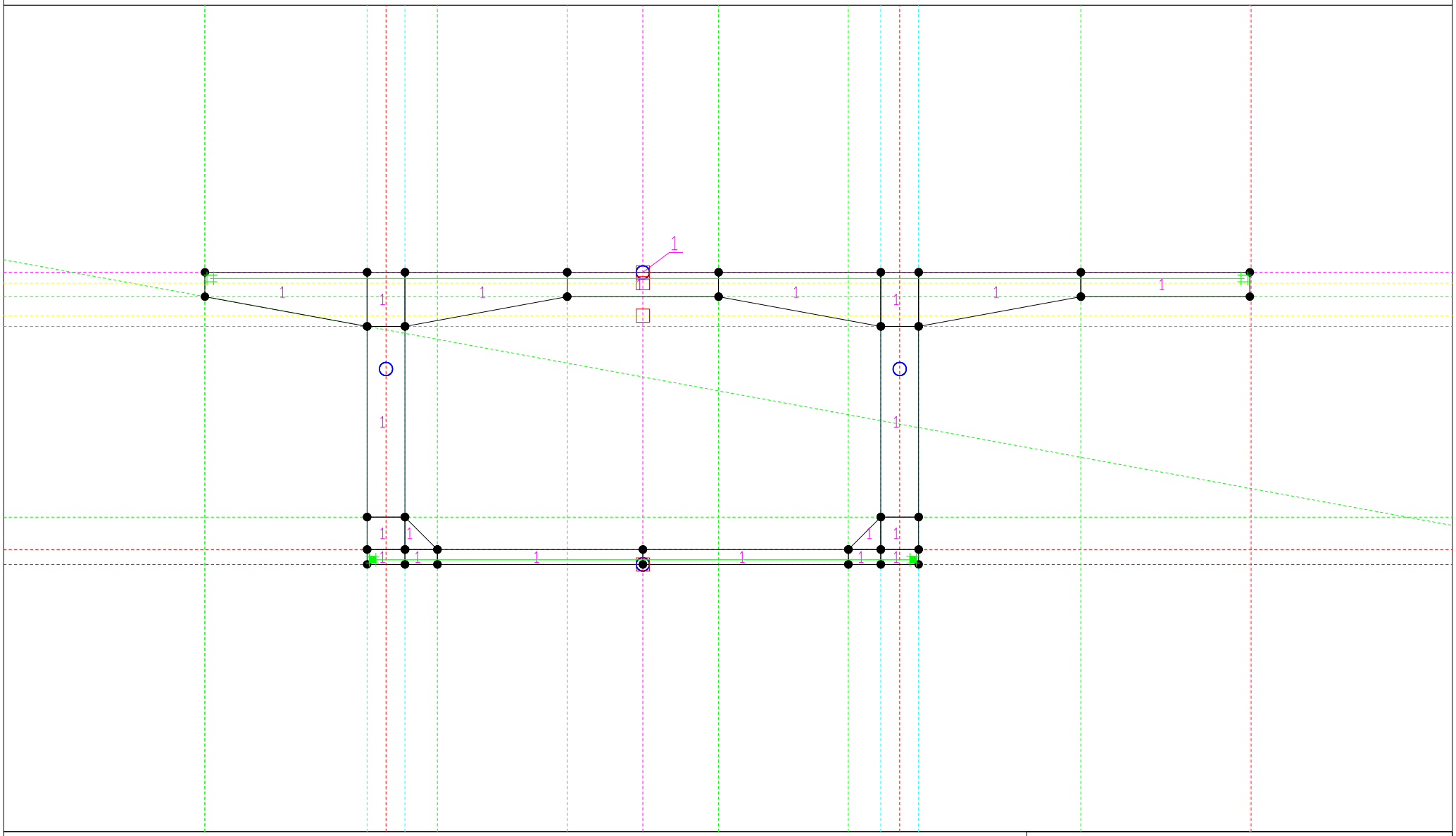
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+SC(W).pl

2.4.1/9



Cross Section MSC(W)s

1 cm Plot = 19.69 in

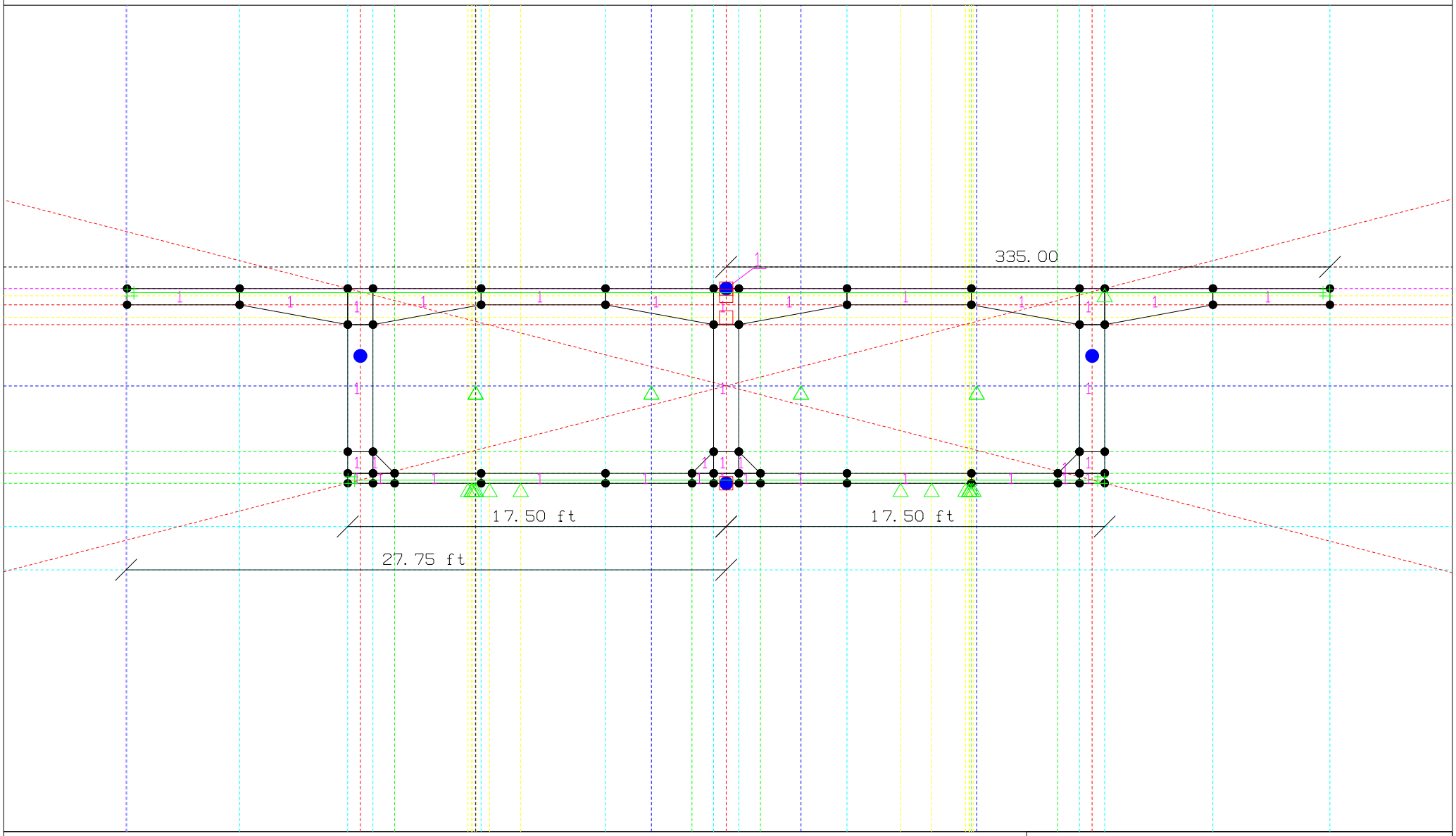
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+SC(W)s.pl

2.4.1/ 10



Cross Section MDC(E)

1 cm Plot = 29.53 in

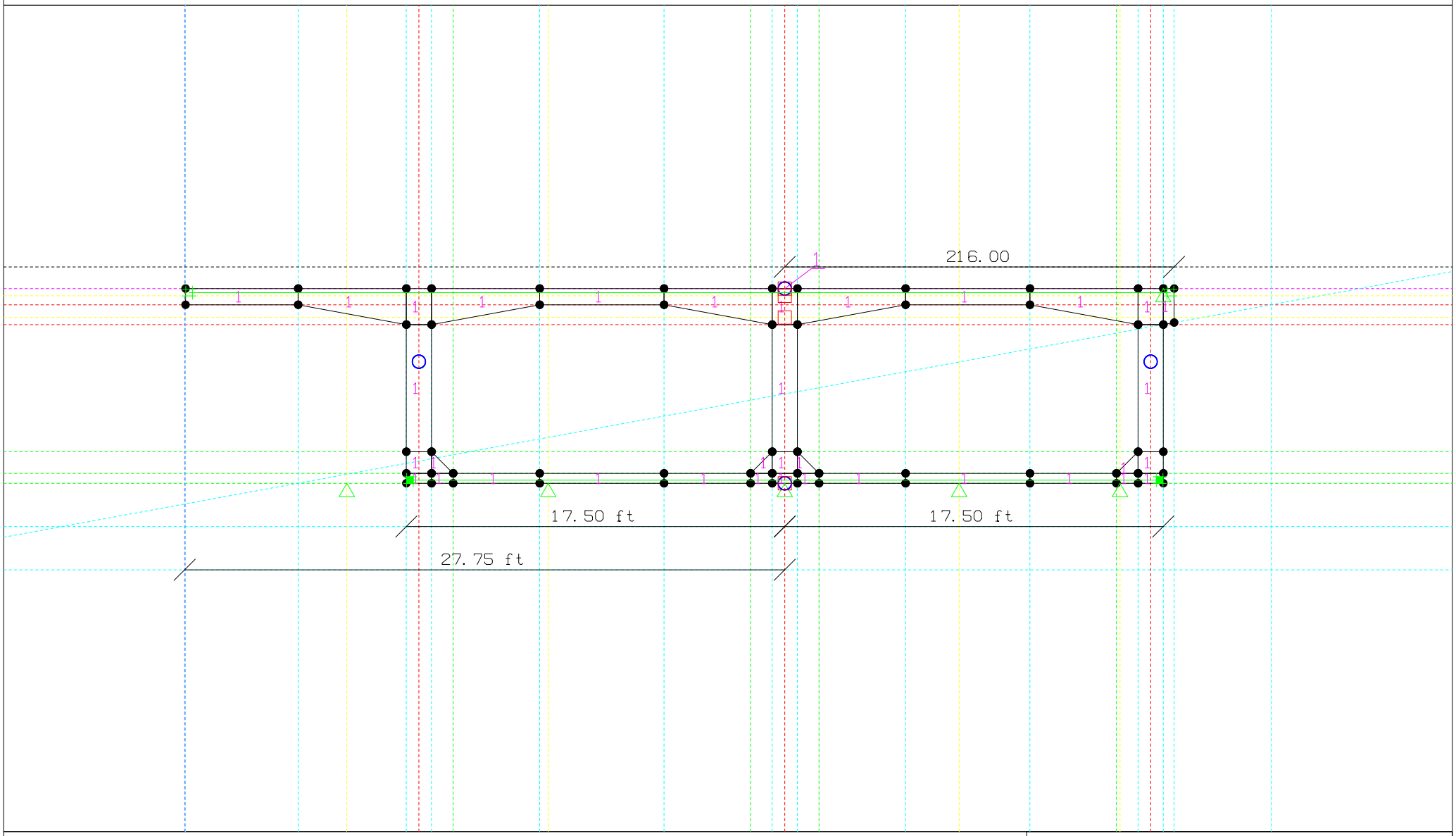
0 29.53 59.06 88.58 118.11 147.64

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC(E).pl

2.4.1/11



Cross Section MDC(E)s

1 cm Plot = 29.53 in

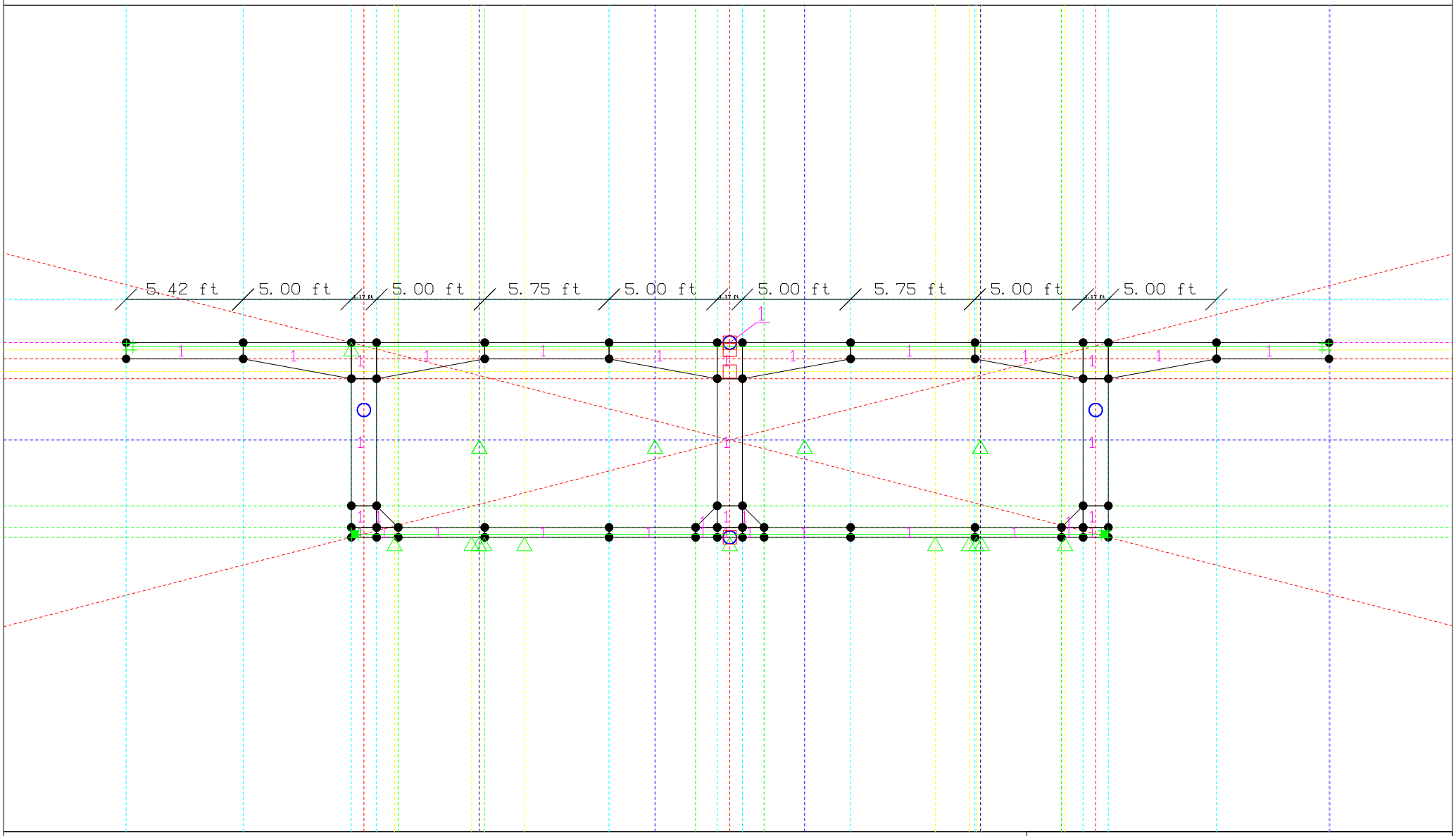
0 29.53 59.06 88.58 118.11 147.64

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC(E)s.pl

2.4.1/ 12



Cross Section MDC(W)

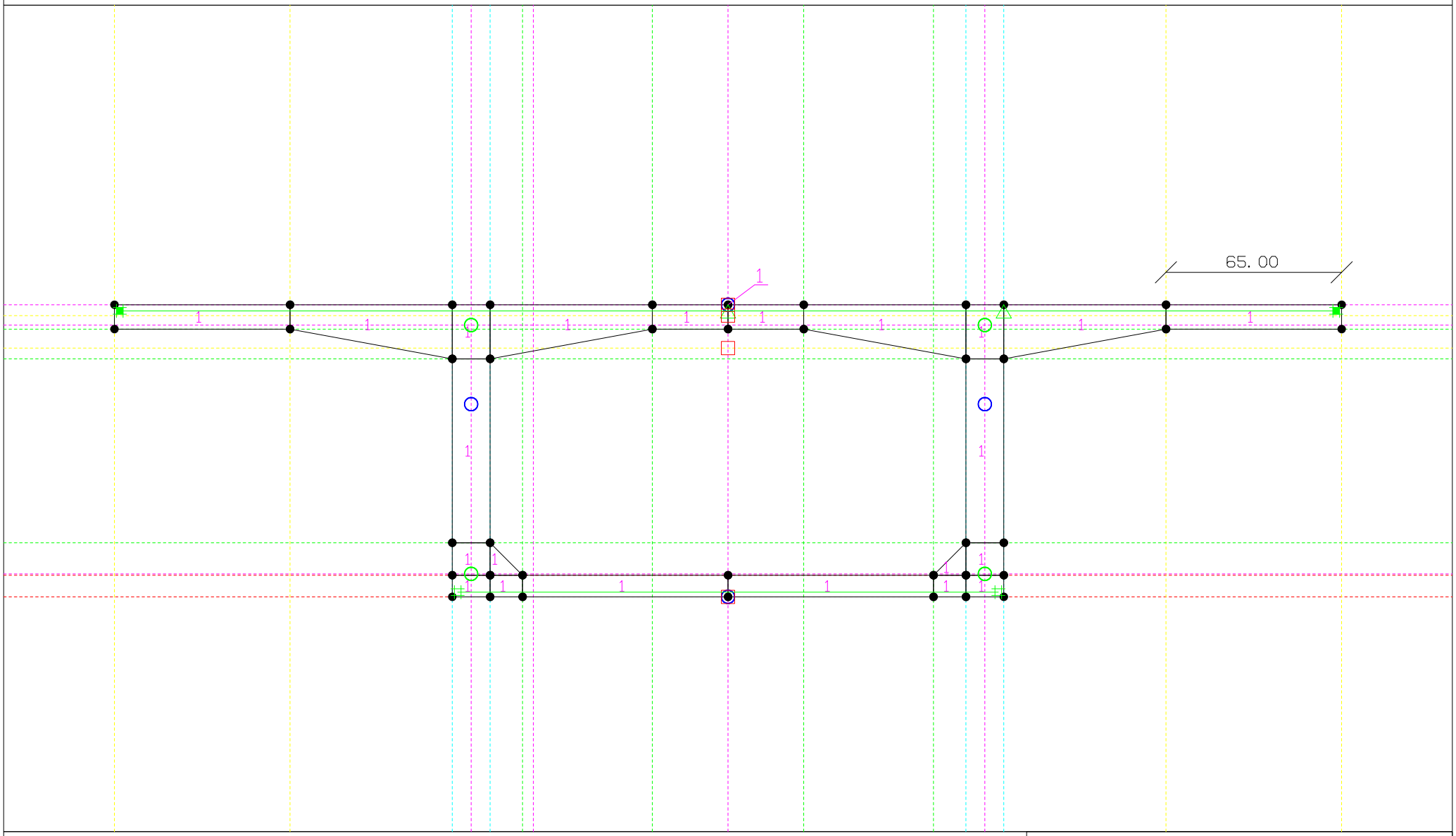
1 cm Plot = 29.53 in

0 29.53 59.06 88.58 118.11 147.64

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

M+DC(W).pl



Cross Section RMA

1 cm Plot = 19.69 in

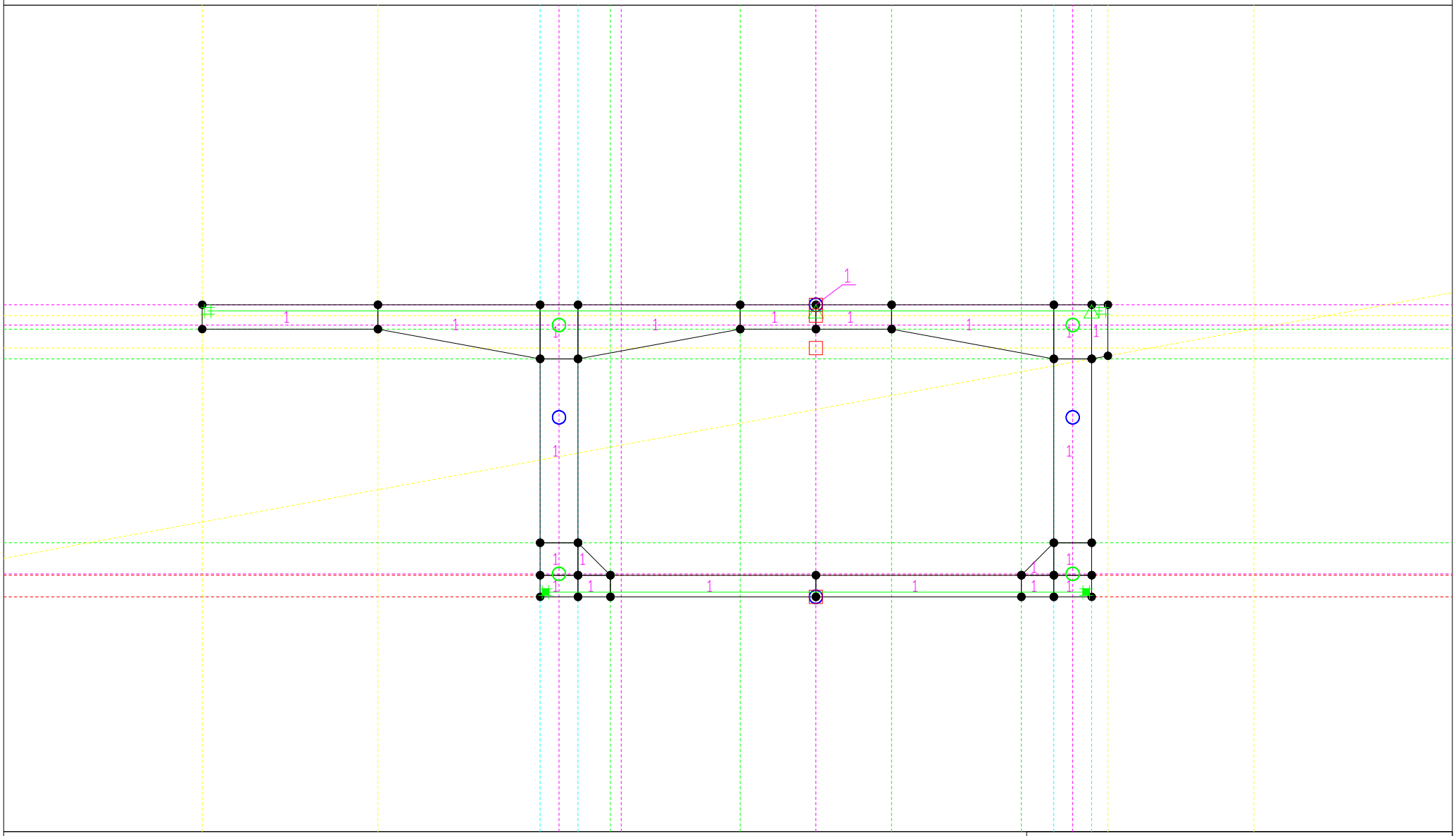
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

RM+A.pl

2.4.1/ 14



Cross Section RMAs

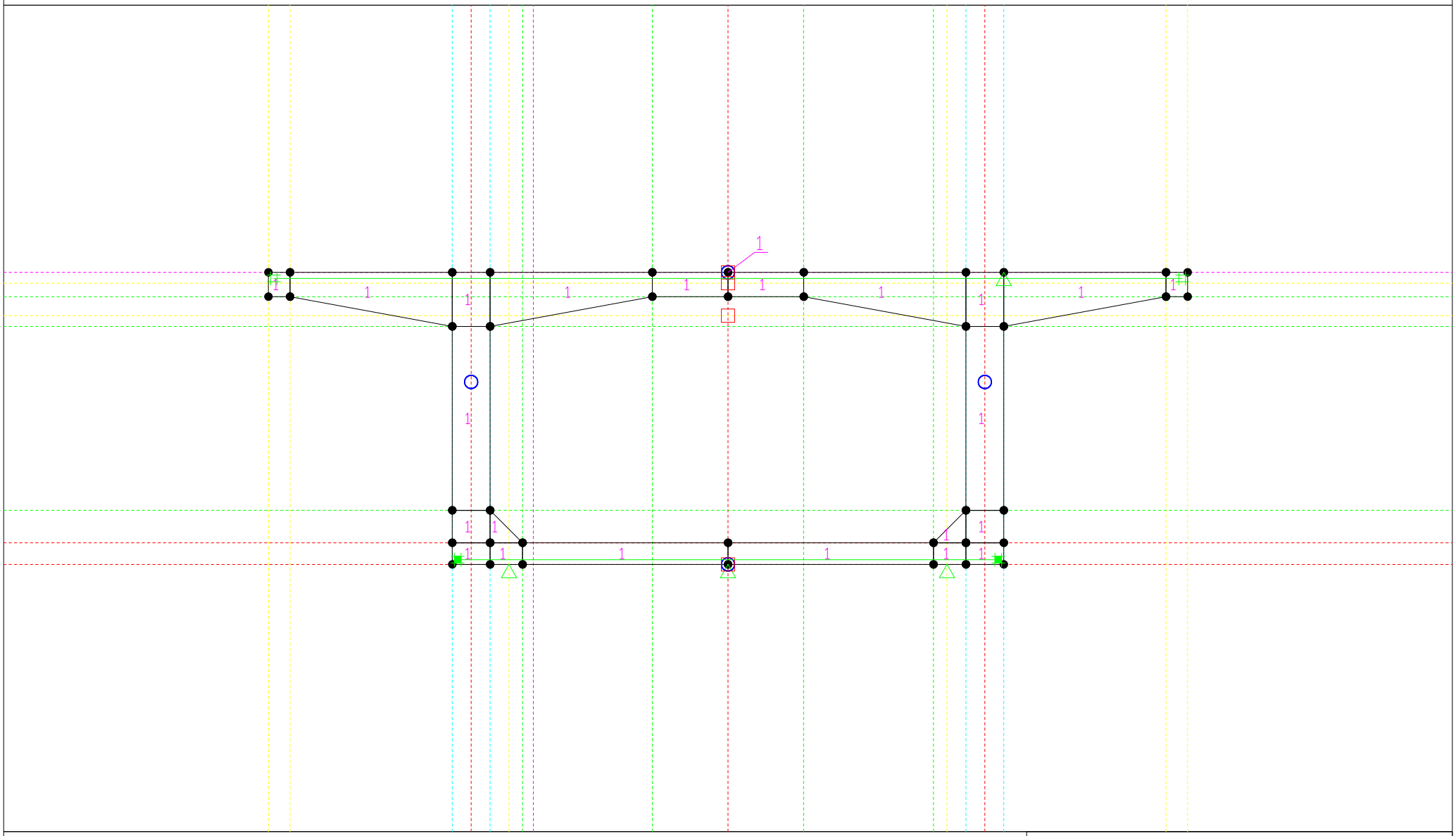
1 cm Plot = 19.69 in

0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

RMsAs.pl



Cross Section RMB

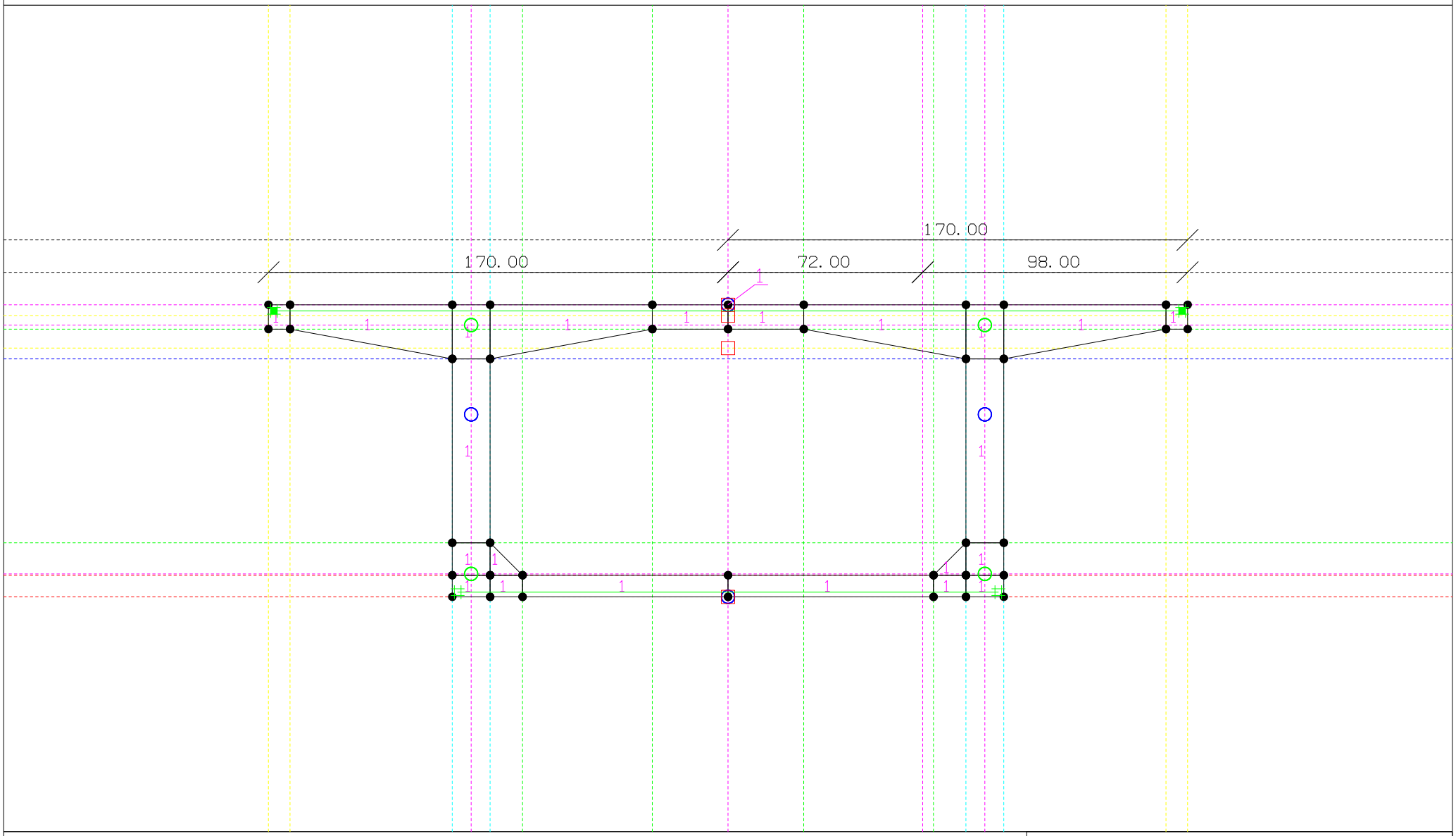
1 cm Plot = 19.69 in

0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

RM+B.pl



Cross Section RMC

1 cm Plot = 19.69 in

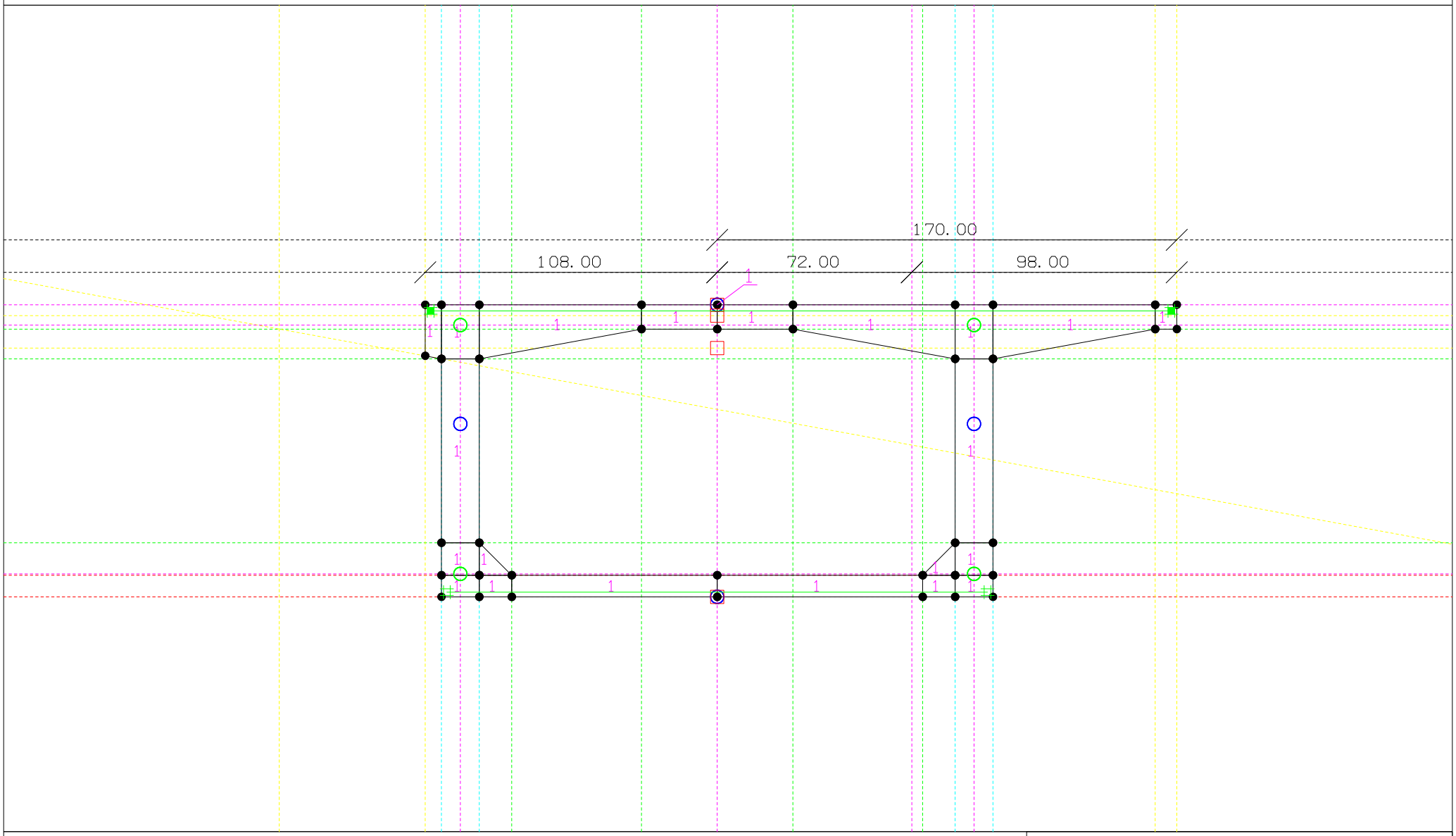
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

RM+C.pl

2.4.1/17



Cross Section RMCs

1 cm Plot = 19.69 in

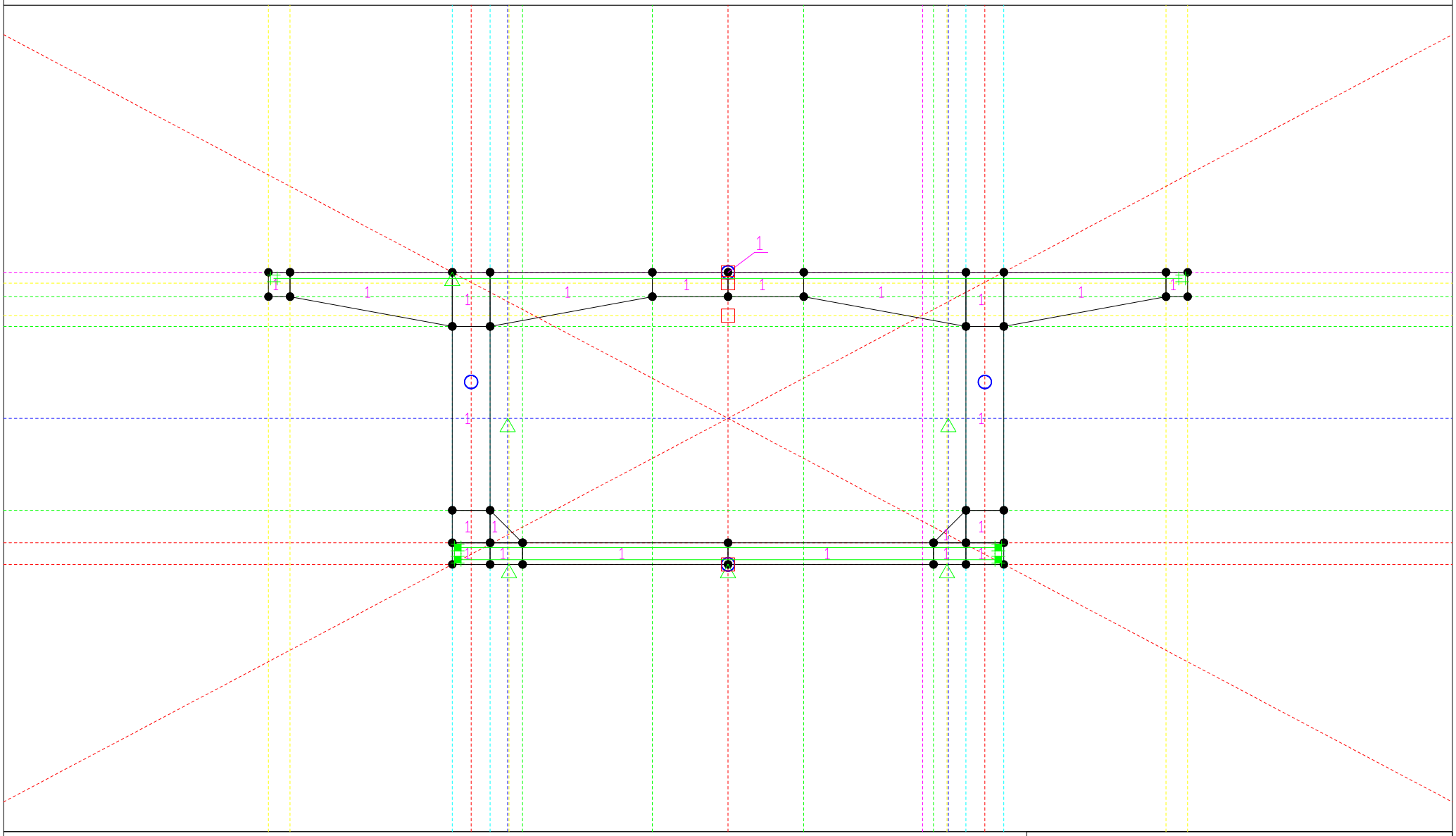
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

RM+Cs.pl

2.4.1/ 18



Cross Section RMD

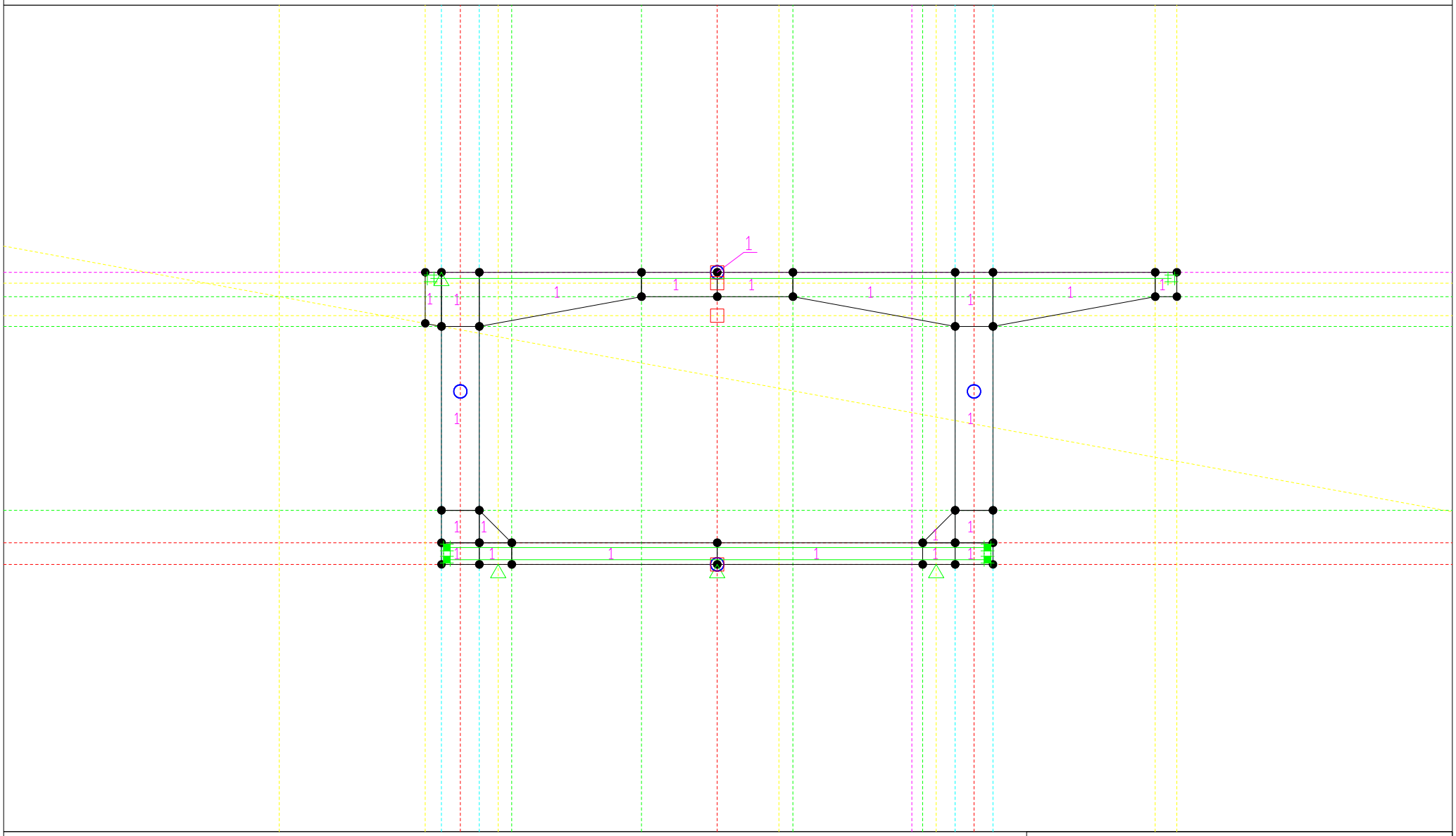
1 cm Plot = 19.69 in

0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

RM+D.pl



Cross Section RMDs

1 cm Plot = 19.69 in

0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

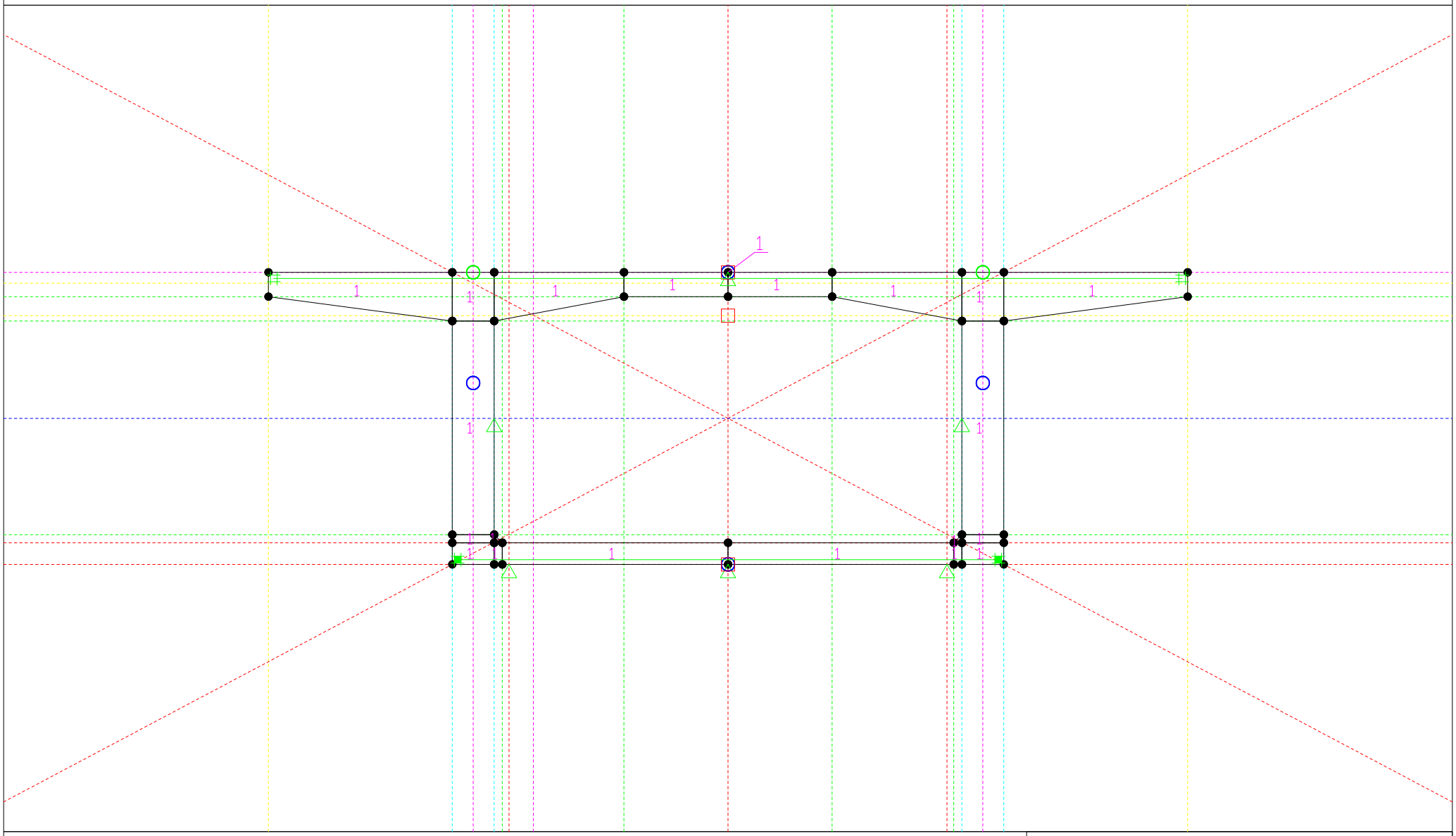
RM+Ds.pl

2.4.1/20

2.4.2 Ramps

2.4.2 Ramps

Segment		Element Nos.	Cross Section Name
Ramp A		4156-4212	R_A
		4213-4247	R_Ar
		4248-4251	R_Al
		4252-4309	R_A2
Ramp B		4501-4547	R_B
Ramp C		5141-5346	R_C
Ramp D		5501-5580	R_D



Cross Section RA

1 cm Plot = 19.69 in

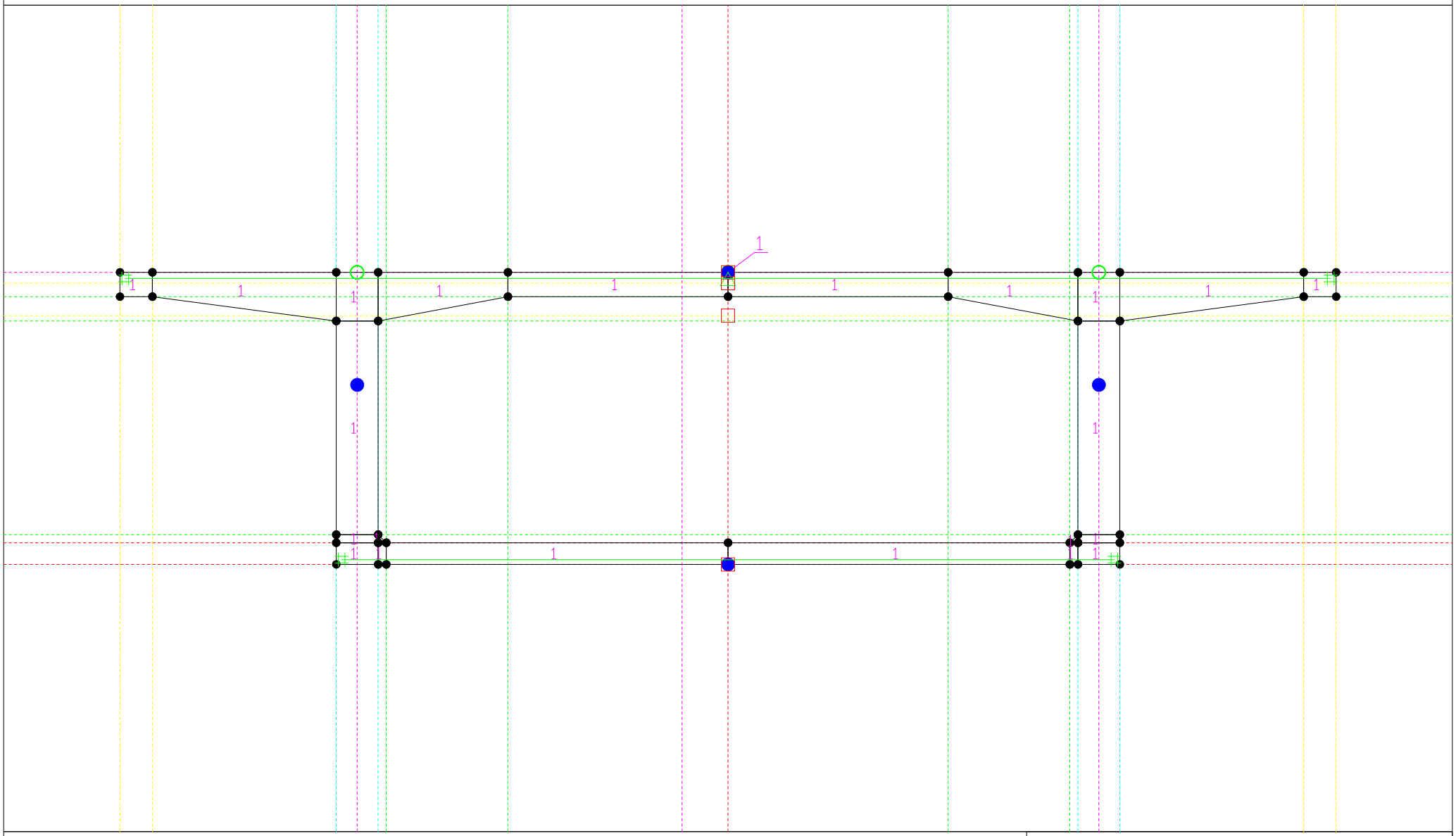
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R+A.pl

2.4.2/2



Cross Section RAr

1 cm Plot = 19.69 in

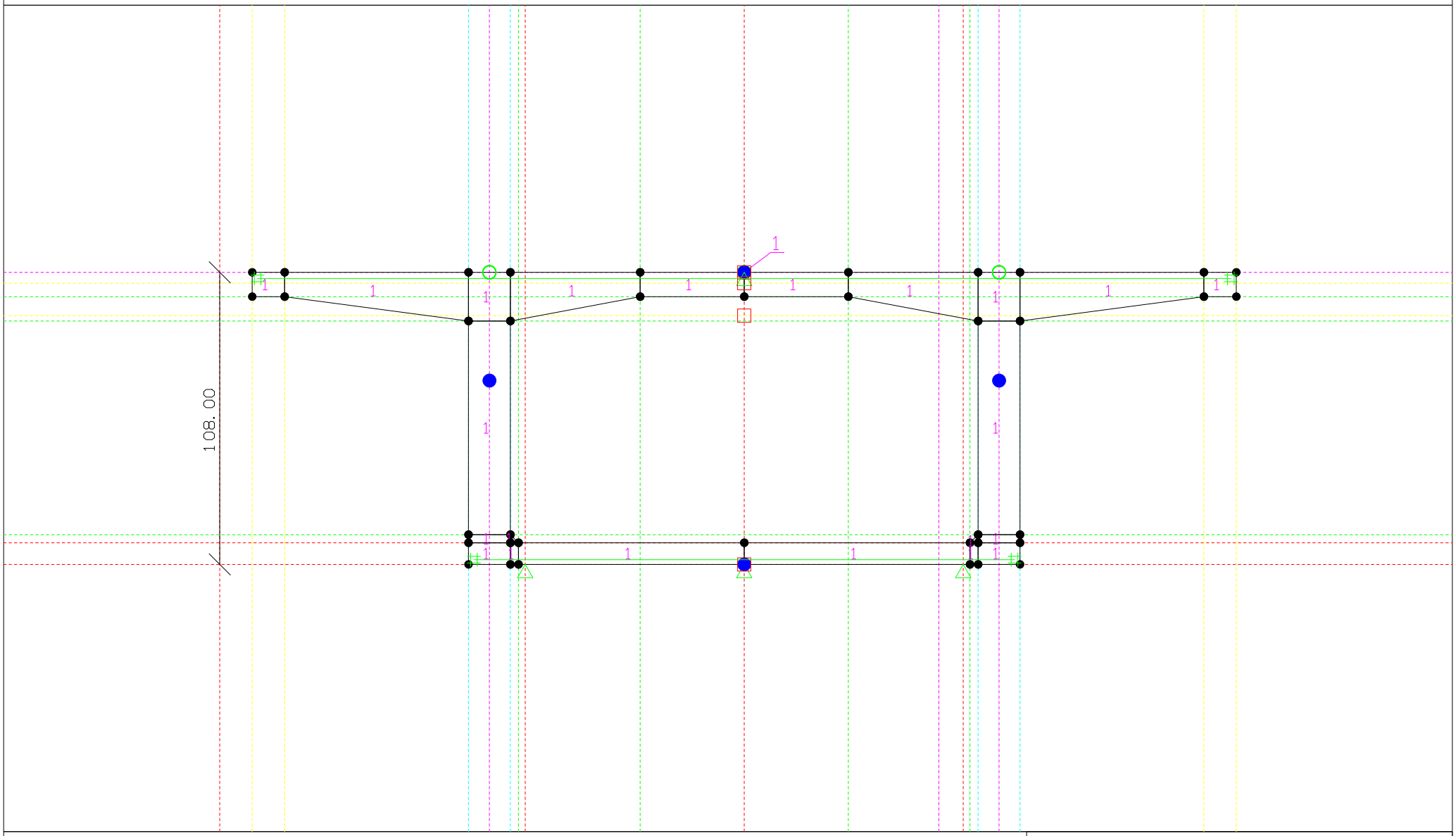
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R*Ar.pl

2.4.2/3



Cross Section RAl

1 cm Plot = 19.69 in

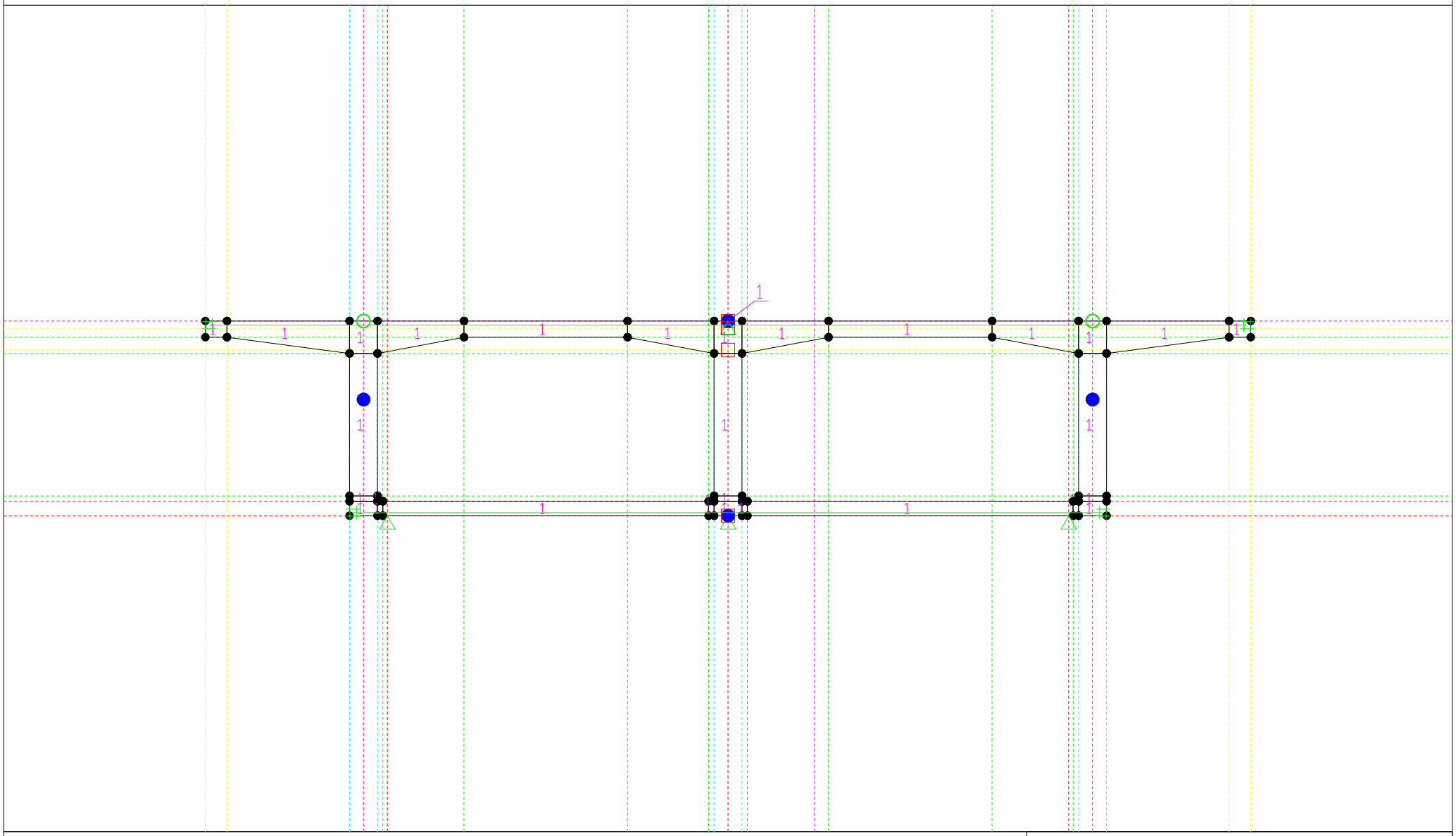
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R*AL.pl

2.4.2/4



Cross Section RA2

1 cm Plot = 29.53 in

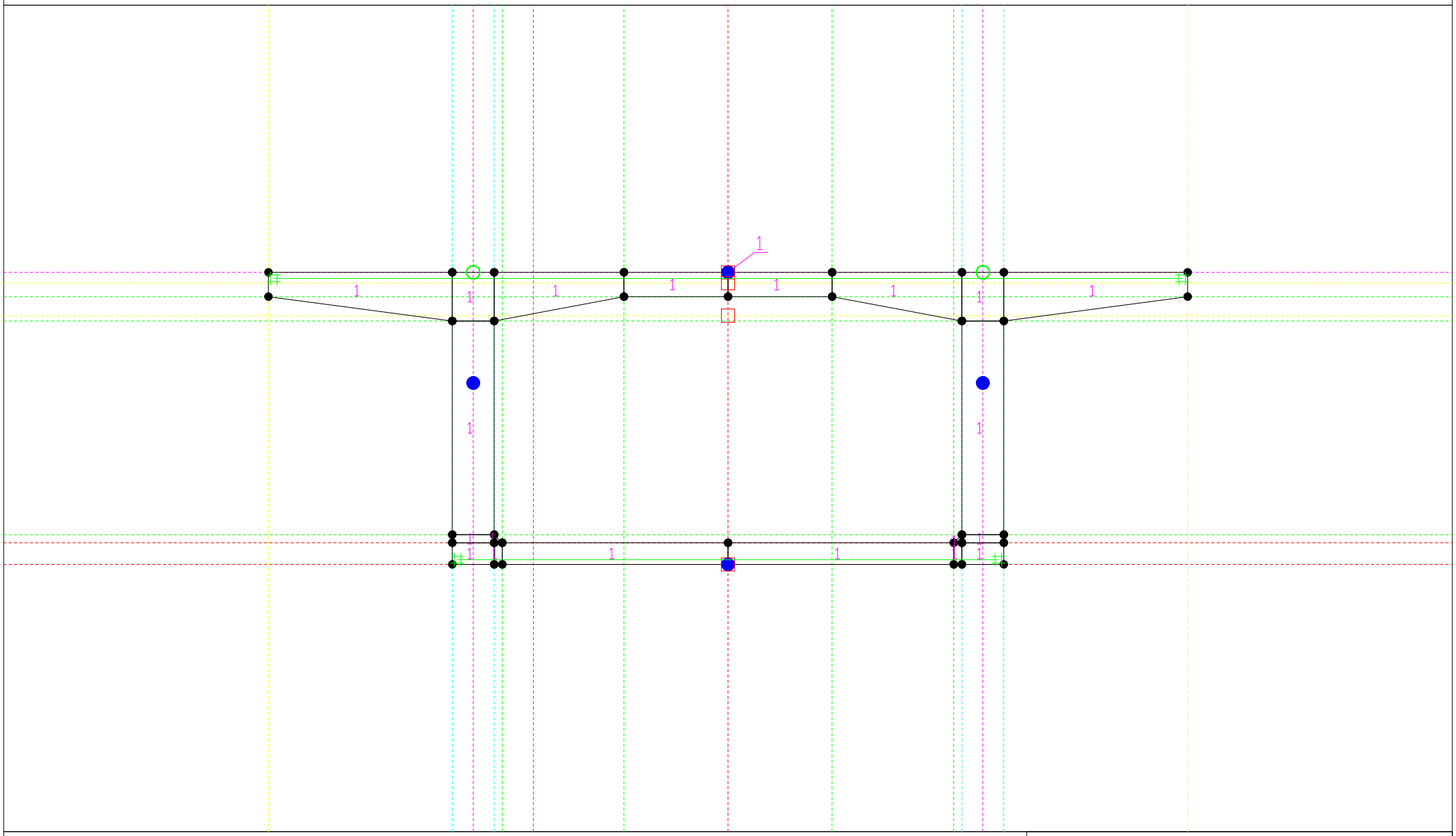
0 29.53 59.06 88.58 118.11 147.64

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R+A2.pl

2.4.2/5



Cross Section RB

1 cm Plot = 19.69 in

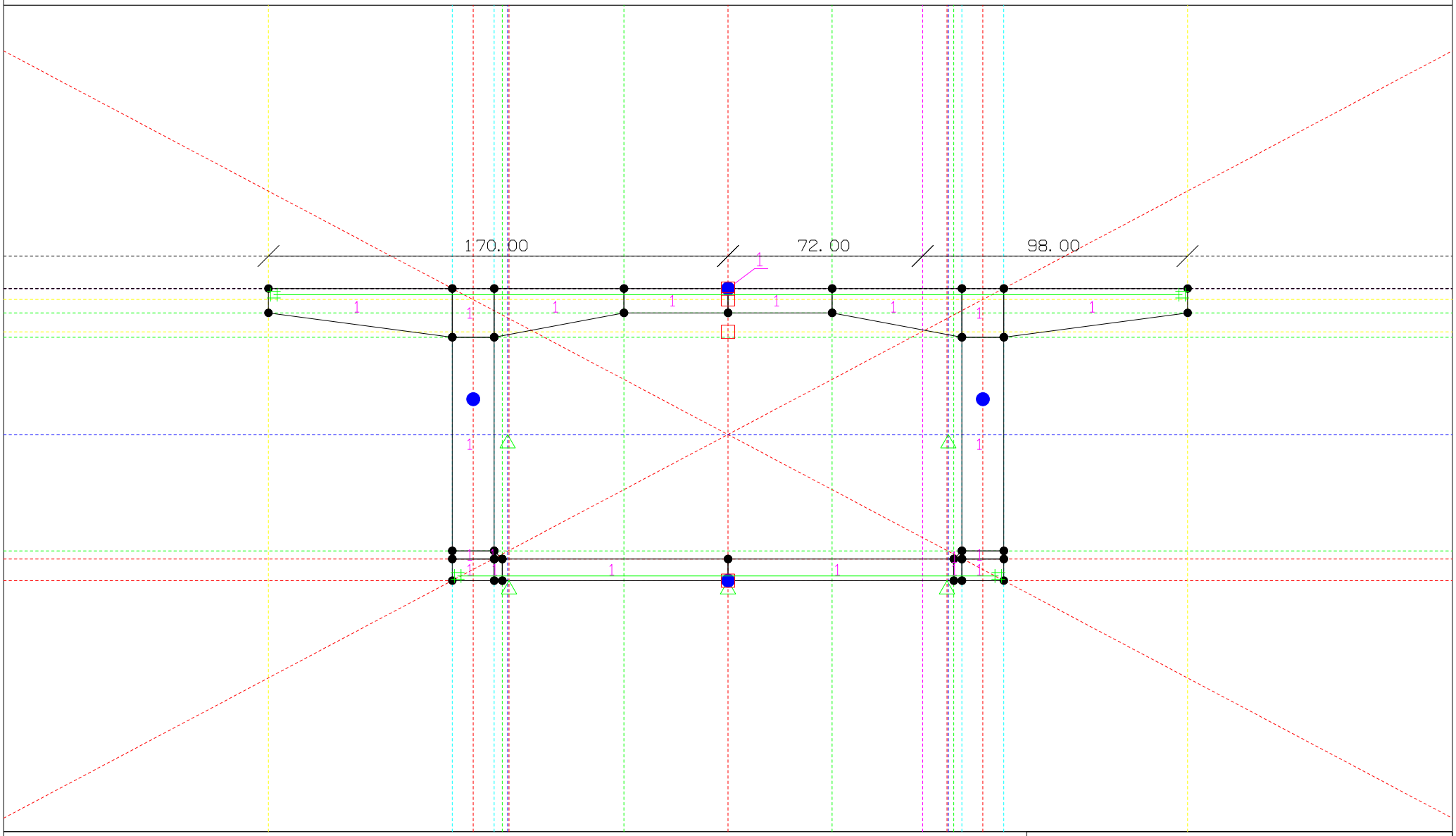
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R+B.pl

2.4.2/6



Cross Section RC

1 cm Plot = 19.69 in

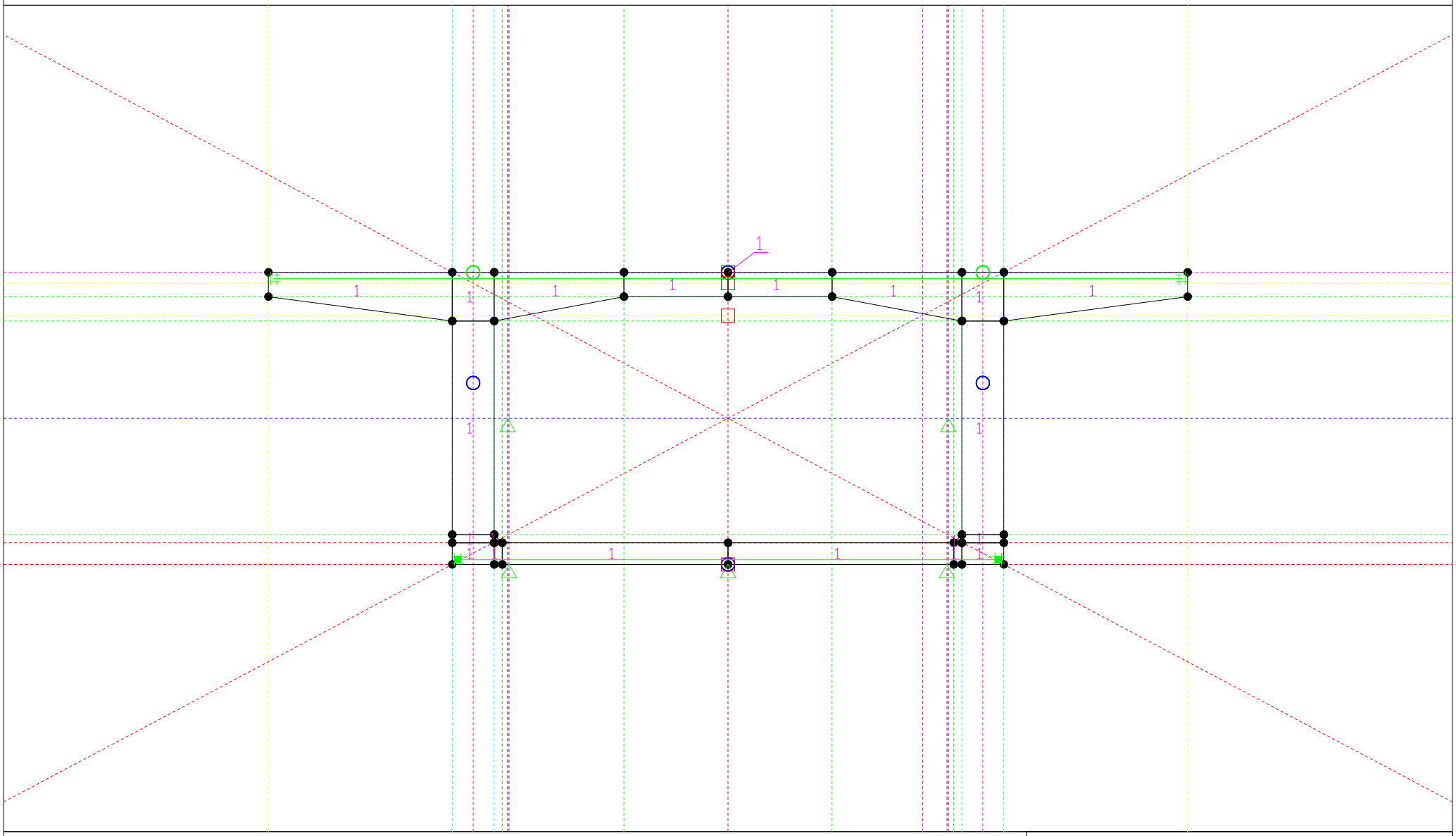
0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R+C.pl

2.4.2/7



Cross Section RD

1 cm Plot = 19.69 in

0 19.69 39.37 59.06 78.74 98.43

URS CORPORATION

7650 West Courtney Campbell Causeway, Tampa, FL 33607

R+D.pl

2.4.2/8

2.4.3 Piers

2.4.3 Piers

In general, piers are rectangular in cross section, with some of them having a variable width pier cap. Some piers have a cross beam at some point in the middle, which are neglected in this model.

2.5 Loads

2.5.1 Dead Loads

2.5.1 Dead Loads

Dead loads represent the structure self weight. Self weight loads are calculated using the cross sections properties. For the superstructure, the unit weight used throughout is 0.156 kcf; for the substructure the unit weight used is 0.150 kcf. Additional concentrated loads and distributed loads are used to include other self weight loads that are not included in the cross section properties, such as blisters, couplers, pier diaphragms, etc.

2.5.2 Superimposed Dead Loads

2.5.2 Superimposed Dead Loads

Superimposed dead load includes barriers and wearing surface weights, plus drainage pipes.

Barrier Weights:

Exterior barriers, 0.450 klf
Interior barriers, 0.530 klf

Wearing Surface Weight:

In general, 0.025 ksf
For elements 2381-2390, 0.050 ksf (increased overlay per field inspection)

Drainage Pipes:

Per spine, 0.065 klf

2.5.3 Live Loads

2.5.3 Live Loads

Live loads included in the model are described in the Design Criteria, and include:

ASSHTO Design Load: HL-93
InDOT Legal Loads: R1, R2 and R3
InDOT Permit Loads: R4, R5, S1, S2, S3, S4 and S5

In all cases InDOT Design Loads R1-R3 and Permit Loads R4, R5, S1-S5 include a 0.64 klf uniform lane load applied simultaneously and not interrupted by the space occupied by the trucks.

2.5.3.1 Number of Design Lanes

The Number of Design Lanes is calculated by dividing the instant clear roadway width between barriers by 12 feet, rounding the number down. The number of lanes is varied from 1 to the maximum number of lanes for the instant cross section.

2.5.3.2 Multiple Presence Factor

Multiple presence factors are applied depending on the number of Design Lanes loaded:

No. Lanes	MPF
1	1.20
2	1.00
3	0.85
>4	0.65

2.5.3.3 Dynamic Load Allowance

All truck axle loads are increased by 33% to account for a Dynamic Impact Factor.

2.5.3.4 Application of Live Load

The extreme force effect is calculated as follows:

1. ASSHTO HL-93. The maximum between the combination of the design tandem with the design lane load, and the combination of one variable axle spacing design truck with the design lane load. Also, for negative moments between points of contra flexure, the combination of 90% of two design trucks spaced a minimum of 50 ft. with 90% of the design lane load.

2. InDOT Legal Loads R1, R2 and R3. Legal loads are applied to each loaded lane using only one truck per lane; do not mix trucks.

3. InDOT Permit Loads R4, R5, S1, S2, S3, S4 and S5. Permit loads are applied to one lane at a time. The remainder of loaded lanes contains the force extreme effect from HL-93, with the position of the permit load varying across the roadway width to produce the maximum force effect.

2.5.4 Creep and Shrinkage

2.5.4 Creep and Shrinkage

Creep and shrinkage strains are calculated in accordance with CEB/FIP Model Code for Concrete Structures, 1978. The relative humidity used is 74%. For purposes of creep and shrinkage, all superstructure elements are activated at 7 days old, with the exception of closure pours which are activates at 4 days old. Substructure elements are activated at 30 days old.

2.5.5 Temperature

2.5.5 Temperature Loads

All elements use a Coefficient of Thermal Expansion of 6.0×10^{-6}/°F.

Two types of temperature loads are included:

2.5.5.1 Uniform Temperature Change

Temperature Rise	+45° F
Temperature Fall	-40° F

2.5.5.2 Temperature Gradient

Use AASHTO Guide Specification for Design and Construction of Segmental Concrete Bridges. The vertical temperature gradient is based on LRFD Article 3.12.3, using a plain concrete surface for solar radiation Zone 3.

T_1 = 41°F
T_2 = 11°F
T_3 = 0°F

2.5.6 Post-Tensioning Geometry

2.5.6 Post-Tensioning Geometry

Post-tensioning is based on the drawing provided. Several spreadsheets were developed to facilitate the definition of all the post-tensioning tendons according to the RM Spaceframe input requirements.

The tendon geometry and RM Input is shown in the following spreadsheets

2.5.6.1 Mainline

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

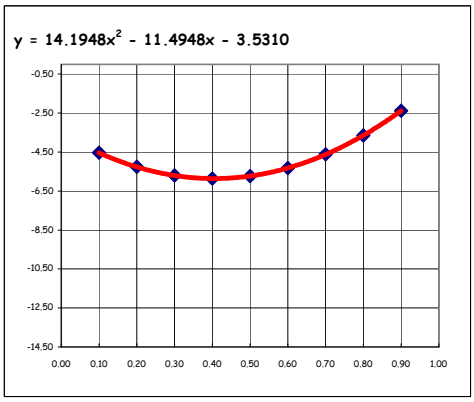
DESCRP: PT DEFINITION - SEGMENT 1, TENDON 20X | CHECKED BY: IC BY PT | DATE: 02/10/09

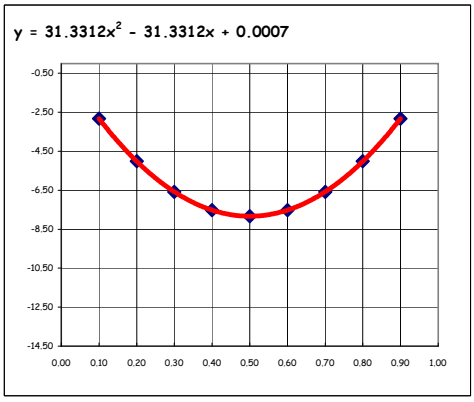
DX at BEG = 0.0000

DX at END = 39.1667

	->TO P2	P2-P3	P3-P4
Span =	1.8021	102.1250	190.2500
A =		14.1948	31.3312
B =		-11.4948	-31.3312
C =		-3.5310	0.0007
Y' =0 :		0.4049	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN							
0.000	1.802	2	0.0000	-3.5300	-3.531	-85.028	**P2**
0.050	6.908	3	0.4590	-4.0703	-4.070		
0.100	12.015	3	0.9907	-4.5400	-4.539	-83.410	
0.200	22.227	5	0.2975	-5.2600	-5.262	-80.245	
0.300	32.440	6	0.6064	-5.7000	-5.702	-71.438	
0.400	42.652	7	0.9154	-5.8600	-5.858	-7.911	
0.405	**43.152**	**7**	**0.9794**		**-5.858**	**0.000**	
0.500	52.865	9	0.2243	-5.7300	-5.730	69.677	
0.600	63.077	10	0.5332	-5.3200	-5.318	79.766	
0.700	73.290	12	0.2045	-4.6200	-4.622	83.193	
0.800	83.502	13	0.6084	-3.6400	-3.642	84.905	
0.900	93.715	15	0.0115	-2.3800	-2.379	85.931	
0.950	98.821	15	0.6660	-1.6403	-1.640		
1.000	103.927	16	1.0000	-1.2500		86.613	**P3**
0.080	119.147	19	0.6303	-2.3053	-2.305		
0.100	122.952	20	0.1180	-2.8200	-2.819	-87.715	
0.200	141.977	22	0.5565	-5.0100	-5.012	-86.955	
0.300	161.002	24	0.9949	-6.5800	-6.579	-85.438	
0.400	180.027	27	0.4334	-7.5200	-7.519	-80.933	
0.500	**199.052**	**29**	**0.8718**	**-7.8300**	**-7.832**	**0.000**	
0.600	218.077	32	0.5666	-7.5200	-7.519	80.933	
0.700	237.102	35	0.0051	-6.5800	-6.579	85.438	
0.800	256.127	37	0.4435	-5.0100	-5.012	86.955	
0.900	275.152	39	0.8820	-2.8200	-2.819	87.715	
0.920	278.957	40	0.3697	-2.3053	-2.305	87.824	
1.000	294.177	42	1.0000	-1.2500		88.172	**P3**
22.067	316.244	46	0.508	-1.2500			
3.218	319.462	46	0.920	-1.4539			
3.167	322.629	47	0.326	-2.0622			
END	333.344	48	0.700	-4.8333			





R = 25.5

theta = 14.5

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 1, TENDON 30X — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 19.1667

DX at END = 39.1667

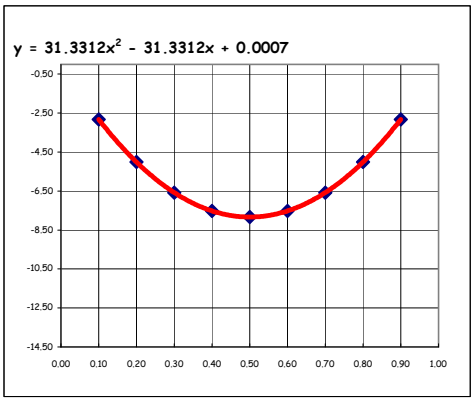
R = 41.75

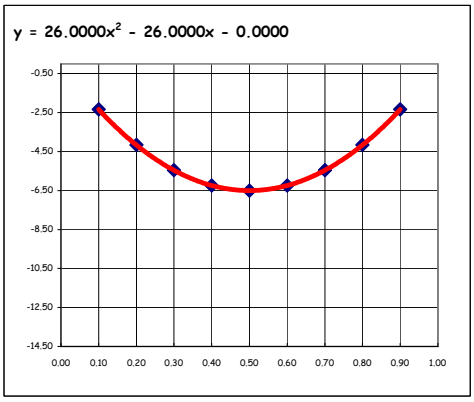
theta = 14.5

L end = 8.713

	->TO P3	P3-P4	P4-P5
Span =	103.9271	190.2500	207.0000
A =		31.3312	26.0000
B =		-31.3312	-26.0000
C =		0.0007	0.0000
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	84.760	13	0.7814	-4.8333			
5.185	93.474	14	0.9792	-2.5798			
5.269	98.658	15	0.6451	-1.5838			
0.000	103.927	17	0.0000	-1.2500	0.001	-88.172	P3
0.080	119.147	19	0.6303	-2.3053	-2.305		
0.100	122.952	20	0.1180	-2.8200	-2.819	-87.715	
0.200	141.977	22	0.5565	-5.0100	-5.012	-86.955	
0.300	161.002	24	0.9949	-6.5800	-6.579	-85.438	
0.400	180.027	27	0.4334	-7.5200	-7.519	-80.933	
0.500	**199.052**	**29**	**0.8718**	**-7.8300**	**-7.832**	**0.000**	
0.600	218.077	32	0.5666	-7.5200	-7.519	80.933	
0.700	237.102	35	0.0051	-6.5800	-6.579	85.438	
0.800	256.127	37	0.4435	-5.0100	-5.012	86.955	
0.900	275.152	39	0.8820	-2.8200	-2.819	87.715	
0.920	278.957	40	0.3697	-2.3053	-2.305		
1.000	294.177	42	1.0000	-1.2500		88.172	P4
0.096	314.049	46	0.2266	-2.2564	-2.256		
0.100	314.877	46	0.3327	-2.3400	-2.340	-87.248	
0.200	335.577	48	0.9858	-4.1600	-4.160	-86.332	
0.300	356.277	51	0.6390	-5.4600	-5.460	-84.508	
0.400	376.977	54	0.2921	-6.2400	-6.240	-79.114	
0.500	**397.677**	**57**	**0.0547**	**-6.5000**	**-6.500**	**0.000**	
0.600	418.377	59	0.7079	-6.2400	-6.240	79.114	
0.700	439.077	62	0.3610	-5.4600	-5.460	84.508	
0.800	459.777	65	0.0142	-4.1600	-4.160	86.332	
0.900	480.477	67	0.6673	-2.3400	-2.340	87.248	
0.904	481.305	67	0.7734	-2.2564	-2.256	87.275	
1.000	501.177	71	0.0000	-1.2500		87.797	P5
22.067	523.244	74	0.508	-1.2500			
3.218	526.462	74	0.920	-1.4539			
3.167	529.629	75	0.326	-2.0622			
END	540.344	76	0.700	-4.8333			





R = 25.5

theta = 14.5

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 1, TENDON 40X — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **39.1667**

DX at END = **39.1667**

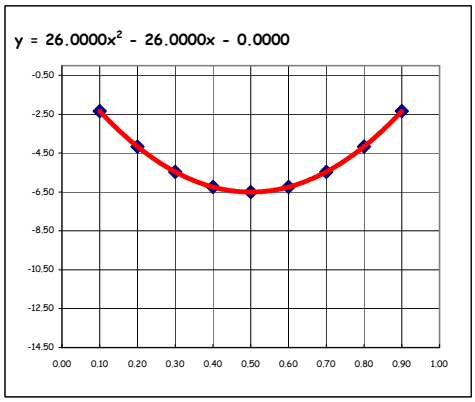
R = **25.5**

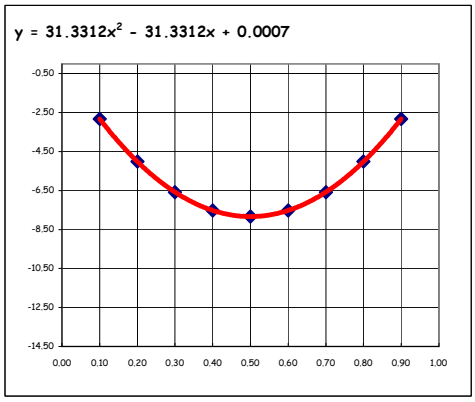
theta = **14.5**

Lend = 10.715

	->TO P4	P4-P5	P5-P6
Span =	294.1771	207.0000	265.7500
A =		26.0000	31.3312
B =		-26.0000	-31.3312
C =		0.0000	0.0007
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	255.010	37	0.3004	**-4.8333**			
3.167	265.725	38	0.6737	-2.0622			
3.218	268.892	39	0.0796	-1.4539			
22.067	272.110	39	0.4921	-1.2500			
0.000	294.177	43	0.0000	-1.2500		-87.797	**P4**
0.096	314.049	46	0.2266	-2.2564	-2.256		
0.100	314.877	46	0.3327	-2.3400	-2.340	-87.248	
0.200	335.577	48	0.9858	-4.1600	-4.160	-86.332	
0.300	356.277	51	0.6390	-5.4600	-5.460	-84.508	
0.400	376.977	54	0.2921	-6.2400	-6.240	-79.114	
0.500	**397.677**	**57**	**0.0547**	**-6.5000**	**-6.500**	**0.000**	
0.600	418.377	59	0.7079	-6.2400	-6.240	79.114	
0.700	439.077	62	0.3610	-5.4600	-5.460	84.508	
0.800	459.777	65	0.0142	-4.1600	-4.160	86.332	
0.900	480.477	67	0.6673	-2.3400	-2.340	87.248	
0.904	481.305	67	0.7734	-2.2564	-2.256		
1.000	501.177	71	0.0000	-1.2500		87.797	**P5**
0.080	522.437	74	0.4045	-2.3053	-2.305		
0.100	527.752	75	0.0857	**-2.8200**	-2.819	-87.715	
0.200	554.327	78	0.4919	**-5.0100**	-5.012	-86.955	
0.300	580.902	81	0.8980	**-6.5800**	-6.579	-85.438	
0.400	607.477	85	0.3041	**-7.5200**	-7.519	-80.933	
0.500	**634.052**	**89**	**0.2897**	**-7.8300**	**-7.832**	**0.000**	
0.600	660.627	92	0.6959	-7.5200	-7.519	80.933	
0.700	687.202	96	0.1020	-6.5800	-6.579	85.438	
0.800	713.777	99	0.5081	-5.0100	-5.012	86.955	
0.900	740.352	102	0.9143	-2.8200	-2.819	87.715	
0.920	745.667	103	0.5955	-2.3053	-2.305	87.824	
1.000	766.927	106	1.0000	-1.2500		88.172	**P6**
22.067	788.994	110	0.508	-1.2500			
3.218	792.212	110	0.920	-1.4539			
3.167	795.379	111	0.326	-2.0622			
END	806.094	112	0.700	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 1, TENDON 50X — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **39.1667**

DX at END = **39.1667**

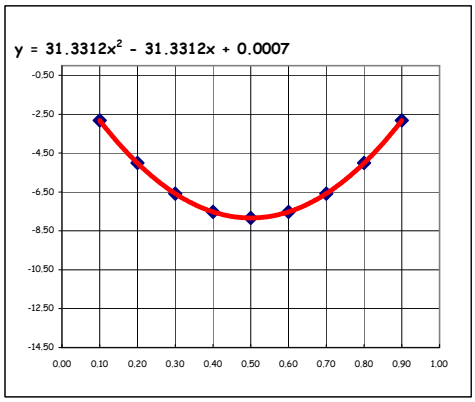
R = **25.5**

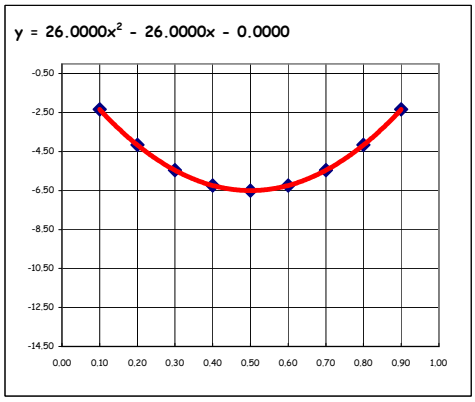
theta = **14.5**

Lend = 10.715

	->TO P5	P5-P6	P6-P7
Span =	501.1771	265.7500	265.7500
A =		31.3312	26.0000
B =		-31.3312	-26.0000
C =		0.0007	0.0000
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	462.010	65	0.3004	**-4.8333**			
3.167	472.725	66	0.6737	-2.0622			
3.218	475.892	67	0.0796	-1.4539			
22.067	479.110	67	0.4921	-1.2500			
0.000	501.177	71	0.0000	-1.2500	0.001	-88.172	**P5**
0.080	522.437	74	0.4045	-2.3053	-2.305		
0.100	527.752	75	0.0857	-2.8200	-2.819	-87.715	
0.200	554.327	78	0.4919	-5.0100	-5.012	-86.955	
0.300	580.902	81	0.8980	-6.5800	-6.579	-85.438	
0.400	607.477	85	0.3041	-7.5200	-7.519	-80.933	
0.500	**634.052**	**89**	**0.2897**	**-7.8300**	**-7.832**	**0.000**	
0.600	660.627	92	0.6959	-7.5200	-7.519	80.933	
0.700	687.202	96	0.1020	-6.5800	-6.579	85.438	
0.800	713.777	99	0.5081	-5.0100	-5.012	86.955	
0.900	740.352	102	0.9143	-2.8200	-2.819	87.715	
0.920	745.667	103	0.5955	-2.3053	-2.305		
1.000	766.927	106	1.0000	-1.2500		88.172	**P6**
0.096	792.439	110	0.9495	-2.2564	-2.256		
0.100	793.502	111	0.0857	**-2.3400**	-2.340	-87.248	
0.200	820.077	114	0.4919	**-4.1600**	-4.160	-86.332	
0.300	846.652	117	0.8980	**-5.4600**	-5.460	-84.508	
0.400	873.227	121	0.3041	**-6.2400**	-6.240	-79.114	
0.500	**899.802**	**124**	**0.7103**	**-6.5000**	**-6.500**	**0.000**	
0.600	926.377	128	0.6959	-6.2400	-6.240	79.114	
0.700	952.952	132	0.1020	-5.4600	-5.460	84.508	
0.800	979.527	135	0.5081	-4.1600	-4.160	86.332	
0.900	1006.102	138	0.9143	-2.3400	-2.340	87.248	
0.904	1007.165	139	0.0505	-2.2564	-2.256	87.275	
1.000	1032.677	142	1.0000	-1.2500		87.797	**P7**
22.067	1054.744	146	0.508	-1.2500			
3.218	1057.962	146	0.920	-1.4539			
3.167	1061.129	147	0.326	-2.0622			
END	1071.844	148	0.700	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 1, TENDON 60X — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **39.1667**

DX at END =

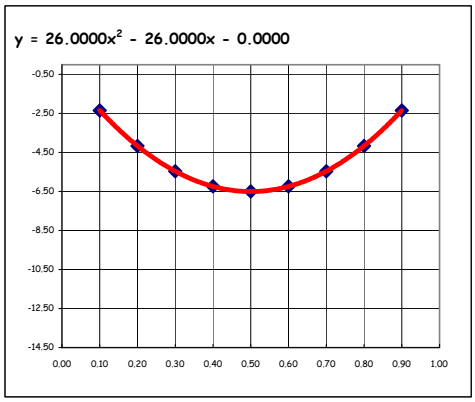
R = **25.5**

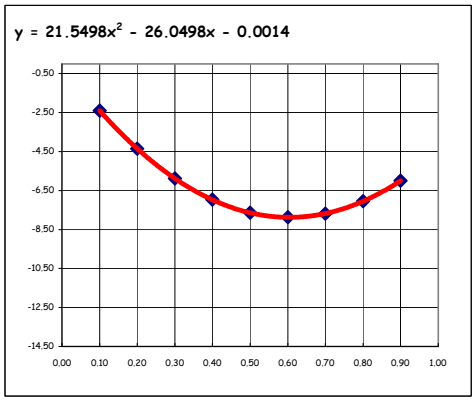
theta = **14.5**

Lend = 10.715

	->TO P6	P6-P7	P7-EJ2
Span =	766.9271	265.7500	224.2500
A =		26.0000	21.5498
B =		-26.0000	-26.0498
C =		0.0000	-0.0014
Y' =0 :		0.5000	0.6044

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	727.760	101	0.3004	**-4.8333**			
3.167	738.475	102	0.6737	-2.0622			
3.218	741.642	103	0.0796	-1.4539			
22.067	744.860	103	0.4921	-1.2500			
0.000	766.927	107	0.0000	-1.2500	0.000	-87.797	**P6**
0.096	792.439	110	0.9495	-2.2564	-2.256		
0.100	793.502	111	0.0857	-2.3400	-2.340	-87.248	
0.200	820.077	114	0.4919	-4.1600	-4.160	-86.332	
0.300	846.652	117	0.8980	-5.4600	-5.460	-84.508	
0.400	873.227	121	0.3041	-6.2400	-6.240	-79.114	
0.500	**899.802**	**124**	**0.7103**	**-6.5000**	**-6.500**	**0.000**	
0.600	926.377	128	0.6959	-6.2400	-6.240	79.114	
0.700	952.952	132	0.1020	-5.4600	-5.460	84.508	
0.800	979.527	135	0.5081	-4.1600	-4.160	86.332	
0.900	1006.102	138	0.9143	-2.3400	-2.340	87.248	
0.904	1007.165	139	0.0505	-2.2564	-2.256		
1.000	1032.677	142	1.0000	-1.2500		87.797	**P7**
0.096	1054.205	146	0.4388	-2.3036	-2.304		
0.100	1055.102	146	0.5538	**-2.3900**	-2.391	-87.366	
0.200	1077.527	149	0.4280	**-4.3500**	-4.349	-86.716	
0.300	1099.952	152	0.3023	**-5.8800**	-5.877	-85.641	
0.400	1122.377	155	0.1765	**-6.9700**	-6.973	-83.524	
0.500	1144.802	158	0.0507	**-7.6400**	-7.639	-77.471	
0.600	1167.227	161	0.5031	-7.8700	-7.873	-10.760	
0.604	**1168.216**	**161**	**0.6298**		**-7.874**	**0.000**	
0.700	1189.652	164	0.3773	**-7.6800**	-7.677	76.357	
0.800	1212.077	167	0.2515	**-7.0500**	-7.049	83.235	
0.900	1234.502	170	0.1258	**-5.9900**	-5.991	85.512	
0.950	1245.715	171	0.5629	-5.3000	-5.300		
1.000	1256.927	172	1.0000	-4.5000		3.357	**EJ2**
END							





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 80X | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END = **43.1667**

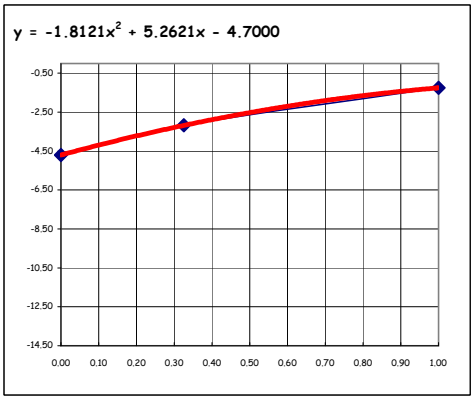
	->TO EJ2	EJ2-P8	P8-P9
Span =	1256.9271	41.5000	257.9479
A =		-1.8121	28.0000
B =		5.2621	-28.0000
C =		-4.7000	0.0000
Y' =0 :		1.4519	0.5000

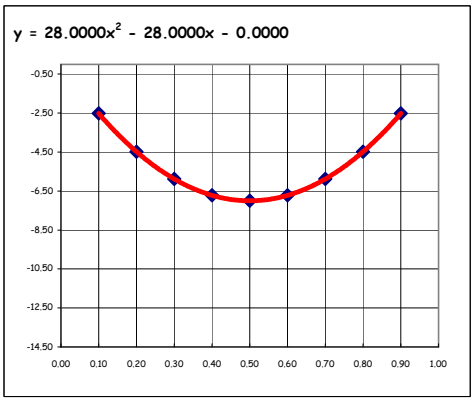
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	1256.927	174	0.0000	-4.7000	-4.700	10.760	**EJ2**
0.325	1270.427	175	0.7303	**-3.1800**	-3.180		
1.000	1298.427	180	0.0000	-1.2500			**P8**
0.089	1321.384	183	0.6220	-2.2702	-2.270		
0.100	1324.222	183	0.9857	**-2.5200**	-2.520	-87.444	
0.200	1350.017	187	0.2919	**-4.4800**	-4.480	-86.594	
0.300	1375.811	190	0.5980	**-5.8800**	-5.880	-84.898	
0.400	1401.606	193	0.9041	**-6.7200**	-6.720	-79.875	
0.500	**1427.401**	**197**	**0.5000**	**-7.0000**	**-7.000**	**0.000**	
0.600	1453.196	201	0.0959	-6.7200	-6.720	79.875	
0.700	1478.991	204	0.4020	-5.8800	-5.880	84.898	
0.800	1504.785	207	0.7081	-4.4800	-4.480	86.594	
0.900	1530.580	211	0.0143	-2.5200	-2.520	87.444	
0.911	1533.418	211	0.3780	-2.2702	-2.270		
1.000	1556.375	215	0.0000	-1.2500		2.045	**P9**
26.067	1582.442	219	0.021	-1.2500			
3.218	1585.660	219	0.433	-1.4539			
3.167	1588.827	219	0.839	-2.0622			
END	1599.542	221	0.2123	**-4.8333**			

R = **25.5**

theta = **14.5**

Lend = 10.715





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

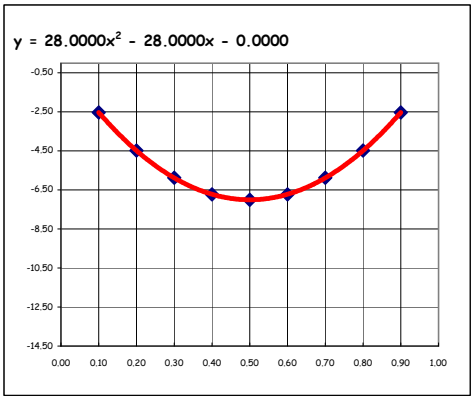
DESCRP: PT DEFINITION - SEGMENT 2, TENDON 81XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

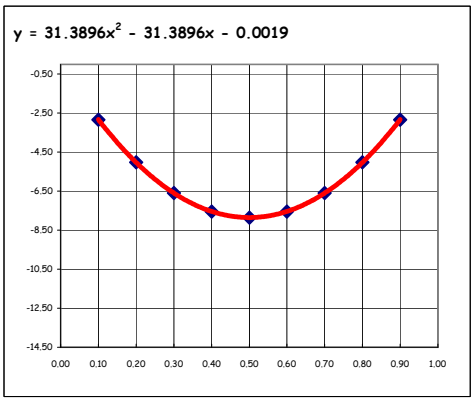
DX at BEG =

DX at END = **43.1667**

	->TO EJ2	EJ2-P8	P8-P9	P9-P10
Span =	1256.9271	41.5000	257.9479	284.3958
A =			28.0000	31.3896
B =			-28.0000	-31.3896
C =			0.0000	-0.0019
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	1256.927	174	0.0000	-4.7000			**EJ2**
0.325	1270.427	175	0.7303	**-3.1800**			
0.000	1298.427	180	0.0000	-1.2500	0.000	0.000	**P8**
0.089	1321.384	183	0.6220	-2.2702	-2.270		
0.100	1324.222	183	0.9857	-2.5200	-2.520	0.000	
0.200	1350.017	187	0.2919	-4.4800	-4.480	0.000	
0.300	1375.811	190	0.5980	-5.8800	-5.880	0.000	
0.400	1401.606	193	0.9041	-6.7200	-6.720	0.000	
0.500	**1427.401**	**197**	**0.5000**	**-7.0000**	**-7.000**	**0.000**	
0.600	1453.196	201	0.0959	-6.7200	-6.720	0.000	
0.700	1478.991	204	0.4020	-5.8800	-5.880	0.000	
0.800	1504.785	207	0.7081	-4.4800	-4.480	0.000	
0.900	1530.580	211	0.0143	-2.5200	-2.520	0.000	
0.911	1533.418	211	0.3780	-2.2702	-2.270		
1.000	1556.375	215	0.0000	-1.2500		0.000	**P9**
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	**-2.8300**	-2.827	-87.444	
0.200	1613.254	222	0.9698	**-5.0200**	-5.024	-86.594	
0.300	1641.694	226	0.6150	**-6.5900**	-6.594	-84.898	
0.400	1670.133	230	0.2601	**-7.5400**	-7.535	-79.875	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	79.875	
0.700	1755.452	241	0.3850	-6.5900	-6.594	84.898	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.594	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.444	
0.921	1818.304	249	0.4408	-2.2858	-2.286	87.571	
1.000	1840.771	252	1.0000	-1.2500		87.955	**P10**
26.067	1866.838	257	0.021	-1.2500			
3.218	1870.056	257	0.433	-1.4539			
3.167	1873.222	257	0.839	-2.0622			
END	1883.937	259	0.2123	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

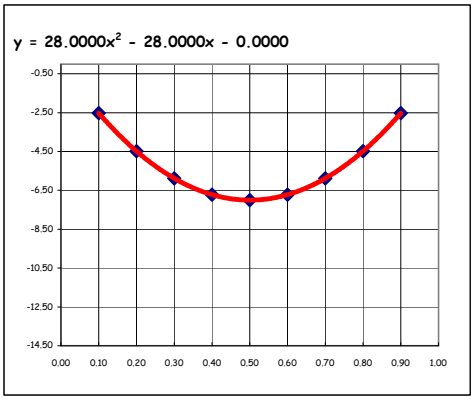
DESCRP: PT DEFINITION - SEGMENT 2, TENDON 814 — CHECKED BY: **IC BY PT** — DATE: 02/10/09

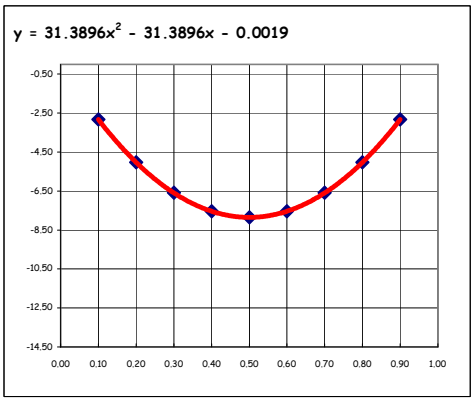
DX at BEG =

DX at END = **43.1667**

	->TO EJ2	EJ2-P8	P8-P9	P9-P10
Span =	1256.9271	41.5000	257.9479	284.3958
A =			28.0000	31.3896
B =			-28.0000	-31.3896
C =			0.0000	-0.0019
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	1256.927	174	0.0000	-4.7000			**EJ2**
0.325	1270.427	175	0.7303	**-3.1800**			
0.000	1298.427	180	0.0000	-1.2500	0.000	0.000	**P8**
0.089	1321.384	183	0.6220	-2.2702	-2.270		
0.100	1324.222	183	0.9857	**-2.5200**	-2.520	0.000	
0.200	1350.017	187	0.2919	**-4.4800**	-4.480	0.000	
0.300	1375.811	190	0.5980	**-5.8800**	-5.880	0.000	
0.400	1401.606	193	0.9041	**-6.7200**	-6.720	0.000	
0.500	**1427.401**	**197**	**0.5000**	**-7.0000**	**-7.000**	**0.000**	
0.600	1453.196	201	0.0959	-6.7200	-6.720	0.000	
0.700	1478.991	204	0.4020	-5.8800	-5.880	0.000	
0.800	1504.785	207	0.7081	-4.4800	-4.480	0.000	
0.900	1530.580	211	0.0143	-2.5200	-2.520	0.000	
0.911	1533.418	211	0.3780	-2.2702	-2.270		
1.000	1556.375	215	0.0000	-1.2500		0.000	**P9**
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	**-2.8300**	-2.827	-87.444	
0.200	1613.254	222	0.9698	**-5.0200**	-5.024	-86.594	
0.300	1641.694	226	0.6150	**-6.5900**	-6.594	-84.898	
0.400	1670.133	230	0.2601	**-7.5400**	-7.535	-79.875	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	79.875	
0.700	1755.452	241	0.3850	-6.5900	-6.594	84.898	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.594	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.444	
0.921	1818.304	249	0.4408	-2.2858	-2.286	87.571	
1.000	1840.771	252	1.0000	-1.2500		87.955	**P10**
	1840.771	253	0.0000	-1.2500			
26.067	1866.838	257	0.021	-1.2500			
3.218	1870.056	257	0.433	-1.4539			
3.167	1873.223	257	0.839	-2.0622			
END	1883.937	259	0.2123	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

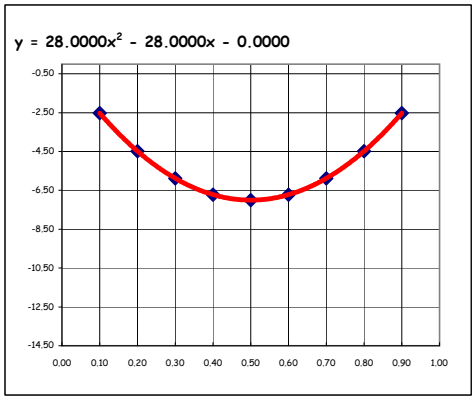
DESCRP: PT DEFINITION - SEGMENT 2, TENDON 815 — CHECKED BY: **IC BY PT** — DATE: 02/10/09

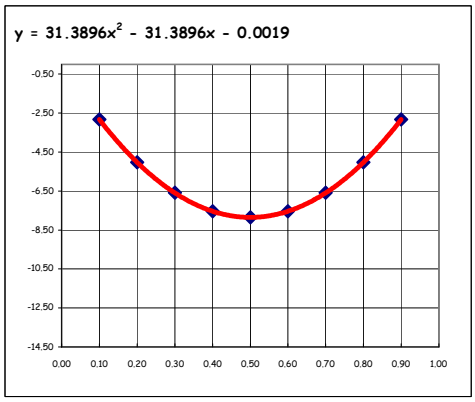
DX at BEG =

DX at END = **43.1667**

	->TO EJ2	EJ2-P8	P8-P9	P9-P10
Span =	1256.9271	41.5000	257.9479	284.3958
A =			28.0000	31.3896
B =			-28.0000	-31.3896
C =			0.0000	-0.0019
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	1256.927	174	0.0000	-4.7000			**EJ2**
0.325	1270.427	175	0.7303	**-3.1800**			
0.000	1298.427	180	0.0000	-1.2500	0.000	0.000	**P8**
0.089	1321.384	183	0.6220	-2.2702	-2.270		
0.100	1324.222	183	0.9857	**-2.5200**	-2.520	0.000	
0.200	1350.017	187	0.2919	**-4.4800**	-4.480	0.000	
0.300	1375.811	190	0.5980	**-5.8800**	-5.880	0.000	
0.400	1401.606	193	0.9041	**-6.7200**	-6.720	0.000	
0.500	**1427.401**	**197**	**0.5000**	**-7.0000**	**-7.000**	**0.000**	
0.600	1453.196	201	0.0959	-6.7200	-6.720	0.000	
0.700	1478.991	204	0.4020	-5.8800	-5.880	0.000	
0.800	1504.785	207	0.7081	-4.4800	-4.480	0.000	
0.900	1530.580	211	0.0143	-2.5200	-2.520	0.000	
0.911	1533.418	211	0.3780	-2.2702	-2.270		
1.000	1556.375	215	0.0000	-1.2500		0.000	**P9**
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	**-2.8300**	-2.827	-87.444	
0.200	1613.254	222	0.9698	**-5.0200**	-5.024	-86.594	
0.300	1641.694	226	0.6150	**-6.5900**	-6.594	-84.898	
0.400	1670.133	230	0.2601	**-7.5400**	-7.535	-79.875	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	79.875	
0.700	1755.452	241	0.3850	-6.5900	-6.594	84.898	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.594	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.444	
0.921	1818.304	249	0.4408	-2.2858	-2.286	87.571	
1.000	1840.771	252	1.0000	-1.2500		87.955	**P10**
0.000	1840.771	253	0.0000	-1.2500			
0.049	1854.974	255	0.5000	-1.2500			
0.062	1858.875	255	1.0000	-1.2500			
26.067	1866.838	257	0.021	-1.2500			
3.218	1870.056	257	0.433	-1.4539			
3.167	1873.222	257	0.839	-2.0622			
END	1883.937	259	0.2123	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

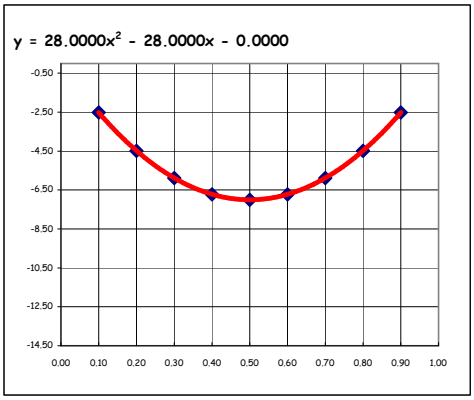
DESCRP: PT DEFINITION - SEGMENT 2, TENDON 817 | CHECKED BY: **IC BY PT** | DATE: 02/10/09

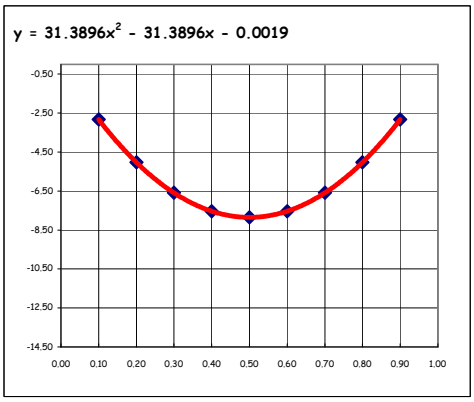
DX at BEG =

DX at END = **43.1667**

	->TO EJ2	EJ2-P8	P8-P9	P9-P10
Span =	1256.9271	41.5000	257.9479	284.3958
A =			28.0000	31.3896
B =			-28.0000	-31.3896
C =			0.0000	-0.0019
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	1256.927	174	0.0000	-4.7000			**EJ2**
0.325	1270.427	175	0.7303	**-3.1800**			
0.000	1298.427	180	0.0000	-1.2500	0.000	0.000	**P8**
0.089	1321.384	183	0.6220	-2.2702	-2.270		
0.100	1324.222	183	0.9857	**-2.5200**	-2.520	0.000	
0.200	1350.017	187	0.2919	**-4.4800**	-4.480	0.000	
0.300	1375.811	190	0.5980	**-5.8800**	-5.880	0.000	
0.400	1401.606	193	0.9041	**-6.7200**	-6.720	0.000	
0.500	**1427.401**	**197**	**0.5000**	**-7.0000**	**-7.000**	**0.000**	
0.600	1453.196	201	0.0959	-6.7200	-6.720	0.000	
0.700	1478.991	204	0.4020	-5.8800	-5.880	0.000	
0.800	1504.785	207	0.7081	-4.4800	-4.480	0.000	
0.900	1530.580	211	0.0143	-2.5200	-2.520	0.000	
0.911	1533.418	211	0.3780	-2.2702	-2.270		
1.000	1556.375	215	0.0000	-1.2500		0.000	**P9**
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	**-2.8300**	-2.827	-87.444	
0.200	1613.254	222	0.9698	**-5.0200**	-5.024	-86.594	
0.300	1641.694	226	0.6150	**-6.5900**	-6.594	-84.898	
0.400	1670.133	230	0.2601	**-7.5400**	-7.535	-79.875	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	79.875	
0.700	1755.452	241	0.3850	-6.5900	-6.594	84.898	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.594	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.444	
0.921	1818.304	249	0.4408	-2.2858	-2.286	87.571	
1.000	1840.771	252	1.0000	-1.2500		87.955	**P10**
0.000	0.000	1	0.0000	-1.2500			
26.067	26.067	5	0.031	-1.2500			
3.218	29.285	5	0.445	-1.4539			
3.167	32.452	5	0.852	-2.0622			
END	43.167	7	0.229	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 90XE — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 43.1667

DX at END = 43.1667

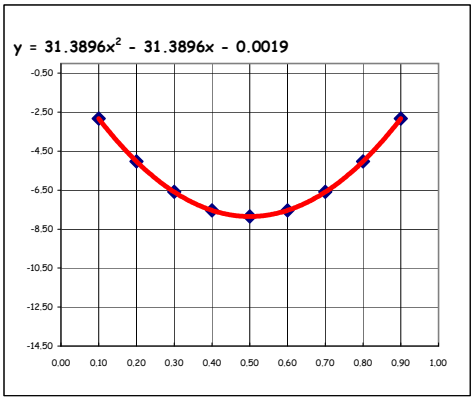
R = 25.5

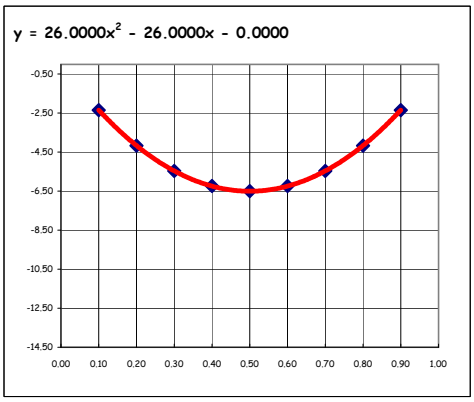
theta = 14.5

Lend = 10.715

	->TO P9	P9-P10	P10-P11
Span =	1556.3750	284.3958	292.1979
A =		31.3896	26.0000
B =		-31.3896	-26.0000
C =		-0.0019	0.0000
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	1513.208	208	0.7877	-4.8333			
3.167	1523.923	210	0.1611	-2.0622			
3.218	1527.090	210	0.5669	-1.4539			
26.067	1530.308	210	0.9794	-1.2500			
0.000	1556.375	215	0.0000	-1.2500	-0.002	-88.175	P9
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	-2.8300	-2.827	-87.720	
0.200	1613.254	222	0.9698	-5.0200	-5.024	-86.961	
0.300	1641.694	226	0.6150	-6.5900	-6.594	-85.446	
0.400	1670.133	230	0.2601	-7.5400	-7.535	-80.949	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	80.949	
0.700	1755.452	241	0.3850	-6.5900	-6.594	85.446	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.961	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.720	
0.921	1818.304	249	0.4408	-2.2858	-2.286		
1.000	1840.771	252	1.0000	-1.2500		88.175	P10
0.000	1840.771	253	0.0000	-1.2500			
0.096	1868.822	257	0.2749	-2.2564	-2.256	-87.275	
0.100	1869.991	257	0.4247	-2.3400	-2.340	-87.248	
0.200	1899.210	261	0.1698	-4.1600	-4.160	-86.332	
0.300	1928.430	264	0.9150	-5.4600	-5.460	-84.508	
0.400	1957.650	268	0.6601	-6.2400	-6.240	-79.114	
0.500	**1986.870**	**272**	**0.5000**	**-6.5000**	**-6.500**	**0.000**	
0.600	2016.090	276	0.3399	-6.2400	-6.240	79.114	
0.700	2045.309	280	0.0850	-5.4600	-5.460	84.508	
0.800	2074.529	283	0.8302	-4.1600	-4.160	86.332	
0.900	2103.749	287	0.5753	-2.3400	-2.340	87.248	
0.904	2104.918	287	0.7251	-2.2564	-2.256	87.275	
1.000	2132.969	292	0.0000	-1.2500		87.797	P11
26.067	2159.036	296	0.021	-1.2500			
3.218	2162.254	296	0.433	-1.4539			
3.167	2165.421	296	0.839	-2.0622			
END	2176.135	298	0.2123	-4.8333			





R = 25.5

theta = 14.5

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 90XW — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 43.1667

DX at END = 43.1667

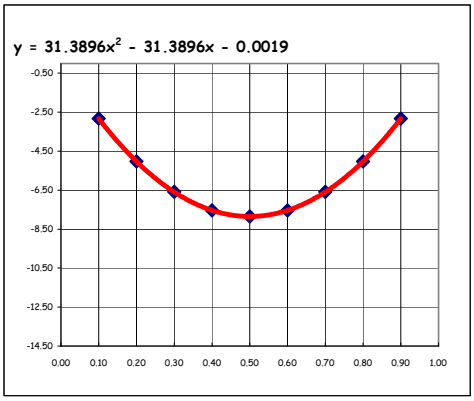
R = 25.5

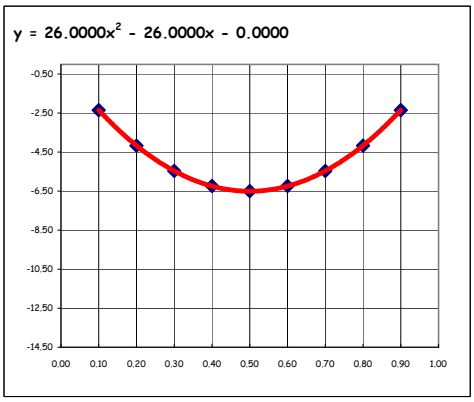
theta = 14.5

Lend = 10.715

	->TO P9	P9-P10	P10-P11
Span =	1556.3750	284.3958	292.1979
A =		31.3896	26.0000
B =		-31.3896	-26.0000
C =		-0.0019	0.0000
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	1513.208	208	0.7877	-4.8333			
3.167	1523.923	210	0.1611	-2.0622			
3.218	1527.090	210	0.5669	-1.4539			
26.067	1530.308	210	0.9794	-1.2500			
0.000	1556.375	215	0.0000	-1.2500	-0.002	-88.175	P9
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	-2.8300	-2.827	-87.720	
0.200	1613.254	222	0.9698	-5.0200	-5.024	-86.961	
0.300	1641.694	226	0.6150	-6.5900	-6.594	-85.446	
0.400	1670.133	230	0.2601	-7.5400	-7.535	-80.949	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	80.949	
0.700	1755.452	241	0.3850	-6.5900	-6.594	85.446	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.961	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.720	
0.921	1818.304	249	0.4408	-2.2858	-2.286		
1.000	1840.771	252	1.0000	-1.2500		88.175	P10
0.000	1840.771	253	0.0000	-1.2500			
0.049	1854.974	255	0.5000	-1.5080	-1.508		
0.062	1858.875	255	1.0000	-1.6692	-1.669		
0.096	1868.822	257	0.2749	-2.2564	-2.256	-87.275	
0.100	1869.991	257	0.4247	-2.3400	-2.340	-87.248	
0.200	1899.210	261	0.1698	-4.1600	-4.160	-86.332	
0.300	1928.430	264	0.9150	-5.4600	-5.460	-84.508	
0.400	1957.650	268	0.6601	-6.2400	-6.240	-79.114	
0.500	**1986.870**	**272**	**0.5000**	**-6.5000**	**-6.500**	**0.000**	
0.600	2016.090	276	0.3399	-6.2400	-6.240	79.114	
0.700	2045.309	280	0.0850	-5.4600	-5.460	84.508	
0.800	2074.529	283	0.8302	-4.1600	-4.160	86.332	
0.900	2103.749	287	0.5753	-2.3400	-2.340	87.248	
0.904	2104.918	287	0.7251	-2.2564	-2.256	87.275	
1.000	2132.969	292	0.0000	-1.2500		87.797	P11
26.067	2159.036	296	0.021	-1.2500			
3.218	2162.254	296	0.433	-1.4539			
3.167	2165.421	296	0.839	-2.0622			
END	2176.135	298	0.2123	-4.8333			





R = 25.5

theta = 14.5

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 907 — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **43.1667**

DX at END = **43.1667**

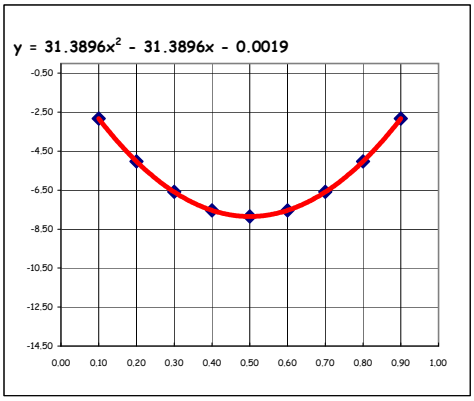
R = **25.5**

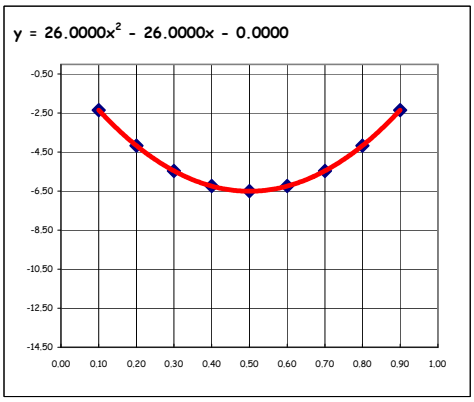
theta = **14.5**

Lend = 10.715

	->TO P9	P9-P10	P10-P11
Span =	1556.3750	284.3958	292.3085
A =		31.3896	26.0000
B =		-31.3896	-26.0000
C =		-0.0019	0.0000
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	1513.208	208	0.7877	**-4.8333**			
3.167	1523.923	210	0.1611	-2.0622			
3.218	1527.090	210	0.5669	-1.4539			
26.067	1530.308	210	0.9794	-1.2500			
0.000	1556.375	215	0.0000	-1.2500	-0.002	-88.175	**P9**
0.079	1578.842	218	0.5592	-2.2858	-2.286		
0.100	1584.815	219	0.3247	**-2.8300**	-2.827	-87.720	
0.200	1613.254	222	0.9698	**-5.0200**	-5.024	-86.961	
0.300	1641.694	226	0.6150	**-6.5900**	-6.594	-85.446	
0.400	1670.133	230	0.2601	**-7.5400**	-7.535	-80.949	
0.500	**1698.573**	**234**	**0.0948**	**-7.8500**	**-7.849**	**0.000**	
0.600	1727.013	237	0.7399	-7.5400	-7.535	80.949	
0.700	1755.452	241	0.3850	-6.5900	-6.594	85.446	
0.800	1783.892	245	0.0302	-5.0200	-5.024	86.961	
0.900	1812.331	248	0.6753	-2.8300	-2.827	87.720	
0.921	1818.304	249	0.4408	-2.2858	-2.286		
1.000	1840.771	252	1.0000	**-1.2500**		88.175	**P10**
0.000	0.000	1	0.0000	-1.2500			
0.096	28.062	5	0.2872	-2.2564	-2.256		
0.100	29.231	5	0.4375	**-2.3400**	-2.340	-87.248	
0.200	58.462	9	0.1957	**-4.1600**	-4.160	-86.332	
0.300	87.693	12	0.9504	**-5.4600**	-5.460	-84.508	
0.400	116.923	16	0.6941	**-6.2400**	-6.240	-79.114	
0.500	**146.154**	**20**	**0.5402**	**-6.5000**	**-6.500**	**0.000**	
0.600	175.385	24	0.3710	-6.2400	-6.240	79.114	
0.700	204.616	28	0.1147	-5.4600	-5.460	84.508	
0.800	233.847	31	0.8525	-4.1600	-4.160	86.332	
0.900	263.078	35	0.5855	-2.3400	-2.340	87.248	
0.904	264.247	35	0.7348	-2.2564	-2.256	87.275	
1.000	292.309	40	0.0000	-1.2500		87.797	**P11**
26.067	318.376	44	0.021	-1.2500			
3.218	321.594	44	0.433	-1.4539			
3.167	324.760	44	0.839	-2.0622			
END	335.475	46	0.2123	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 100XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **43.1667**

DX at END =

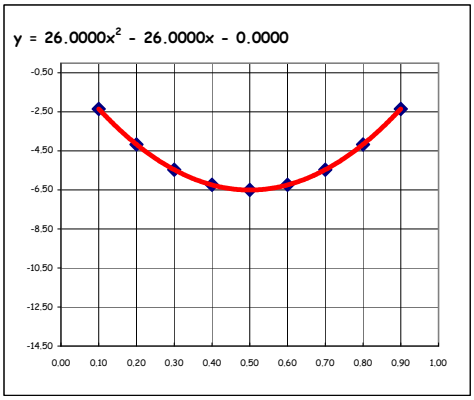
R = **25.5**

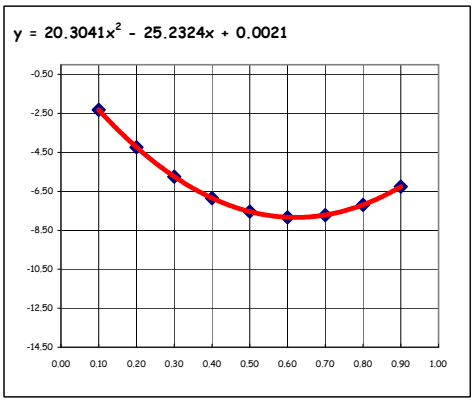
theta = **14.5**

Lend = 10.715

	->TO P10	P10-P11	P11-EJ3
Span =	1840.7708	292.1979	242.8854
A =		26.0000	20.3041
B =		-26.0000	-25.2324
C =		0.0000	0.0021
Y' =0 :		0.5000	0.6214

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	1797.604	246	0.7877	**-4.8333**			
3.167	1808.319	248	0.1611	-2.0622			
3.218	1811.486	248	0.5669	-1.4539			
26.067	1814.704	248	0.9794	-1.2500			
0.000	1840.771	253	0.0000	-1.2500	0.000	-87.797	**P10**
0.096	1868.822	257	0.2749	-2.2564	-2.256		
0.100	1869.991	257	0.4247	**-2.3400**	-2.340	-87.248	
0.200	1899.210	261	0.1698	**-4.1600**	-4.160	-86.332	
0.300	1928.430	264	0.9150	**-5.4600**	-5.460	-84.508	
0.400	1957.650	268	0.6601	**-6.2400**	-6.240	-79.114	
0.500	**1986.870**	**272**	**0.5000**	**-6.5000**	**-6.500**	**0.000**	
0.600	2016.090	276	0.3399	-6.2400	-6.240	79.114	
0.700	2045.309	280	0.0850	-5.4600	-5.460	84.508	
0.800	2074.529	283	0.8302	-4.1600	-4.160	86.332	
0.900	2103.749	287	0.5753	-2.3400	-2.340	87.248	
0.904	2104.918	287	0.7251	-2.2564	-2.256		
1.000	2132.969	292	0.0000	-1.2500		87.797	**P11**
0.083	2153.128	295	0.2634	-1.9523	-1.952		
0.100	2157.257	295	0.7927	**-2.3200**	-2.318	-87.296	
0.200	2181.546	298	0.9057	**-4.2300**	-4.232	-86.655	
0.300	2205.834	302	0.0188	**-5.7400**	-5.740	-85.618	
0.400	2230.123	305	0.1319	**-6.8400**	-6.842	-83.652	
0.500	2254.411	308	0.2450	-7.5400	-7.538	-78.530	
0.600	2278.700	311	0.3581	**-7.8300**	-7.828	-40.941	
0.621	**2283.889**	**312**	**0.0285**		**-7.837**	**0.000**	
0.700	2302.989	314	0.6607	**-7.7100**	-7.712	72.612	
0.800	2327.277	317	0.7738	**-7.1900**	-7.189	82.151	
0.900	2351.566	320	0.8869	**-6.2600**	-6.261	84.949	
0.917	2355.695	321	0.4161	-6.0625	-6.063	85.238	
1.000	2375.854	323	1.0000	**-4.9200**			**EJ3**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 100XW — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 43.1667

DX at END =

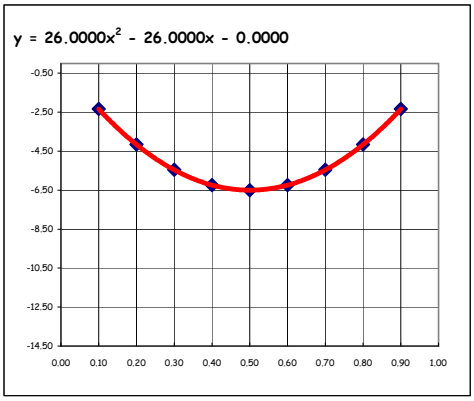
R = 25.5

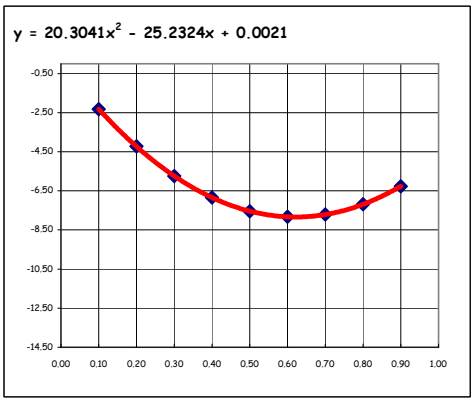
theta = 14.5

Lend = 10.715

	->TO P10	P10-P11	P11-EJ3
Span =	1840.7708	292.1979	242.8854
A =		26.0000	20.3041
B =		-26.0000	-25.2324
C =		0.0000	0.0021
Y' =0 :		0.5000	0.6214

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	1797.604	246	0.7877	-4.8333			
3.167	1808.319	248	0.1611	-2.0622			
3.218	1811.486	248	0.5669	-1.4539			
26.067	1814.704	248	0.9794	-1.2500			
	1840.771	252	1.0000	-1.2500			P10
0.000	1840.771	253	0.0000	-1.2500	0.000	-87.797	
0.049	1854.974	255	0.5000	-1.5080	-1.508		
0.062	1858.875	255	1.0000	-1.6692	-1.669		
0.096	1868.822	257	0.2749	-2.2564	-2.256		
0.100	1869.991	257	0.4247	-2.3400	-2.340	-87.248	
0.200	1899.210	261	0.1698	-4.1600	-4.160	-86.332	
0.300	1928.430	264	0.9150	-5.4600	-5.460	-84.508	
0.400	1957.650	268	0.6601	-6.2400	-6.240	-79.114	
0.500	**1986.870**	**272**	**0.5000**	**-6.5000**	**-6.500**	**0.000**	
0.600	2016.090	276	0.3399	-6.2400	-6.240	79.114	
0.700	2045.309	280	0.0850	-5.4600	-5.460	84.508	
0.800	2074.529	283	0.8302	-4.1600	-4.160	86.332	
0.900	2103.749	287	0.5753	-2.3400	-2.340	87.248	
0.904	2104.918	287	0.7251	-2.2564	-2.256		
1.000	2132.969	292	0.0000	-1.2500		87.797	P11
0.083	2153.128	295	0.2634	-1.9523	-1.952		
0.100	2157.257	295	0.7927	-2.3200	-2.318	-87.296	
0.200	2181.546	298	0.9057	-4.2300	-4.232	-86.655	
0.300	2205.834	302	0.0188	-5.7400	-5.740	-85.618	
0.400	2230.123	305	0.1319	-6.8400	-6.842	-83.652	
0.500	2254.411	308	0.2450	-7.5400	-7.538	-78.530	
0.600	2278.700	311	0.3581	-7.8300	-7.828	-40.941	
0.621	**2283.889**	**312**	**0.0285**		**-7.837**	**0.000**	
0.700	2302.989	314	0.6607	-7.7100	-7.712	72.612	
0.800	2327.277	317	0.7738	-7.1900	-7.189	82.151	
0.900	2351.566	320	0.8869	-6.2600	-6.261	84.949	
0.917	2355.695	321	0.4161	-6.0625	-6.063	85.238	
1.000	2375.854	323	1.0000	-4.9200			EJ3
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

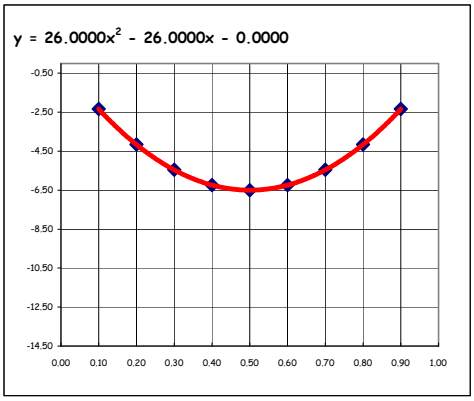
DESCRP: PT DEFINITION - SEGMENT 2, TENDON 1006 — CHECKED BY: IC BY PT — DATE: 02/10/09

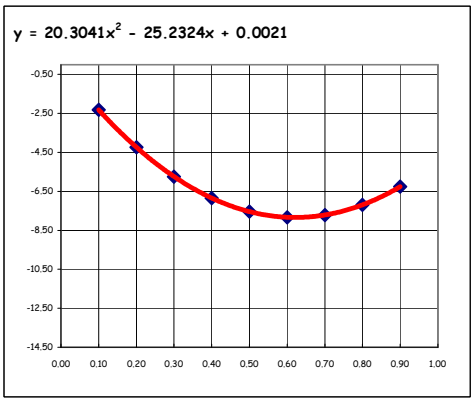
DX at BEG =

DX at END =

	->TO P10	P10-P11	P11-EJ3
Span =	1840.7708	292.3085	242.6985
A =		26.0000	20.3041
B =		-26.0000	-25.2324
C =		0.0000	0.0021
Y' =0 :		0.5000	0.6214

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN							
0.000	0.000	1	0.0000	-1.2500	0.000	-87.797	**P10**
0.096	28.062	5	0.2872	-2.2564	-2.256		
0.100	29.231	5	0.4375	-2.3400	-2.340	-87.248	
0.200	58.462	9	0.1957	-4.1600	-4.160	-86.332	
0.300	87.693	12	0.9504	-5.4600	-5.460	-84.508	
0.400	116.923	16	0.6941	-6.2400	-6.240	-79.114	
0.500	**146.154**	**20**	**0.5402**	**-6.5000**	**-6.500**	**0.000**	
0.600	175.385	24	0.3710	-6.2400	-6.240	79.114	
0.700	204.616	28	0.1147	-5.4600	-5.460	84.508	
0.800	233.847	31	0.8525	-4.1600	-4.160	86.332	
0.900	263.078	35	0.5855	-2.3400	-2.340	87.248	
0.904	264.247	35	0.7348	-2.2564	-2.256		
1.000	292.309	40	0.0000	-1.2500		87.797	**P11**
0.083	312.452	43	0.2614	-1.9523	-1.952		
0.100	316.578	43	0.7903	-2.3200	-2.318	-87.296	
0.200	340.848	46	0.9009	-4.2300	-4.232	-86.655	
0.300	365.118	50	0.0116	-5.7400	-5.740	-85.618	
0.400	389.388	53	0.1223	-6.8400	-6.842	-83.652	
0.500	413.658	56	0.2330	-7.5400	-7.538	-78.530	
0.600	437.928	59	0.3437	-7.8300	-7.828	-40.941	
0.621	**443.112**	**60**	**0.0101**		**-7.837**	**0.000**	
0.700	462.197	62	0.6439	-7.7100	-7.712	72.612	
0.800	486.467	65	0.7832	-7.1900	-7.189	82.151	
0.900	510.737	68	0.8916	-6.2600	-6.261	84.949	
0.917	514.863	69	0.4200	-6.0625	-6.063	85.238	
1.000	535.007	71	1.0000	-4.9200		86.279	**EJ3**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 1007 — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **43.1667**

DX at END =

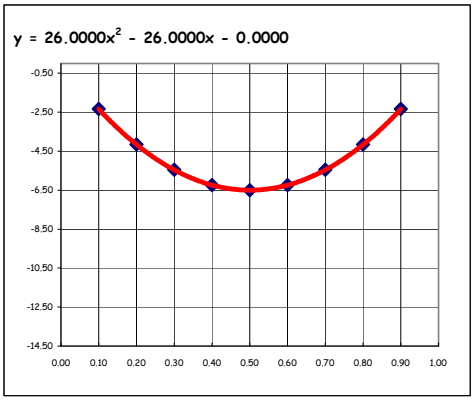
R = **25.5**

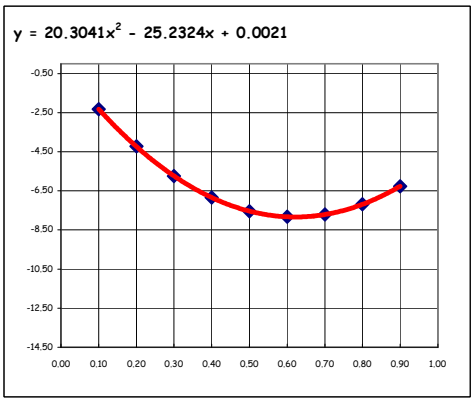
theta = **14.5**

Lend = 10.715

	->TO P10	P10-P11	P11-EJ3
Span =	1840.7708	292.3085	242.6985
A =		26.0000	20.3041
B =		-26.0000	-25.2324
C =		0.0000	0.0021
Y' =0 :		0.5000	0.6214

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	1797.604	246	0.7877	**-4.8333**			
3.167	1808.319	248	0.1610	-2.0622			
3.218	1811.486	248	0.5669	-1.4539			
26.067	1814.704	248	0.9794	-1.2500			
0.000	1840.771	252	1.0000	**-1.2500**			**P10**
0.000	0.000	1	0.0000	**-1.2500**	0.000	-87.797	
0.096	28.062	5	0.2872	-2.2564	-2.256		
0.100	29.231	5	0.4375	**-2.3400**	-2.340	-87.248	
0.200	58.462	9	0.1957	**-4.1600**	-4.160	-86.332	
0.300	87.693	12	0.9504	**-5.4600**	-5.460	-84.508	
0.400	116.923	16	0.6941	**-6.2400**	-6.240	-79.114	
0.500	**146.154**	**20**	**0.5402**	**-6.5000**	**-6.500**	**0.000**	
0.600	175.385	24	0.3710	-6.2400	-6.240	79.114	
0.700	204.616	28	0.1147	-5.4600	-5.460	84.508	
0.800	233.847	31	0.8525	-4.1600	-4.160	86.332	
0.900	263.078	35	0.5855	-2.3400	-2.340	87.248	
0.904	264.247	35	0.7348	-2.2564	-2.256		
1.000	292.309	40	0.0000	-1.2500		87.797	**P11**
0.083	312.452	43	0.2614	-1.9523	-1.952		
0.100	316.578	43	0.7903	**-2.3200**	-2.318	-87.296	
0.200	340.848	46	0.9009	**-4.2300**	-4.232	-86.655	
0.300	365.118	50	0.0116	**-5.7400**	-5.740	-85.618	
0.400	389.388	53	0.1223	**-6.8400**	-6.842	-83.652	
0.500	413.658	56	0.2330	-7.5400	-7.538	-78.530	
0.600	437.928	59	0.3437	**-7.8300**	-7.828	-40.941	
0.621	**443.112**	**60**	**0.0101**		**-7.837**	**0.000**	
0.700	462.197	62	0.6439	**-7.7100**	-7.712	72.612	
0.800	486.467	65	0.7832	**-7.1900**	-7.189	82.151	
0.900	510.737	68	0.8916	**-6.2600**	-6.261	84.949	
0.917	514.863	69	0.4200	-6.0625	-6.063	85.238	
1.000	535.007	71	1.0000	**-4.9200**		86.279	**EJ3**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 110X — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **43.1667**

DX at END =

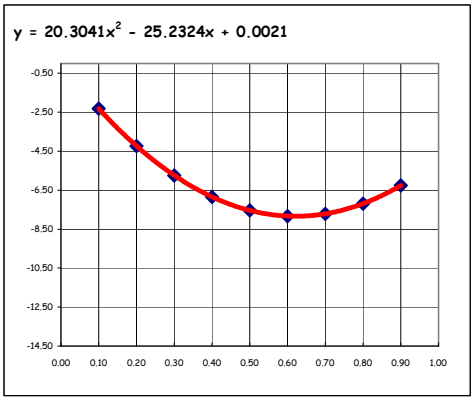
R = **25.5**

theta = **14.5**

Lend = 10.715

	->TO P11	P11-EJ3	
Span =	2132.9687	242.8854	
A =		20.3041	
B =		-25.2324	
C =		0.0021	
Y' =0 :		0.6214	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	2089.802	285	0.7877	**-4.8333**			
3.167	2100.517	287	0.1611	-2.0622			
3.218	2103.684	287	0.5669	-1.4539			
26.067	2106.902	287	0.9794	-1.2500			
0.000	2132.969	292	0.0000	-1.2500	0.002	-87.730	**P11**
0.083	2153.128	295	0.2634	-1.9523	-1.952		
0.100	2157.257	295	0.7927	**-2.3200**	-2.318	-87.296	
0.200	2181.546	298	0.9057	**-4.2300**	-4.232	-86.655	
0.300	2205.834	302	0.0188	**-5.7400**	-5.740	-85.618	
0.400	2230.123	305	0.1319	**-6.8400**	-6.842	-83.652	
0.500	2254.411	308	0.2450	**-7.5400**	-7.538	-78.530	
0.600	2278.700	311	0.3581	**-7.8300**	-7.828	-40.941	
0.621	**2283.889**	**312**	**0.0285**		**-7.837**	**0.000**	
0.700	2302.989	314	0.6607	**-7.7100**	-7.712	72.612	
0.800	2327.277	317	0.7738	**-7.1900**	-7.189	82.151	
0.900	2351.566	320	0.8869	**-6.2600**	-6.261	84.949	
0.917	2355.695	321	0.4161	-6.0625	-6.063		
1.000	2375.854	323	1.0000	**-4.9200**		86.279	**EJ3**
END							



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 2, TENDON 1107 | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **43.1667**

DX at END =

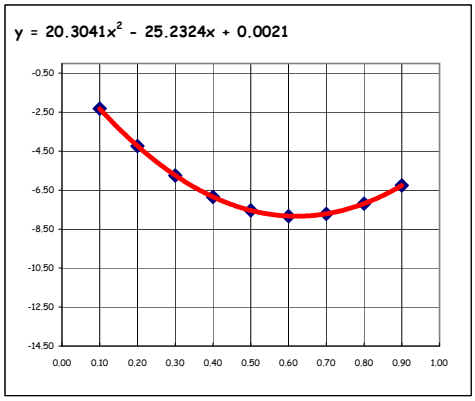
R = **25.5**

theta = **14.5**

Lend = 10.715

	->TO P11	P11-EJ3	
Span =	292.3085	242.6985	
A =		20.3041	
B =		-25.2324	
C =		0.0021	
Y' =0 :		0.6214	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	249.142	33	0.8056	**-4.8333**			
3.167	259.857	35	0.1741	-2.0622			
3.218	263.023	35	0.5785	-1.4539			
26.067	266.241	35	0.9896	-1.2500			
0.000	292.309	40	0.0000	-1.2500	0.002	-87.730	**P11**
0.083	312.452	43	0.2614	-1.9523	-1.952		
0.100	316.578	43	0.7903	-2.3200	-2.318	-87.296	
0.200	340.848	46	0.9009	-4.2300	-4.232	-86.655	
0.300	365.118	50	0.0116	-5.7400	-5.740	-85.618	
0.400	389.388	53	0.1223	-6.8400	-6.842	-83.652	
0.500	413.658	56	0.2330	-7.5400	-7.538	-78.530	
0.600	437.928	59	0.3437	-7.8300	-7.828	-40.941	
0.621	**443.112**	**60**	**0.0101**		**-7.837**	**0.000**	
0.700	462.197	62	0.6439	-7.7100	-7.712	72.612	
0.800	486.467	65	0.7832	-7.1900	-7.189	82.151	
0.900	510.737	68	0.8916	-6.2600	-6.261	84.949	
0.917	514.863	69	0.4200	-6.0625	-6.063		
1.000	535.007	71	1.0000	-4.9200		86.279	**EJ3**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X1E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **62.7500**

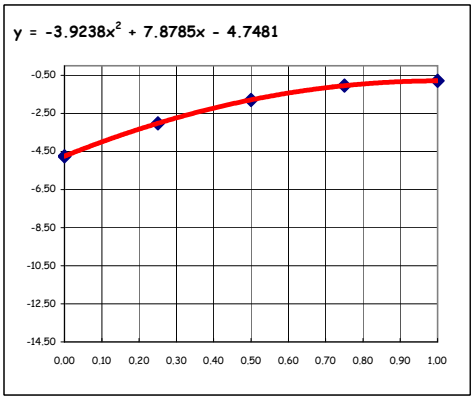
	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

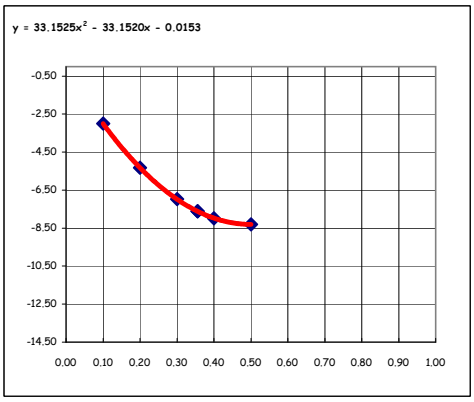
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.7500**			**EJ3**
0.250	2390.432	326	0.8685	**-3.0200**	-3.024	80.407	
0.500	2402.010	328	0.3525	**-1.7900**	-1.790	75.809	
0.750	2413.589	329	0.8364	**-1.0500**	-1.046	63.352	
1.000	2425.167	331	1.0000	**-0.7917**		1.770	**P12**
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	**-3.0000**	-2.999	-87.841	
0.200	2483.606	340	0.1698	**-5.3200**	-5.320	-87.122	
0.300	2512.826	343	0.9150	**-6.9700**	-6.978	-85.688	
0.356	2529.094	**345**	**1.0000**	**-7.6131**	-7.613	-84.035	
0.356	2529.094	**346**	**0.0000**	**-7.6131**	-7.613		
0.400	2542.046	347	0.6601	**-7.9800**	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	2642.945	360	0.7821	**0.0000**			
3.903	2646.887	361	0.2872	0.1947			
3.824	2650.790	361	0.7875	0.7768			
END	2654.615	362	0.2777	**1.5417**			
	2717.365						**P13**

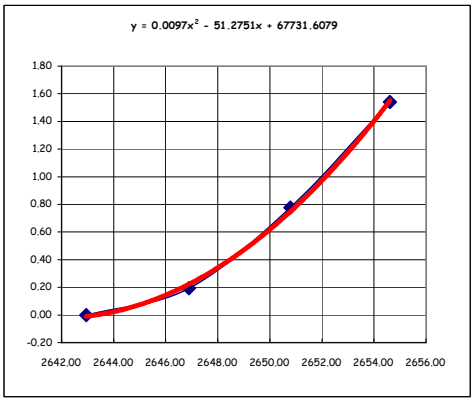
R = **40**

theta = **11.310**

Lend =







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X2E — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 3.0000

DX at END = 87.7500

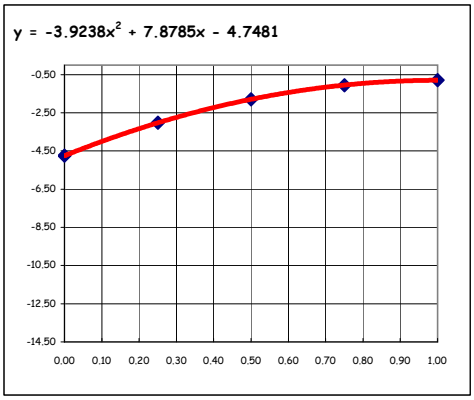
	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

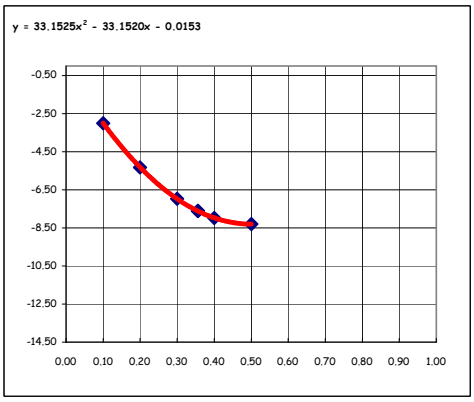
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	-4.7500			EJ3
0.250	2390.432	326	0.8685	-3.0200	-3.024	80.407	
0.500	2402.010	328	0.3525	-1.7900	-1.790	75.809	
0.750	2413.589	329	0.8364	-1.0500	-1.046	63.352	
1.000	2425.167	331	1.0000	-0.7917		1.770	P12
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	-3.0000	-2.999	-87.841	
0.200	2483.606	340	0.1698	-5.3200	-5.320	-87.122	
0.300	2512.826	343	0.9150	-6.9700	-6.978	-85.688	
0.356	2529.094	345	1.0000	-7.6131	-7.613	-84.035	
0.356	2529.094	346	0.0000	-7.6131	-7.613		
0.400	2542.046	347	0.6601	-7.9800	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	2617.945	357	0.5778	0.0000			
3.903	2621.887	358	0.0830	0.1947			
3.824	2625.790	358	0.5832	0.7768			
END	2629.615	359	0.0734	1.5417			
	2717.365						P13

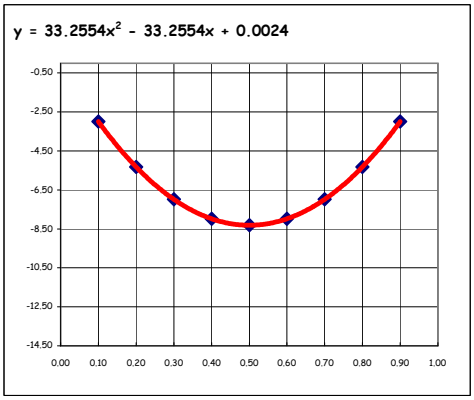
R = 40

theta = 11.310

Lend =

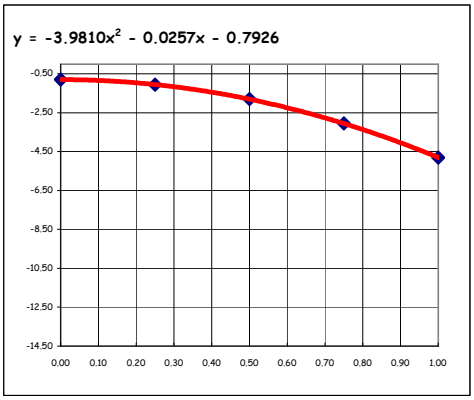






0.100	2748.925	374	0.4869	-0.7917		-87.841	P14
0.047	2762.583	375	0.4289	-1.4871	-1.487	-88.099	
0.100	2777.985	376	0.4911	-2.9900	-2.991	-87.847	
0.200	2807.046	378	0.4953	-5.3200	-5.318	-87.131	
0.300	2836.106	380	0.4994	-6.9800	-6.981	-85.701	
0.400	2865.167	382	0.5036	-7.9800	-7.979	-81.450	
0.500	**2894.227**	**385**	**0.1213**	**-8.3100**	**-8.311**	**0.000**	

0.600	2923.288	387	0.1254	-7.9800	-7.979	81.450	
0.669	2943.404	388	0.5128		-7.359		
0.669	2943.404	388	0.5128		-7.359		
0.700	2952.348	389	0.1296	-6.9800	-6.981	85.701	
0.800	2981.408	391	0.1338	-5.3200	-5.318	87.131	
0.900	3010.469	393	0.1379	-2.9900	-2.991	87.847	
0.953	3025.871	394	0.3869	-1.4871	-1.487	88.099	
0.000	3039.529	397	0.5204	-0.7917		-88.278	**P15**
0.250	3027.969	394	0.6667	-1.0500	-1.048	-63.619	
0.500	3016.409	393	0.5476	-1.8000	-1.801	-75.986	
0.750	3004.849	392	0.7504	-3.0500	-3.051	-80.533	
1.000	2993.290	391	0.9532	-4.8000			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X3E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **112.7500**

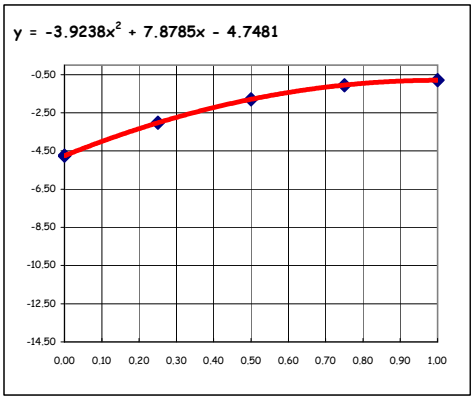
	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

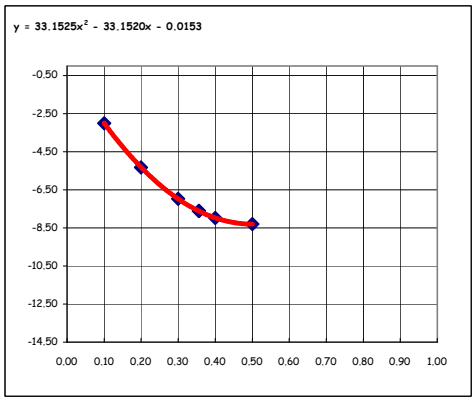
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.7500**			**EJ3**
0.250	2390.432	326	0.8685	**-3.0200**	-3.024	80.407	
0.500	2402.010	328	0.3525	**-1.7900**	-1.790	75.809	
0.750	2413.589	329	0.8364	**-1.0500**	-1.046	63.352	
1.000	2425.167	331	1.0000	**-0.7917**		1.770	**P12**
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	**-3.0000**	-2.999	-87.841	
0.200	2483.606	340	0.1698	**-5.3200**	-5.320	-87.122	
0.300	2512.826	343	0.9150	**-6.9700**	-6.978	-85.688	
0.356	2529.094	**345**	**1.0000**	**-7.6131**	-7.613	-84.035	
0.356	2529.094	**346**	**0.0000**	**-7.6131**	-7.613		
0.400	2542.046	347	0.6601	**-7.9800**	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	2592.945	354	0.3735	**0.0000**			
3.903	2596.887	354	0.8787	0.1947			
3.824	2600.790	355	0.3790	0.7768			
END	2604.615	355	0.8692	**1.5417**			
	2717.365						**P13**

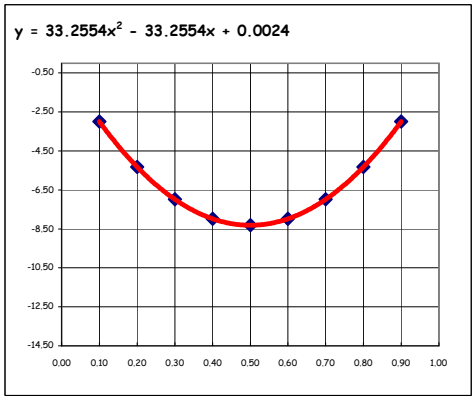
R = **40**

theta = **11.310**

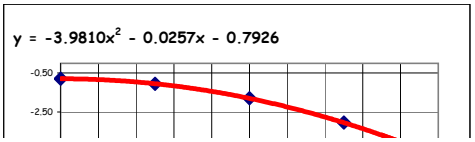
Lend =



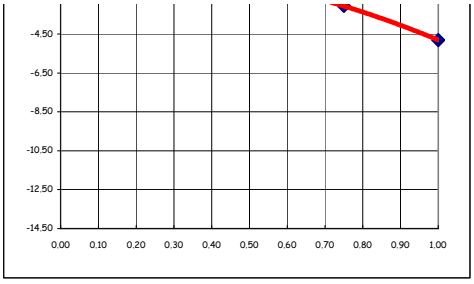




0.100	2748.925	374	0.4869	**-0.7917**		-87.841	**P14**
0.047	2762.583	375	0.4289	-1.4871	-1.487	-88.099	
0.100	2777.985	376	0.4911	**-2.9900**	-2.991	-87.847	
0.200	2807.046	378	0.4953	**-5.3200**	-5.318	-87.131	
0.300	2836.106	380	0.4994	**-6.9800**	-6.981	-85.701	
0.400	2865.167	382	0.5036	**-7.9800**	-7.979	-81.450	
0.500	**2894.227**	**385**	**0.1213**	**-8.3100**	**-8.311**	**0.000**	
0.600	2923.288	387	0.1254	-7.9800	-7.979	81.450	
0.669	2943.404	**388**	**0.5128**		-7.359		
0.669	2943.404	**388**	**0.5128**		-7.359		
0.700	2952.348	389	0.1296	-6.9800	-6.981	85.701	



0.800	2981.408	391	0.1338	-5.3200	-5.318	87.131	
0.900	3010.469	393	0.1379	-2.9900	-2.991	87.847	
0.953	3025.871	394	0.3869	-1.4871	-1.487	88.099	
0.000	3039.529	397	0.5204	**-0.7917**		-88.278	**P15**
0.250	3021.719	393	0.9138	**-1.0500**	-1.048	-63.619	
0.500	3003.909	392	0.6856	**-1.8000**	-1.801	-75.986	
0.750	2986.099	391	0.4573	**-3.0500**	-3.051	-80.533	
1.000	2968.290	390	0.2290	**-4.8000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

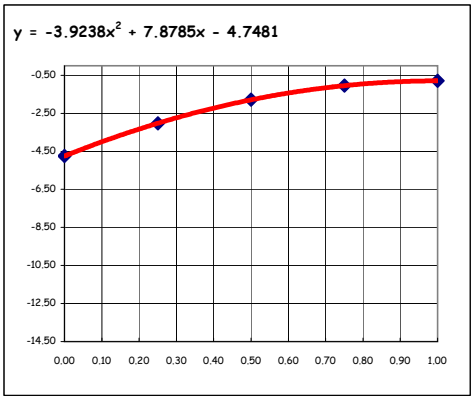
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X4E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **102.1979**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.7500**			**EJ3**
0.250	2390.432	326	0.8685	**-3.0200**	-3.024	80.407	
0.500	2402.010	328	0.3525	**-1.7900**	-1.790	75.809	
0.750	2413.589	329	0.8364	**-1.0500**	-1.046	63.352	
1.000	2425.167	331	1.0000	**-0.7917**		1.770	**P12**
END	2527.365	345	0.7784	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

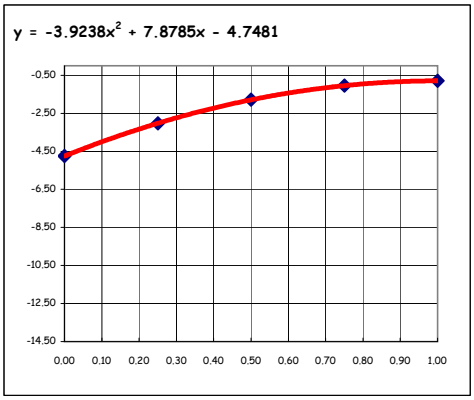
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X5E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **45.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.7500**			**EJ3**
0.250	2390.432	326	0.8685	**-3.0200**	-3.024	80.407	
0.500	2402.010	328	0.3525	**-1.7900**	-1.790	75.809	
0.750	2413.589	329	0.8364	**-1.0500**	-1.046	63.352	
1.000	2425.167	331	1.0000	**-0.7917**		1.770	**P12**
END	2470.167	338	0.4473	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

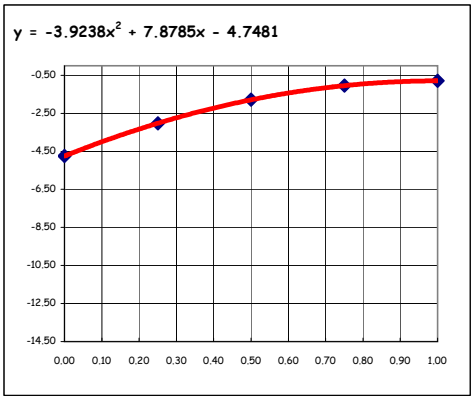
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X6E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **15.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.7500**			**EJ3**
0.250	2390.432	326	0.8685	**-3.0200**	-3.024	80.407	
0.500	2402.010	328	0.3525	**-1.7900**	-1.790	75.809	
0.750	2413.589	329	0.8364	**-1.0500**	-1.046	63.352	
1.000	2425.167	331	1.0000	**-0.7917**		1.770	**P12**
END	2440.167	334	0.6021	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

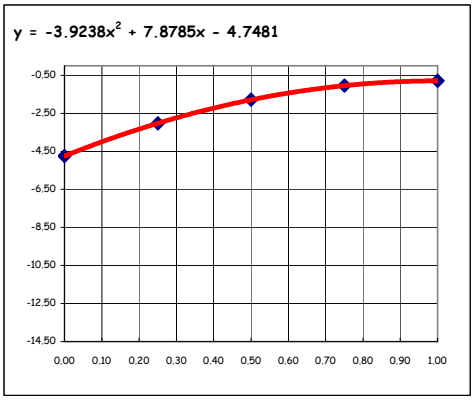
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 1227E | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **30.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.7500**			**EJ3**
0.250	2390.432	326	0.8685	**-3.0200**	-3.024	80.407	
0.500	2402.010	328	0.3525	**-1.7900**	-1.790	75.809	
0.750	2413.589	329	0.8364	**-1.0500**	-1.046	63.352	
1.000	2425.167	331	1.0000	**-0.7917**		1.770	**P12**
END	2455.167	336	0.5247	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X1E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **62.7500**

DX at END = **3.0000**

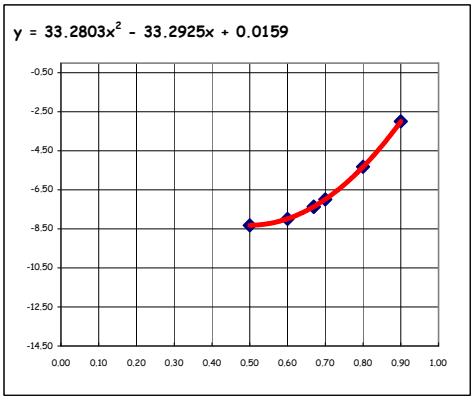
R = **40**

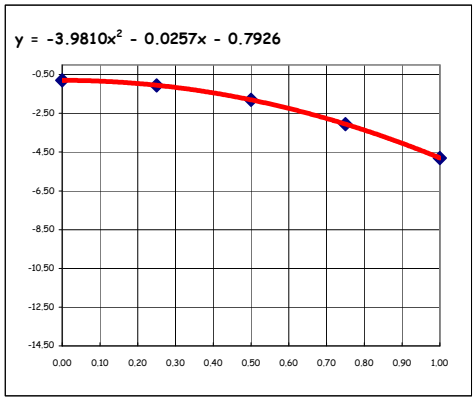
theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969						**P14**
BEGIN	3095.719	404	0.7223	**1.5417**			
3.824	3099.543	405	0.2125	0.7768			
3.903	3103.446	405	0.7128	0.1947			
3.942	3107.388	406	0.2179	**0.0000**			
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.669	3227.448	**421**	**1.0000**	**-7.3591**	-7.359		
0.669	3227.448	**422**	**0.0000**	**-7.3591**	-7.359		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0500**	-1.048	-63.619	
0.500	3342.828	438	0.1475	**-1.8000**	-1.801	-75.986	
0.750	3352.456	439	0.3815	**-3.0500**	-3.051	-80.533	
1.000	3362.083	440	0.6155	**-4.8000**			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X2E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **87.7500**

DX at END = **3.0000**

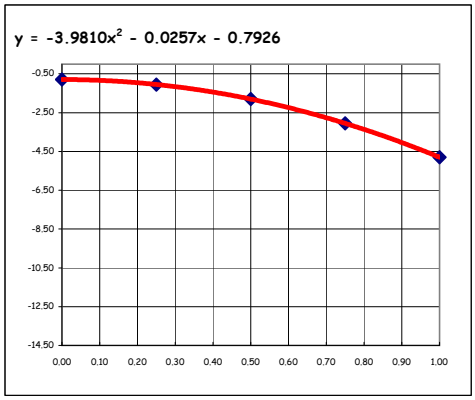
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969						**P14**
BEGIN	3120.719	407	0.9266	**1.5417**			
3.824	3124.543	408	0.4168	0.7768			
3.903	3128.446	408	0.9170	0.1947			
3.942	3132.388	409	0.4222	**0.0000**			
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.669	3227.448	**421**	**1.0000**	**-7.3591**	-7.359		
0.669	3227.448	**422**	**0.0000**	**-7.3591**	-7.359		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0500**	-1.048	-63.619	
0.500	3342.828	438	0.1475	**-1.8000**	-1.801	-75.986	
0.750	3352.456	439	0.3815	**-3.0500**	-3.051	-80.533	
1.000	3362.083	440	0.6155	**-4.8000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X3E — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **112.7500**

DX at END = **3.0000**

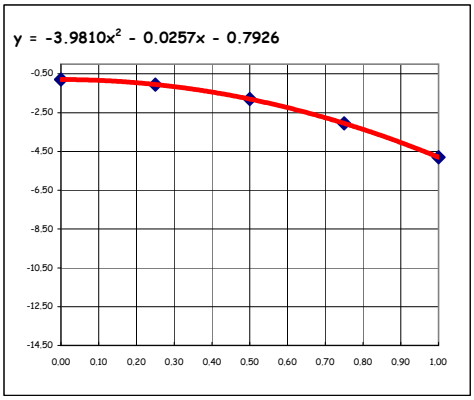
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969						**P14**
BEGIN	3145.719	411	0.1308	**1.5417**			
3.824	3149.543	411	0.6210	0.7768			
3.903	3153.446	412	0.1213	0.1947			
3.942	3157.388	412	0.6265	**0.0000**			
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.669	3227.448	**421**	**1.0000**	**-7.3591**	-7.359		
0.669	3227.448	**422**	**0.0000**	**-7.3591**	-7.359		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0500**	-1.048	-63.619	
0.500	3342.828	438	0.1475	**-1.8000**	-1.801	-75.986	
0.750	3352.456	439	0.3815	**-3.0500**	-3.051	-80.533	
1.000	3362.083	440	0.6155	**-4.8000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X4E | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **100.6042**

DX at END = **3.0000**

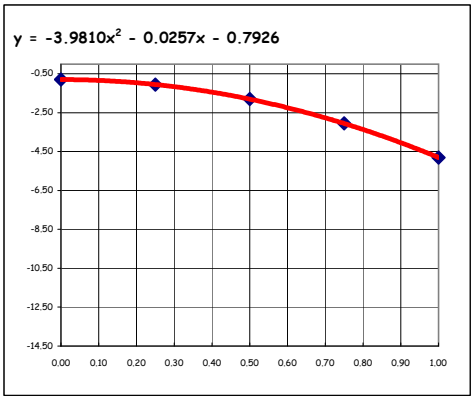
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM		Y from TOP flange		Y'	Depth
			x/l	drawing	equation		
BEGIN	3222.969	421	0.4259	-0.7917			
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0500**	-1.048	-63.619	
0.500	3342.828	438	0.1475	**-1.8000**	-1.801	-75.986	
0.750	3352.456	439	0.3815	**-3.0500**	-3.051	-80.533	
1.000	3362.083	440	0.6155	**-4.8000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 13X1 | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **54.7500**

DX at END = **54.7500**

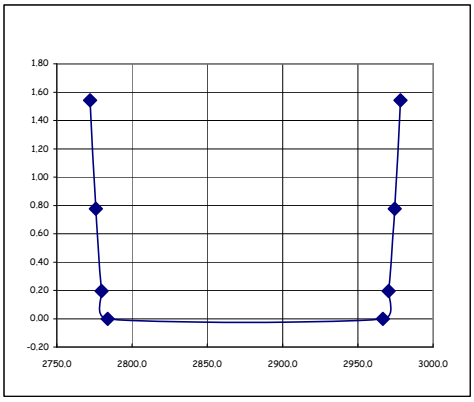
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14
Span =	2375.8542	49.3125	292.1979	315.6042
A =		-3.9238	33.1558	33.1558
B =		7.8785	-33.1558	-33.1558
C =		-4.7481	-0.0148	-0.0148
Y' =0 :		1.0039	0.5000	0.5000

DL	X	ELEM	x/l	Y from BOT flange drawing	equation	Y'	
	2717.365						**P13**
BEGIN	2772.115	376	0.0862	**1.5417**			
3.824	2775.939	376	0.3500	0.7768			
3.903	2779.842	376	0.6191	0.1947			
3.942	2783.784	376	0.8910	**0.0000**			
3.942	2966.550	390	0.1090	**0.0000**			
3.903	2970.491	390	0.3809	0.1947			
3.824	2974.394	390	0.6500	0.7768			
END	2978.219	390	0.9138	**1.5417**			
	3032.969						**P14**
END							



R = **40**

theta = **11.310**

Lend =

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

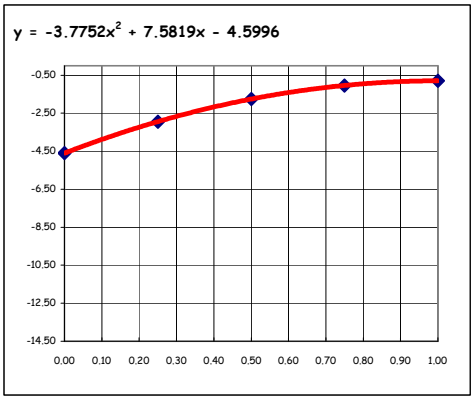
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X1W — CHECKED BY: **IC BY PT** — DATE: 02/10/09

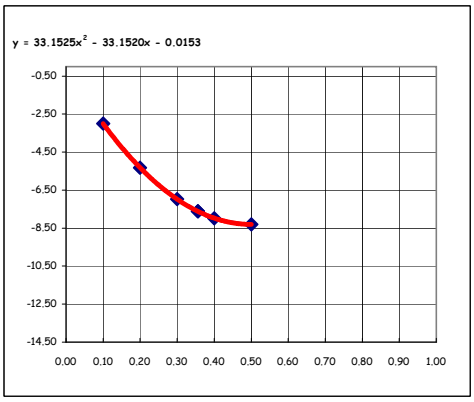
DX at BEG = **3.0000**

DX at END = **62.7500**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.6000**			**EJ3**
0.250	2390.432	326	0.8685	**-2.9400**	-2.939	80.044	
0.500	2402.010	328	0.3525	**-1.7500**	-1.752	75.256	
0.750	2413.589	329	0.8364	**-1.0400**	-1.039	62.277	
1.000	2425.167	331	1.0000	**-0.7917**		0.327	**P12**
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	**-3.0000**	-2.999	-87.841	
0.200	2483.606	340	0.1698	**-5.3200**	-5.320	-87.122	
0.300	2512.826	343	0.9150	**-6.9700**	-6.978	-85.688	
0.356	2529.094	**345**	**1.0000**	**-7.6131**	-7.613	-84.035	
0.356	2529.094	**346**	**0.0000**	**-7.6131**	-7.613		
0.400	2542.046	347	0.6601	**-7.9800**	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	2642.945	360	0.7821	**0.0000**			
3.903	2646.887	361	0.2872	0.1947			
3.824	2650.790	361	0.7875	0.7768			
END	2654.615	362	0.2777	**1.5417**			
	2717.365						**P13**





R = **40**

theta = **11.310**

Lend =

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X2W — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 3.0000

DX at END = 87.7500

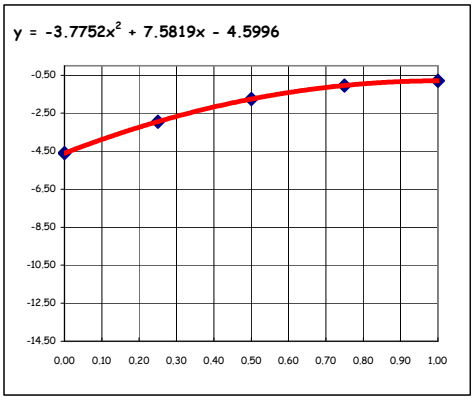
	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

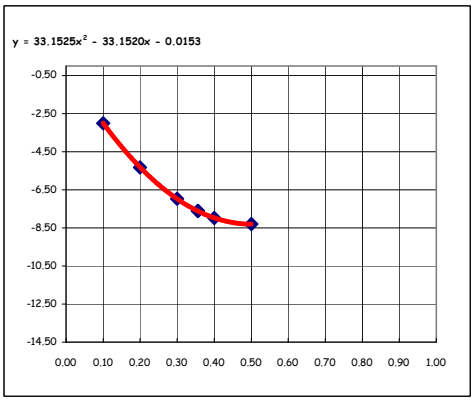
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	-4.6000			EJ3
0.250	2390.432	326	0.8685	-2.9400	-2.939	80.044	
0.500	2402.010	328	0.3525	-1.7500	-1.752	75.256	
0.750	2413.589	329	0.8364	-1.0400	-1.039	62.277	
1.000	2425.167	331	1.0000	-0.7917		0.327	P12
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	-3.0000	-2.999	-87.841	
0.200	2483.606	340	0.1698	-5.3200	-5.320	-87.122	
0.300	2512.826	343	0.9150	-6.9700	-6.978	-85.688	
0.356	2529.094	345	1.0000	-7.6131	-7.613	-84.035	
0.356	2529.094	346	0.0000	-7.6131	-7.613		
0.400	2542.046	347	0.6601	-7.9800	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	2617.945	357	0.5778	0.0000			
3.903	2621.887	358	0.0830	0.1947			
3.824	2625.790	358	0.5832	0.7768			
END	2629.615	359	0.0734	1.5417			
	2717.365						P13

R = 40

theta = 11.310

Lend =





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X3W — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **112.7500**

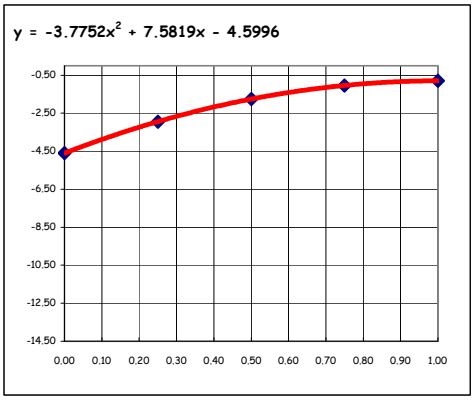
	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

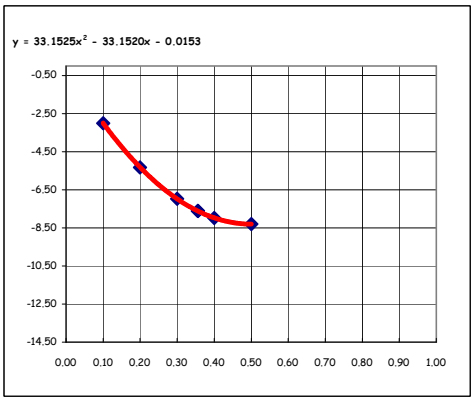
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.6000**			**EJ3**
0.250	2390.432	326	0.8685	**-2.9400**	-2.939	80.044	
0.500	2402.010	328	0.3525	**-1.7500**	-1.752	75.256	
0.750	2413.589	329	0.8364	**-1.0400**	-1.039	62.277	
1.000	2425.167	331	1.0000	**-0.7917**		0.327	**P12**
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	**-3.0000**	-2.999	-87.841	
0.200	2483.606	340	0.1698	**-5.3200**	-5.320	-87.122	
0.300	2512.826	343	0.9150	**-6.9700**	-6.978	-85.688	
0.356	2529.094	**345**	**1.0000**	**-7.6131**	-7.613	-84.035	
0.356	2529.094	**346**	**0.0000**	**-7.6131**	-7.613		
0.400	2542.046	347	0.6601	**-7.9800**	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	2592.945	354	0.3735	**0.0000**			
3.903	2596.887	354	0.8787	0.1947			
3.824	2600.790	355	0.3790	0.7768			
END	2604.615	355	0.8692	**1.5417**			
	2717.365						**P13**

R = **40**

theta = **11.310**

Lend =





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

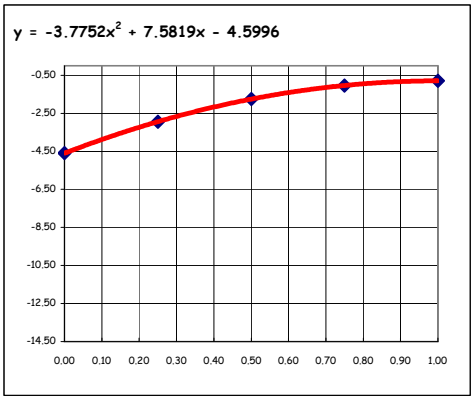
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X4W | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **102.1979**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.6000**			**EJ3**
0.250	2390.432	326	0.8685	**-2.9400**	-2.939	80.044	
0.500	2402.010	328	0.3525	**-1.7500**	-1.752	75.256	
0.750	2413.589	329	0.8364	**-1.0400**	-1.039	62.277	
1.000	2425.167	331	1.0000	**-0.7917**		0.327	**P12**
END	2527.365	345	0.7784	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

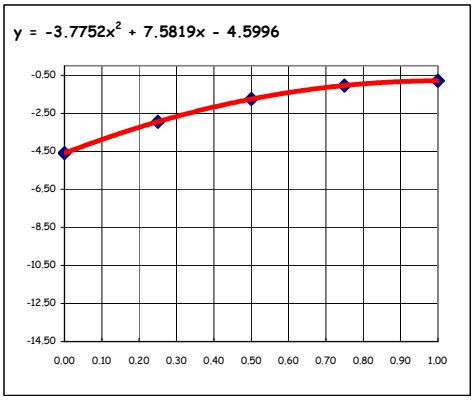
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X5W | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **45.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.6000**			**EJ3**
0.250	2390.432	326	0.8685	**-2.9400**	-2.939	80.044	
0.500	2402.010	328	0.3525	**-1.7500**	-1.752	75.256	
0.750	2413.589	329	0.8364	**-1.0400**	-1.039	62.277	
1.000	2425.167	331	1.0000	**-0.7917**		0.327	**P12**
END	2470.167	338	0.4473	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

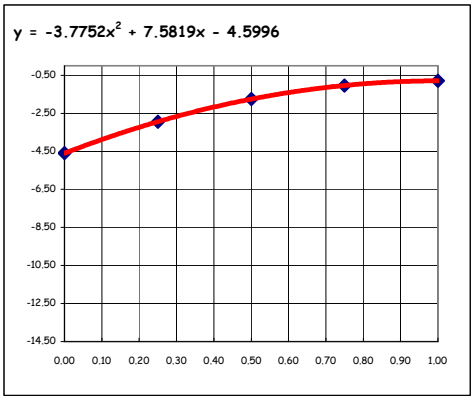
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X6W | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **30.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.6000**			**EJ3**
0.250	2390.432	326	0.8685	**-2.9400**	-2.939	80.044	
0.500	2402.010	328	0.3525	**-1.7500**	-1.752	75.256	
0.750	2413.589	329	0.8364	**-1.0400**	-1.039	62.277	
1.000	2425.167	331	1.0000	**-0.7917**		0.327	**P12**
END	2455.167	336	0.5247	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

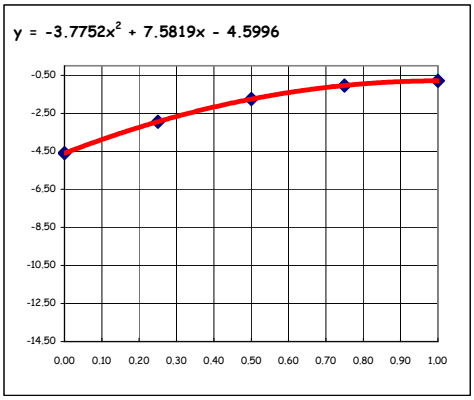
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X7W | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **15.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	**-4.6000**			**EJ3**
0.250	2390.432	326	0.8685	**-2.9400**	-2.939	80.044	
0.500	2402.010	328	0.3525	**-1.7500**	-1.752	75.256	
0.750	2413.589	329	0.8364	**-1.0400**	-1.039	62.277	
1.000	2425.167	331	1.0000	**-0.7917**		0.327	**P12**
END	2440.167	334	0.6021	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X1W — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **62.7500**

DX at END = **3.0000**

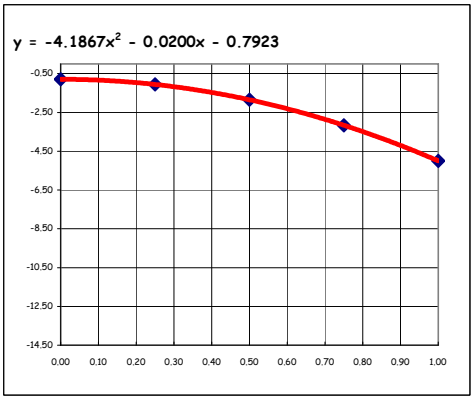
R = **40**

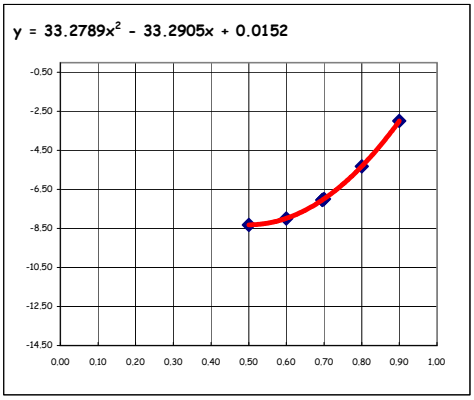
theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969					-88.272	**P14**
BEGIN	3095.719	404	0.7223	**1.5417**			
3.824	3099.543	405	0.2125	0.7768			
3.903	3103.446	405	0.7128	0.1947			
3.942	3107.388	406	0.2179	**0.0000**			
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.696	3235.250	**422**	**1.0000**	-7.0330	-7.033		
0.696	3235.250	**423**	**0.0000**	-7.0330	-7.033		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0600**	-1.059	-64.677	
0.500	3342.828	438	0.1475	**-1.8500**	-1.849	-76.628	
0.750	3352.456	439	0.3815	**-3.1600**	-3.162	-80.981	
1.000	3362.083	440	0.6155	**-5.0000**			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X5W | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **93.6042**

DX at END = **3.0000**

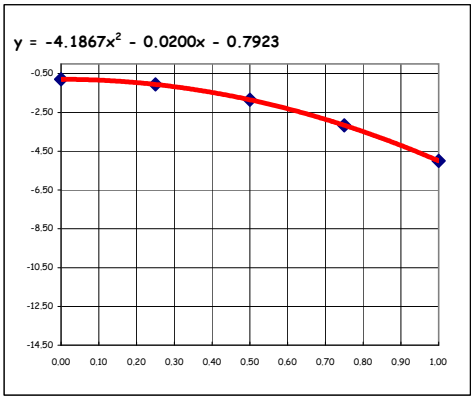
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN	3229.969	422	0.3231	-0.7917			
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0600**	-1.059	-64.677	
0.500	3342.828	438	0.1475	**-1.8500**	-1.849	-76.628	
0.750	3352.456	439	0.3815	**-3.1600**	-3.162	-80.981	
1.000	3362.083	440	0.6155	**-5.0000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X6W | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **15.0000**

DX at END = **3.0000**

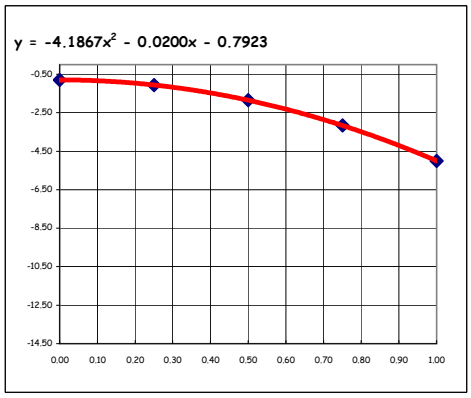
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM		Y from TOP flange		Y'	Depth
			x/l	drawing	equation		
BEGIN	3308.573	432	0.3979	-0.7917			
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0600**	-1.059	-64.677	
0.500	3342.828	438	0.1475	**-1.8500**	-1.849	-76.628	
0.750	3352.456	439	0.3815	**-3.1600**	-3.162	-80.981	
1.000	3362.083	440	0.6155	**-5.0000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X2W — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **91.0000**

DX at END = **3.0000**

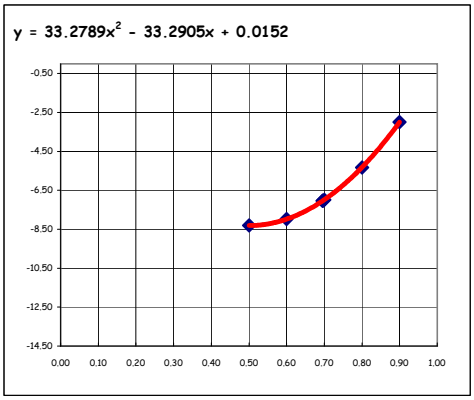
R = **40**

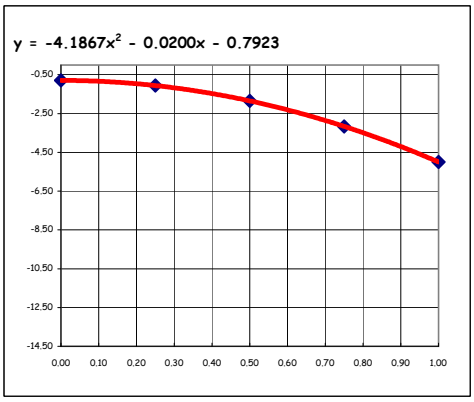
theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969					-88.272	**P14**
BEGIN	3123.969	408	0.3431	**1.5417**			
3.824	3127.793	408	0.8333	0.7768			
3.903	3131.696	409	0.3336	0.1947			
3.942	3135.638	409	0.8388	**0.0000**			
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.696	3235.250	**422**	**1.0000**	-7.0330	-7.033		
0.696	3235.250	**423**	**0.0000**	-7.0330	-7.033		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0600**	-1.059	-64.677	
0.500	3342.828	438	0.1475	**-1.8500**	-1.849	-76.628	
0.750	3352.456	439	0.3815	**-3.1600**	-3.162	-80.981	
1.000	3362.083	440	0.6155	**-5.0000**			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X3W — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **119.2500**

DX at END = **3.0000**

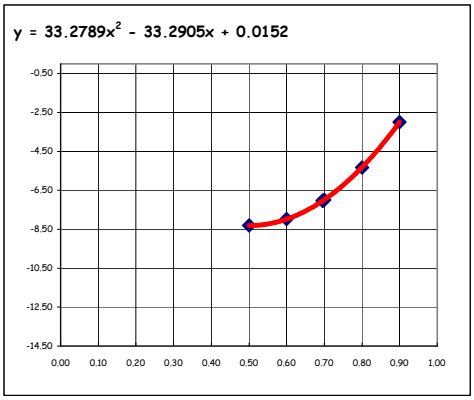
R = **40**

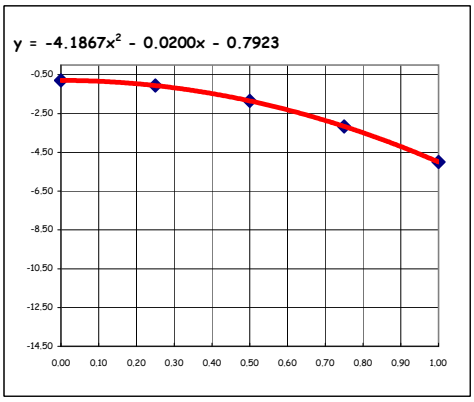
theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969					-88.272	**P14**
BEGIN	3152.219	411	0.9640	**1.5417**			
3.824	3156.043	412	0.4541	0.7768			
3.903	3159.946	412	0.9544	0.1947			
3.942	3163.888	413	0.4596	**0.0000**			
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.696	3235.250	**422**	**1.0000**	-7.0330	-7.033		
0.696	3235.250	**423**	**0.0000**	-7.0330	-7.033		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0600**	-1.059	-64.677	
0.500	3342.828	438	0.1475	**-1.8500**	-1.849	-76.628	
0.750	3352.456	439	0.3815	**-3.1600**	-3.162	-80.981	
1.000	3362.083	440	0.6155	**-5.0000**			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X4W — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **147.5000**

DX at END = **3.0000**

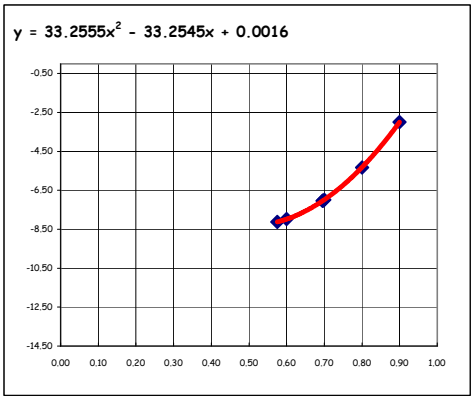
R = **40**

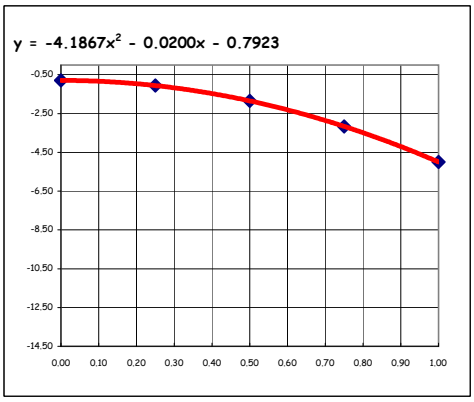
theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.7943	33.1558	33.1558	33.2554	-4.1867
B =		7.5943	-33.1558	-33.1558	-33.2554	-0.0200
C =		-4.6003	-0.0148	-0.0148	0.0024	-0.7923
Y' =0 @		1.0008	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	3032.969					-88.272	**P14**
BEGIN	3180.469	415	0.5848	**1.5417**			
3.824	3184.293	416	0.1237	0.7768			
3.903	3188.196	416	0.9490	0.1947			
3.942	3192.138	417	0.4743	**0.0000**			
0.575	**3200.066**	**418**	**0.4905**	**-8.1244**	**-8.124**	**78.664**	
0.600	3207.331	419	0.4216	**-7.9800**	-7.979	81.450	
0.696	3235.250	422	1.0000	-7.0330	-7.033		
0.696	3235.250	423	0.0000	-7.0330	-7.033		
0.700	3236.392	423	0.1463	**-6.9800**	-6.981	85.701	
0.800	3265.452	426	0.8710	**-5.3200**	-5.318	87.131	
0.900	3294.513	430	0.5957	**-2.9900**	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0600**	-1.059	-64.677	
0.500	3342.828	438	0.1475	**-1.8500**	-1.849	-76.628	
0.750	3352.456	439	0.3815	**-3.1600**	-3.162	-80.981	
1.000	3362.083	440	0.6155	**-5.0000**			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

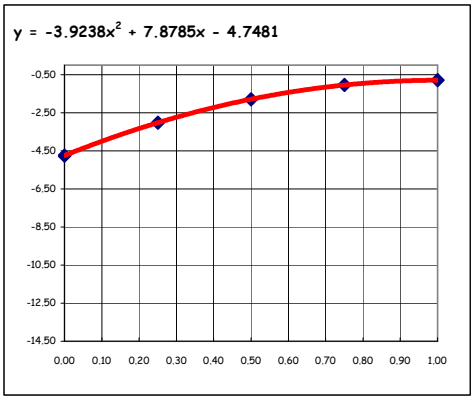
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14XXE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

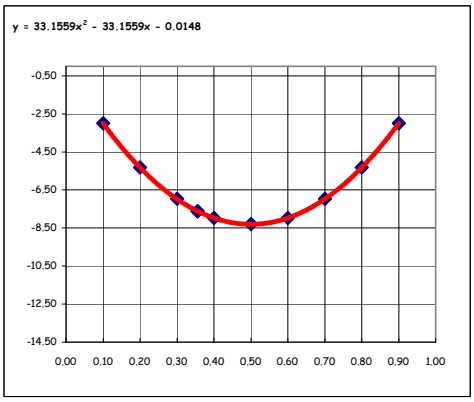
DX at BEG = **3.0000**

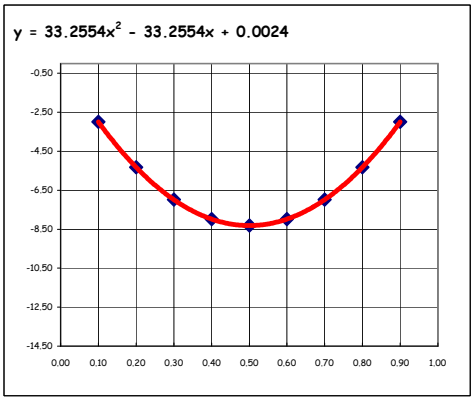
DX at END = **3.0000**

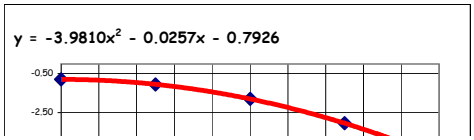
	->TO EJ3	EJ3-P12	P12-P13	P13-P14	P14-P15	P15-EJ 5
Span =	2375.8542	49.3125	292.1979	315.6042	290.6042	41.5104
A =		-3.9238	33.1558	33.1558	33.2554	-3.9810
B =		7.8785	-33.1558	-33.1558	-33.2554	-0.0257
C =		-4.7481	-0.0148	-0.0148	0.0024	-0.7926
Y' =0 @		1.0039	0.5000	0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	2378.854	325	0.3845	-4.7500			**EJ3**
0.250	2390.432	326	0.8685	-3.0200	-3.024	80.407	
0.500	2402.010	328	0.3525	-1.7900	-1.790	75.809	
0.750	2413.589	329	0.8364	-1.0500	-1.046	63.352	
1.000	2425.167	331	1.0000	-0.7917		1.770	**P12**
0.047	2438.900	334	0.4398	-1.4999	-1.500		
0.100	2454.386	336	0.4247	-3.0000	-2.999	-87.841	
0.200	2483.606	340	0.1698	-5.3200	-5.320	-87.122	
0.300	2512.826	343	0.9150	-6.9700	-6.978	-85.688	
0.356	2529.094	345	1.0000	-7.6131	-7.613	-84.035	
0.356	2529.094	346	0.0000	-7.6131	-7.613		
0.400	2542.046	347	0.6601	-7.9800	-7.972	-81.424	
0.500	**2571.266**	**351**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
0.600	2600.485	355	0.3399	-7.9800	-7.972	81.424	
0.700	2629.705	359	0.0850	-6.9700	-6.978	85.688	
0.800	2658.925	362	0.8302	-5.3200	-5.320	87.122	
0.900	2688.145	366	0.5753	-3.0000	-2.999	87.841	
0.953	2703.631	368	0.5602	-1.4999	-1.500	88.093	
1.000	2717.365	370	1.0000	-0.7917		88.272	**P13**
0.047	2732.198	373	0.3333	-1.4999	-1.500	-88.093	
0.100	2748.925	374	0.4869	-3.0000	-2.999	-87.841	
0.200	2780.485	376	0.6635	-5.3200	-5.320	-87.122	
0.300	2812.046	378	0.8401	-6.9700	-6.978	-85.688	
0.400	2843.606	381	0.0167	-7.9800	-7.972	-81.424	
0.500	**2875.167**	**383**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
0.600	2906.727	385	0.9833	-7.9800	-7.972	81.424	
0.700	2938.288	388	0.1599	-6.9700	-6.978	85.688	
0.800	2969.848	390	0.3365	-5.3200	-5.320	87.122	
0.900	3001.408	392	0.5131	-3.0000	-2.999	87.841	
0.953	3018.135	393	0.6667	-1.4999	-1.500	88.093	
1.000	3032.969	395	1.0000	-0.7917		88.272	**P14**
0.047	3046.627	398	0.4302	-1.4871	-1.487	-88.099	
0.100	3062.029	400	0.4043	-2.9900	-2.991	-87.847	
0.200	3091.090	404	0.1290	-5.3200	-5.318	-87.131	
0.300	3120.150	407	0.8537	-6.9800	-6.981	-85.701	
0.400	3149.210	411	0.5784	-7.9800	-7.979	-81.450	
0.500	**3178.271**	**415**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	3207.331	419	0.4216	-7.9800	-7.979	81.450	
0.669	3227.448	421	1.0000		-7.359		
0.669	3227.448	422	0.0000		-7.359		

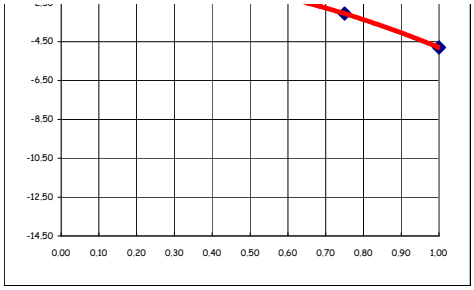








0.700	3236.392	423	0.1463	-6.9800	-6.981	85.701	
0.800	3265.452	426	0.8710	-5.3200	-5.318	87.131	
0.900	3294.513	430	0.5957	-2.9900	-2.991	87.847	
0.953	3309.915	432	0.5698	-1.4871	-1.487	88.099	
0.000	3323.573	434	1.0000	**-0.7917**		-88.278	**P15**
0.250	3333.201	436	0.9136	**-1.0500**	-1.048	-63.619	
0.500	3342.828	438	0.1475	**-1.8000**	-1.801	-75.986	
0.750	3352.456	439	0.3815	**-3.0500**	-3.051	-80.533	
1.000	3362.083	440	0.6155	**-4.8000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 13X2 | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **69.2500**

DX at END = **69.2500**

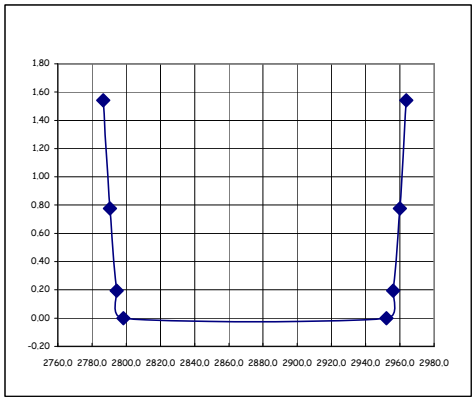
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14
Span =	2375.8542	49.3125	292.1979	315.6042
A =		-3.9238	33.1558	33.1558
B =		7.8785	-33.1558	-33.1558
C =		-4.7481	-0.0148	-0.0148
Y' =0 :		1.0039	0.5000	0.5000

DL	X	ELEM	x/l	Y from BOT flange drawing	equation	Y'	
	2717.365						**P13**
BEGIN	2786.615	377	0.0862	**1.5417**			
3.824	2790.439	377	0.3500	0.7768			
3.903	2794.342	377	0.6191	0.1947			
3.942	2798.284	377	0.8910	**0.0000**			
3.942	2952.050	389	0.1090	**0.0000**			
3.903	2955.991	389	0.3809	0.1947			
3.824	2959.894	389	0.6500	0.7768			
END	2963.719	389	0.9138	**1.5417**			
	3032.969						**P14**



R = **40**

theta = **11.310**

Lend =

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 13X3 | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **83.7500**

DX at END = **83.7500**

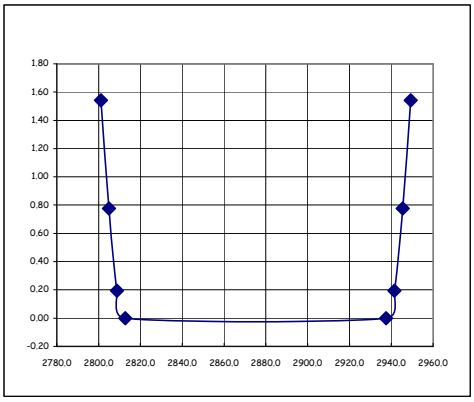
R = **40**

theta = **11.310**

Lend =

	->TO EJ3	EJ3-P12	P12-P13	P13-P14
Span =	2375.8542	49.3125	292.1979	315.6042
A =		-3.9238	33.1558	33.1558
B =		7.8785	-33.1558	-33.1558
C =		-4.7481	-0.0148	-0.0148
Y' =0 :		1.0039	0.5000	0.5000

DL	X	ELEM	x/l	Y from BOT flange drawing	equation	Y'	
	2717.365						**P13**
BEGIN	2801.115	378	0.0862	**1.5417**			
3.824	2804.939	378	0.3500	0.7768			
3.903	2808.842	378	0.6191	0.1947			
3.942	2812.784	378	0.8910	**0.0000**			
3.942	2937.550	388	0.1090	**0.0000**			
3.903	2941.491	388	0.3809	0.1947			
3.824	2945.394	388	0.6500	0.7768			
END	2949.219	388	0.9138	**1.5417**			
	3032.969						**P14**



R = **40**

theta = **11.310**

Lend =

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X1C | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **62.7500**

DX at END = **3.0000**

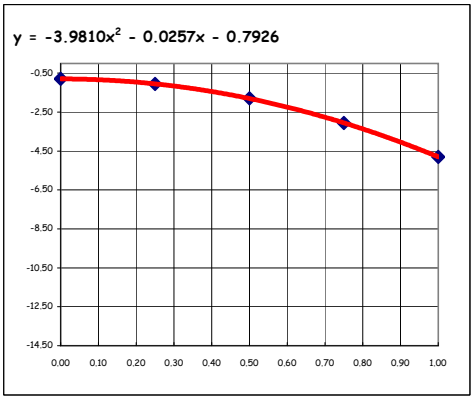
R = **40**

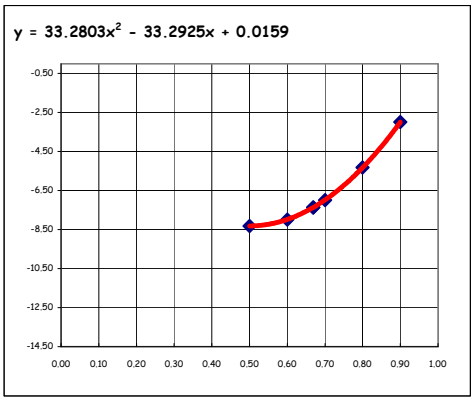
theta = **11.310**

Lend =

	->TO P14	P14-P15	P15-EJ 5	P13-P14
Span =	0.0000	290.6607	41.5189	
A =		33.2554	-3.9810	
B =		-33.2554	-0.0257	
C =		0.0024	-0.7926	
Y' =0 @		0.5000	-0.0032	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	0.000						**P14**
BEGIN	62.750	9	0.7207	**1.5417**			
3.824	66.574	10	0.2108	0.7768			
3.903	70.478	10	0.7110	0.1947			
3.942	74.419	11	0.2161	**0.0000**			
0.500	**145.330**	**20**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	174.396	24	0.4216	**-7.9800**	-7.979	81.450	
0.669	194.517	**26**	**1.0000**	-7.3591	-7.359		
0.669	194.517	**27**	**0.0000**	-7.3591	-7.359		
0.700	203.462	28	0.1463	**-6.9800**	-6.981	85.701	
0.800	232.529	31	0.8710	**-5.3200**	-5.318	87.131	
0.900	261.595	35	0.5957	**-2.9900**	-2.991	87.847	
0.953	277.000	37	0.5698	-1.4871	-1.487	88.099	
0.000	290.661	40	**1.0000**	**-0.7917**		-88.278	**P15**
0.250	300.290	41	0.9055	**-1.0500**	-1.048	-63.619	
0.500	309.920	43	0.1476	**-1.8000**	-1.801	-75.986	
0.750	319.550	44	0.3816	**-3.0500**	-3.051	-80.533	
1.000	329.180	45	0.6156	**-4.8000**			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X2C — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 87.7500

DX at END = 3.0000

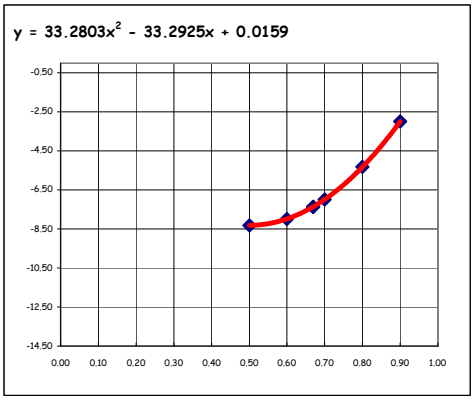
R = 40

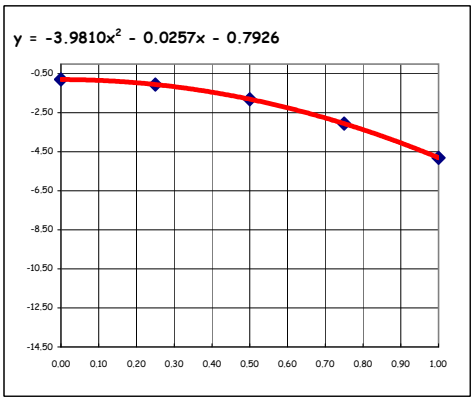
theta = 11.310

Lend =

	->TO P14	P14-P15	P15-EJ 5	P13-P14
Span =	0.0000	290.6607	41.5189	
A =		33.2554	-3.9810	
B =		-33.2554	-0.0257	
C =		0.0024	-0.7926	
Y' =0 @		0.5000	-0.0032	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	0.000						**P14**
BEGIN	87.750	12	0.9244	1.5417			
3.824	91.574	13	0.4145	0.7768			
3.903	95.478	13	0.9146	0.1947			
3.942	99.419	14	0.4197	0.0000			
0.500	**145.330**	**20**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	174.396	24	0.4216	-7.9800	-7.979	81.450	
0.669	194.517	26	1.0000	-7.3591	-7.359		
0.669	194.517	27	0.0000	-7.3591	-7.359		
0.700	203.462	28	0.1463	-6.9800	-6.981	85.701	
0.800	232.529	31	0.8710	-5.3200	-5.318	87.131	
0.900	261.595	35	0.5957	-2.9900	-2.991	87.847	
0.953	277.000	37	0.5698	-1.4871	-1.487	88.099	
0.000	290.661	40	1.0000	-0.7917		-88.278	**P15**
0.250	300.290	41	0.9055	-1.0500	-1.048	-63.619	
0.500	309.920	43	0.1476	-1.8000	-1.801	-75.986	
0.750	319.550	44	0.3816	-3.0500	-3.051	-80.533	
1.000	329.180	45	0.6156	-4.8000			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14X3C — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 112.7500

DX at END = 3.0000

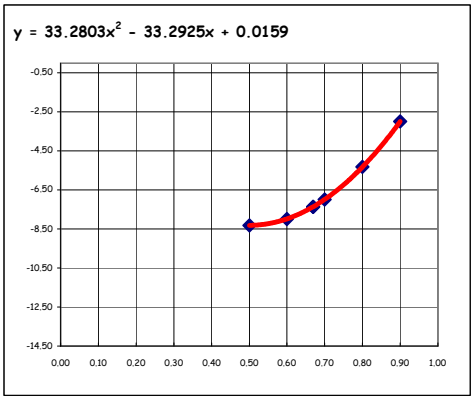
R = 40

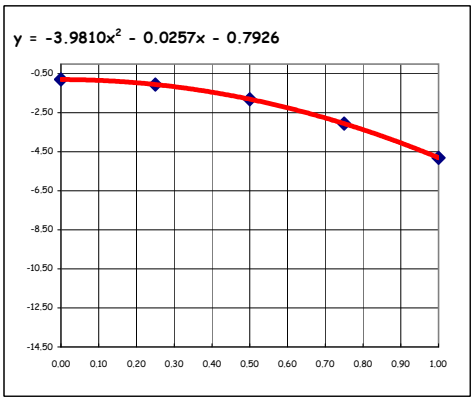
theta = 11.310

Lend =

	->TO P14	P14-P15	P15-EJ 5	P13-P14
Span =	0.0000	290.6607	41.5189	
A =		33.2554	-3.9810	
B =		-33.2554	-0.0257	
C =		0.0024	-0.7926	
Y' =0 @		0.5000	-0.0032	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
	0.000						**P14**
BEGIN	112.750	16	0.1280	1.5417			
3.824	116.574	16	0.6181	0.7768			
3.903	120.478	17	0.1183	0.1947			
3.942	124.419	17	0.6234	0.0000			
0.500	**145.330**	**20**	**0.3031**	**-8.3100**	**-8.311**	**0.000**	
0.600	174.396	24	0.4216	-7.9800	-7.979	81.450	
0.669	194.517	26	1.0000	-7.3591	-7.359		
0.669	194.517	27	0.0000	-7.3591	-7.359		
0.700	203.462	28	0.1463	-6.9800	-6.981	85.701	
0.800	232.529	31	0.8710	-5.3200	-5.318	87.131	
0.900	261.595	35	0.5957	-2.9900	-2.991	87.847	
0.953	277.000	37	0.5698	-1.4871	-1.487	88.099	
0.000	290.661	40	1.0000	-0.7917		-88.278	**P15**
0.250	300.290	41	0.9055	-1.0500	-1.048	-63.619	
0.500	309.920	43	0.1476	-1.8000	-1.801	-75.986	
0.750	319.550	44	0.3816	-3.0500	-3.051	-80.533	
1.000	329.180	45	0.6156	-4.8000			**EJ5**
END							





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14XXC | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **100.6042**

DX at END = **3.0000**

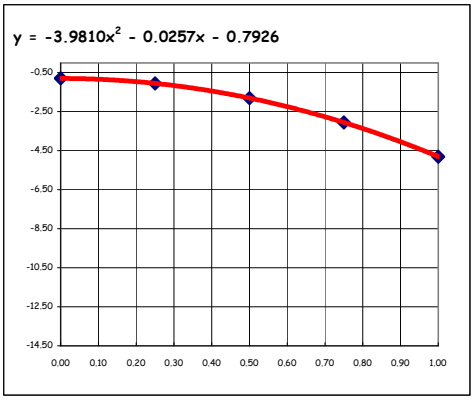
R = **40**

theta = **11.310**

Lend =

	->TO P14	P14-P15	P15-EJ 5	P13-P14
Span =	0.0000	290.6607	41.5189	
A =		33.2554	-3.9810	
B =		-33.2554	-0.0257	
C =		0.0024	-0.7926	
Y' =0 @		0.5000	-0.0032	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN	190.057	26	0.4284	-0.7917			
0.000	290.661	40	**0.0000**	**-0.7917**		-88.278	**P15**
0.250	300.290	41	0.9055	**-1.0500**	-1.048	-63.619	
0.500	309.920	43	0.1476	**-1.8000**	-1.801	-75.986	
0.750	319.550	44	0.3816	**-3.0500**	-3.051	-80.533	
1.000	329.180	45	0.6156	**-4.8000**			**EJ5**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

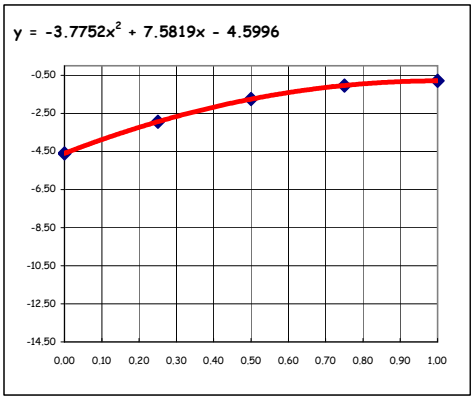
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X1A — CHECKED BY: IC BY PT — DATE: 02/10/09

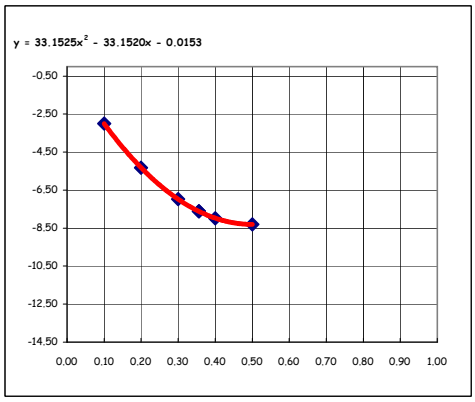
DX at BEG = 3.0000

DX at END = 62.7500

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	-4.6000			EJ3
0.250	549.593	74	0.8682	-2.9400	-2.939	80.044	
0.500	561.179	76	0.3522	-1.7500	-1.752	75.256	
0.750	572.765	77	0.8362	-1.0400	-1.039	62.277	
1.000	584.351	80	0.0000	-0.7917		0.327	P12
0.047	598.093	82	0.4400	-1.4999	-1.500		
0.100	613.589	84	0.4248	-3.0000	-2.999	-87.841	
0.200	642.828	88	0.1698	-5.3200	-5.320	-87.122	
0.300	672.066	91	0.9149	-6.9700	-6.978	-85.688	
0.356	688.345	93	1.0000	-7.6131	-7.613	-84.035	
0.356	688.345	94	0.0000	-7.6131	-7.613		
0.400	701.305	95	0.6599	-7.9800	-7.972	-81.424	
0.500	**730.543**	**99**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	802.317	108	0.7882	0.0000			
3.903	806.259	109	0.2931	0.1947			
3.824	810.162	109	0.7930	0.7768			
END	813.986	110	0.2829	1.5417			
	876.736						P13

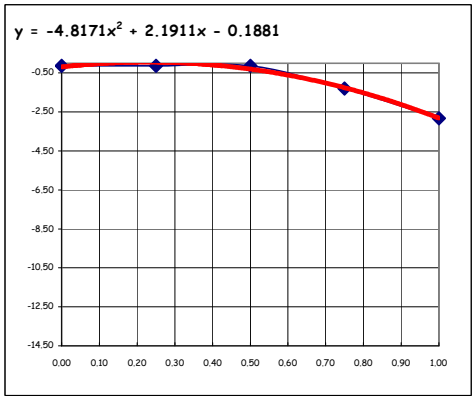




R = 40

theta = 11.310

Lend =



0.100	876.736	119	0.0000	-0.7917		-87.841	P13
0.047	891.543	121	0.3306	-1.4999	-1.500	-88.093	
0.100	908.240	122	0.4813	-3.0000	-2.999	-87.841	
0.200	939.744	124	0.6524	-5.3200	-5.320	-87.122	
0.300	971.249	126	0.8235	-6.9700	-6.978	-85.688	
0.400	1002.753	128	0.9947	-7.9800	-7.972	-81.424	
0.500	**1034.257**	**131**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
0.600	1065.761	134	0.0053	-7.9800	-7.972	81.424	
0.700	1097.265	136	0.1765	-6.9700	-6.978	85.688	
0.800	1128.770	138	0.3476	-5.3200	-5.320	87.122	
0.900	1160.274	140	0.5187	-3.0000	-2.999	87.841	
0.953	1176.971	141	0.6694	-1.4999	-1.500	88.093	
0.000	1191.778	144	0.0000	-0.1250		-88.272	P207
0.250	1210.779	147	19.5071	-0.1250	0.059	-12.265	
0.500	1229.781	149	19.9425	-0.1250	-0.297	-69.152	

0.750	1248.782	151	20.3779	-1.3000	-1.254	-78.765	
1.000	1267.783	156	17.8134	-2.8200			**EJ4**

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

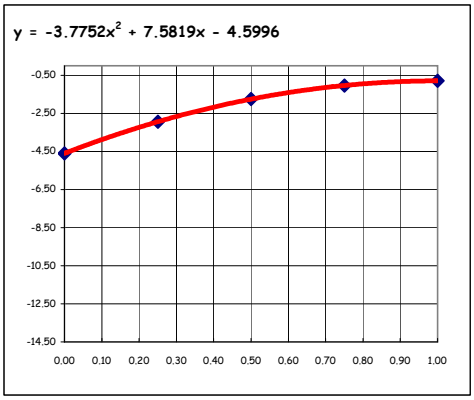
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X2A — CHECKED BY: IC BY PT — DATE: 02/10/09

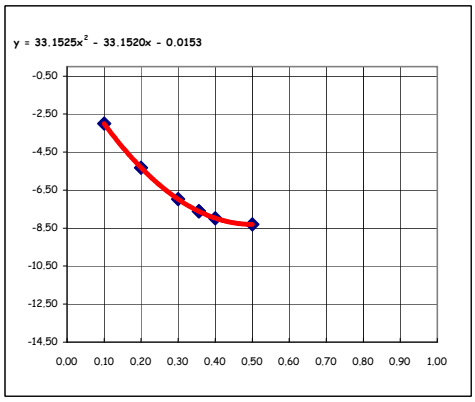
DX at BEG = 3.0000

DX at END = 87.7500

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	-4.6000			EJ3
0.250	549.593	74	0.8682	-2.9400	-2.939	80.044	
0.500	561.179	76	0.3522	-1.7500	-1.752	75.256	
0.750	572.765	77	0.8362	-1.0400	-1.039	62.277	
1.000	584.351	80	0.0000	-0.7917		0.327	P12
0.047	598.093	82	0.4400	-1.4999	-1.500		
0.100	613.589	84	0.4248	-3.0000	-2.999	-87.841	
0.200	642.828	88	0.1698	-5.3200	-5.320	-87.122	
0.300	672.066	91	0.9149	-6.9700	-6.978	-85.688	
0.356	688.345	93	1.0000	-7.6131	-7.613	-84.035	
0.356	688.345	94	0.0000	-7.6131	-7.613		
0.400	701.305	95	0.6599	-7.9800	-7.972	-81.424	
0.500	**730.543**	**99**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	777.317	105	0.5861	0.0000			
3.903	781.259	106	0.0909	0.1947			
3.824	785.162	106	0.5909	0.7768			
END	788.986	107	0.0807	1.5417			
	876.736						P13

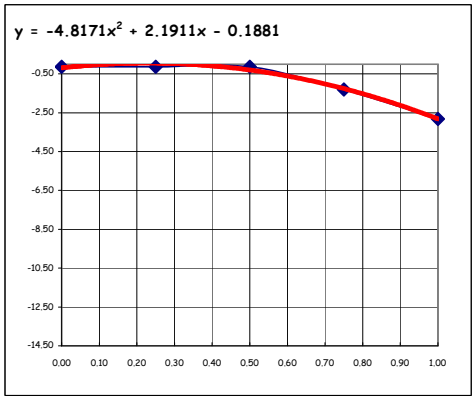




R = 40

theta = 11.310

Lend =



0.100	876.736	119	0.0000	-0.7917		-87.841	P13
0.047	891.543	121	0.3306	-1.4999	-1.500	-88.093	
0.100	908.240	122	0.4813	-3.0000	-2.999	-87.841	
0.200	939.744	124	0.6524	-5.3200	-5.320	-87.122	
0.300	971.249	126	0.8235	-6.9700	-6.978	-85.688	
0.400	1002.753	128	0.9947	-7.9800	-7.972	-81.424	
0.500	**1034.257**	**131**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
0.600	1065.761	134	0.0053	-7.9800	-7.972	81.424	
0.700	1097.265	136	0.1765	-6.9700	-6.978	85.688	
0.800	1128.770	138	0.3476	-5.3200	-5.320	87.122	
0.900	1160.274	140	0.5187	-3.0000	-2.999	87.841	
0.953	1176.971	141	0.6694	-1.4999	-1.500	88.093	
0.000	1191.778	144	0.0000	-0.1250		-88.272	P207
0.250	1210.779	147	19.5071	-0.1250	0.059	-12.265	
0.500	1229.781	149	19.9425	-0.1250	-0.297	-69.152	

0.750	1248.782	151	20.3779	-1.3000	-1.254	-78.765	
1.000	1267.783	156	17.8134	-2.8200			**EJ4**

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

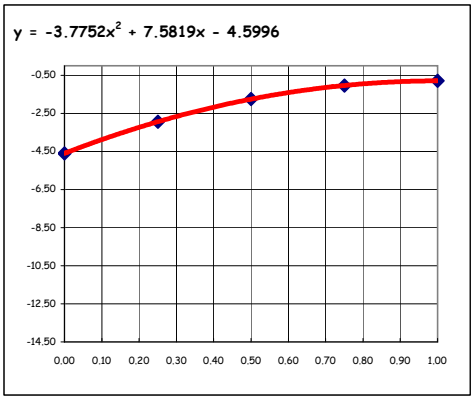
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X3A — CHECKED BY: IC BY PT — DATE: 02/10/09

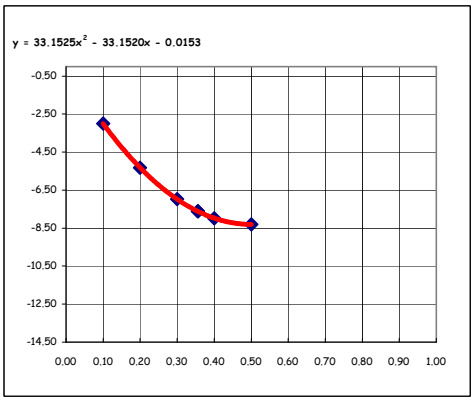
DX at BEG = 3.0000

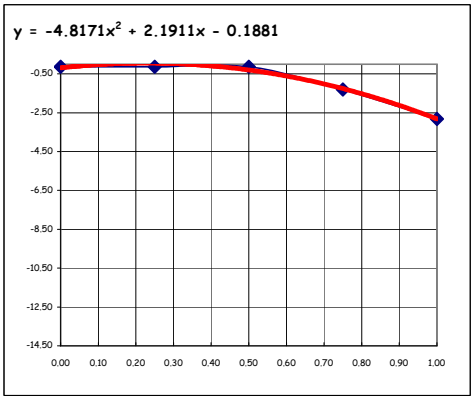
DX at END = 112.7500

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	-4.6000			EJ3
0.250	549.593	74	0.8682	-2.9400	-2.939	80.044	
0.500	561.179	76	0.3522	-1.7500	-1.752	75.256	
0.750	572.765	77	0.8362	-1.0400	-1.039	62.277	
1.000	584.351	80	0.0000	-0.7917		0.327	P12
0.047	598.093	82	0.4400	-1.4999	-1.500		
0.100	613.589	84	0.4248	-3.0000	-2.999	-87.841	
0.200	642.828	88	0.1698	-5.3200	-5.320	-87.122	
0.300	672.066	91	0.9149	-6.9700	-6.978	-85.688	
0.356	688.345	93	1.0000	-7.6131	-7.613	-84.035	
0.356	688.345	94	0.0000	-7.6131	-7.613		
0.400	701.305	95	0.6599	-7.9800	-7.972	-81.424	
0.500	**730.543**	**99**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
3.942	752.317	102	0.3839	0.0000			
3.903	756.259	102	0.8888	0.1947			
3.824	760.162	103	0.3887	0.7768			
END	763.986	103	0.8786	1.5417			
	876.736						P13







R = 40

theta = 11.310

Lend =

0.100	876.736	119	0.0000	-0.7917		-87.841	P13
0.047	891.543	121	0.3306	-1.4999	-1.500	-88.093	
0.100	908.240	122	0.4813	-3.0000	-2.999	-87.841	
0.200	939.744	124	0.6524	-5.3200	-5.320	-87.122	
0.300	971.249	126	0.8235	-6.9700	-6.978	-85.688	
0.400	1002.753	128	0.9947	-7.9800	-7.972	-81.424	
0.500	**1034.257**	**131**	**0.5000**	**-8.3000**	**-8.304**	**0.000**	
0.600	1065.761	134	0.0053	-7.9800	-7.972	81.424	
0.700	1097.265	136	0.1765	-6.9700	-6.978	85.688	
0.800	1128.770	138	0.3476	-5.3200	-5.320	87.122	
0.900	1160.274	140	0.5187	-3.0000	-2.999	87.841	
0.953	1176.971	141	0.6694	-1.4999	-1.500	88.093	
0.000	1191.778	144	0.0000	-0.1250		-88.272	P207
0.250	1210.779	147	19.5071	-0.1250	0.059	-12.265	
0.500	1229.781	149	19.9425	-0.1250	-0.297	-69.152	

0.750	1248.782	151	20.3779	-1.3000	-1.254	-78.765	
1.000	1267.783	156	17.8134	-2.8200			**EJ4**

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

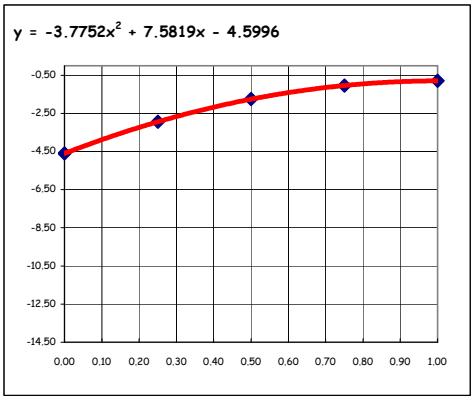
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X4A | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **102.1979**

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	**-4.6000**			**EJ3**
0.250	549.593	74	0.8682	**-2.9400**	-2.939	80.044	
0.500	561.179	76	0.3522	**-1.7500**	-1.752	75.256	
0.750	572.765	77	0.8362	**-1.0400**	-1.039	62.277	
1.000	584.351	80	0.0000	**-0.7917**		0.327	**P12**
END	686.549	93	0.7698	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

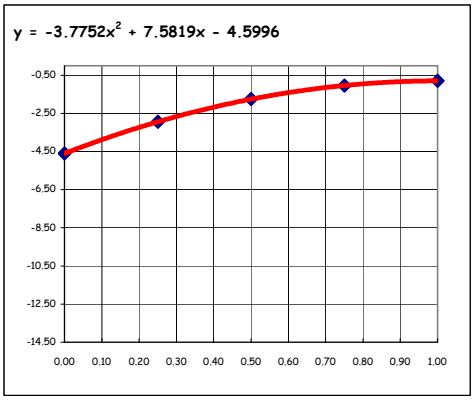
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X5A | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **45.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	**-4.6000**			**EJ3**
0.250	549.593	74	0.8682	**-2.9400**	-2.939	80.044	
0.500	561.179	76	0.3522	**-1.7500**	-1.752	75.256	
0.750	572.765	77	0.8362	**-1.0400**	-1.039	62.277	
1.000	584.351	80	0.0000	**-0.7917**		0.327	**P12**
END	629.351	86	0.4436	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

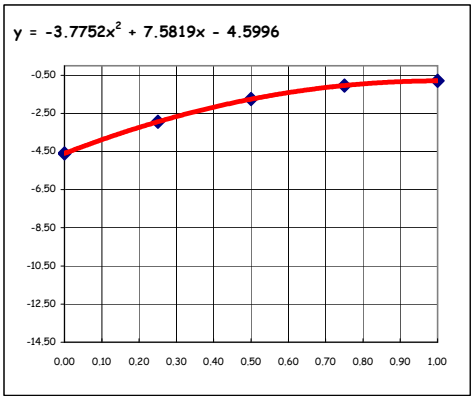
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X6A — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **30.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	**-4.6000**			**EJ3**
0.250	549.593	74	0.8682	**-2.9400**	-2.939	80.044	
0.500	561.179	76	0.3522	**-1.7500**	-1.752	75.256	
0.750	572.765	77	0.8362	**-1.0400**	-1.039	62.277	
1.000	584.351	80	0.0000	**-0.7917**		0.327	**P12**
END	614.351	84	0.5223	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

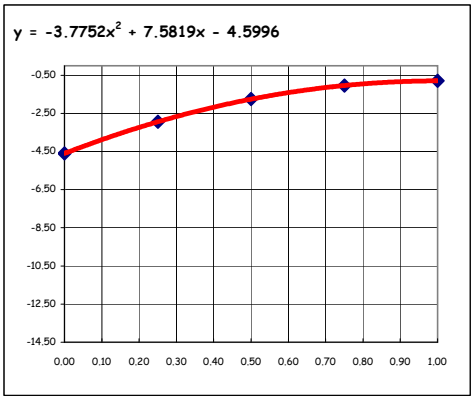
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 12X7A | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **15.0000**

	->TO EJ3	EJ3-P12	P12-P13	P13-P207	P207-EJ4	EJ4-P206
Span =	535.0070	49.3437	292.3854	315.0417	76.0056	169.6000
A =		-3.7943	33.1558	33.1558	-4.8170	4.5920
B =		7.5943	-33.1558	-33.1558	2.1911	-5.3632
C =		-4.6003	-0.0148	-0.0148	-0.1881	-6.8096
Y' =0 @		1.0008	0.5000	0.5000	0.2274	0.5840

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN							
0.000	538.007	73	0.3843	**-4.6000**			**EJ3**
0.250	549.593	74	0.8682	**-2.9400**	-2.939	80.044	
0.500	561.179	76	0.3522	**-1.7500**	-1.752	75.256	
0.750	572.765	77	0.8362	**-1.0400**	-1.039	62.277	
1.000	584.351	80	0.0000	**-0.7917**		0.327	**P12**
END	599.351	82	0.6011	-0.7917			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

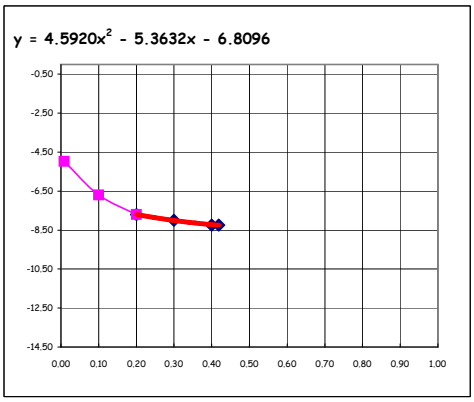
DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14XXA | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **35.0000**

DX at END =

	->TO EJ4	P11-EJ3	
Span =	1267.7835		
A =		20.3041	
B =		-25.2324	
C =		0.0021	
Y' =0 :		0.6214	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	1267.783	156					**EJ4**
0.009	1269.283	156	0.7129	**-4.9700**	-6.857	-79.279	
0.100	1284.743	159	0.1960	**-6.7000**	-7.300	-77.321	
0.200	1301.703	160	0.8920	**-7.7000**	-7.699	-74.168	
0.300	1318.663	162	0.3279	**-8.0000**	-8.005	-69.021	
0.400	1335.623	163	0.8859	**-8.2370**	-8.220	-59.381	
0.419	1338.778	164	**1.0000**	**-8.2370**	-8.250	-56.638	CJ10'

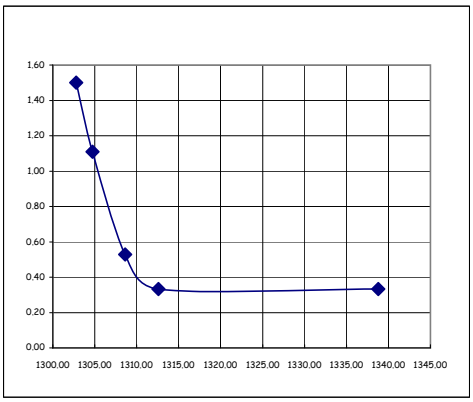


R = **40**

theta = **11.310**

Lend =

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0	1302.783	161	0.0000	**1.5000**			
1.949	1304.733	161	0.1625	1.1101			
3.903	1308.636	161	0.4877	0.5280			
3.942	1312.578	161	0.8162	0.3333			
71.000	1338.783	164	1.0000	0.3333			
END							



URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON P13E CHECKED BY: **IC BY PT** DATE: 02/10/09

REF (P13) = **######**

TENDON END LOCATIONS

1	2	3	4	5	6	7	8	9	10	11
	BEGIN					END				
TENDONS	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
1	2717.365	-184.000	2533.365	**347**	**0.0000**	2717.3645	155.000	2872.364	382	1.0000
2	2717.365	-146.000	2571.365	351	0.5157	2717.3645	126.000	2843.364	380	1.0000
3	2717.365	-108.000	2609.365	356	0.4780	2717.3645	82.500	2799.864	377	1.0000
4	2717.365	-146.000	2571.365	351	0.5157	2717.3645	97.000	2814.364	378	1.0000
5	2717.365	-76.000	2641.365	360	0.5794	2717.3645	53.500	2770.864	375	1.0000
6	2717.365	-108.000	2609.365	356	0.4780	2717.3645	68.000	2785.364	376	1.0000
7	2717.365	-76.000	2641.365	360	0.5794	2717.3645	39.000	2756.364	374	1.0000
8	2717.365	-44.000	2673.365	364	0.6809	2717.3645	24.500	2741.864	373	1.0000
9	2717.365	-44.000	2673.365	364	0.6809	2717.3645	10.000	2727.364	372	1.0000
10	2717.365	-44.000	2673.365	364	0.6809	2717.3645	10.000	2727.364	372	1.0000
11	2717.365	-76.000	2641.365	360	0.5794	2717.3645	39.000	2756.364	374	1.0000
12	2717.365	-44.000	2673.365	364	0.6809	2717.3645	24.500	2741.864	373	1.0000
13	2717.365	-108.000	2609.365	356	0.4780	2717.3645	68.000	2785.364	376	1.0000
14	2717.365	-76.000	2641.365	360	0.5794	2717.3645	53.500	2770.864	375	1.0000
15	2717.365	-146.000	2571.365	351	0.5157	2717.3645	111.500	2828.864	379	1.0000
16	2717.365	-108.000	2609.365	356	0.4780	2717.3645	82.500	2799.864	377	1.0000
17	2717.365	-184.000	2533.365	**347**	**0.0000**	2717.3645	140.500	2857.864	381	1.0000
18	2717.365									
19	2717.365	-184.000	2533.365	**347**	**0.0000**	2717.3645	140.500	2857.864	381	1.0000
20	2717.365	-146.000	2571.365	351	0.5157	2717.3645	111.500	2828.864	379	1.0000
21	2717.365	-108.000	2609.365	356	0.4780	2717.3645	82.500	2799.864	377	1.0000
22	2717.365	-76.000	2641.365	360	0.5794	2717.3645	53.500	2770.864	375	1.0000
23	2717.365	-44.000	2673.365	364	0.6809	2717.3645	24.500	2741.864	373	1.0000
24	2717.365	-76.000	2641.365	360	0.5794	2717.3645	39.000	2756.364	374	1.0000
25	2717.365	-44.000	2673.365	364	0.6809	2717.3645	10.000	2727.364	372	1.0000
26	2717.365	-44.000	2673.365	364	0.6809	2717.3645	10.000	2727.364	372	1.0000
27	2717.365	-76.000	2641.365	360	0.5794	2717.3645	39.000	2756.364	374	1.0000
28	2717.365	-44.000	2673.365	364	0.6809	2717.3645	24.500	2741.864	373	1.0000
29	2717.365	-146.000	2571.365	351	0.5157	2717.3645	97.000	2814.364	378	1.0000
30	2717.365	-108.000	2609.365	356	0.4780	2717.3645	68.000	2785.364	376	1.0000
31	2717.365	-184.000	2533.365	**347**	**0.0000**	2717.3645	155.000	2872.364	382	1.0000
32	2717.365	-146.000	2571.365	351	0.5157	2717.3645	126.000	2843.364	380	1.0000

URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON P13W CHECKED BY: IC BY PT DATE: 02/10/09

REF (P13) = ######

TENDON END LOCATIONS

1	2	3	4	5	6	7	8	9	10	11
	BEGIN					END				
TENDONS	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
13	2717.365	-80.000	2637.365	360	0.0668	2717.3645	140.500	2857.864	381	1.0000
14	2717.365	-80.000	2637.365	360	0.0668	2717.3645	111.500	2828.864	379	1.0000
15	2717.365	-80.000	2637.365	360	0.0668	2717.3645	82.500	2799.864	377	1.0000
16	2717.365	-80.000	2637.365	360	0.0668	2717.3645	53.500	2770.864	375	1.0000
17	2717.365	-46.000	2671.365	364	0.4246	2717.3645	24.500	2741.864	373	1.0000
18	2717.365	-46.000	2671.365	364	0.4246	2717.3645	10.000	2727.364	372	1.0000
19	2717.365	-46.000	2671.365	364	0.4246	2717.3645	10.000	2727.364	372	1.0000
20	2717.365	-80.000	2637.365	360	0.0668	2717.3645	68.000	2785.364	376	1.0000
21	2717.365	-46.000	2671.365	364	0.4246	2717.3645	39.000	2756.364	374	1.0000
22	2717.365	-80.000	2637.365	360	0.0668	2717.3645	126.000	2843.364	380	1.0000
23	2717.365	-80.000	2637.365	360	0.0668	2717.3645	97.000	2814.364	378	1.0000
24	2717.365	-80.000	2637.365	360	0.0668	2717.3645	155.000	2872.364	382	1.0000
25	2717.365	-184.000	2533.365	347	0.0000	2717.3645	155.000	2872.364	382	1.0000
26	2717.365	-146.000	2571.365	351	0.5157	2717.3645	126.000	2843.364	380	1.0000
27	2717.365	-114.000	2603.365	355	0.7089	2717.3645	97.000	2814.364	378	1.0000
28	2717.365	-80.000	2637.365	360	0.0668	2717.3645	68.000	2785.364	376	1.0000
29	2717.365	-46.000	2671.365	364	0.4246	2717.3645	39.000	2756.364	374	1.0000
30	2717.365	-46.000	2671.365	364	0.4246	2717.3645	24.500	2741.864	373	1.0000
31	2717.365	-46.000	2671.365	364	0.4246	2717.3645	10.000	2727.364	372	1.0000
32	2717.365	-46.000	2671.365	364	0.4246	2717.3645	10.000	2727.364	372	1.0000
33	2717.365	-46.000	2671.365	364	0.4246	2717.3645	39.000	2756.364	374	1.0000
34	2717.365	-46.000	2671.365	364	0.4246	2717.3645	24.500	2741.864	373	1.0000
35	2717.365	-114.000	2603.365	355	0.7089	2717.3645	82.500	2799.864	377	1.0000
36	2717.365	-80.000	2637.365	360	0.0668	2717.3645	53.500	2770.864	375	1.0000
37	2717.365	-184.000	2533.365	347	0.0000	2717.3645	140.500	2857.864	381	1.0000
38	2717.365	-146.000	2571.365	351	0.5157	2717.3645	111.500	2828.864	379	1.0000
39	2717.365	-184.000	2533.365	347	0.0000	2717.3645	155.000	2872.364	382	1.0000
40	2717.365	-146.000	2571.365	351	0.5157	2717.3645	126.000	2843.364	380	1.0000
41	2717.365	-114.000	2603.365	355	0.7089	2717.3645	82.500	2799.864	377	1.0000
42	2717.365	-114.000	2603.365	355	0.7089	2717.3645	97.000	2814.364	378	1.0000
43	2717.365	-80.000	2637.365	360	0.0668	2717.3645	53.500	2770.864	375	1.0000
44	2717.365	-80.000	2637.365	360	0.0668	2717.3645	68.000	2785.364	376	1.0000
45	2717.365	-46.000	2671.365	364	0.4246	2717.3645	39.000	2756.364	374	1.0000
46	2717.365	-46.000	2671.365	364	0.4246	2717.3645	24.500	2741.864	373	1.0000
47	2717.365	-46.000	2671.365	364	0.4246	2717.3645	10.000	2727.364	372	1.0000
48	2717.365	-46.000	2671.365	364	0.4246	2717.3645	10.000	2727.364	372	1.0000
49	2717.365	-46.000	2671.365	364	0.4246	2717.3645	39.000	2756.364	374	1.0000
50	2717.365	-46.000	2671.365	364	0.4246	2717.3645	24.500	2741.864	373	1.0000
51	2717.365	-80.000	2637.365	360	0.0668	2717.3645	53.500	2770.864	375	1.0000
52	2717.365	-80.000	2637.365	360	0.0668	2717.3645	53.500	2770.864	375	1.0000
53	2717.365	-146.000	2571.365	351	0.5157	2717.3645	111.500	2828.864	379	1.0000
54	2717.365	-114.000	2603.365	355	0.7089	2717.3645	82.500	2799.864	377	1.0000
55	2717.365	-184.000	2533.365	347	0.0000	2717.3645	140.500	2857.864	381	1.0000

URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON P13A CHECKED BY: **IC BY PT** DATE: 02/10/09

F (P13-A) = **876.7362**

TENDON END LOCATIONS

1	2	3	4	5	6	7	8	9	10	11
	BEGIN					END				
TENDONS	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
1	876.736	-146.000	730.736	99	0.5305	876.7362	111.583	988.319	127	1.0000
2	876.736	-184.000	692.736	**95**	**0.0000**	876.7362	140.604	1017.340	129	1.0000
3	876.736	-114.000	762.736	103	0.7185	876.7362	82.563	959.299	125	1.0000
4	876.736	-80.000	796.736	108	0.0734	876.7362	53.542	930.278	123	1.0000
5	876.736	-46.000	830.736	112	0.4283	876.7362	24.521	901.257	121	1.0000
6	876.736	-46.000	830.736	112	0.4283	876.7362	10.010	886.746	120	1.0000
7	876.736	-80.000	796.736	108	0.0734	876.7362	68.052	944.788	124	1.0000
8	876.736	-46.000	830.736	112	0.4283	876.7362	39.031	915.767	122	1.0000
9	876.736	-114.000	762.736	103	0.7185	876.7362	97.073	973.809	126	1.0000
10	876.736	-146.000	730.736	99	0.5305	876.7362	126.094	1002.830	128	1.0000
11	876.736	-184.000	692.736	**95**	**0.0000**	876.7362	155.115	1031.851	130	1.0000
12	876.736									

URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14E CHECKED BY: **IC BY PT** DATE: 02/10/09

REF (P14) = **######**

TENDON END LOCATIONS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	BEGIN					END ON SEGMENT 3E					END ON SEGMENT 3C				
TENDONS	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
1	3032.969	-140.500	2892.469	385	0.0000	3032.969	184.000	3216.969	**420**	**1.0000**	0.000	184.000	184.000	25	0.6523
2	3032.969	-111.500	2921.469	387	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889
3	3032.969	-82.500	2950.469	389	0.0000	3032.969	108.000	3140.969	410	0.5220	0.000	108.000	108.000	15	0.5193
4	3032.969	-97.000	2935.969	388	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889
5	3032.969	-53.500	2979.469	391	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
6	3032.969	-68.000	2964.969	390	0.0000	3032.969	108.000	3140.969	410	0.5220	0.000	108.000	108.000	15	0.5193
7	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
8	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
9	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
10	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
11	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
12	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
13	3032.969	-68.000	2964.969	390	0.0000	3032.969	108.000	3140.969	410	0.5220	0.000	108.000	108.000	15	0.5193
14	3032.969	-53.500	2979.469	391	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
15	3032.969	-97.000	2935.969	388	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889
16	3032.969	-82.500	2950.469	389	0.0000	3032.969	108.000	3140.969	410	0.5220	0.000	108.000	108.000	15	0.5193
17	3032.969	-155.000	2877.969	384	0.0000	3032.969	184.000	3216.969	**420**	**1.0000**	0.000	184.000	184.000	25	0.6523
18	3032.969	-126.000	2906.969	386	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889
19	3032.969	-140.500	2892.469	385	0.0000	3032.969	184.000	3216.969	**420**	**1.0000**	0.000	184.000	184.000	25	0.6523
20	3032.969	-111.500	2921.469	387	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889
21	3032.969	-82.500	2950.469	389	0.0000	3032.969	108.000	3140.969	410	0.5220	0.000	108.000	108.000	15	0.5193
22	3032.969	-53.500	2979.469	391	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
23	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
24	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
25	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
26	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
27	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206	0.000	76.000	76.000	11	0.4187
28	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191	0.000	44.000	44.000	7	0.3180
29	3032.969	-97.000	2935.969	388	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889
30	3032.969	-68.000	2964.969	390	0.0000	3032.969	108.000	3140.969	410	0.5220	0.000	108.000	108.000	15	0.5193
31	3032.969	-155.000	2877.969	384	0.0000	3032.969	184.000	3216.969	**420**	**1.0000**	0.000	184.000	184.000	25	0.6523
32	3032.969	-126.000	2906.969	386	0.0000	3032.969	146.000	3178.969	415	0.3925	0.000	146.000	146.000	20	0.3889

URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 3, TENDON 14W CHECKED BY: **IC BY PT** DATE: 02/10/09

REF (P14) = **######**

TENDON END LOCATIONS

1	2	3	4	5	6	7	8	9	10	11
	BEGIN					END ON SEGMENT				
TENDONS	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
13	3032.969	-126.000	2906.969	386	0.0000	3032.969	153.000	3185.969	416	0.4780
14	3032.969	-155.000	2877.969	384	0.0000	3032.969	191.000	3223.969	**421**	**1.0000**
15	3032.969	-82.500	2950.469	389	0.0000	3032.969	108.000	3140.969	410	0.5220
16	3032.969	-97.000	2935.969	388	0.0000	3032.969	153.000	3185.969	416	0.4780
17	3032.969	-53.500	2979.469	391	0.0000	3032.969	76.000	3108.969	406	0.4206
18	3032.969	-68.000	2964.969	390	0.0000	3032.969	108.000	3140.969	410	0.5220
19	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206
20	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191
21	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191
22	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191
23	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206
24	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191
25	3032.969	-53.500	2979.469	391	0.0000	3032.969	76.000	3108.969	406	0.4206
26	3032.969	-68.000	2964.969	390	0.0000	3032.969	108.000	3140.969	410	0.5220
27	3032.969	-82.500	2950.469	389	0.0000	3032.969	108.000	3140.969	410	0.5220
28	3032.969	-111.500	2921.469	387	0.0000	3032.969	153.000	3185.969	416	0.4780
29	3032.969	-140.500	2892.469	385	0.0000	3032.969	191.000	3223.969	**421**	**1.0000**
30										
31	3032.969	-126.000	2906.969	386	0.0000	3032.969	153.000	3185.969	416	0.4780
32	3032.969	-155.000	2877.969	384	0.0000	3032.969	191.000	3223.969	**421**	**1.0000**
33	3032.969	-68.000	2964.969	390	0.0000	3032.969	108.000	3140.969	410	0.5220
34	3032.969	-97.000	2935.969	388	0.0000	3032.969	153.000	3185.969	416	0.4780
35	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206
36	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191
37	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191
38	3032.969	-10.000	3022.969	394	0.0000	3032.969	44.000	3076.969	402	0.3191
39	3032.969	-39.000	2993.969	392	0.0000	3032.969	76.000	3108.969	406	0.4206
40	3032.969	-24.500	3008.469	393	0.0000	3032.969	44.000	3076.969	402	0.3191
41	3032.969	-53.500	2979.469	391	0.0000	3032.969	76.000	3108.969	406	0.4206
42	3032.969	-82.500	2950.469	389	0.0000	3032.969	108.000	3140.969	410	0.5220
43	3032.969	-111.500	2921.469	387	0.0000	3032.969	153.000	3185.969	416	0.4780
44	3032.969	-140.500	2892.469	385	0.0000	3032.969	191.000	3223.969	**421**	**1.0000**

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

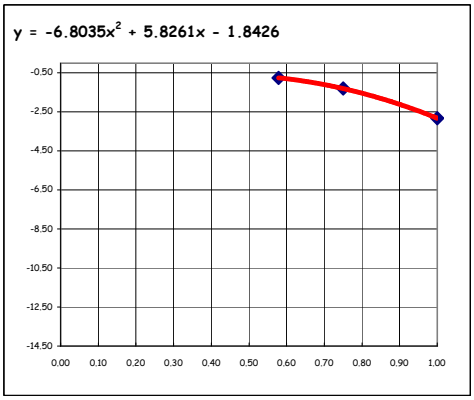
DESCRP: PT DEFINITION - SEGMENT 3, TENDON P14A — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **3.0000**

	->TO P207	P207-EJ4				
Span =	1191.7778	76.0056				
A =		-6.8035				
B =		5.8261				
C =		-1.8426				
Y' =0 @		0.4282				

DL	X	ELEM	x/l	Y from TOP flange drawing	Y from TOP flange equation	Y'	Depth
BEGIN							
0.000	1191.778	144	0.0000	**-0.7500**	**-0.750**		**P207**
0.579	1235.781	150	0.3195	**-0.7500**	-0.750		
0.700	1244.982	151	0.4988		-1.098		
0.750	1248.782	151	0.9859	**-1.3000**	-1.300		
0.800	1252.582	152	0.4729		-1.536		
0.900	1260.183	153	0.4471		-2.110		
1.000	1267.783	154	1.0000	**-2.8200**	**-2.820**		**EJ4**



F (P14-A) = **######**

TENDON END LOCATIONS

1	2	3	4	5	6	7	8	9	10	11
	BEGIN					END ON SEGMENT				
TENDONS	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
1	1191.778	-140.604	1051.174	133	0.0000	1191.778	73.506	1265.283	154	0.2394
2	1191.778	-111.583	1080.195	135	0.0000	1191.778	73.506	1265.283	154	0.2394
3	1191.778	-82.563	1109.215	137	0.0000	1191.778	76.006	1267.783	154	1.0000
4	1191.778	-53.542	1138.236	139	0.0000	1191.778	76.006	1267.783	154	1.0000
5	1191.778	-24.521	1167.257	141	0.0000	1191.778	44.000	1235.778	150	0.3191
6	1191.778	-10.010	1181.767	142	0.0000	1191.778	44.000	1235.778	150	0.3191
7	1191.778	-68.052	1123.726	138	0.0000	1191.778	76.006	1267.783	154	1.0000
8	1191.778	-39.031	1152.747	140	0.0000	1191.778	76.006	1267.783	154	1.0000
9	1191.778	-126.094	1065.684	134	0.0000	1191.778	73.506	1265.283	154	0.2394
10	1191.778	-97.073	1094.705	136	0.0000	1191.778	73.506	1265.283	154	0.2394
11	1191.778	-155.115	1036.663	132	0.0000	1191.778	73.506	1265.283	154	0.2394
12										

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

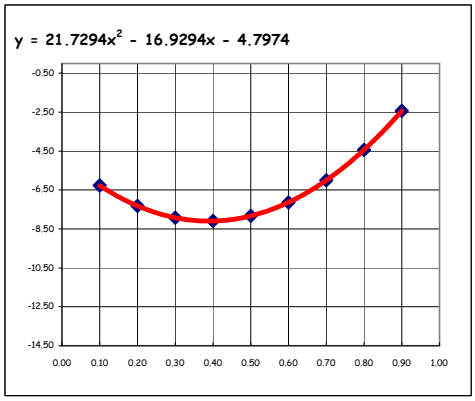
DESCRP: PT DEFINITION - SEGMENT 4, TENDON 150X | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **0.0000**

DX at END = **32.1667**

	->TO EJ5	EJ5-P16	
Span =	3365.0833	204.0938	
A =		21.7294	
B =		-16.9294	
C =		-4.7974	
Y' =0 :		0.3896	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN							
0.000	3365.083	442	0.0000	**-4.8000**	-4.797	-86.620	**EJ5**
0.100	3385.493	444	0.7753	**-6.2700**	-6.273	-85.456	
0.200	3405.902	447	0.6430	**-7.3200**	-7.314	-83.079	
0.300	3426.311	450	0.2589	**-7.9200**	-7.921	-75.589	
0.390	**3444.588**	**452**	**0.6014**		**-8.095**	**0.000**	
0.400	3446.721	452	0.8748	**-8.0900**	-8.092	24.424	
0.500	3467.130	456	0.2410	**-7.8300**	-7.830	78.232	
0.600	3487.540	458	0.8569	**-7.1300**	-7.132	83.760	
0.700	3507.949	461	0.4728	**-6.0000**	-6.001	85.761	
0.800	3528.358	464	0.0887	**-4.4400**	-4.434	86.791	
0.900	3548.768	466	0.7045	**-2.4300**	-2.433	87.419	
0.908	3550.400	466	0.9138	-2.2542	-2.254		
1.000	3569.177	470	0.0000	**-1.2500**		87.841	**P16**
15.068	3584.245	472	0.611	-1.2500			
3.218	3587.463	473	0.023	-1.4539			
3.167	3590.630	473	0.429	-2.0622			
END	3601.344	474	0.8024	**-4.8330**			



R = **25.5**

theta = **14.5**

Lend = 10.714

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

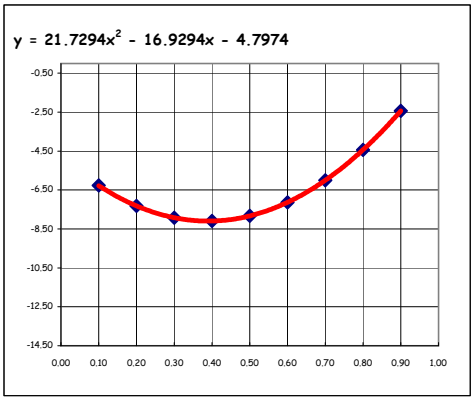
DESCRP: PT DEFINITION - SEGMENT 4, TENDON 150XC | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **0.0000**

DX at END = **32.1667**

	->TO EJ5	EJ5-P16	
Span =	332.1796	196.5173	
A =		21.7294	
B =		-16.9294	
C =		-4.7974	
Y' =0 :		0.3896	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN							
0.000	332.180	47	0.0000	**-4.8000**	-4.797	-86.620	**EJ5**
0.100	351.831	49	0.7633	**-6.2700**	-6.273	-85.456	
0.200	371.483	52	0.6267	**-7.3200**	-7.314	-83.079	
0.300	391.135	55	0.2377	**-7.9200**	-7.921	-75.589	
0.390	**408.733**	**57**	**0.5774**		**-8.095**	**0.000**	
0.400	410.787	57	0.8505	**-8.0900**	-8.092	24.424	
0.500	430.438	61	0.2156	**-7.8300**	-7.830	78.232	
0.600	450.090	63	0.8321	**-7.1300**	-7.132	83.760	
0.700	469.742	66	0.4505	**-6.0000**	-6.001	85.761	
0.800	489.393	69	0.0720	**-4.4400**	-4.434	86.791	
0.900	509.045	71	0.6958	**-2.4300**	-2.433	87.419	
0.908	510.617	71	0.9058	-2.2542	-2.254		
1.000	528.697	75	0.0000	**-1.2500**		87.841	**P16**
15.067	543.764	77	0.693	-1.2500			
3.218	546.982	78	0.123	-1.4539			
3.167	550.149	78	0.546	-2.0622			
END	560.864	79	0.9787	**-4.8333**			



R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 151X — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **0.0000**

DX at END = **32.1667**

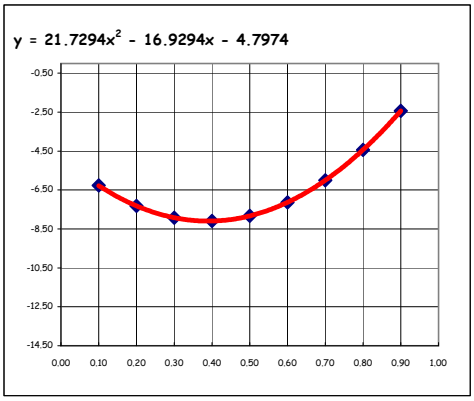
	->TO EJ5	EJ5-P16	P16-P17
Span =	3365.0833	204.0938	215.0000
A =		21.7294	31.3312
B =		-16.9294	-31.3312
C =		-4.7974	0.0007
Y' =0 :		0.3896	0.5000

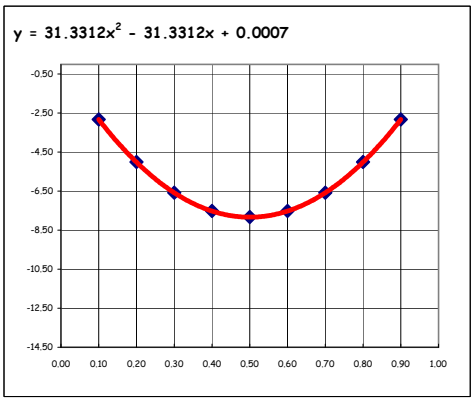
DL	X	ELEM	x/l	Y from TOP flange drawing	Y from TOP flange equation	Y'	
BEGIN							
0.000	3365.083	442	0.0000	**-4.8000**	-4.797	-86.620	**EJ5**
0.100	3385.493	444	0.7753	**-6.2700**	-6.273	-85.456	
0.200	3405.902	447	0.6430	**-7.3200**	-7.314	-83.079	
0.300	3426.311	450	0.2589	**-7.9200**	-7.921	-75.589	
0.390	**3444.588**	**452**	**0.6014**		**-8.095**	**0.000**	
0.400	3446.721	452	0.8748	**-8.0900**	-8.092	24.424	
0.500	3467.130	456	0.2410	**-7.8300**	-7.830	78.232	
0.600	3487.540	458	0.8569	**-7.1300**	-7.132	83.760	
0.700	3507.949	461	0.4728	**-6.0000**	-6.001	85.761	
0.800	3528.358	464	0.0887	**-4.4400**	-4.434	86.791	
0.900	3548.768	466	0.7045	**-2.4300**	-2.433	87.419	
0.908	3550.400	466	0.9138	-2.2542	-2.254		
1.000	3569.177	469	1.0000	**-1.2500**		87.841	**P16**
0.080	3586.377	472	0.8841	-2.3053	-2.305		
0.100	3590.677	473	0.4352	**-2.8200**	-2.819	-87.715	
0.200	3612.177	476	0.1909	**-5.0100**	-5.012	-86.955	
0.300	3633.677	478	0.9466	**-6.5800**	-6.579	-85.438	
0.400	3655.177	481	0.7023	**-7.5200**	-7.519	-80.933	
0.500	**3676.677**	**484**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	3698.177	487	0.2977	-7.5200	-7.519	80.933	
0.700	3719.677	490	0.0534	-6.5800	-6.579	85.438	
0.800	3741.177	492	0.8091	-5.0100	-5.012	86.955	
0.843	**3750.469**	**493**	**1.0000**		-4.141	87.338	
0.880	**3758.270**	**494**	**1.0000**		-3.320	87.592	
0.900	3762.677	495	0.5648	-2.8200	-2.819	87.715	
0.920	3766.977	496	0.1159	-2.3053	-2.305	87.824	
1.000	3784.177	499	0.0000	-1.2500		88.172	**P17**
15.067	3799.244	501	0.611	-1.2500			
3.218	3802.462	502	0.023	-1.4539			
3.167	3805.629	502	0.429	-2.0622			
END	3816.344	503	0.8024	**-4.8333**			

R = **25.5**

theta = **14.5**

Lend = 10.715





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

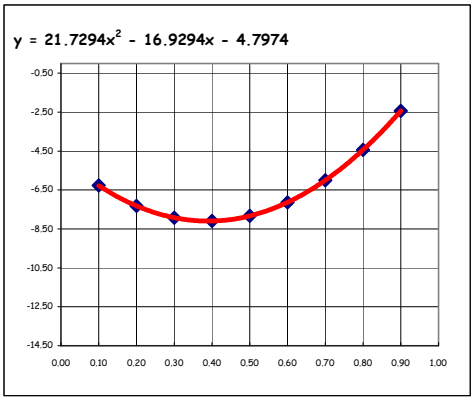
DESCRP: PT DEFINITION - SEGMENT 4, TENDON 151XC — CHECKED BY: IC BY PT — DATE: 02/10/09

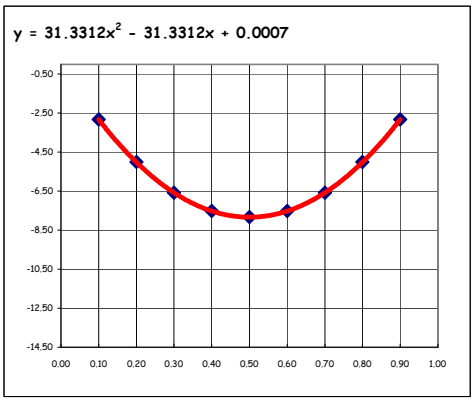
DX at BEG = 0.0000

DX at END = 32.1667

	->TO EJ5	EJ5-P16	P16-P17
Span =	332.1796	196.5173	205.9152
A =		21.7294	31.3312
B =		-16.9294	-31.3312
C =		-4.7974	0.0007
Y' =0 :		0.3896	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN							
0.000	332.180	47	0.0000	-4.8000	-4.797	-86.620	**EJ5**
0.100	351.831	49	0.7633	-6.2700	-6.273	-85.456	
0.200	371.483	52	0.6267	-7.3200	-7.314	-83.079	
0.300	391.135	55	0.2377	-7.9200	-7.921	-75.589	
0.390	**408.733**	**57**	**0.5774**		**-8.095**	**0.000**	
0.400	410.787	57	0.8505	-8.0900	-8.092	24.424	
0.500	430.438	61	0.2156	-7.8300	-7.830	78.232	
0.600	450.090	63	0.8321	-7.1300	-7.132	83.760	
0.700	469.742	66	0.4505	-6.0000	-6.001	85.761	
0.800	489.393	69	0.0720	-4.4400	-4.434	86.791	
0.900	509.045	71	0.6958	-2.4300	-2.433	87.419	
0.908	510.617	71	0.9058	-2.2542	-2.254		
1.000	528.697	75	0.0000	-1.2500		87.841	**P16**
0.080	545.170	77	0.8810	-2.3053	-2.305		
0.100	549.288	78	0.4314	-2.8200	-2.819	-87.715	
0.200	569.880	81	0.1841	-5.0100	-5.012	-86.955	
0.300	590.471	83	0.9377	-6.5800	-6.579	-85.438	
0.400	611.063	86	0.6921	-7.5200	-7.519	-80.933	
0.500	**631.655**	**89**	**0.4885**	**-7.8300**	**-7.832**	**0.000**	
0.600	652.246	92	0.2877	-7.5200	-7.519	80.933	
0.700	672.838	95	0.0447	-6.5800	-6.579	85.438	
0.800	693.429	97	0.8026	-5.0100	-5.012	86.955	
0.900	714.021	100	0.5612	-2.8200	-2.819	87.715	
0.920	718.139	101	0.1130	-2.3053	-2.305	87.824	
1.000	734.612	104	0.0000	-1.2500		88.172	**P17**
15.067	749.679	106	0.699	-1.2500			
3.218	752.897	107	0.130	-1.4539			
3.167	756.064	107	0.555	-2.0622			
END	766.779	108	0.9915	-4.8333			





R = 25.5

theta = 14.5

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 160XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

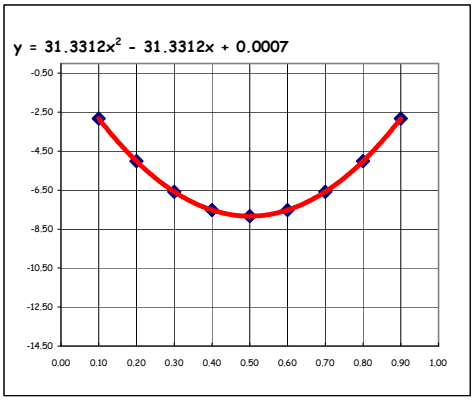
R = **28.5**

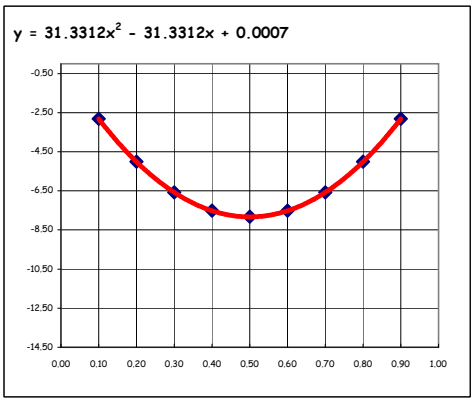
theta = **14.5**

Lend = 7.285

	->TO P16	P16-P17	P17-P18
Span =	3569.1771	215.0000	215.0000
A =		31.3312	31.3312
B =		-31.3312	-31.3312
C =		0.0007	0.0007
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	3537.010	465	0.1976	**-4.0417**			
3.539	3544.295	466	0.1313	-2.1578			
3.597	3547.834	466	0.5849	-1.4779			
17.746	3551.431	467	0.0459	-1.2500			
0.000	3569.177	470	0.0000	**-1.2500**	0.001	-88.172	**P16**
0.080	3586.377	472	0.8841	-2.3053	-2.305		
0.100	3590.677	473	0.4352	**-2.8200**	-2.819	-87.715	
0.200	3612.177	476	0.1909	**-5.0100**	-5.012	-86.955	
0.300	3633.677	478	0.9466	**-6.5800**	-6.579	-85.438	
0.400	3655.177	481	0.7023	**-7.5200**	-7.519	-80.933	
0.500	3676.677	484	0.5000	**-7.8300**	-7.832	0.000	
0.600	3698.177	487	0.2977	-7.5200	-7.519	80.933	
0.700	3719.677	490	0.0534	-6.5800	-6.579	85.438	
0.800	3741.177	492	0.8091	-5.0100	-5.012	86.955	
0.843	**3750.469**	**493**	**1.0000**		-4.141	87.338	
0.880	**3758.270**	**494**	**1.0000**		-3.320	87.592	
0.900	3762.677	495	0.5648	-2.8200	-2.819	87.715	
0.920	3766.977	496	0.1159	-2.3053	-2.305		
1.000	3784.177	498	1.0000	**-1.2500**		88.172	**P17**
0.080	3801.377	501	0.8841	-2.3053	-2.305		
0.100	3805.677	502	0.4352	**-2.8200**	-2.819	-87.715	
0.200	3827.177	505	0.1909	**-5.0100**	-5.012	-86.955	
0.300	3848.677	507	0.9466	**-6.5800**	-6.579	-85.438	
0.400	3870.177	510	0.7023	**-7.5200**	-7.519	-80.933	
0.500	**3891.677**	**513**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	3913.177	516	0.2977	-7.5200	-7.519	80.933	
0.700	3934.677	519	0.0534	-6.5800	-6.579	85.438	
0.800	3956.177	521	0.8091	-5.0100	-5.012	86.955	
0.900	3977.677	524	0.5648	-2.8200	-2.819	87.715	
0.920	3981.977	525	0.1159	-2.3053	-2.305	87.824	
1.000	3999.177	528	0.0000	-1.2500		88.172	**P18**
17.746	4016.923	530	0.954	-1.2500			
3.597	4020.520	531	0.415	-1.4779			
3.539	4024.059	531	0.869	-2.1578			
END	4031.344	532	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 160XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

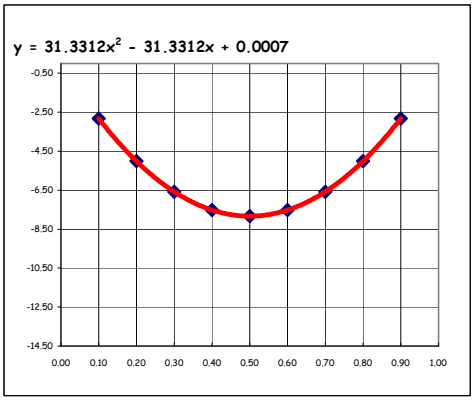
R = **25.5**

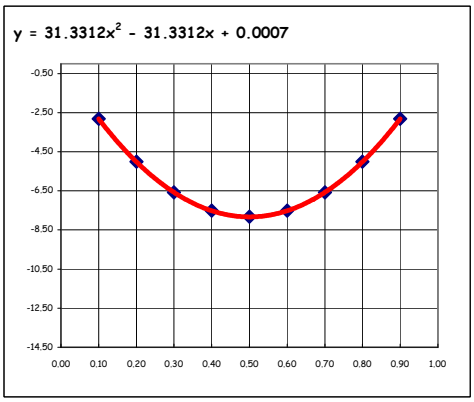
theta = **14.5**

Lend = 10.715

	->TO P16	P16-P17	P17-P18
Span =	3569.1771	215.0000	215.0000
A =		31.3312	31.3312
B =		-31.3312	-31.3312
C =		0.0007	0.0007
Y' =0 :		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	3537.010	465	0.1976	**-4.8333**			
3.167	3547.725	466	0.5709	-2.0622			
3.218	3550.892	466	0.9768	-1.4539			
15.067	3554.110	467	0.3893	-1.2500			
0.000	3569.177	470	0.0000	**-1.2500**	0.001	-88.172	**P16**
0.080	3586.377	472	0.8841	-2.3053	-2.305		
0.100	3590.677	473	0.4352	**-2.8200**	-2.819	-87.715	
0.200	3612.177	476	0.1909	**-5.0100**	-5.012	-86.955	
0.300	3633.677	478	0.9466	**-6.5800**	-6.579	-85.438	
0.400	3655.177	481	0.7023	**-7.5200**	-7.519	-80.933	
0.500	3676.677	484	0.5000	**-7.8300**	-7.832	0.000	
0.600	3698.177	487	0.2977	-7.5200	-7.519	80.933	
0.700	3719.677	490	0.0534	-6.5800	-6.579	85.438	
0.800	3741.177	492	0.8091	-5.0100	-5.012	86.955	
0.843	**3750.469**	**493**	**1.0000**		-4.141	87.338	
0.880	**3758.270**	**494**	**1.0000**		-3.320	87.592	
0.900	3762.677	495	0.5648	-2.8200	-2.819	87.715	
0.920	3766.977	496	0.1159	-2.3053	-2.305		
1.000	3784.177	498	1.0000	**-1.2500**		88.172	**P17**
0.080	3801.377	501	0.8841	-2.3053	-2.305		
0.100	3805.677	502	0.4352	**-2.8200**	-2.819	-87.715	
0.200	3827.177	505	0.1909	**-5.0100**	-5.012	-86.955	
0.300	3848.677	507	0.9466	**-6.5800**	-6.579	-85.438	
0.400	3870.177	510	0.7023	**-7.5200**	-7.519	-80.933	
0.500	**3891.677**	**513**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	3913.177	516	0.2977	-7.5200	-7.519	80.933	
0.700	3934.677	519	0.0534	-6.5800	-6.579	85.438	
0.800	3956.177	521	0.8091	-5.0100	-5.012	86.955	
0.900	3977.677	524	0.5648	-2.8200	-2.819	87.715	
0.920	3981.977	525	0.1159	-2.3053	-2.305	87.824	
1.000	3999.177	528	0.0000	-1.2500		88.172	**P18**
15.067	4014.244	530	0.611	-1.2500			
3.218	4017.462	531	0.023	-1.4539			
3.167	4020.629	531	0.429	-2.0622			
END	4031.344	532	0.8024	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 160XC — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **3.0000**

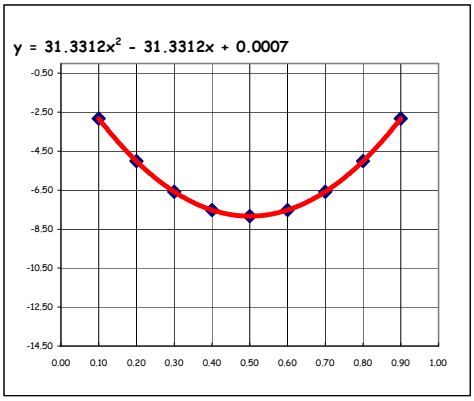
R = **28.5**

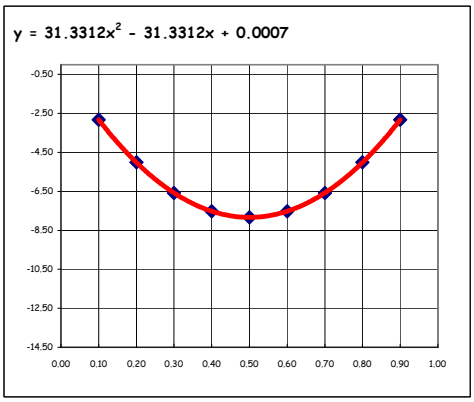
theta = **14.5**

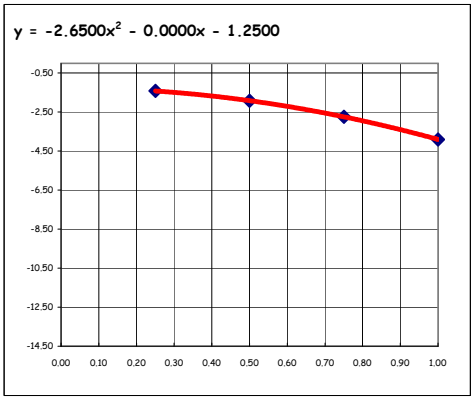
Lend = 7.285

	->TO P16	P16-P17	P17-P410	P410-EJ6
Span =	528.6969	205.9152	196.4723	51.1143
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	496.530	70	0.0242	**-4.0417**			
3.539	503.815	70	0.9972	-2.1578			
3.597	507.354	71	0.4699	-1.4779			
17.746	510.951	71	0.9503	-1.2500			
0.000	528.697	75	0.0000	**-1.2500**	0.001	-88.172	**P16**
0.080	545.170	77	0.8810	-2.3053	-2.305		
0.100	549.288	78	0.4314	**-2.8200**	-2.819	-87.715	
0.200	569.880	81	0.1841	**-5.0100**	-5.012	-86.955	
0.300	590.471	83	0.9377	**-6.5800**	-6.579	-85.438	
0.400	611.063	86	0.6921	**-7.5200**	-7.519	-80.933	
0.500	**631.655**	**89**	**0.4885**	**-7.8300**	**-7.832**	**0.000**	
0.600	652.246	92	0.2877	-7.5200	-7.519	80.933	
0.700	672.838	95	0.0447	-6.5800	-6.579	85.438	
0.800	693.429	97	0.8026	-5.0100	-5.012	86.955	
0.900	714.021	100	0.5612	-2.8200	-2.819	87.715	
0.920	718.139	101	0.1130	-2.3053	-2.305		
1.000	734.612	104	0.0000	**-1.2500**		88.172	**P17**
0.080	750.330	106	0.7863	-2.3053	-2.305		
0.100	754.259	107	0.3130	**-2.8200**	-2.819	-87.715	
0.200	773.907	109	0.9472	**-5.0100**	-5.012	-86.955	
0.300	793.554	112	0.5825	**-6.5800**	-6.579	-85.438	
0.400	813.201	115	0.2188	**-7.5200**	-7.519	-80.933	
0.500	**832.848**	**117**	**0.8564**	**-7.8300**	**-7.832**	**0.000**	
0.600	852.495	120	0.5796	-7.5200	-7.519	80.933	
0.700	872.143	123	0.2186	-6.5800	-6.579	85.438	
0.800	891.790	125	0.8577	-5.0100	-5.012	86.955	
0.900	911.437	128	0.4973	-2.8200	-2.819	87.715	
0.920	915.367	129	0.0252	-2.3053	-2.305	87.824	
1.000	931.084	132	0.0000	-1.2500		88.172	**P410**
0.250	943.8630	134	0.5262	-1.4156			
0.500	956.6415	136	0.2184	-1.9125			
0.750	969.4201	137	0.9105	-2.7406			
1.000	982.199	139	0.6027	**-3.9000**			







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 170X — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 32.1667

DX at END = 32.1667

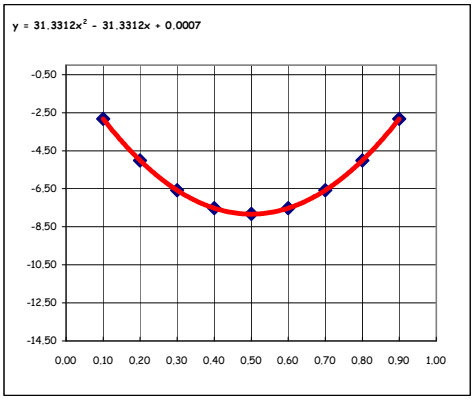
R = 25.5

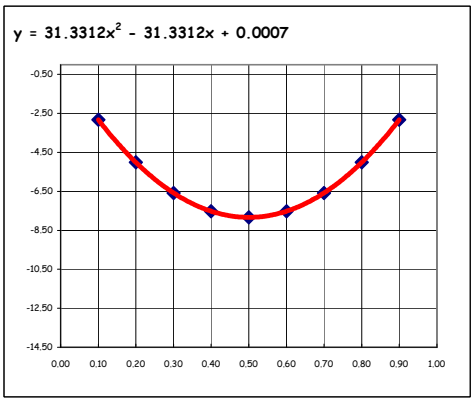
theta = 14.5

Lend = 10.715

	->TO P17	P17-P18	P18-P19
Span =	3784.1771	215.0000	215.0000
A =		31.3312	31.3312
B =		-31.3312	-31.3312
C =		0.0007	0.0007
Y' =0 @		0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN	3752.010	494	0.1976	-4.8333			
3.167	3762.725	495	0.5709	-2.0622			
3.218	3765.892	495	0.9768	-1.4539			
15.067	3769.110	496	0.3893	-1.2500			
0.000	3784.177	499	0.0000	-1.2500	0.001	-88.172	**P17**
0.080	3801.377	501	0.8841	-2.3053	-2.305		
0.100	3805.677	502	0.4352	-2.8200	-2.819	-87.715	
0.200	3827.177	505	0.1909	-5.0100	-5.012	-86.955	
0.300	3848.677	507	0.9466	-6.5800	-6.579	-85.438	
0.400	3870.177	510	0.7023	-7.5200	-7.519	-80.933	
0.500	**3891.677**	**513**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	3913.177	516	0.2977	-7.5200	-7.519	80.933	
0.700	3934.677	519	0.0534	-6.5800	-6.579	85.438	
0.800	3956.177	521	0.8091	-5.0100	-5.012	86.955	
0.900	3977.677	524	0.5648	-2.8200	-2.819	87.715	
0.920	3981.977	525	0.1159	-2.3053	-2.305		
1.000	3999.177	527	1.0000	-1.2500		88.172	**P18**
0.080	4016.377	530	0.8841	-2.3053	-2.305	-87.824	
0.100	4020.677	531	0.4352	-2.8200	-2.819	-87.715	
0.200	4042.177	534	0.1909	-5.0100	-5.012	-86.955	
0.300	4063.677	536	0.9466	-6.5800	-6.579	-85.438	
0.400	4085.177	539	0.7023	-7.5200	-7.519	-80.933	
0.500	**4106.677**	**542**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4128.177	545	0.2977	-7.5200	-7.519	80.933	
0.700	4149.677	548	0.0534	-6.5800	-6.579	85.438	
0.800	4171.177	550	0.8091	-5.0100	-5.012	86.955	
0.900	4192.677	553	0.5648	-2.8200	-2.819	87.715	
0.920	4196.977	554	0.1159	-2.3053	-2.305	87.824	
1.000	4214.177	557	0.0000	-1.2500		88.172	**P19**
15.067	4229.244	559	0.611	-1.2500			
3.218	4232.462	560	0.023	-1.4539			
3.167	4235.629	560	0.429	-2.0622			
END	4246.344	561	0.8024	-4.8333			





R = 25.5

theta = 14.5

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 172XC — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 32.1667

DX at END = 3.0000

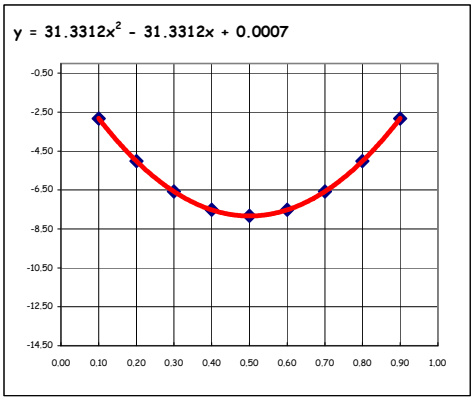
R = 28.5

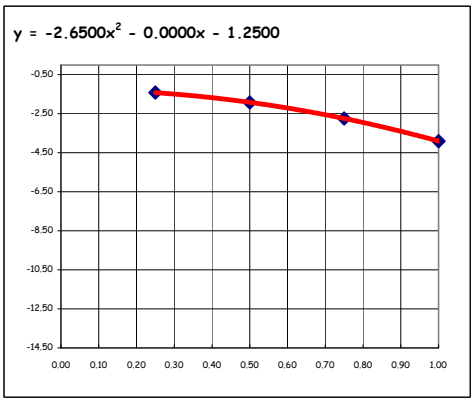
theta = 14.5

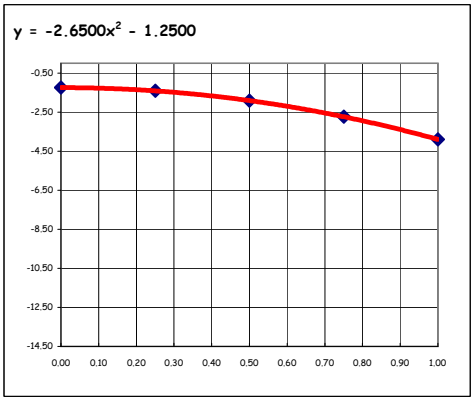
Lend = 7.285

	->TO P17	P17-P410	P410-EJ6
Span =	734.6121	196.4723	54.1143
A =		31.3312	
B =		-31.3312	
C =		0.0007	
Y' =0 :		0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	702.445	99	0.0104	-4.0417			
3.539	709.730	99	0.9863	-2.1578			
3.597	713.269	100	0.4605	-1.4779			
17.746	716.866	100	0.9424	-1.2500			
0.000	734.612	104	0.0000	-1.2500			P17
0.080	750.330	106	0.7863	-2.3053	-2.305		
0.100	754.259	107	0.3130	-2.8200	-2.819	-87.715	
0.200	773.907	109	0.9472	-5.0100	-5.012	-86.955	
0.300	793.554	112	0.5825	-6.5800	-6.579	-85.438	
0.400	813.201	115	0.2188	-7.5200	-7.519	-80.933	
0.500	**832.848**	**117**	**0.8564**	**-7.8300**	**-7.832**	**0.000**	
0.600	852.495	120	0.5796	-7.5200	-7.519	80.933	
0.700	872.143	123	0.2186	-6.5800	-6.579	85.438	
0.800	891.790	125	0.8577	-5.0100	-5.012	86.955	
0.900	911.437	128	0.4973	-2.8200	-2.819	87.715	
0.920	915.367	129	0.0252	-2.3053	-2.305	87.824	
0.000	931.084	132	0.0000	-1.2500			P410
0.250	943.8630	134	0.5262	-1.4156			
0.500	956.6415	136	0.2184	-1.9125			
0.750	969.4201	137	0.9105	-2.7406			
1.000	982.199	139	0.6027	-3.9000			







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 171X — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

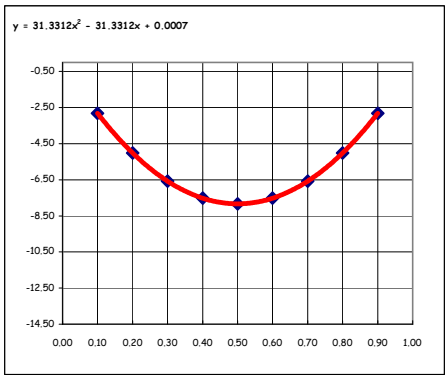
R = **25.5**

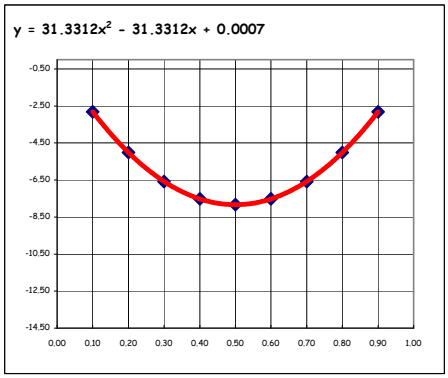
theta = **14.5**

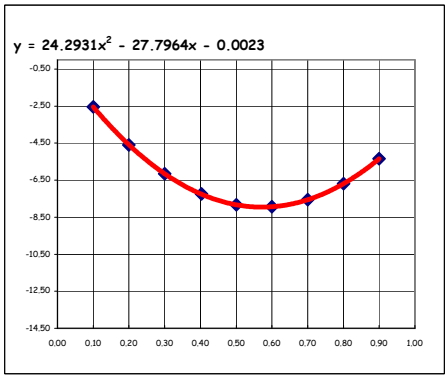
Lend = 10.715

	->TO P17	P17-P18	P18-P19	P19-EJ7
Span =	3784.1771	215.0000	215.0000	161.2917
A =		31.3312	31.3312	24.3312
B =		-31.3312	-31.3312	-27.8312
C =		0.0007	0.0007	0.0070
Y' =0 @		0.5000	0.5000	0.5719

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN	3752.010	494	0.1976	**-4.8333**			
3.167	3762.725	495	0.5709	-2.0622			
3.218	3765.892	495	0.9768	-1.4539			
15.067	3769.110	496	0.3893	-1.2500			
0.000	3784.177	499	0.0000	**-1.2500**	0.001	-88.172	**P17**
0.080	3801.377	501	0.8841	-2.3053	-2.305		
0.100	3805.677	502	0.4352	**-2.8200**	-2.819	-87.715	
0.200	3827.177	505	0.1909	**-5.0100**	-5.012	-86.955	
0.300	3848.677	507	0.9466	**-6.5800**	-6.579	-85.438	
0.400	3870.177	510	0.7023	**-7.5200**	-7.519	-80.933	
0.500	**3891.677**	**513**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	3913.177	516	0.2977	-7.5200	-7.519	80.933	
0.700	3934.677	519	0.0534	-6.5800	-6.579	85.438	
0.800	3956.177	521	0.8091	-5.0100	-5.012	86.955	
0.900	3977.677	524	0.5648	-2.8200	-2.819	87.715	
0.920	3981.977	525	0.1159	-2.3053	-2.305		
1.000	3999.177	527	1.0000	**-1.2500**		88.172	**P18**
0.080	4016.377	530	0.8841	-2.3053	-2.305	-87.824	
0.100	4020.677	531	0.4352	**-2.8200**	-2.819	-87.715	
0.200	4042.177	534	0.1909	**-5.0100**	-5.012	-86.955	
0.300	4063.677	536	0.9466	**-6.5800**	-6.579	-85.438	
0.400	4085.177	539	0.7023	**-7.5200**	-7.519	-80.933	
0.500	**4106.677**	**542**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4128.177	545	0.2977	-7.5200	-7.519	80.933	
0.700	4149.677	548	0.0534	-6.5800	-6.579	85.438	
0.800	4171.177	550	0.8091	-5.0100	-5.012	86.955	
0.900	4192.677	553	0.5648	-2.8200	-2.819	87.715	
0.920	4196.977	554	0.1159	-2.3053	-2.305	87.824	
1.000	4214.177	556	1.0000	**-1.2500**		88.172	**P19**
0.080	4227.080	559	0.3334	-2.0638	-2.064	-87.608	
0.100	4230.306	559	0.7469	**-2.5400**	-2.533	-87.507	
0.200	4246.435	561	0.8142	**-4.5900**	-4.586	-86.837	
0.300	4262.565	563	0.8814	**-6.1600**	-6.153	-85.678	
0.402	**4279.094**	**565**	**1.0000**	**-7.2400**	-7.253	-83.085	
0.402	**4279.094**	**566**	**0.0000**		-7.253	-83.085	
0.500	4294.823	568	0.0160	-7.8300	-7.826	-74.055	
0.572	**4306.424**	**569**	**0.5029**		**-7.952**	**0.000**	
0.600	4310.952	570	0.2364	**-7.9400**	-7.932	53.798	
0.700	4327.081	572	0.7981	**-7.5600**	-7.553	80.885	
0.800	4343.210	574	0.8654	**-6.6900**	-6.686	84.852	
0.900	4359.340	576	0.9327	**-5.3400**	-5.333	86.416	
0.920	4362.565	577	0.3462	-5.0038	-5.004	86.621	
1.000	4375.469	578	1.0000	**-3.5000**	**-3.493**	87.252	**EJ7**
END							







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 180X — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 32.1667

DX at END = 32.1667

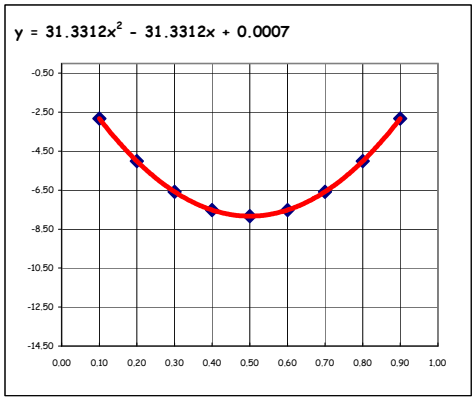
R = 25.5

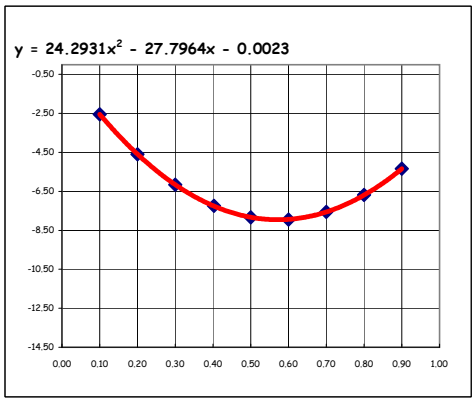
theta = 14.5

Lend = 10.715

	->TO P18	P18-P19	P19-EJ7
Span =	3999.1771	215.0000	161.2917
A =		31.3312	24.3312
B =		-31.3312	-27.8312
C =		0.0007	0.0070
Y' =0 @		0.5000	0.5719

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN	3967.010	523	0.1976	-4.8333			
3.167	3977.725	524	0.5709	-2.0622			
3.218	3980.892	524	0.9768	-1.4539			
15.067	3984.110	525	0.3893	-1.2500			
0.000	3999.177	528	0.0000	-1.2500		-88.172	**P18**
0.080	4016.377	530	0.8841	-2.3053	-2.305	-87.824	
0.100	4020.677	531	0.4352	-2.8200	-2.819	-87.715	
0.200	4042.177	534	0.1909	-5.0100	-5.012	-86.955	
0.300	4063.677	536	0.9466	-6.5800	-6.579	-85.438	
0.400	4085.177	539	0.7023	-7.5200	-7.519	-80.933	
0.500	**4106.677**	**542**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4128.177	545	0.2977	-7.5200	-7.519	80.933	
0.700	4149.677	548	0.0534	-6.5800	-6.579	85.438	
0.800	4171.177	550	0.8091	-5.0100	-5.012	86.955	
0.900	4192.677	553	0.5648	-2.8200	-2.819	87.715	
0.920	4196.977	554	0.1159	-2.3053	-2.305	87.824	
1.000	4214.177	557	0.0000	-1.2500		88.172	**P19**
0.080	4227.080	559	0.3334	-2.0638	-2.064	-87.608	
0.100	4230.306	559	0.7469	-2.5400	-2.533	-87.507	
0.200	4246.435	561	0.8142	-4.5900	-4.586	-86.837	
0.300	4262.565	563	0.8814	-6.1600	-6.153	-85.678	
0.402	4279.094	565	1.0000	-7.2400	-7.253	-83.085	
0.402	4279.094	566	0.0000		-7.253	-83.085	
0.500	4294.823	568	0.0160	-7.8300	-7.826	-74.055	
0.572	**4306.424**	**569**	**0.5029**		**-7.952**	**0.000**	
0.600	4310.952	570	0.2364	-7.9400	-7.932	53.798	
0.700	4327.081	572	0.7981	-7.5600	-7.553	80.885	
0.800	4343.210	574	0.8654	-6.6900	-6.686	84.852	
0.900	4359.340	576	0.9327	-5.3400	-5.333	86.416	
0.920	4362.565	577	0.3462	-5.0038	-5.004	86.621	
1.000	4375.469	578	1.0000	-3.5000	**-3.493**	87.252	**EJ7**
END							





URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 18XXC CHECKED BY: **IC BY PT** DATE: 02/10/09

TENDON END LOCATIONS

	TENDON BEGIN					TENDON END				
TENDON	REF	DL	X	ELEM	x/l	REF	DL	X	ELEM	x/l
PIER 410 CONTINUITY TENDONS - TOP										
1	931.084	-53.000	878.084	124	0.0167	931.084	51.1143	982.199	139	0.6027
2	931.084	-33.000	898.084	126	0.7033	931.084	51.1143	982.199	139	0.6027

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 4, TENDON 190X | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

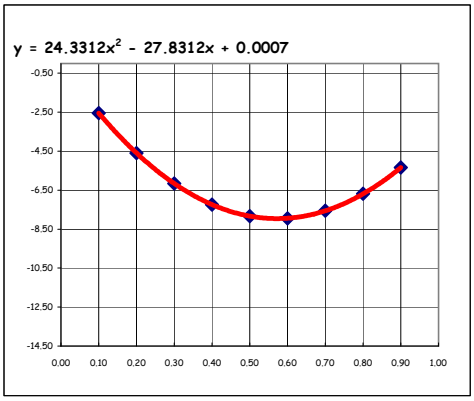
R = **25.5**

theta = **14.5**

Lend = 10.715

	->TO P19	P19-EJ7
Span =	4214.1771	161.2917
A =		24.3312
B =		-27.8312
C =		0.0070
Y' =0 @		0.5719

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	Depth
BEGIN	4182.010	552	0.1976	**-4.8333**			
3.167	4192.725	553	0.5709	-2.0622			
3.218	4195.892	553	0.9768	-1.4539			
15.067	4199.110	554	0.3893	-1.2500			
0.000	4214.177	557	0.0000	**-1.2500**			**P19**
0.080	4227.080	559	0.3334	-2.0638	-2.064	-87.608	
0.100	4230.306	559	0.7469	**-2.5400**	-2.533	-87.507	
0.200	4246.435	561	0.8142	**-4.5900**	-4.586	-86.837	
0.300	4262.565	563	0.8814	**-6.1600**	-6.153	-85.678	
0.400	4278.694	565	0.9487	**-7.2400**	-7.232	-83.184	
0.500	4294.823	568	0.0160	-7.8300	-7.826	-74.055	
0.572	**4306.424**	**569**	**0.5029**		**-7.952**	**0.000**	
0.600	4310.952	570	0.2364	**-7.9400**	-7.932	53.798	
0.700	4327.081	572	0.7981	**-7.5600**	-7.553	80.885	
0.800	4343.210	574	0.8654	**-6.6900**	-6.686	84.852	
0.900	4359.340	576	0.9327	**-5.3400**	-5.333	86.416	
0.920	4362.565	577	0.3462	-5.0038	-5.004	86.621	
1.000	4375.469	578	1.0000	**-3.5000**	**-3.493**	87.252	**EJ7**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 200XE — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 3.0000

DX at END = 32.1667

	->TO EJ7	EJ7-P20	P20-P21	P21-P22
Span =	4375.4688	33.7083	195.0000	195.0000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

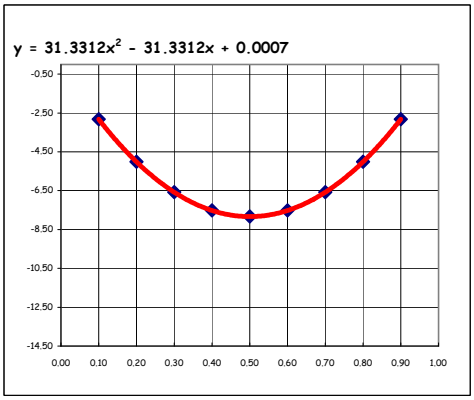
30.708

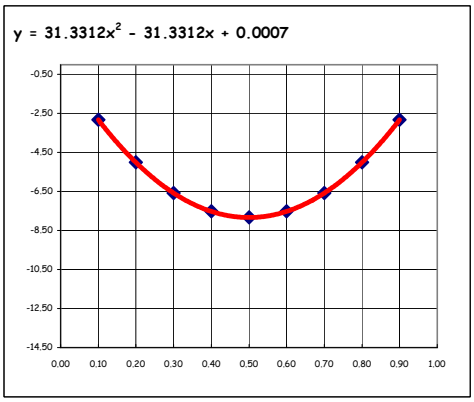
			x/l	drawing	equation	Y'	
0.000	4378.469	580	0.3845	-3.9200			EJ7
0.250	4386.1458	581	0.3685	-2.7519			
0.500	4393.8229	582	0.3525	-1.9175			
0.750	4401.5000	583	0.3364	-1.4169			
1.000	4409.177	585	0.0000	-1.2500	0.000	0.000	P20
0.080	4424.777	587	0.6790	-2.3053	-2.305		
0.100	4428.677	588	0.1789	-2.8200	-2.819	-87.715	
0.200	4448.177	590	0.6782	-5.0100	-5.012	-86.955	
0.300	4467.677	593	0.1776	-6.5800	-6.579	-85.438	
0.400	4487.177	595	0.6769	-7.5200	-7.519	-80.933	
0.500	**4506.677**	**598**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4526.177	601	0.3231	-7.5200	-7.519	80.933	
0.700	4545.677	603	0.8224	-6.5800	-6.579	85.438	
0.800	4565.177	606	0.3218	-5.0100	-5.012	86.955	
0.900	4584.677	608	0.8211	-2.8200	-2.819	87.715	
0.920	4588.577	609	0.3210	-2.3053	-2.305		
1.000	4604.177	612	0.0000	-1.2500		0.000	P21
0.080	4619.777	614	0.6790	-2.3053	-2.305		
0.100	4623.677	615	0.1789	-2.8200	-2.819	-87.715	
0.200	4643.177	617	0.6782	-5.0100	-5.012	-86.955	
0.300	4662.677	620	0.1776	-6.5800	-6.579	-85.438	
0.400	4682.177	622	0.6769	-7.5200	-7.519	-80.933	
0.500	**4701.677**	**625**	**0.5000**	-7.8300	**-7.832**	**0.000**	
0.600	4721.177	628	0.3231	-7.5200	-7.519	80.933	
0.700	4740.677	630	0.8224	-6.5800	-6.579	85.438	
0.800	4760.177	633	0.3218	-5.0100	-5.012	86.955	
0.900	4779.677	635	0.8211	-2.8200	-2.819	87.715	
0.920	4783.577	636	0.3210	-2.3053	-2.305	87.824	
1.000	4799.177	638	1.0000	-1.2500		88.172	P22
17.746	4816.923	641	0.954	-1.2500			
3.597	4820.520	642	0.415	-1.4779			
3.539	4824.059	642	0.869	-2.1578			
END	4831.344	643	0.8024	-4.0417			

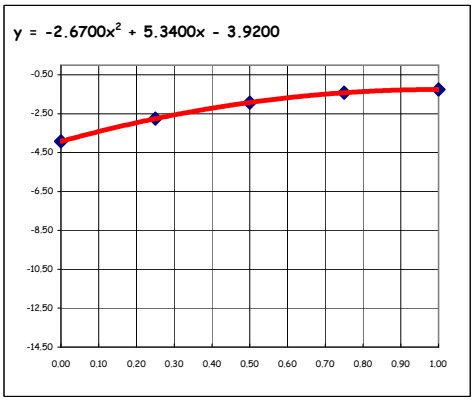
R = 28.5

theta = 14.5

Lend = 7.285







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

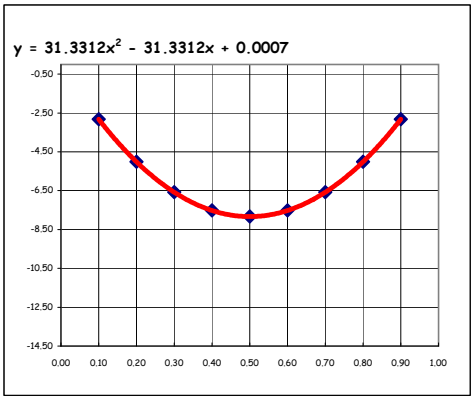
DESCRP: PT DEFINITION - SEGMENT 5, TENDON 200XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

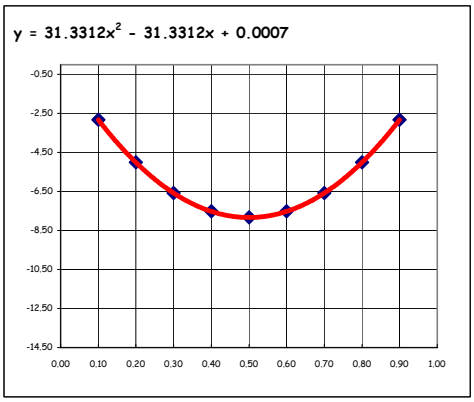
DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ7	EJ7-P20'	P20'-P21'	P21'-P22'
Span =	4375.4688	33.7083	190.0000	172.5000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	4378.469	580	0.3845	**-3.9200**			**EJ7**
0.250	4386.1458	581	0.3685	-2.7519			
0.500	4393.8229	582	0.3525	-1.9175			
0.750	4401.5000	583	0.3364	-1.4169			
0.000	4409.177	585	0.0000	**-1.2500**	0.000	0.000	**P20'**
0.080	4424.377	587	0.6278	-2.3053	-2.305		
0.100	4428.177	588	0.1148	**-2.8200**	-2.819	-87.715	
0.200	4447.177	590	0.5501	**-5.0100**	-5.012	-86.955	
0.300	4466.177	592	0.9853	**-6.5800**	-6.579	-85.438	
0.400	4485.177	595	0.4206	**-7.5200**	-7.519	-80.933	
0.500	**4504.177**	**597**	**0.8558**	**-7.8300**	**-7.832**	**0.000**	
0.600	4523.177	600	0.5794	-7.5200	-7.519	80.933	
0.700	4542.177	603	0.0147	-6.5800	-6.579	85.438	
0.800	4561.177	605	0.4499	-5.0100	-5.012	86.955	
0.900	4580.177	607	0.8852	-2.8200	-2.819	87.715	
0.920	4583.977	608	0.3722	-2.3053	-2.305		
1.000	4599.177	611	0.0000	**-1.2500**		0.000	**P21'**
0.080	4612.977	613	0.4483	-2.3053	-2.305		
0.100	4616.427	613	0.8905	-2.8200	-2.819	-87.715	
0.200	4633.677	616	0.1015	-5.0100	-5.012	-86.955	
0.300	4650.927	618	0.3124	-6.5800	-6.579	-85.438	
0.400	4668.177	620	0.5234	-7.5200	-7.519	-80.933	
0.500	**4685.427**	**622**	**0.7343**	-7.8300	**-7.832**	**0.000**	
0.600	4702.677	625	0.4766	-7.5200	-7.519	80.933	
0.700	4719.927	627	0.6876	-6.5800	-6.579	85.438	
0.800	4737.177	629	0.8985	-5.0100	-5.012	86.955	
0.900	4754.427	632	0.1095	-2.8200	-2.819	87.715	
0.920	4757.877	632	0.5517	-2.3053	-2.305	87.824	
1.000	4771.677	634	1.0000	-1.2500		88.172	**P22'**
17.746	4789.423	637	0.954	-1.2500			
3.597	4793.020	638	0.415	-1.4779			
3.539	4796.559	638	0.869	-2.1578			
END	4803.844	639	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

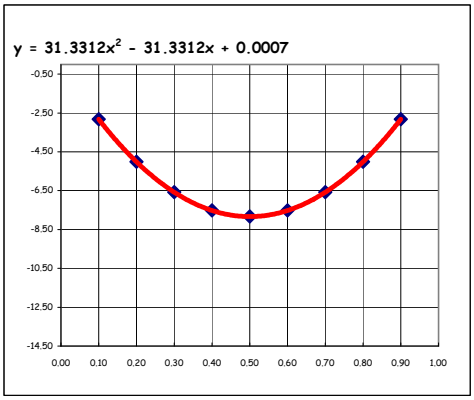
DESCRP: PT DEFINITION - SEGMENT 5, TENDON 201XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ7	EJ7-P20	P20-P21	P21-P22
Span =	4375.4688	33.7083	195.0000	195.0000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	4378.469	580	0.3845	**-3.9200**			**EJ7**
0.250	4386.1458	581	0.3685	-2.7519			
0.500	4393.8229	582	0.3525	-1.9175			
0.750	4401.5000	583	0.3364	-1.4169			
0.000	4409.177	585	0.0000	**-1.2500**	0.000	0.000	**P20**
0.080	4424.777	587	0.6790	-2.3053	-2.305		
0.100	4428.677	588	0.1789	**-2.8200**	-2.819	-87.715	
0.200	4448.177	590	0.6782	**-5.0100**	-5.012	-86.955	
0.300	4467.677	593	0.1776	**-6.5800**	-6.579	-85.438	
0.400	4487.177	595	0.6769	**-7.5200**	-7.519	-80.933	
0.500	**4506.677**	**598**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4526.177	601	0.3231	-7.5200	-7.519	80.933	
0.700	4545.677	603	0.8224	-6.5800	-6.579	85.438	
0.800	4565.177	606	0.3218	-5.0100	-5.012	86.955	
0.900	4584.677	608	0.8211	-2.8200	-2.819	87.715	
0.920	4588.577	609	0.3210	-2.3053	-2.305		
1.000	4604.177	612	0.0000	**-1.2500**		0.000	**P21**
17.746	4621.923	614	0.954	-1.2500			
3.597	4625.520	615	0.415	-1.4779			
3.539	4629.059	615	0.869	-2.1578			
END	4636.344	616	0.8024	**-4.0417**			



R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

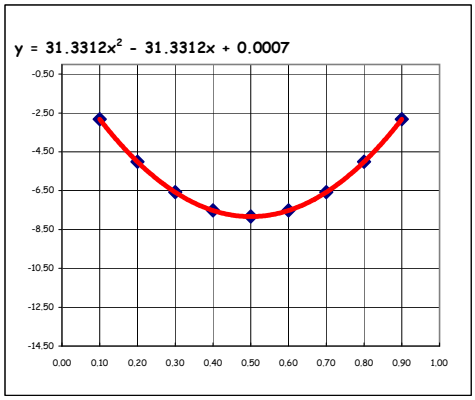
DESCRP: PT DEFINITION - SEGMENT 5, TENDON 201XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ7	EJ7-P20'	P20'-P21'	P21'-P22'
Span =	4375.4688	33.7083	190.0000	172.5000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	4378.469	580	0.3845	**-3.9200**			**EJ7**
0.250	4386.1458	581	0.3685	-2.7519			
0.500	4393.8229	582	0.3525	-1.9175			
0.750	4401.5000	583	0.3364	-1.4169			
0.000	4409.177	585	0.0000	**-1.2500**	0.000	0.000	**P20**
0.080	4424.377	587	0.6278	-2.3053	-2.305		
0.100	4428.177	588	0.1148	**-2.8200**	-2.819	-87.715	
0.200	4447.177	590	0.5501	**-5.0100**	-5.012	-86.955	
0.300	4466.177	592	0.9853	**-6.5800**	-6.579	-85.438	
0.400	4485.177	595	0.4206	**-7.5200**	-7.519	-80.933	
0.500	**4504.177**	**597**	**0.8558**	**-7.8300**	**-7.832**	**0.000**	
0.600	4523.177	600	0.5794	-7.5200	-7.519	80.933	
0.700	4542.177	603	0.0147	-6.5800	-6.579	85.438	
0.800	4561.177	605	0.4499	-5.0100	-5.012	86.955	
0.900	4580.177	607	0.8852	-2.8200	-2.819	87.715	
0.920	4583.977	608	0.3722	-2.3053	-2.305		
1.000	4599.177	611	0.0000	**-1.2500**		0.000	**P21**
17.746	4616.923	613	0.954	-1.2500			
3.597	4620.520	614	0.415	-1.4779			
3.539	4624.059	614	0.869	-2.1578			
END	4631.344	615	0.8024	**-4.0417**			



R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

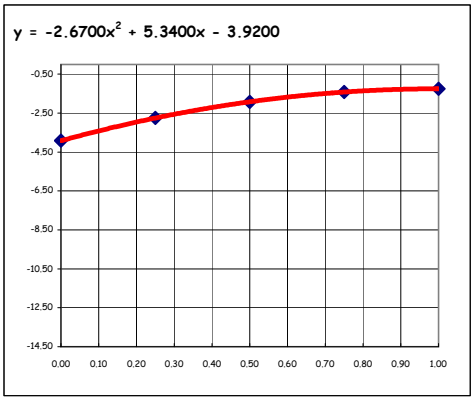
DESCRP: PT DEFINITION - SEGMENT 5, TENDON 202XE | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ7	EJ7-P20		
Span =	4375.4688	33.7083		
A =		-2.6700		
B =		5.3400		
C =		-3.9200		
Y' =0 :				

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	4378.469	580	0.3845	**-3.9200**			**EJ7**
0.250	4386.1458	581	0.3685	-2.7519	-2.752		
0.500	4393.8229	582	0.3525	-1.9175	-1.918		
0.750	4401.5000	583	0.3364	-1.4169	-1.417		
1.000	4409.177	585	0.0000	**-1.2500**	-1.250	0.000	**P20**
17.746	4426.923	587	0.954	-1.2500			
3.597	4430.520	588	0.415	-1.4779			
3.539	4434.059	588	0.869	-2.1578			
END	4441.344	589	0.8024	**-4.0417**			



R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

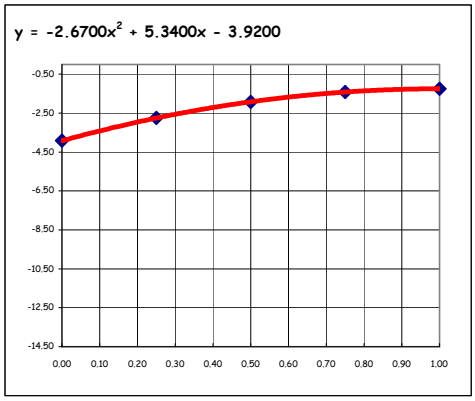
DESCRP: PT DEFINITION - SEGMENT 5, TENDON 202XW | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ7	EJ7-P20'		
Span =	4375.4688	33.7083		
A =		-2.6700		
B =		5.3400		
C =		-3.9200		
Y' =0 :				

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	4378.469	580	0.3845	**-3.9200**			**EJ7**
0.250	4386.1458	581	0.3685	-2.7519	-2.7519		
0.500	4393.8229	582	0.3525	-1.9175	-1.9175		
0.750	4401.5000	583	0.3364	-1.4169	-1.4169		
1.000	4409.177	585	0.0000	**-1.2500**	-1.250	0.000	**P20**
17.746	4426.923	587	0.954	-1.2500			
3.597	4430.520	588	0.415	-1.4779			
3.539	4434.059	588	0.869	-2.1578			
END	4441.344	589	0.8024	**-4.0417**			



R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 210XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

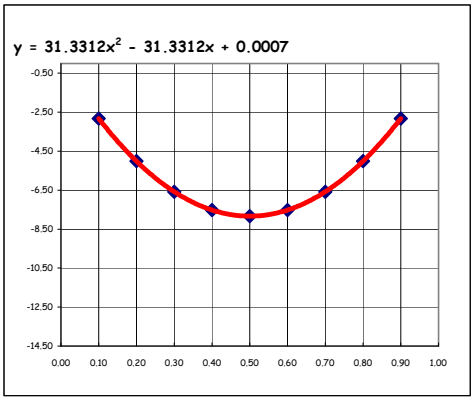
R = **28.5**

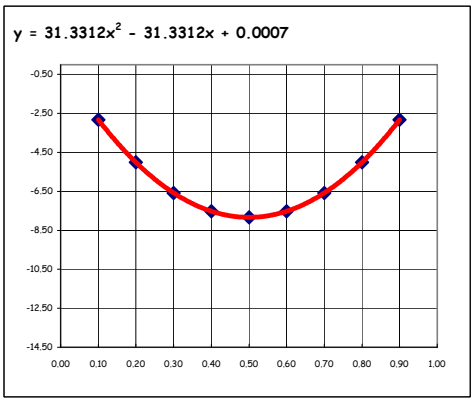
theta = **14.5**

Lend = 7.285

	->TO P21	P21-P22	P22-P23	
Span =	4604.1771	195.0000	195.0000	
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	4572.010	607	0.1976	**-4.0417**			
3.539	4579.295	608	0.1313	-2.1578			
3.597	4582.834	608	0.5849	-1.4779			
17.746	4586.431	609	0.0459	-1.2500			
0.000	4604.177	612	0.0000	**-1.2500**	0.001	-88.172	**P21**
0.080	4619.777	614	0.6790	-2.3053	-2.305		
0.100	4623.677	615	0.1789	**-2.8200**	-2.819	-87.715	
0.200	4643.177	617	0.6782	**-5.0100**	-5.012	-86.955	
0.300	4662.677	620	0.1776	**-6.5800**	-6.579	-85.438	
0.400	4682.177	622	0.6769	**-7.5200**	-7.519	-80.933	
0.500	**4701.677**	**625**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4721.177	628	0.3231	-7.5200	-7.519	80.933	
0.700	4740.677	630	0.8224	-6.5800	-6.579	85.438	
0.800	4760.177	633	0.3218	-5.0100	-5.012	86.955	
0.900	4779.677	635	0.8211	-2.8200	-2.819	87.715	
0.920	4783.577	636	0.3210	-2.3053	-2.305		
1.000	4799.177	639	0.0000	**-1.2500**		88.172	**P22**
0.080	4814.777	641	0.6790	-2.3053	-2.305		
0.100	4818.677	642	0.1789	-2.8200	-2.819	-87.715	
0.200	4838.177	644	0.6782	-5.0100	-5.012	-86.955	
0.300	4857.677	647	0.1776	-6.5800	-6.579	-85.438	
0.400	4877.177	649	0.6769	-7.5200	-7.519	-80.933	
0.500	**4896.677**	**652**	**0.5000**	-7.8300	**-7.832**	**0.000**	
0.600	4916.177	655	0.3231	-7.5200	-7.519	80.933	
0.700	4935.677	657	0.8224	-6.5800	-6.579	85.438	
0.800	4955.177	660	0.3218	-5.0100	-5.012	86.955	
0.900	4974.677	662	0.8211	-2.8200	-2.819	87.715	
0.920	4978.577	663	0.3210	-2.3053	-2.305	87.824	
1.000	4994.177	666	0.0000	-1.2500		88.172	**P23**
17.746	5011.923	668	0.954	-1.2500			
3.597	5015.520	669	0.415	-1.4779			
3.539	5019.059	669	0.869	-2.1578			
END	5026.344	670	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 210XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

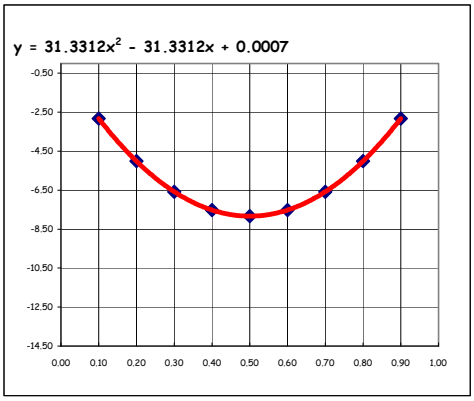
R = **28.5**

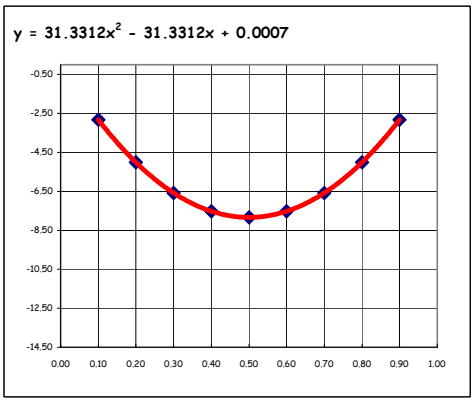
theta = **14.5**

Lend = 7.285

	->TO P21	P21'-P22'	P22'-P23'	
Span =	4599.1771	172.5000	172.5000	
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	4567.010	606	0.1976	**-4.0417**			
3.539	4574.295	607	0.1313	-2.1578			
3.597	4577.834	607	0.5849	-1.4779			
17.746	4581.431	608	0.0459	-1.2500			
0.000	4599.177	611	0.0000	**-1.2500**		-88.172	**P21'**
0.080	4612.977	613	0.4483	-2.3053	-2.305		
0.100	4616.427	613	0.8905	**-2.8200**	-2.819	-87.715	
0.200	4633.677	616	0.1015	**-5.0100**	-5.012	-86.955	
0.300	4650.927	618	0.3124	**-6.5800**	-6.579	-85.438	
0.400	4668.177	620	0.5234	**-7.5200**	-7.519	-80.933	
0.500	**4685.427**	**622**	**0.7343**	**-7.8300**	**-7.832**	**0.000**	
0.600	4702.677	625	0.4766	-7.5200	-7.519	80.933	
0.700	4719.927	627	0.6876	-6.5800	-6.579	85.438	
0.800	4737.177	629	0.8985	-5.0100	-5.012	86.955	
0.900	4754.427	632	0.1095	-2.8200	-2.819	87.715	
0.920	4757.877	632	0.5517	-2.3053	-2.305		
1.000	4771.677	635	0.0000	**-1.2500**		88.172	**P22'**
0.080	4785.477	637	0.4483	-2.3053	-2.305		
0.100	4788.927	637	0.8905	-2.8200	-2.819	-87.715	
0.200	4806.177	640	0.1015	-5.0100	-5.012	-86.955	
0.300	4823.427	642	0.3124	-6.5800	-6.579	-85.438	
0.400	4840.677	644	0.5234	-7.5200	-7.519	-80.933	
0.500	**4857.927**	**647**	**0.2657**	-7.8300	**-7.832**	**0.000**	
0.600	4875.177	649	0.4766	-7.5200	-7.519	80.933	
0.700	4892.427	651	0.6876	-6.5800	-6.579	85.438	
0.800	4909.677	653	0.8985	-5.0100	-5.012	86.955	
0.900	4926.927	656	0.1095	-2.8200	-2.819	87.715	
0.920	4930.377	656	0.5517	-2.3053	-2.305	87.824	
1.000	4944.177	659	0.0000	-1.2500		88.172	**P23'**
17.746	4961.923	661	0.954	-1.2500			
3.597	4965.520	662	0.415	-1.4779			
3.539	4969.059	662	0.869	-2.1578			
END	4976.344	663	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 220XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

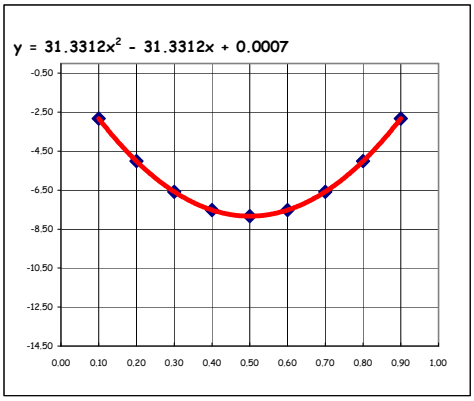
R = **28.5**

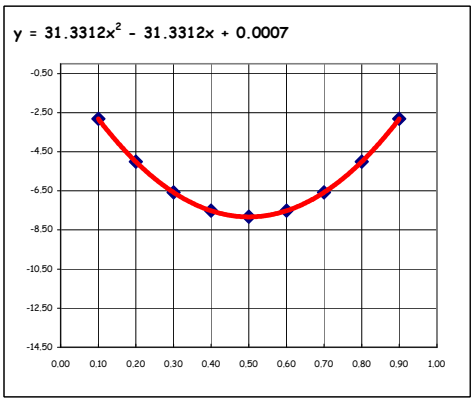
theta = **14.5**

Lend = 7.285

	->TO P22	P22-P23	P23-P24	
Span =	4799.1771	195.0000	202.8021	
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	4767.010	634	0.1976	**-4.0417**			
3.539	4774.295	635	0.1313	-2.1578			
3.597	4777.834	635	0.5849	-1.4779			
17.746	4781.431	636	0.0459	-1.2500			
0.000	4799.177	639	0.0000	**-1.2500**	0.001	-88.172	**P22**
0.080	4814.777	641	0.6790	-2.3053	-2.305		
0.100	4818.677	642	0.1789	**-2.8200**	-2.819	-87.715	
0.200	4838.177	644	0.6782	**-5.0100**	-5.012	-86.955	
0.300	4857.677	647	0.1776	**-6.5800**	-6.579	-85.438	
0.400	4877.177	649	0.6769	**-7.5200**	-7.519	-80.933	
0.500	**4896.677**	**652**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	4916.177	655	0.3231	-7.5200	-7.519	80.933	
0.700	4935.677	657	0.8224	-6.5800	-6.579	85.438	
0.800	4955.177	660	0.3218	-5.0100	-5.012	86.955	
0.900	4974.677	662	0.8211	-2.8200	-2.819	87.715	
0.920	4978.577	663	0.3210	-2.3053	-2.305		
1.000	4994.177	666	0.0000	**-1.2500**		88.172	**P23**
0.080	5010.401	668	0.7590	-2.3053	-2.305		
0.100	5014.457	669	0.2789	-2.8200	-2.819	-87.715	
0.200	5034.738	671	0.8782	-5.0100	-5.012	-86.955	
0.300	5055.018	674	0.4776	-6.5800	-6.579	-85.438	
0.400	5075.298	677	0.0769	-7.5200	-7.519	-80.933	
0.500	**5095.578**	**680**	**0.3238**	-7.8300	**-7.832**	**0.000**	
0.600	5115.858	682	0.9231	-7.5200	-7.519	80.933	
0.700	5136.139	685	0.5224	-6.5800	-6.579	85.438	
0.800	5156.419	688	0.1218	-5.0100	-5.012	86.955	
0.900	5176.699	690	0.7211	-2.8200	-2.819	87.715	
0.920	5180.755	691	0.2410	-2.3053	-2.305	87.824	
1.000	5196.979	694	0.0000	-1.2500		88.172	**P24**
17.746	5214.725	696	0.954	-1.2500			
3.597	5218.322	697	0.415	-1.4779			
3.539	5221.861	697	0.869	-2.1578			
END	5229.146	698	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 220XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

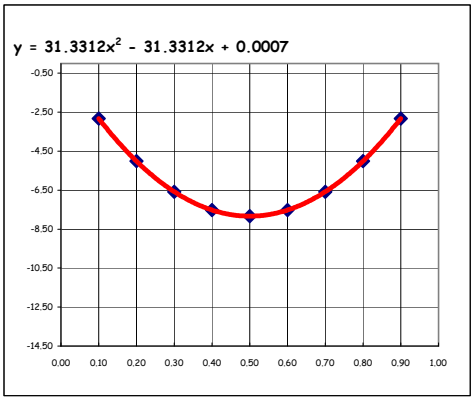
R = **28.5**

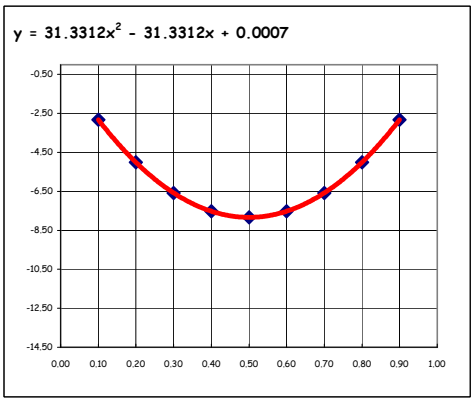
theta = **14.5**

Lend = 7.285

	->TO P22'	P22'-P23'	P23'-P24'	
Span =	4771.6771	172.5000	200.0000	
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	4739.510	630	0.1976	**-4.0417**			
3.539	4746.795	631	0.1313	-2.1578			
3.597	4750.334	631	0.5849	-1.4779			
17.746	4753.931	632	0.0459	-1.2500			
0.000	4771.677	635	0.0000	**-1.2500**	0.001	-88.172	**P22'**
0.080	4785.477	637	0.4483	-2.3053	-2.305		
0.100	4788.927	637	0.8905	**-2.8200**	-2.819	-87.715	
0.200	4806.177	640	0.1015	**-5.0100**	-5.012	-86.955	
0.300	4823.427	642	0.3124	**-6.5800**	-6.579	-85.438	
0.400	4840.677	644	0.5234	**-7.5200**	-7.519	-80.933	
0.500	**4857.927**	**647**	**0.2657**	**-7.8300**	**-7.832**	**0.000**	
0.600	4875.177	649	0.4766	-7.5200	-7.519	80.933	
0.700	4892.427	651	0.6876	-6.5800	-6.579	85.438	
0.800	4909.677	653	0.8985	-5.0100	-5.012	86.955	
0.900	4926.927	656	0.1095	-2.8200	-2.819	87.715	
0.920	4930.377	656	0.5517	-2.3053	-2.305		
1.000	4944.177	659	0.0000	**-1.2500**		88.172	**P23'**
0.080	4960.177	661	0.7303	-2.3053	-2.305		
0.100	4964.177	662	0.2430	-2.8200	-2.819	-87.715	
0.200	4984.177	664	0.8064	-5.0100	-5.012	-86.955	
0.300	5004.177	667	0.3698	-6.5800	-6.579	-85.438	
0.400	5024.177	669	0.9332	-7.5200	-7.519	-80.933	
0.500	**5044.177**	**672**	**0.5000**	-7.8300	**-7.832**	**0.000**	
0.600	5064.177	675	0.0668	-7.5200	-7.519	80.933	
0.700	5084.177	677	0.6302	-6.5800	-6.579	85.438	
0.800	5104.177	680	0.1936	-5.0100	-5.012	86.955	
0.900	5124.177	682	0.7570	-2.8200	-2.819	87.715	
0.920	5128.177	683	0.2697	-2.3053	-2.305	87.824	
1.000	5144.177	686	0.0000	-1.2500		88.172	**P24'**
17.746	5161.923	688	0.954	-1.2500			
3.597	5165.520	689	0.415	-1.4779			
3.539	5169.059	689	0.869	-2.1578			
END	5176.344	690	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 230XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

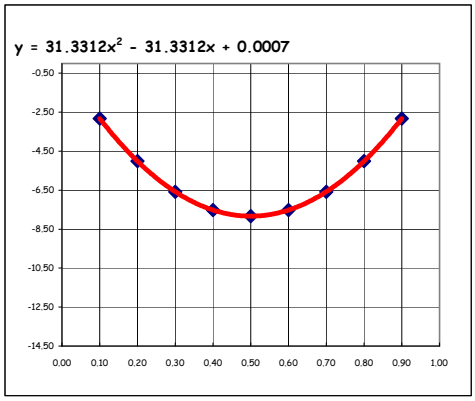
R = **28.5**

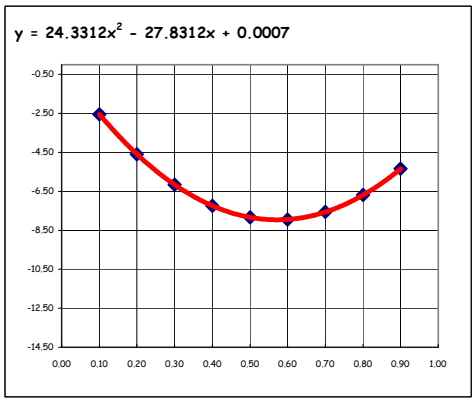
theta = **14.5**

Lend = 7.285

	->TO P23	P23-P24	P24-EJ8	
Span =	4994.1771	202.8021	180.4896	
A =		31.3312	24.3312	
B =		-31.3312	-27.8312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5719	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	4962.010	661	0.1976	**-4.0417**			
3.539	4969.295	662	0.1313	-2.1578			
3.597	4972.834	662	0.5849	-1.4779			
17.746	4976.431	663	0.0459	-1.2500			
0.000	4994.177	666	0.0000	**-1.2500**	0.001		**P23**
0.080	5010.401	668	0.7590	-2.3053	-2.305		
0.100	5014.457	669	0.2789	**-2.8200**	-2.819	-87.715	
0.200	5034.737	671	0.8782	**-5.0100**	-5.012	-86.955	
0.300	5055.018	674	0.4776	**-6.5800**	-6.579	-85.438	
0.400	5075.298	677	0.0769	**-7.5200**	-7.519	-80.933	
0.500	**5095.578**	**680**	**0.3238**	**-7.8300**	**-7.832**	**0.000**	
0.600	5115.858	682	0.9231	-7.5200	-7.519	80.933	
0.700	5136.139	685	0.5224	-6.5800	-6.579	85.438	
0.800	5156.419	688	0.1218	-5.0100	-5.012	86.955	
0.900	5176.699	690	0.7211	-2.8200	-2.819	87.715	
0.920	5180.755	691	0.2410	-2.3053	-2.305		
1.000	5196.979	694	0.0000	**-1.2500**			**P24**
0.089	5213.043	696	0.7385	-2.2835	-2.284		
0.100	5215.028	696	0.9929	**-2.5400**	-2.5391	-87.507	
0.200	5233.077	699	0.3063	**-4.5900**	-4.5923	-86.837	
0.300	5251.126	701	0.6196	**-6.1600**	-6.1589	-85.678	
0.400	5269.175	703	0.9330	**-7.2400**	-7.2388	-83.184	
0.500	5287.224	706	0.2463	**-7.8300**	-7.8321	-74.055	
0.572	**5300.206**	707	0.7434		-7.9580	**0.000**	
0.600	5305.273	708	0.3354	**-7.9400**	-7.9388	53.798	
0.700	5323.322	710	0.6487	**-7.5600**	-7.5589	80.885	
0.800	5341.371	712	0.9621	**-6.6900**	-6.6923	84.852	
0.900	5359.420	714	0.6866	**-5.3400**	-5.3391	86.416	
0.911	5361.405	714	0.9411	-5.1605	-5.161	86.532	
1.000	5377.469	716	1.0000	**-3.5000**		87.252	**EJ8**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 230XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

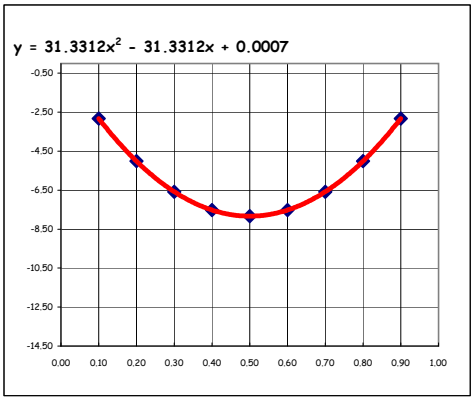
R = **28.5**

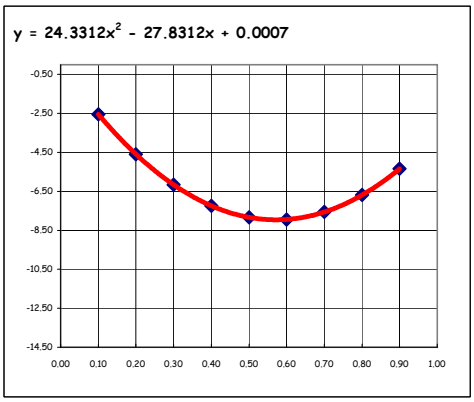
theta = **14.5**

Lend = 7.285

	->TO P23'	P23'-P24'	P24'-EJ8	
Span =	4944.1771	200.0000	166.2917	
A =		31.3312	24.3312	
B =		-31.3312	-27.8312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5719	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	4912.010	654	0.1976	**-4.0417**			
3.539	4919.295	655	0.1313	-2.1578			
3.597	4922.834	655	0.5849	-1.4779			
17.746	4926.431	656	0.0459	-1.2500			
0.000	4944.177	659	0.0000	**-1.2500**	0.001	-88.172	**P23'**
0.080	4960.177	661	0.7303	-2.3053	-2.305		
0.100	4964.177	662	0.2430	**-2.8200**	-2.819	-87.507	
0.200	4984.177	664	0.8064	**-5.0100**	-5.012	-86.837	
0.300	5004.177	667	0.3698	**-6.5800**	-6.579	-85.678	
0.400	5024.177	669	0.9332	**-7.5200**	-7.519	-83.184	
0.500	**5044.177**	**672**	**0.5000**	**-7.8300**	**-7.832**	**-74.055**	
0.600	5064.177	675	0.0668	-7.5200	-7.519	53.798	
0.700	5084.177	677	0.6302	-6.5800	-6.579	80.885	
0.800	5104.177	680	0.1936	-5.0100	-5.012	84.852	
0.900	5124.177	682	0.7570	-2.8200	-2.819	86.416	
0.920	5128.177	683	0.2697	-2.3053	-2.305		
1.000	5144.177	686	0.0000	**-1.2500**		88.172	**P24'**
0.089	5158.977	688	0.5765	-2.2835	-2.284		
0.100	5160.806	688	0.8109	**-2.5400**	-2.539	-87.507	
0.200	5177.435	690	0.9423	**-4.5900**	-4.592	-86.837	
0.300	5194.065	693	0.0737	**-6.1600**	-6.159	-85.678	
0.400	5210.694	695	0.2051	**-7.2400**	-7.239	-83.184	
0.500	5227.323	697	0.3364	**-7.8300**	-7.832	-74.055	
0.572	**5239.283**	698	0.8694		**-7.958**	**0.000**	
0.600	5243.952	699	0.3318	**-7.9400**	-7.939	53.798	
0.700	5260.581	701	0.1893	**-7.5600**	-7.559	80.885	
0.800	5277.210	703	0.3207	**-6.6900**	-6.692	84.852	
0.900	5293.840	704	0.9170	**-5.3400**	-5.339	86.416	
0.911	5295.669	705	0.1031	-5.1605	-5.161	86.532	
1.000	5310.469	706	1.0000	**-3.5000**		87.252	**EJ8**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 240XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

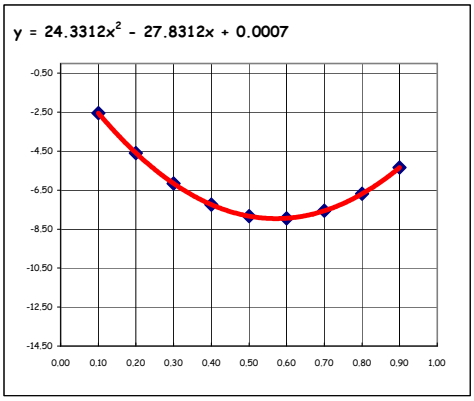
R = **25.5**

theta = **14.5**

Lend = 10.715

	->TO P24	P24-EJ8		
Span =	5196.9792	180.4896		
A =		24.3312		
B =		-27.8312		
C =		0.0007		
Y' =0 :		0.5719		

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5164.812	689	0.1976	**-4.8333**			
3.167	5175.527	690	0.5709	-2.0622			
3.218	5178.694	690	0.9768	-1.4539			
15.067	5181.912	691	0.3893	-1.2500			
0.000	5196.979	694	0.0000	**-1.2500**		-87.942	**P24**
0.089	5213.043	696	0.7385	-2.2835	-2.284		
0.100	5215.028	696	0.9929	**-2.5400**	-2.539	-87.507	
0.200	5233.077	699	0.3063	**-4.5900**	-4.592	-86.837	
0.300	5251.126	701	0.6196	**-6.1600**	-6.159	-85.678	
0.400	5269.175	703	0.9330	**-7.2400**	-7.239	-83.184	
0.500	5287.224	706	0.2463	**-7.8300**	-7.832	-74.055	
0.572	**5300.206**	707	0.7434		**-7.958**	**0.000**	
0.600	5305.273	708	0.3354	**-7.9400**	-7.939	53.798	
0.700	5323.322	710	0.6487	**-7.5600**	-7.559	80.885	
0.800	5341.371	712	0.9621	**-6.6900**	-6.692	84.852	
0.900	5359.420	714	0.6866	**-5.3400**	-5.339	86.416	
0.911	5361.405	714	0.9411	-5.1605	-5.161	86.532	
1.000	5377.469	716	1.0000	**-3.5000**			**EJ8**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 5, TENDON 240XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

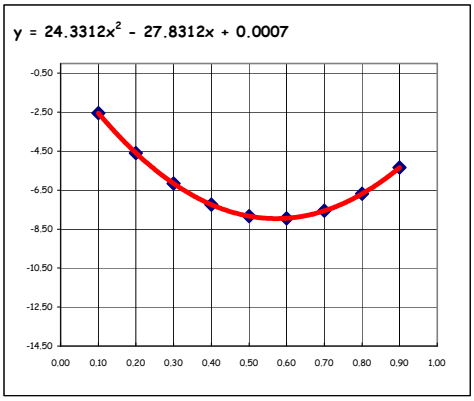
R = **28.5**

theta = **14.5**

Lend = 7.285

	->TO P24'	P24'-EJ8		
Span =	5144.1771	166.2917		
A =		24.3312		
B =		-27.8312		
C =		0.0007		
Y' =0 :		0.5719		

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5112.010	681	0.1976	**-4.0417**			
3.539	5119.295	682	0.1313	-2.1578			
3.597	5122.834	682	0.5849	-1.4779			
17.746	5126.431	683	0.0459	-1.2500			
0.000	5144.177	686	0.0000	**-1.2500**		-87.942	**P24'**
0.089	5158.977	688	0.5765	-2.2835	-2.284		
0.100	5160.806	688	0.8109	**-2.5400**	-2.539	-87.507	
0.200	5177.435	690	0.9423	**-4.5900**	-4.592	-86.837	
0.300	5194.065	693	0.0737	**-6.1600**	-6.159	-85.678	
0.400	5210.694	695	0.2051	**-7.2400**	-7.239	-83.184	
0.500	5227.323	697	0.3364	**-7.8300**	-7.832	-74.055	
0.572	**5239.283**	698	0.8694		**-7.958**	**0.000**	
0.600	5243.952	699	0.3318	**-7.9400**	-7.939	53.798	
0.700	5260.581	701	0.1893	**-7.5600**	-7.559	80.885	
0.800	5277.210	703	0.3207	**-6.6900**	-6.692	84.852	
0.900	5293.840	704	0.9170	**-5.3400**	-5.339	86.416	
0.911	5295.669	705	0.1031	-5.1605	-5.161	86.532	
1.000	5310.469	706	1.0000	**-3.5000**			**EJ8**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 250XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

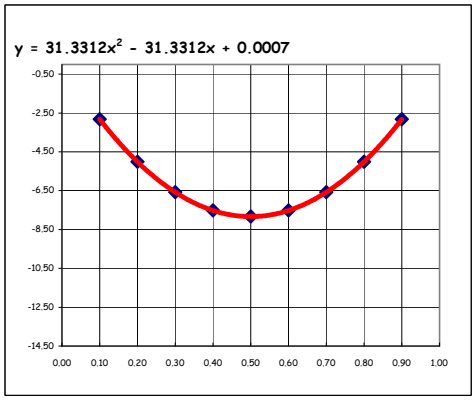
	->TO EJ8	EJ8-P25	P25-P26	P26-P27
Span =	5377.4687	33.7083	222.0000	222.0000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

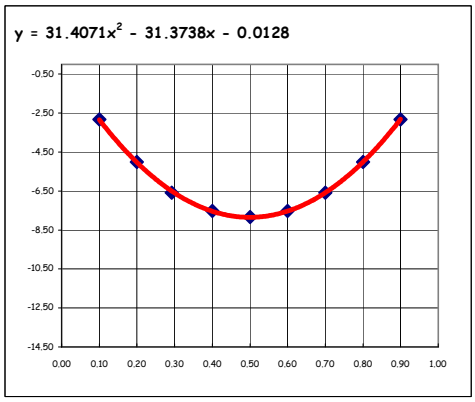
DL	X	ELEM	x/l	Y from TOP flange drawing	Y from TOP flange equation	Y'	
0.000	5380.469	718	0.3845	**-3.9200**			**EJ8**
0.250	5388.1458	719	0.3685	-2.7519			
0.500	5395.8229	720	0.3525	-1.9175			
0.750	5403.5000	721	0.3364	-1.4169			
1.000	5411.177	723	0.0000	**-1.2500**	0.000	0.000	**P25**
0.080	5428.937	725	0.9559	-2.3053	-2.305		
0.100	5433.377	726	0.5250	**-2.8200**	-2.819	-87.715	
0.200	5455.577	729	0.3704	**-5.0100**	-5.012	-86.955	
0.300	5477.777	732	0.2158	**-6.5800**	-6.579	-85.438	
0.400	5499.977	735	0.0611	**-7.5200**	-7.519	-80.933	
0.500	**5522.177**	**738**	**0.0935**	**-7.8300**	**-7.832**	**0.000**	
0.600	5544.377	740	0.9389	-7.5200	-7.519	80.933	
0.700	5566.577	743	0.7842	-6.5800	-6.579	85.438	
0.800	5588.777	746	0.6296	-5.0100	-5.012	86.955	
0.900	5610.977	749	0.4750	-2.8200	-2.819	87.715	
0.920	5615.417	750	0.0441	-2.3053	-2.305		
1.000	5633.177	753	0.0000	**-1.2500**		0.000	**P26**
0.080	5650.937	755	0.9559	-2.3053	-2.305		
0.100	5655.377	756	0.5250	-2.8200	-2.819	-87.715	
0.200	5677.577	759	0.3704	-5.0100	-5.012	-86.955	
0.292	**5698.094**	**761**	**1.0000**	-6.5800	-6.482	-85.604	
0.292	**5698.094**	**762**	**0.0000**		-6.482	-85.604	
0.400	5721.977	765	0.0611	-7.5200	-7.519	-80.933	
0.500	**5744.177**	**767**	**0.9065**	-7.8300	**-7.832**	**0.000**	
0.600	5766.377	770	0.9389	-7.5200	-7.519	80.933	
0.700	5788.577	773	0.7842	-6.5800	-6.579	85.438	
0.800	5810.777	776	0.6296	-5.0100	-5.012	86.955	
0.900	5832.977	779	0.4750	-2.8200	-2.819	87.715	
0.920	5837.417	780	0.0441	-2.3053	-2.305	87.824	
1.000	5855.177	783	0.0000	-1.2500		88.172	**P27**
15.067	5870.244	785	0.611	-1.2500			
3.218	5873.462	786	0.023	-1.4539			
3.167	5876.629	786	0.429	-2.0622			
END	5887.344	787	0.8024	**-4.8333**			

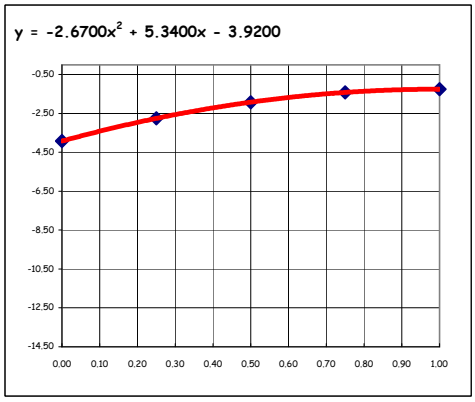
R = **25.5**

theta = **14.5**

Lend = 10.715







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

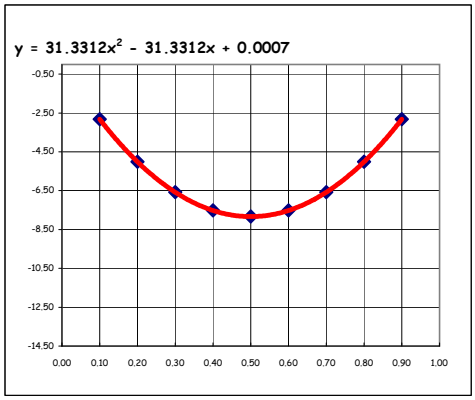
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 250XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

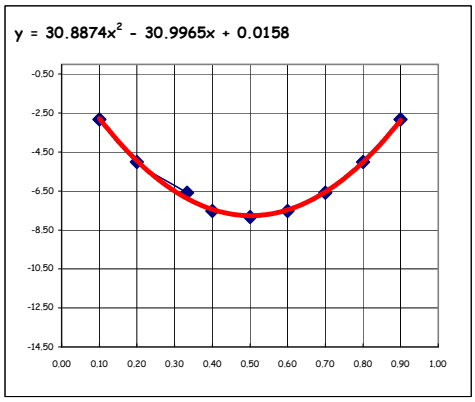
DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ8	EJ8-P25'	P25'-P26'	P26'-P27'
Span =	5310.4687	33.7083	195.0000	195.0000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	5313.469	708	0.3845	**-3.9200**			**EJ8**
0.250	5321.1458	709	0.3685	-2.7519			
0.500	5328.8229	710	0.3525	-1.9175			
0.750	5336.5000	711	0.3364	-1.4169			
0.000	5344.177	713	0.0000	**-1.2500**			**P25'**
0.080	5359.777	715	0.6790	-2.3053	-2.305		
0.100	5363.677	716	0.1789	**-2.8200**	-2.819	-87.715	
0.200	5383.177	718	0.6782	**-5.0100**	-5.012	-86.955	
0.300	5402.677	721	0.1776	**-6.5800**	-6.579	-85.438	
0.400	5422.177	723	0.6769	**-7.5200**	-7.519	-80.933	
0.500	**5441.677**	**726**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	5461.177	729	0.3231	-7.5200	-7.519	80.933	
0.700	5480.677	731	0.8224	-6.5800	-6.579	85.438	
0.800	5500.177	734	0.3218	-5.0100	-5.012	86.955	
0.900	5519.677	736	0.8211	-2.8200	-2.819	87.715	
0.920	5523.577	737	0.3210	-2.3053	-2.305		
1.000	5539.177	740	0.0000	**-1.2500**			**P26'**
0.080	5554.777	742	0.6790	-2.3053	-2.305		
0.100	5558.677	743	0.1789	-2.8200	-2.819	-87.715	
0.200	5578.177	745	0.6782	-5.0100	-5.012	-86.955	
0.333	**5604.094**	**748**	**1.0000**	-6.5800	-6.957	-84.544	
0.333	**5604.094**	**749**	**0.0000**		-6.957	-84.544	
0.400	5617.177	750	0.6769	-7.5200	-7.519	-80.933	
0.500	**5636.677**	**753**	**0.5000**	-7.8300	**-7.832**	**0.000**	
0.600	5656.177	756	0.3231	-7.5200	-7.519	80.933	
0.700	5675.677	758	0.8224	-6.5800	-6.579	85.438	
0.800	5695.177	761	0.3218	-5.0100	-5.012	86.955	
0.900	5714.677	763	0.8211	-2.8200	-2.819	87.715	
0.920	5718.577	764	0.3210	-2.3053	-2.305	87.824	
1.000	5734.177	767	0.0000	-1.2500			**P27'**
15.068	5749.245	769	0.611	-1.2500			
3.218	5752.463	770	0.023	-1.4539			
3.167	5755.630	770	0.429	-2.0622			
END	5766.344	771	0.8024	**-4.8330**			





R = **25.5**

theta = **14.5**

Lend = 10.714

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

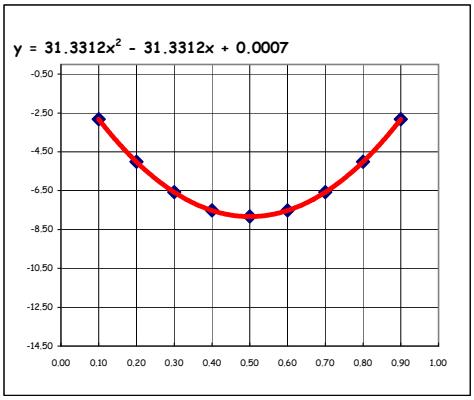
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 251XE | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ8	EJ8-P25	P25-P26	
Span =	5377.4687	33.7083	222.0000	
A =			31.3312	
B =			-31.3312	
C =			0.0007	
Y' =0 :			0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	5380.469	718	0.3845	**-3.9200**			**EJ8**
0.250	5388.1458	719	0.3685	-2.7519			
0.500	5395.8229	720	0.3525	-1.9175			
0.750	5403.5000	721	0.3364	-1.4169			
0.000	5411.177	723	0.0000	**-1.2500**	0.000	0.000	**P25**
0.080	5428.937	725	0.9559	-2.3053	-2.305		
0.100	5433.377	726	0.5250	**-2.8200**	-2.819	-87.715	
0.200	5455.577	729	0.3704	**-5.0100**	-5.012	-86.955	
0.300	5477.777	732	0.2158	**-6.5800**	-6.579	-85.438	
0.400	5499.977	735	0.0611	**-7.5200**	-7.519	-80.933	
0.500	**5522.177**	**738**	**0.0935**	**-7.8300**	**-7.832**	**0.000**	
0.600	5544.377	740	0.9389	-7.5200	-7.519	80.933	
0.700	5566.577	743	0.7842	-6.5800	-6.579	85.438	
0.800	5588.777	746	0.6296	-5.0100	-5.012	86.955	
0.900	5610.977	749	0.4750	-2.8200	-2.819	87.715	
0.920	5615.417	750	0.0441	-2.3053	-2.305		
1.000	5633.177	753	0.0000	**-1.2500**			**P26**
15.067	5648.244	755	0.611	-1.2500			
3.218	5651.462	756	0.023	-1.4539			
3.167	5654.629	756	0.429	-2.0622			
END	5665.344	757	0.8024	**-4.8333**			



R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

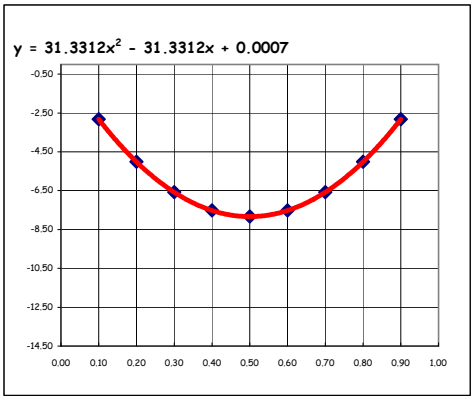
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 251XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ8	EJ8-P25'	P25'-P26'	
Span =	5310.4687	33.7083	195.0000	
A =			31.3312	
B =			-31.3312	
C =			0.0007	
Y' =0 :			0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	5313.469	708	0.3845	**-3.9200**			**EJ8**
0.250	5321.1458	709	0.3685	-2.7519			
0.500	5328.8229	710	0.3525	-1.9175			
0.750	5336.5000	711	0.3364	-1.4169			
0.000	5344.177	713	0.0000	**-1.2500**			**P25'**
0.080	5359.777	715	0.6790	-2.3053	-2.305		
0.100	5363.677	716	0.1789	**-2.8200**	-2.819	-87.715	
0.200	5383.177	718	0.6782	**-5.0100**	-5.012	-86.955	
0.300	5402.677	721	0.1776	**-6.5800**	-6.579	-85.438	
0.400	5422.177	723	0.6769	**-7.5200**	-7.519	-80.933	
0.500	**5441.677**	**726**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	5461.177	729	0.3231	-7.5200	-7.519	80.933	
0.700	5480.677	731	0.8224	-6.5800	-6.579	85.438	
0.800	5500.177	734	0.3218	-5.0100	-5.012	86.955	
0.900	5519.677	736	0.8211	-2.8200	-2.819	87.715	
0.920	5523.577	737	0.3210	-2.3053	-2.305		
1.000	5539.177	740	0.0000	**-1.2500**			**P26'**
17.746	5556.923	742	0.954	-1.2500			
3.597	5560.520	743	0.415	-1.4779			
3.539	5564.059	743	0.869	-2.1578			
END	5571.344	744	0.8024	**-4.0417**			



R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE COMPUTED BY: DEM DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 252XW CHECKED BY: **IC BY PT** DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

	->TO EJ8	EJ8-P25'	P25'-P26'	
Span =	5310.4687	33.7083	195.0000	
A =			31.3312	
B =			-31.3312	
C =			0.0007	
Y' =0 :			0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	5313.469	708	0.3845	**-3.9200**			**EJ8**
0.250	5321.1458	709	0.3685	-2.7519			
0.500	5328.8229	710	0.3525	-1.9175			
0.750	5336.5000	711	0.3364	-1.4169			
0.000	5344.177	713	0.0000	**-1.2500**			**P25'**
17.746	5361.923	715	0.954	-1.2500			
3.597	5365.520	716	0.415	-1.4779			
3.539	5369.059	716	0.869	-2.1578			
END	5376.344	717	0.8024	**-4.0417**			

R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 260XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

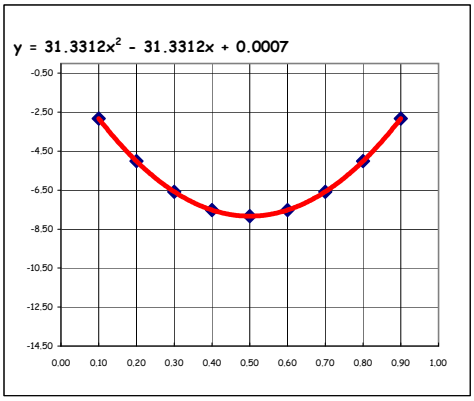
R = **25.5**

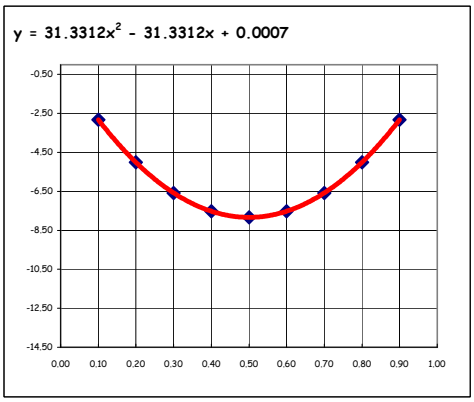
theta = **14.5**

Lend = 10.715

	->TO P26	P26-P27	P27-P28	
Span =	5633.1771	222.0000	222.0000	
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5601.010	748	0.1976	**-4.8333**			
3.167	5611.725	749	0.5709	-2.0622			
3.218	5614.892	749	0.9768	-1.4539			
15.067	5618.110	750	0.3893	-1.2500			
0.000	5633.177	753	0.0000	**-1.2500**	0.001	-88.172	**P26**
0.080	5650.937	755	0.9559	-2.3053	-2.305		
0.100	5655.377	756	0.5250	**-2.8200**	-2.819	-87.715	
0.200	5677.577	759	0.3704	**-5.0100**	-5.012	-86.955	
0.300	5699.777	762	0.2158	**-6.5800**	-6.579	-85.438	
0.400	5721.977	765	0.0611	**-7.5200**	-7.519	-80.933	
0.500	**5744.177**	**767**	**0.9065**	**-7.8300**	**-7.832**	**0.000**	
0.600	5766.377	770	0.9389	-7.5200	-7.519	80.933	
0.700	5788.577	773	0.7842	-6.5800	-6.579	85.438	
0.800	5810.777	776	0.6296	-5.0100	-5.012	86.955	
0.900	5832.977	779	0.4750	-2.8200	-2.819	87.715	
0.920	5837.417	780	0.0441	-2.3053	-2.305		
1.000	5855.177	783	0.0000	**-1.2500**		88.172	**P27**
0.080	5872.937	785	0.9559	-2.3053	-2.305		
0.100	5877.377	786	0.5250	-2.8200	-2.819	-87.715	
0.200	5899.577	789	0.3704	-5.0100	-5.012	-86.955	
0.300	5921.777	792	0.2158	-6.5800	-6.579	-85.438	
0.400	5943.977	795	0.0611	-7.5200	-7.519	-80.933	
0.500	**5966.177**	**798**	**0.0935**	-7.8300	**-7.832**	**0.000**	
0.600	5988.377	800	0.9389	-7.5200	-7.519	80.933	
0.700	6010.577	803	0.7842	-6.5800	-6.579	85.438	
0.800	6032.777	806	0.6296	-5.0100	-5.012	86.955	
0.900	6054.977	809	0.4750	-2.8200	-2.819	87.715	
0.920	6059.417	810	0.0441	-2.3053	-2.305	87.824	
1.000	6077.177	813	0.0000	-1.2500		88.172	**P28**
15.067	6092.244	815	0.611	-1.2500			
3.218	6095.462	816	0.023	-1.4539			
3.167	6098.629	816	0.429	-2.0622			
END	6109.344	817	0.8024	**-4.8333**			





R = **25.5**

theta = **14.5**

Lend = 10.715

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 250XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END = **32.1667**

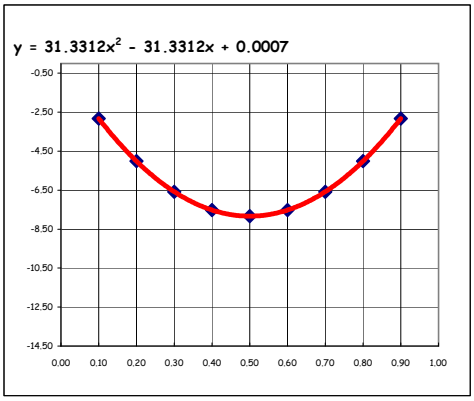
R = **28.5**

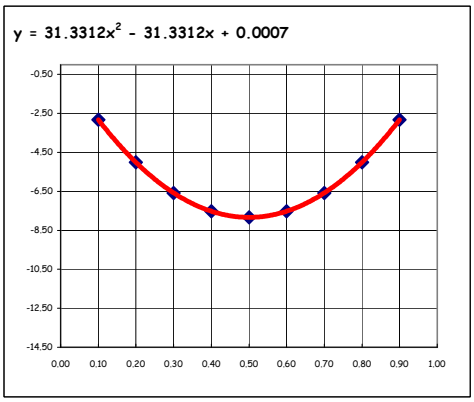
theta = **14.5**

Lend = 7.285

	->TO P26'	P26'-P27'	P27'-P28'	
Span =	5539.1771	195.0000	183.0000	
A =		31.3312	31.3312	
B =		-31.3312	-31.3312	
C =		0.0007	0.0007	
Y' =0 :		0.5000	0.5000	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5507.010	735	0.1976	**-4.0417**			
3.539	5514.295	736	0.1313	-2.1578			
3.597	5517.834	736	0.5849	-1.4779			
17.746	5521.431	737	0.0459	-1.2500			
0.000	5539.177	740	0.0000	**-1.2500**	0.001	-88.172	**P21'**
0.080	5554.777	742	0.6790	-2.3053	-2.305		
0.100	5558.677	743	0.1789	**-2.8200**	-2.819	-87.715	
0.200	5578.177	745	0.6782	**-5.0100**	-5.012	-86.955	
0.300	5597.677	748	0.1776	**-6.5800**	-6.579	-85.438	
0.400	5617.177	750	0.6769	**-7.5200**	-7.519	-80.933	
0.500	**5636.677**	**753**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	5656.177	756	0.3231	-7.5200	-7.519	80.933	
0.700	5675.677	758	0.8224	-6.5800	-6.579	85.438	
0.800	5695.177	761	0.3218	-5.0100	-5.012	86.955	
0.900	5714.677	763	0.8211	-2.8200	-2.819	87.715	
0.920	5718.577	764	0.3210	-2.3053	-2.305		
1.000	5734.177	767	0.0000	**-1.2500**		88.172	**P22'**
0.080	5748.817	769	0.5560	-2.3053	-2.305		
0.100	5752.477	770	0.0251	-2.8200	-2.819	-87.715	
0.200	5770.777	772	0.3706	-5.0100	-5.012	-86.955	
0.300	5789.077	774	0.7162	-6.5800	-6.579	-85.438	
0.400	5807.377	777	0.0617	-7.5200	-7.519	-80.933	
0.500	**5825.677**	**779**	**0.5000**	-7.8300	**-7.832**	**0.000**	
0.600	5843.977	781	0.9383	-7.5200	-7.519	80.933	
0.700	5862.277	784	0.2838	-6.5800	-6.579	85.438	
0.800	5880.577	786	0.6294	-5.0100	-5.012	86.955	
0.900	5898.877	788	0.9749	-2.8200	-2.819	87.715	
0.920	5902.537	789	0.4440	-2.3053	-2.305	87.824	
1.000	5917.177	792	0.0000	-1.2500		88.172	**P23'**
17.746	5934.923	794	0.954	-1.2500			
3.597	5938.520	795	0.415	-1.4779			
3.539	5942.059	795	0.869	-2.1578			
END	5949.344	796	0.8024	**-4.0417**			





R = **28.5**

theta = **14.5**

Lend = 7.285

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 270XE — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

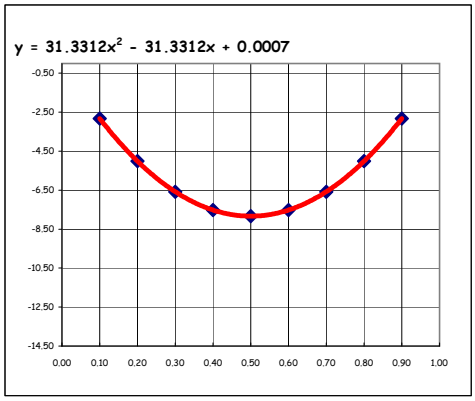
R = **25.5**

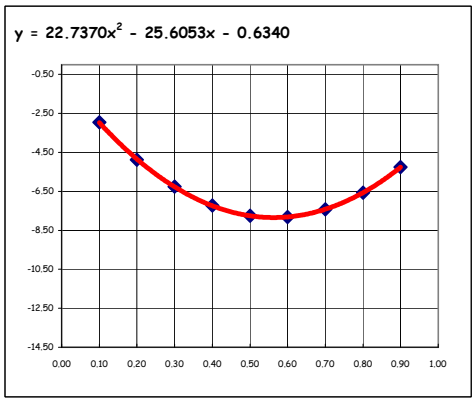
theta = **14.5**

Lend = 10.715

	->TO P27	P27-P28	P28-P29	
Span =	5855.1771	222.0000	178.0000	
A =		31.3312	22.7270	
B =		-31.3312	-25.6053	
C =		0.0007	-0.6340	
Y' =0 :		0.5000	0.5633	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5823.010	778	0.1976	**-4.8333**			
3.167	5833.725	779	0.5709	-2.0622			
3.218	5836.892	779	0.9768	-1.4539			
15.067	5840.110	780	0.3893	-1.2500			
0.000	5855.177	783	0.0000	**-1.2500**	0.001		**P27**
0.080	5872.937	785	0.9559	-2.3053	-2.305		
0.100	5877.377	786	0.5250	**-2.8200**	-2.819	-87.715	
0.200	5899.577	789	0.3704	**-5.0100**	-5.012	-86.955	
0.300	5921.777	792	0.2158	**-6.5800**	-6.579	-85.438	
0.400	5943.977	795	0.0611	**-7.5200**	-7.519	-80.933	
0.500	**5966.177**	**798**	**0.0935**	**-7.8300**	**-7.832**	**0.000**	
0.600	5988.377	800	0.9389	-7.5200	-7.519	80.933	
0.700	6010.577	803	0.7842	-6.5800	-6.579	85.438	
0.800	6032.777	806	0.6296	-5.0100	-5.012	86.955	
0.900	6054.977	809	0.4750	-2.8200	-2.819	87.715	
0.920	6059.417	810	0.0441	-2.3053	-2.305		
1.000	6077.177	813	0.0000	**-1.2500**			**P28**
0.050	6086.077	814	0.8203	-1.8574	-1.857		
0.100	6094.977	815	0.9610	**-2.9500**	-2.9673	-87.281	
0.200	6112.777	818	0.2425	**-4.8800**	-4.8460	-86.535	
0.300	6130.577	820	0.5239	**-6.2600**	-6.2702	-85.224	
0.400	6148.377	822	0.8053	**-7.2300**	-7.2398	-82.328	
0.500	6166.177	825	0.0868	**-7.7500**	-7.7549	-70.841	
0.563	**6177.449**	826	0.5315		-7.8460	**0.000**	
0.600	6183.977	827	0.3682	**-7.8100**	-7.8155	59.043	
0.700	6201.777	830	0.4761	**-7.4200**	-7.4215	80.856	
0.800	6219.577	832	0.7575	**-6.5700**	-6.5730	84.689	
0.900	6237.377	835	0.0390	**-5.2600**	-5.2699	86.261	
0.950	6246.277	836	0.1468	-4.4479	-4.448	86.744	
1.000	6255.177	837	1.0000	**-3.5000**		87.116	**P29**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 270XW — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG = 32.1667

DX at END = 32.1667

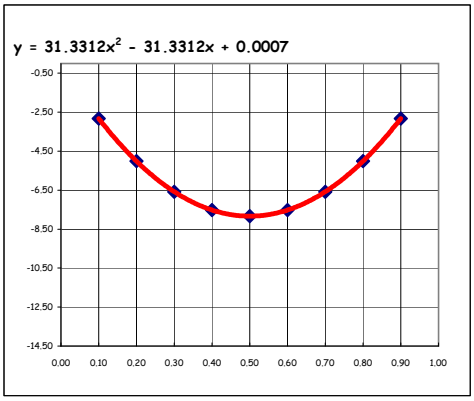
R = 28.5

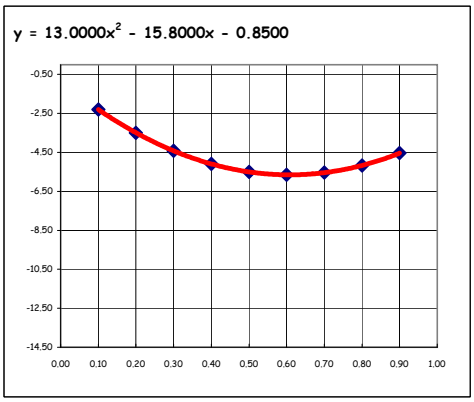
theta = 14.5

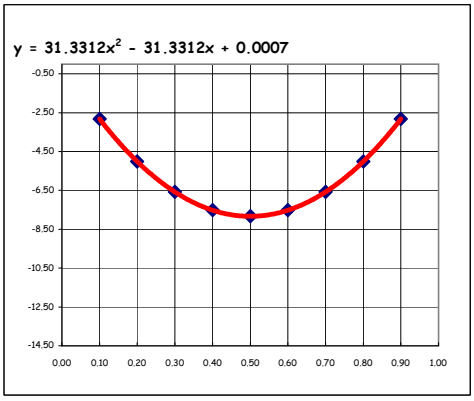
Lend = 7.285

	->TO P27'	P27'-P28'	P28'-P29	P29'-P30'
Span =	5734.1771	183.0000	198.0000	140.0000
A =		31.3312	31.3312	13.0000
B =		-31.3312	-31.3312	-15.8000
C =		0.0007	0.0007	-0.8500
Y' =0 :		0.5000	0.5000	0.6077

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5702.010	762	0.1976	-4.0417			
3.539	5709.295	763	0.1313	-2.1578			
3.597	5712.834	763	0.5849	-1.4779			
17.746	5716.431	764	0.0459	-1.2500			
0.000	5734.177	767	0.0000	-1.2500			P27'
0.080	5748.817	769	0.5560	-2.3053	-2.305		
0.100	5752.477	770	0.0251	-2.8200	-2.819	-85.668	
0.200	5770.777	772	0.3706	-5.0100	-5.012	-84.611	
0.300	5789.077	774	0.7162	-6.5800	-6.579	-82.875	
0.400	5807.377	777	0.0617	-7.5200	-7.519	-79.509	
0.500	**5825.677**	**779**	**0.5000**	**-7.8300**	**-7.832**	**-70.346**	
0.600	5843.977	781	0.9383	-7.5200	-7.519	-11.310	
0.700	5862.277	784	0.2838	-6.5800	-6.579	67.380	
0.800	5880.577	786	0.6294	-5.0100	-5.012	78.690	
0.900	5898.877	788	0.9749	-2.8200	-2.819	82.504	
0.920	5902.537	789	0.4440	-2.3053	-2.305		
1.000	5917.177	792	0.0000	-1.2500			P28'
0.080	5933.017	794	0.7098	-2.3053	-2.305		
0.100	5936.977	795	0.2174	-2.8200	-2.819	-85.668	
0.200	5956.777	797	0.7551	-5.0100	-5.012	-84.611	
0.300	5976.577	800	0.2929	-6.5800	-6.579	-82.875	
0.400	5996.377	802	0.8307	-7.5200	-7.519	-79.509	
0.500	**6016.177**	**805**	**0.5000**	-7.8300	**-7.832**	**-70.346**	
0.600	6035.977	808	0.1693	-7.5200	-7.519	-11.310	
0.700	6055.777	810	0.7071	-6.5800	-6.579	67.380	
0.800	6075.577	813	0.2449	-5.0100	-5.012	78.690	
0.900	6095.377	815	0.7826	-2.8200	-2.819	82.504	
0.920	6099.337	816	0.2902	-2.3053	-2.305		
1.000	6115.177	819	0.0000	-1.2500			P29'
0.051	6122.317	820	0.5947	-1.6220	-1.622		
0.100	6129.177	821	0.4740	-2.3000	-2.300	-85.668	
0.200	6143.177	823	0.2684	-3.4900	-3.490	-84.611	
0.300	6157.177	825	0.0628	-4.4200	-4.420	-82.875	
0.400	6171.177	826	0.8571	-5.0900	-5.090	-79.509	
0.500	6185.177	828	0.6515	-5.5000	-5.500	-70.346	
0.600	6199.177	830	0.4459	-5.6500	-5.650	-11.310	
0.608	**6200.254**	830	0.5840		**-5.651**	**0.000**	
0.700	6213.177	832	0.7930	-5.5400	-5.540	67.380	
0.800	6227.177	834	0.7316	-5.1700	-5.170	78.690	
0.900	6241.177	836	0.5260	-4.5400	-4.540	82.504	
0.949	6248.037	837	0.3310	-4.1364	-4.136	83.571	







1.000	6255.177	838	1.0000	-3.6500			**P30'**
END							

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 280XE | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

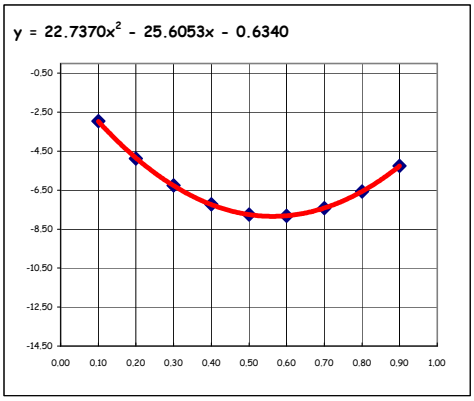
R = **25.5**

theta = **14.5**

Lend = 10.715

	->TO P28	P28-P29		
Span =	6077.1771	178.0000		
A =		22.7270		
B =		-25.6053		
C =		-0.6340		
Y' =0 :		0.5633		

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	6045.010	808	0.1976	**-4.8333**			
3.167	6055.725	809	0.5709	-2.0622			
3.218	6058.892	809	0.9768	-1.4539			
15.067	6062.110	810	0.3893	-1.2500			
0.000	6077.177	813	0.0000	**-1.2500**		-87.763	**P24**
0.050	6086.077	814	0.8203	-1.8574	-1.857		
0.100	6094.977	815	0.9610	**-2.9500**	-2.967	-87.281	
0.200	6112.777	818	0.2425	**-4.8800**	-4.846	-86.535	
0.300	6130.577	820	0.5239	**-6.2600**	-6.270	-85.224	
0.400	6148.377	822	0.8053	**-7.2300**	-7.240	-82.328	
0.500	6166.177	825	0.0868	**-7.7500**	-7.755	-70.841	
0.563	**6177.449**	826	0.5315		**-7.846**	**0.000**	
0.600	6183.977	827	0.3682	**-7.8100**	-7.815	59.043	
0.700	6201.777	830	0.4761	**-7.4200**	-7.421	80.856	
0.800	6219.577	832	0.7575	**-6.5700**	-6.573	84.689	
0.900	6237.377	835	0.0390	**-5.2600**	-5.270	86.261	
0.950	6246.277	836	0.1468	-4.4479	-4.448	86.744	
1.000	6255.177	837	1.0000	**-3.5000**			**EJ8**
END							



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 280XW — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

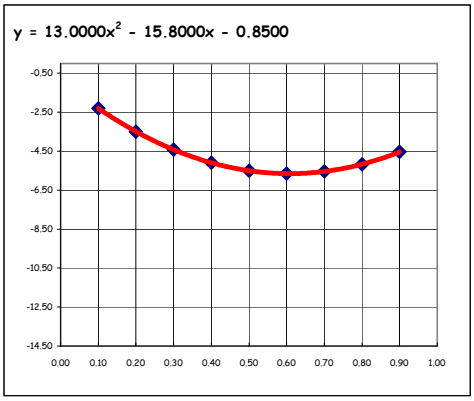
R = **28.5**

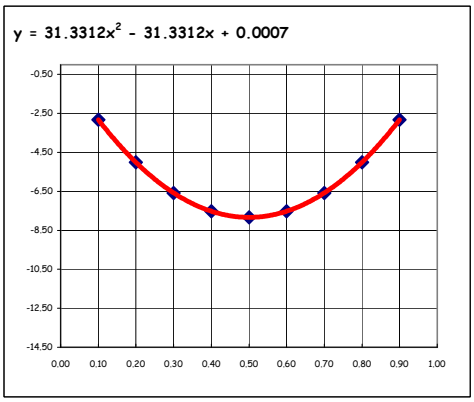
theta = **14.5**

Lend = 7.285

	->TO P28'	P28'-P29	P29'-P30'	
Span =	5917.1771	198.0000	140.0000	
A =		31.3312	13.0000	
B =		-31.3312	-15.8000	
C =		0.0007	-0.8500	
Y' =0 :		0.5000	0.6077	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	5885.010	787	0.1976	**-4.0417**			
3.539	5892.295	788	0.1313	-2.1578			
3.597	5895.834	788	0.5849	-1.4779			
17.746	5899.431	789	0.0459	-1.2500			
0.000	5917.177	792	0.0000	**-1.2500**			**P28'**
0.080	5933.017	794	0.7098	-2.3053	-2.305		
0.100	5936.977	795	0.2174	**-2.8200**	-2.819	-87.715	
0.200	5956.777	797	0.7551	**-5.0100**	-5.012	-86.955	
0.300	5976.577	800	0.2929	**-6.5800**	-6.579	-85.438	
0.400	5996.377	802	0.8307	**-7.5200**	-7.519	-80.933	
0.500	**6016.177**	**805**	**0.5000**	**-7.8300**	**-7.832**	**0.000**	
0.600	6035.977	808	0.1693	-7.5200	-7.519	80.933	
0.700	6055.777	810	0.7071	-6.5800	-6.579	85.438	
0.800	6075.577	813	0.2449	-5.0100	-5.012	86.955	
0.900	6095.377	815	0.7826	-2.8200	-2.819	87.715	
0.920	6099.337	816	0.2902	-2.3053	-2.305		
0.000	6115.177	819	0.0000	**-1.2500**		-86.379	**P29'**
0.051	6122.317	820	0.5947	-1.6220	-1.622		
0.100	6129.177	821	0.4740	**-2.3000**	-2.300	-85.668	
0.200	6143.177	823	0.2684	**-3.4900**	-3.490	-84.611	
0.300	6157.177	825	0.0628	**-4.4200**	-4.420	-82.875	
0.400	6171.177	826	0.8571	**-5.0900**	-5.090	-79.509	
0.500	6185.177	828	0.6515	**-5.5000**	-5.500	-70.346	
0.600	6199.177	830	0.4459	**-5.6500**	-5.650	-11.310	
0.608	**6200.254**	830	0.5840		**-5.651**	**0.000**	
0.700	6213.177	832	0.7930	**-5.5400**	-5.540	67.380	
0.800	6227.177	834	0.7316	**-5.1700**	-5.170	78.690	
0.900	6241.177	836	0.5260	**-4.5400**	-4.540	82.504	
0.949	6248.037	837	0.3310	-4.1364	-4.136		
1.000	6255.177	838	1.0000	**-3.5000**			**P30'**
END							





URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 265XD — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **32.1667**

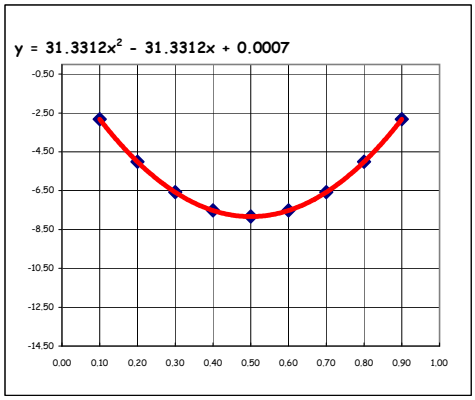
	->TO EJ9	EJ9-P105	P105-P106	P106-P107
Span =	612.4167	53.6667	210.0000	242.0000
A =			31.3312	31.3312
B =			-31.3312	-31.3312
C =			0.0007	0.0007
Y' =0 :			0.5000	0.5000

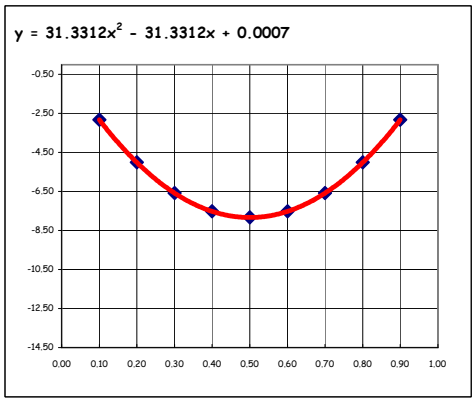
DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	615.417	82	0.5835	**-3.9200**			**EJ9**
0.250	628.0833	85	0.0470	-2.7519			
0.500	640.7500	87	0.5105	-1.9175			
0.750	653.4167	89	0.9741	-1.4169			
1.000	666.083	93	0.0000	**-1.2500**	0.000	0.000	**P105**
0.080	682.883	95	0.8312	-2.3053	-2.305		
0.100	687.083	96	0.3691	**-2.8200**	-2.819	-87.715	
0.200	708.083	99	0.0586	**-5.0100**	-5.012	-86.955	5599
0.300	729.083	101	0.7480	**-6.5800**	-6.579	-85.438	
0.400	750.083	104	0.4375	**-7.5200**	-7.519	-80.933	
0.500	**771.083**	**107**	**0.1269**	**-7.8300**	**-7.832**	**0.000**	
0.600	792.083	110	0.0033	-7.5200	-7.519	80.933	
0.700	813.083	112	0.6927	-6.5800	-6.579	85.438	
0.800	834.083	115	0.3822	-5.0100	-5.012	86.955	5615
0.900	855.083	118	0.0716	-2.8200	-2.819	87.715	
0.920	859.283	118	0.6095	-2.3053	-2.305		
1.000	876.083	121	0.0003	**-1.2500**		0.000	**P106**
0.080	895.443	125	0.6038	-2.3053	-2.305		
0.100	900.283	126	0.2195	-2.8200	-2.819	-87.715	
0.200	924.483	129	0.3187	-5.0100	-5.012	-86.955	5629
0.300	948.683	132	0.4180	-6.5800	-6.579	-85.438	
0.400	972.883	135	0.5173	-7.5200	-7.519	-80.933	
0.500	**997.083**	**138**	**0.7583**	-7.8300	**-7.832**	**0.000**	
0.600	1021.283	141	0.9027	-7.5200	-7.519	80.933	
0.700	1045.483	145	0.0020	-6.5800	-6.579	85.438	
0.800	1069.683	148	0.1012	-5.0100	-5.012	86.955	5648
0.900	1093.883	151	0.1969	-2.8200	-2.819	87.715	
0.920	1098.723	151	0.8087	-2.3053	-2.305	87.824	
1.000	1118.083	155	0.8449	-1.2500		88.172	**P107**
15.067	1133.150	158	0.482	-1.2500			
3.218	1136.368	158	0.885	-1.4539			
3.167	1139.535	159	0.282	-2.0622			
END	1150.250	160	0.6259	**-4.8333**			

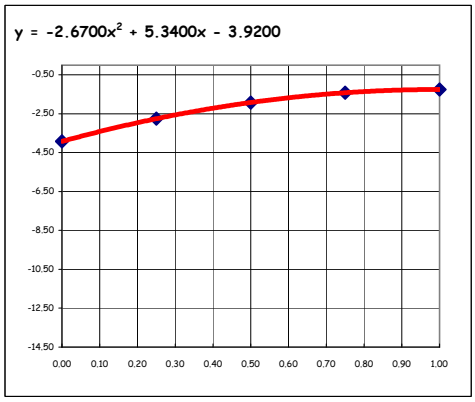
R = **25.5**

theta = **14.5**

Lend = 10.715







URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

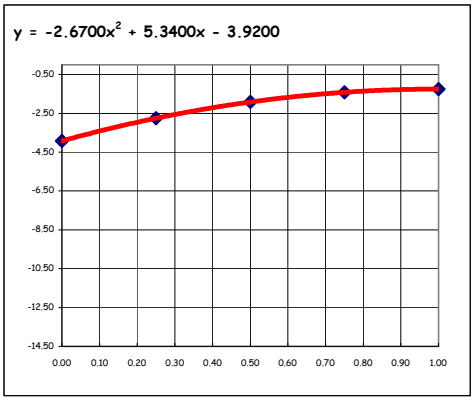
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 266XD | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **23.0000**

	->TO EJ9	EJ9-P105	P105-P106	P106-P107
Span =	612.4167	53.6667	210.0000	242.0000
A =				
B =				
C =				
Y' =0 :				

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	615.417	82	0.5835	**-3.9200**			**EJ9**
0.250	628.0833	85	0.0470	-2.7519			
0.500	640.7500	87	0.5105	-1.9175			
0.750	653.4167	89	0.9741	-1.4169			
1.000	666.083	93	0.0000	**-1.2500**	0.000	0.000	**P105**
END	689.083	96	**0.6253**	-1.2500			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

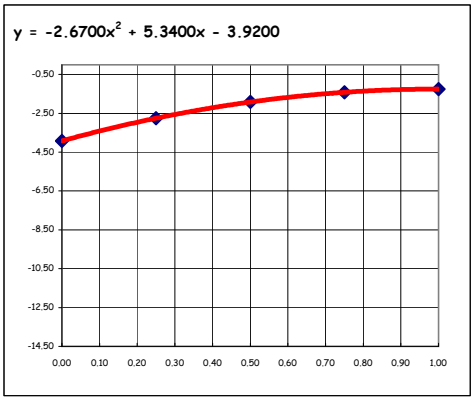
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 267XD | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **43.0000**

	->TO EJ9	EJ9-P105	P105-P106	P106-P107
Span =	612.4167	53.6667	210.0000	242.0000
A =				
B =				
C =				
Y' =0 :				

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	615.417	82	0.5835	**-3.9200**			**EJ9**
0.250	628.0833	85	0.0470	-2.7519			
0.500	640.7500	87	0.5105	-1.9175			
0.750	653.4167	89	0.9741	-1.4169			
1.000	666.083	93	0.0000	**-1.2500**	0.000	0.000	**P105**
END	709.083	99	**0.1866**	-1.2500			



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

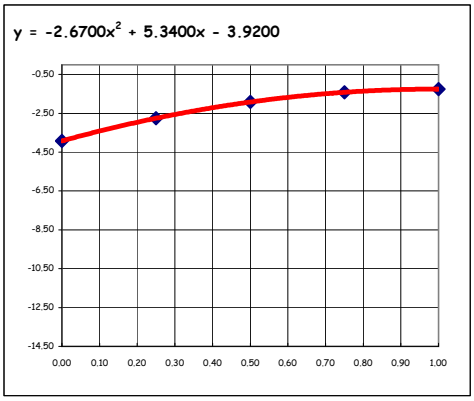
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 268XD | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG = **3.0000**

DX at END = **63.0000**

	->TO EJ9	EJ9-P105	P105-P106	P106-P107
Span =	612.4167	53.6667	210.0000	242.0000
A =				
B =				
C =				
Y' =0 :				

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
0.000	615.417	82	0.5835	**-3.9200**			**EJ9**
0.250	628.0833	85	0.0470	-2.7519			
0.500	640.7500	87	0.5105	-1.9175			
0.750	653.4167	89	0.9741	-1.4169			
1.000	666.083	93	0.0000	**-1.2500**	0.000	0.000	**P105**
END	729.083	101	**0.7480**	-1.2500			



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - SEGMENT 6, TENDON 275XD — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG = **32.1667**

DX at END =

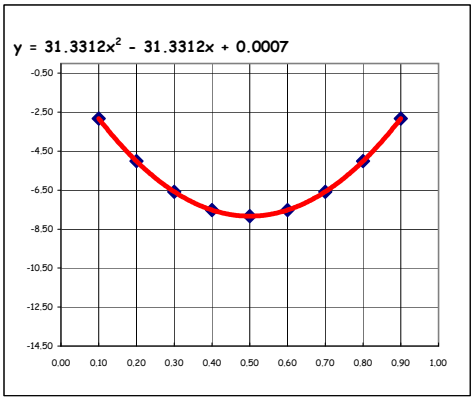
R = **25.5**

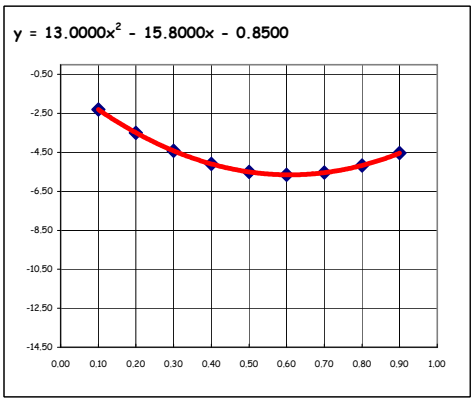
theta = **14.5**

Lend = 10.715

	->TO P106	P106-P107	P107-P108	
Span =	876.0827	242.0000	170.0000	
A =		31.3312	13.0000	
B =		-31.3312	-15.8000	
C =		0.0007	-0.8500	
Y' =0 :		0.5000	0.6077	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN	843.916	116	0.6414	**-4.8333**			
3.167	854.631	118	0.0137	-2.0622			
3.218	857.798	118	0.4192	-1.4539			
15.067	861.016	118	0.8314	-1.2500			
0.000	876.083	121	0.0000	**-1.2500**	0.001		**106**
0.080	895.443	125	0.6038	-2.3053	-2.305		
0.100	900.283	126	0.2194	**-2.8200**	-2.819	-87.715	
0.200	924.483	129	0.3186	**-5.0100**	-5.012	-86.955	5629
0.300	948.683	132	0.4179	**-6.5800**	-6.579	-85.438	
0.400	972.883	135	0.5172	**-7.5200**	-7.519	-80.933	
0.500	**997.083**	**138**	**0.7582**	**-7.8300**	**-7.832**	**0.000**	
0.600	1021.283	141	0.9026	-7.5200	-7.519	80.933	
0.700	1045.483	145	0.0019	-6.5800	-6.579	85.438	
0.800	1069.683	148	0.1012	-5.0100	-5.012	86.955	
0.900	1093.883	151	0.1968	-2.8200	-2.819	87.715	
0.920	1098.723	151	0.8086	-2.3053	-2.305		
1.000	1118.083	155	0.8448	**-1.2500**			**107**
0.050	1126.583	157	0.6588	-1.6075	-1.608		
0.100	1135.083	158	0.7241	**-2.3000**	-2.3000	-85.668	
0.200	1152.083	160	0.8557	**-3.4900**	-3.4900	-84.611	5660
0.300	1169.083	162	0.9885	**-4.4200**	-4.4200	-82.875	
0.400	1186.083	165	0.1223	**-5.0900**	-5.0900	-79.509	
0.500	1203.083	167	0.2570	**-5.5000**	-5.5000	-70.346	
0.600	1220.083	169	0.3925	**-5.6500**	-5.6500	-11.310	
0.608	**1221.390**	169	0.5568		-5.6508	**0.000**	
0.700	1237.083	172	0.3550	**-5.5400**	-5.5400	67.380	
0.800	1254.083	174	0.4916	**-5.1700**	-5.1700	78.690	
0.900	1271.083	176	0.6285	**-4.5400**	-4.5400	82.504	5676
0.950	1279.583	177	0.6970	-4.1275	-4.128	83.589	
1.000	1288.083	178	0.6253	**-3.6500**		84.401	**108**
END							





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

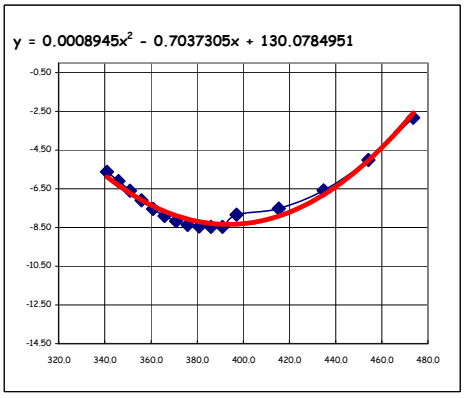
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 295XB | CHECKED BY: **IC BY PT** | DATE: 02/10/09

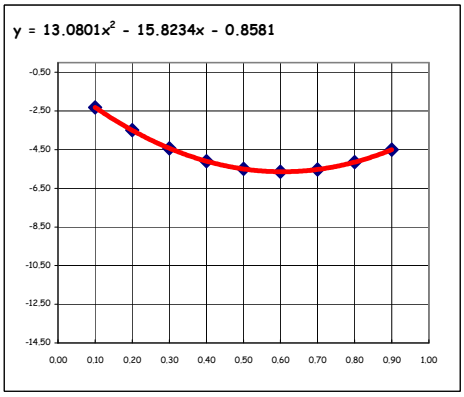
DX at BEG = **32.1667**

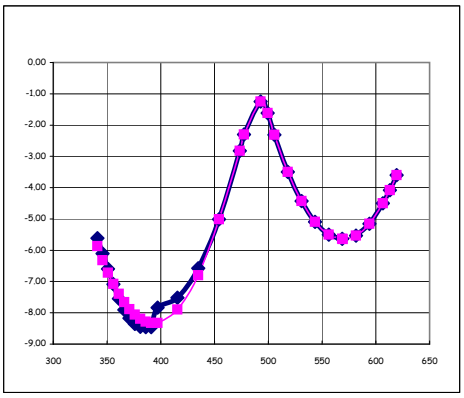
DX at END = **0.6667**

	->TO P303	P303-P304	P304-P305	P303-CJ
Span =	299.0833	193.8827	126.3456	
A =		35.8304	13.0801	0.0009
B =		-35.4836	-15.8234	-0.7037
C =		0.2400	-0.8581	130.0785
Y' =0 :		0.4952	0.6049	393.3653

DL	X	ELEM	x/l	Y from TOP flange drawing	Y from TOP flange equation	Y'	
BEGIN							
							P303
0.216	340.933	42	0.1215	**-5.6133**	**-5.874**		
0.242	345.933	42	0.6452	**-6.1048**	**-6.321**		
0.267	350.933	43	0.1689	**-6.5963**	**-6.723**		
0.293	355.933	43	0.6926	**-7.0878**	**-7.080**		
0.319	360.933	44	0.2164	**-7.5438**	**-7.392**		
0.345	365.933	44	0.7401	**-7.9058**	**-7.660**		
0.371	370.933	45	0.2638	**-8.1758**	**-7.883**		
0.396	375.933	45	0.7875	**-8.3598**	**-8.061**		
0.422	380.933	46	0.3112	**-8.4493**	**-8.195**		
0.448	385.933	46	0.8349	**-8.4583**	**-8.284**		
0.474	390.933	47	0.3586	**-8.4583**	**-8.328**		**0.0000**
0.505	397.057	48	0.0000	**-7.8300**	**-8.321**		
0.600	415.413	50	0.6444	**-7.5200**	**-7.898**		
0.700	434.801	53	0.1451	**-6.5800**	**-6.797**		
0.800	454.189	55	0.6986	**-5.0100**	-5.010		4555
0.900	473.578	58	0.2441	**-2.8200**	-2.820		
0.920	477.455	58	0.7388	**-2.3053**	-2.305		
1.000	492.966	63	0.0000	**-1.2500**	-1.250		**P304**
0.050	499.283	63	0.9945	-1.6166	-1.617		
0.100	505.601	64	0.8269	**-2.3100**	-2.3100	-85.670	
0.200	518.235	66	0.4896	**-3.5000**	-3.5000	-84.606	4566
0.300	530.870	68	0.1518	**-4.4300**	-4.4300	-82.853	
0.400	543.504	69	0.8135	**-5.0900**	-5.0900	-79.431	
0.500	556.139	71	0.4745	**-5.5000**	-5.5000	-69.972	
0.600	568.773	73	0.1349	**-5.6400**	-5.6400	-7.254	
0.605	**569.388**	73	0.2157		-5.6436	**0.000**	
0.700	581.408	75	0.4915	**-5.5300**	-5.5300	68.109	
0.800	594.042	77	0.1503	**-5.1500**	-5.1500	78.916	
0.900	606.677	78	0.8082	**-4.5000**	-4.5000	82.620	4578
0.950	612.994	79	0.5202	-4.0855	-4.086	83.680	
1.000	619.311	81	0.6210	**-3.6000**	-3.600	84.474	**P305**
END							







URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

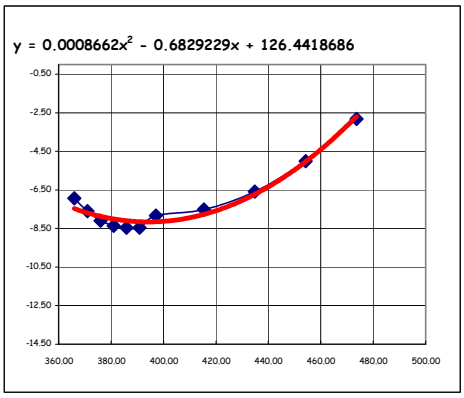
DESCRP: PT DEFINITION - SEGMENT 6, TENDON 296XB — CHECKED BY: **IC BY PT** — DATE: 02/10/09

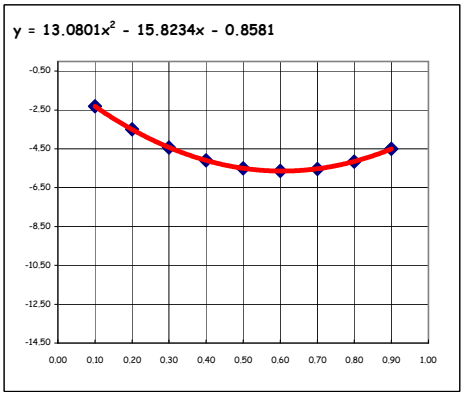
DX at BEG = **32.1667**

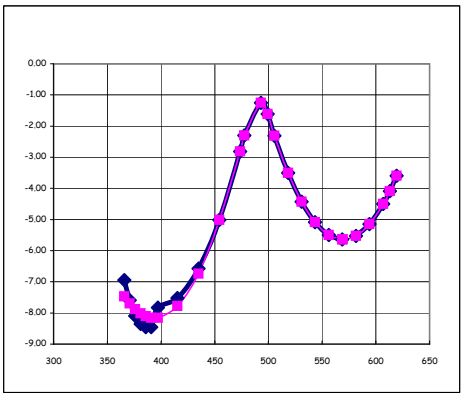
DX at END = **0.6667**

	->TO P303	P303-P304	P304-P305	
Span =	299.0833	193.8827	126.3456	
A =		31.3312	13.0801	0.0009
B =		-31.3312	-15.8234	-0.6829
C =		0.0007	-0.8581	126.4419
Y' =0 :		0.5000	0.6049	

DL	X	ELEM	x/l	Y from TOP flange drawing	equation	Y'	
BEGIN							
							P303
0.345	365.933	44	0.7401	**-6.9418**	-7.472		
0.371	370.933	45	0.2638	**-7.5963**	-7.695		
0.396	375.933	45	0.7875	**-8.0953**	-7.875		
0.422	380.933	46	0.3112	**-8.3543**	-8.012		
0.448	385.933	46	0.8349	**-8.4558**	-8.105		
0.474	390.933	47	0.3586	**-8.4583**	-8.155		
0.505	397.057	48	0.0000	**-7.8300**	-8.157	18.456	
0.600	415.413	50	0.6444	**-7.5200**	-7.775	80.933	
0.700	434.801	53	0.1451	**-6.5800**	-6.737	85.438	
0.800	454.189	55	0.6986	**-5.0100**	-5.010	86.955	
0.900	473.578	58	0.2441	**-2.8200**	-2.820	87.715	
0.920	477.455	58	0.7388	**-2.3053**	-2.305		
1.000	492.966	63	0.0000	**-1.2500**	-1.250		**P304**
0.050	499.283	63	0.9945	-1.6166	-1.617		
0.100	505.601	64	0.8269	**-2.3100**	-2.3100	-85.670	
0.200	518.235	66	0.4896	**-3.5000**	-3.5000	-84.606	
0.300	530.870	68	0.1518	**-4.4300**	-4.4300	-82.853	
0.400	543.504	69	0.8135	**-5.0900**	-5.0900	-79.431	
0.500	556.139	71	0.4745	**-5.5000**	-5.5000	-69.972	
0.600	568.773	73	0.1349	**-5.6400**	-5.6400	-7.254	
0.605	**569.388**	73	0.2157		-5.6436	**0.000**	
0.700	581.408	75	0.4915	**-5.5300**	-5.5300	68.109	
0.800	594.042	77	0.1503	**-5.1500**	-5.1500	78.916	
0.900	606.677	78	0.8082	**-4.5000**	-4.5000	82.620	
0.950	612.994	79	0.5202	-4.0855	-4.086	83.680	
1.000	619.311	81	0.6210	**-3.6000**	-3.600	84.474	**P305**
END							







2.5.6.2 Ramps

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE:

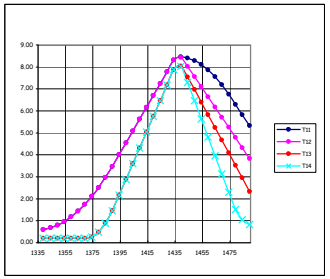
DESCRP: PT DEFINITION - RAMP A, UNIT I | CHECKED BY: IC BY PT | DATE:

DX at BEG =

DX at END =

	->TO CJ4
Span =	1338.7835

@ bl	@ cg				x/l	T11	T12	T13	T14		
		BEGIN									
		0.000	1338.783	165	0.0000	0.5960	0.5960	0.2080	0.2080		C J4
5.375	5.370	5.370	1344.153	166	0.7187	0.6860	0.6860	0.2080	0.2080		
5.000	4.995	4.995	1349.148	167	0.4068	0.8020	0.8020	0.2080	0.2080		
5.000	4.995	4.995	1354.143	167	0.9063	0.9660	0.9660	0.2080	0.2080		
5.000	4.995	4.995	1359.138	168	0.4058	1.1780	1.1780	0.2080	0.2080		
5.000	4.995	4.995	1364.133	168	0.9053	1.4390	1.4390	0.2080	0.2080		
5.000	4.995	4.995	1369.128	169	0.4048	1.7480	1.7480	0.2080	0.2080		
5.000	4.995	4.995	1374.123	169	0.9043	2.1050	2.1050	0.2580	0.2580		
5.000	4.995	4.995	1379.118	170	0.5047	2.5110	2.5110	0.4810	0.4810		
5.000	4.995	4.995	1384.113	171	0.1033	2.9650	2.9650	0.8820	0.8820		
5.000	4.995	4.995	1389.108	171	0.6028	3.4670	3.4670	1.4620	1.4620		
5.000	4.995	4.995	1394.103	172	0.1023	4.0040	4.0040	2.1710	2.1710		
5.000	4.995	4.995	1399.098	172	0.6018	4.5430	4.5430	2.8860	2.8860		
5.000	4.995	4.995	1404.093	173	0.1013	5.0820	5.0820	3.6020	3.6020		
5.000	4.995	4.995	1409.088	173	0.6008	5.6210	5.6210	4.3170	4.3170		
5.000	4.995	4.995	1414.083	174	0.1003	6.1600	6.1600	5.0320	5.0320		
5.000	4.995	4.995	1419.078	174	0.5998	6.6990	6.6990	5.7470	5.7470		
5.000	4.995	4.995	1424.074	175	0.0841	7.2370	7.2370	6.4620	6.4620		
5.000	4.995	4.995	1429.069	175	0.5073	7.7760	7.7760	7.1780	7.1780		
5.000	4.995	4.995	1434.064	175	0.9305	8.3090	8.3090	7.8850	7.8850		
5.000	4.995	4.995	1439.059	177	0.6700	8.4550	8.4260	8.0430	8.0240		
5.000	4.995	4.995	1444.054	178	0.3252	8.4020	8.0260	7.5450	7.3010		
5.000	4.995	4.995	1449.049	178	0.7147	8.2860	7.5640	6.9710	6.4680		
5.000	4.995	4.995	1454.044	179	0.1671	8.1060	7.1020	6.3960	5.6340		
5.000	4.995	4.995	1459.039	179	0.7915	7.8630	6.6400	5.8220	4.8000		
5.000	4.995	4.995	1464.034	180	0.4031	7.5570	6.1770	5.2470	3.9670		
5.000	4.995	4.995	1469.029	181	0.0081	7.1880	5.7150	4.6730	3.1330		
5.000	4.995	4.995	1474.024	181	0.6132	6.7550	5.2530	4.0990	2.2990		
5.000	4.995	4.995	1479.019	183	0.0169	6.2920	4.7910	3.5240	1.5210		
5.000	4.995	4.995	1484.014	183	0.6413	5.8300	4.3290	2.9500	1.0450		
5.375	5.370	5.370	1489.383	184	1.0000	5.3330	3.8330	2.3320	0.8330		C J5
150.750	150.600	150.600									



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT I | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ4
Span =	1338.7835

		DL	X	ELEM	x/l	Y from BOTTOM flange T15				
		BEGIN								
			1338.783							CJ4
	T15	-36.000	1302.783	161	0.0000	0.3333				
		0.000								
		36.297	1375.080	169	1.0000	0.3333				

R = 20.00

		DL	X	ELEM	x/l	Y from BOTTOM flange T15				
		BEGIN								
		0.000	1338.783							CJ4
		0.000	1338.783	165	0.0000	0.3333				
		0.500	1368.877	169	0.3797	0.0063				
		0.500	1369.377	169	0.4297	0.0250				
		0.500	1369.877	169	0.4797	0.0563				
		0.500	1370.377	169	0.5297	0.1003				
		0.500	1370.877	169	0.5797	0.1569				
		0.500	1371.377	169	0.6297	0.2263				
		0.500	1371.877	169	0.6797	0.3086				
		0.500	1372.377	169	0.7297	0.4041				
		0.500	1372.877	169	0.7797	0.5128				
		0.500	1373.377	169	0.8297	0.6351				
		0.500	1373.877	169	0.8797	0.7642				
		0.500	1374.377	169	0.9297	0.8933				
		0.500	1374.877	169	0.9797	1.0224				
		36.094	1374.877	169	0.9797	0.3333				

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP A, UNIT II

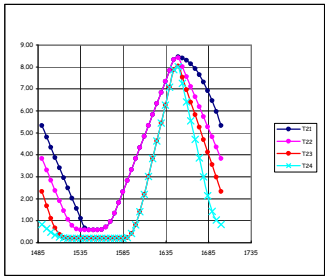
COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 02/10/09
DATE: 02/10/09

DX at BEG =
DX at END =

	->TO CJ
Span =	1489.3834

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T21	T22	T23	T24	
		BEGIN								
		0.000	1489.383	185	0.0000	5.3330	3.8330	2.3320	0.8330	CJ 5 Unit I
5.780	5.750	5.750	1495.133	186	0.3446	4.7990	3.2990	1.6690	0.6380	
5.000	4.974	4.974	1500.107	186	0.9678	4.3370	2.8380	1.1100	0.4740	
5.000	4.974	4.974	1505.080	187	0.4717	3.8750	2.3760	0.6740	0.3450	
5.000	4.974	4.974	1510.054	187	0.9690	3.4120	1.9150	0.3810	0.2590	
5.000	4.974	4.974	1515.028	188	0.4664	2.9500	1.4540	0.2300	0.2150	
5.000	4.974	4.974	1520.001	188	0.9638	2.4880	1.0640	0.2080	0.2080	
5.000	4.974	4.974	1524.975	189	0.4611	2.0260	0.7890	0.2080	0.2080	
5.000	4.974	4.974	1529.949	189	0.9585	1.5640	0.6290	0.2080	0.2080	
5.000	4.974	4.974	1534.922	190	0.4559	1.1020	0.5830	0.2080	0.2080	
5.000	4.974	4.974	1539.896	190	0.9532	0.6630	0.5830	0.2080	0.2080	
5.000	4.974	4.974	1544.869	191	0.4517	0.5830	0.5830	0.2080	0.2080	
5.000	4.974	4.974	1549.843	191	0.9503	0.5830	0.5830	0.2080	0.2080	
5.000	4.974	4.974	1554.817	192	0.4490	0.5830	0.5830	0.2080	0.2080	
5.000	4.974	4.974	1559.790	192	0.9478	0.5970	0.5970	0.2080	0.2080	
5.000	4.974	4.974	1564.764	193	0.4466	0.7180	0.7180	0.2080	0.2080	
5.000	4.974	4.974	1569.738	193	0.9453	0.9640	0.9640	0.2080	0.2080	
5.000	4.974	4.974	1574.711	194	0.4441	1.3350	1.3350	0.2080	0.2080	
5.000	4.974	4.974	1579.685	194	0.9428	1.8180	1.8180	0.2080	0.2080	
5.000	4.974	4.974	1584.659	195	0.4914	2.3200	2.3200	0.2080	0.2080	
5.000	4.974	4.974	1589.632	196	0.0522	2.8210	2.8210	0.2290	0.2290	
5.000	4.974	4.974	1594.606	196	0.6757	3.3230	3.3230	0.4220	0.4220	
5.000	4.974	4.974	1599.580	197	0.2775	3.8250	3.8250	0.8180	0.8180	
5.000	4.974	4.974	1604.553	197	0.8560	4.3270	4.3270	1.4170	1.4170	
5.000	4.974	4.974	1609.527	198	0.4346	4.8280	4.8280	2.1980	2.1980	
5.000	4.974	4.974	1614.501	199	0.0141	5.3300	5.3300	3.0110	3.0110	
5.000	4.974	4.974	1619.474	199	0.6375	5.8320	5.8320	3.8250	3.8250	
5.000	4.974	4.974	1624.448	200	0.1835	6.3340	6.3340	4.6380	4.6380	
5.000	4.974	4.974	1629.422	200	0.6220	6.8360	6.8360	5.4520	5.4520	
5.000	4.974	4.974	1634.395	201	0.0605	7.3370	7.3370	6.2650	6.2650	
5.000	4.974	4.974	1639.369	201	0.4990	7.8390	7.8390	7.0790	7.0790	
5.000	4.974	4.974	1644.342	201	0.9374	8.3320	8.3320	7.8780	7.8780	P205
5.000	4.974	4.974	1649.316	203	0.7103	8.4550	8.4200	8.0350	8.0110	
5.000	4.974	4.974	1654.290	204	0.4906	8.4050	8.0160	7.5340	7.2580	
5.000	4.974	4.974	1659.263	205	0.0646	8.2990	7.5590	6.9660	6.4070	
5.000	4.974	4.974	1664.237	205	0.6385	8.1360	7.1020	6.3970	5.5550	
5.000	4.974	4.974	1669.211	206	0.2308	7.9170	6.6460	5.8290	4.7030	
5.000	4.974	4.974	1674.184	206	0.8542	7.6400	6.1890	5.2610	3.8520	
5.000	4.974	4.974	1679.158	207	0.3086	7.3070	5.7320	4.6930	3.0000	
5.000	4.974	4.974	1684.132	207	0.7114	6.9170	5.2750	4.1250	2.1480	
5.000	4.974	4.974	1689.105	208	0.8481	6.4700	4.8180	3.5570	1.4220	



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT II | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	1489.3834

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T21	T22	T23	T24		
5.000	4.974	4.974	1694.079	209	0.5918	5.9660	4.3610	2.9890	1.0310		
5.780	5.750	5.749	1699.828	210	1.0000	5.3320	3.8330	2.3320	0.8330	CJ 6	Unit III
211.560	210.445	210.445									

		DL	X	ELEM	x/l	Y from BOTTOM flange T2X				
		BEGIN								
			1489.383	185						CJ
	T25	-34.250	1455.133	179	0.3034	0.3333				
	T26	-10.500	1478.883	183	0.0000	0.3333				
		0.000	1489.383	185	0.0000	0.3333				
	T26	106.307	1595.691	196	0.8116	0.3333				
	T25	133.250	1622.633	199	1.0000	0.3333				

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

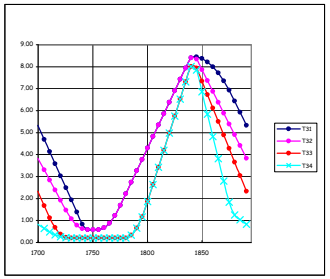
DESCRP: PT DEFINITION - RAMP A, UNIT III | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	1699.8284

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T31	T32	T33	T34		
		BEGIN									
		0.000	1699.828	211	0.0000	5.3320	3.8330	2.3320	0.8330	CJ 6	Unit I
5.832	5.804	5.804	1705.632	212	0.3779	4.6900	3.3000	1.6690	0.6380		
5.000	4.976	4.976	1710.608	212	0.9441	4.1380	2.8430	1.1150	0.4750		
5.000	4.976	4.976	1715.583	213	0.4495	3.5870	2.3860	0.6790	0.3470		
5.000	4.976	4.976	1720.559	213	0.9483	3.0360	1.9290	0.3850	0.2600		
5.000	4.976	4.976	1725.535	214	0.4470	2.4850	1.4720	0.2320	0.2150		
5.000	4.976	4.976	1730.510	214	0.9456	1.9340	1.0720	0.2080	0.2080		
5.000	4.976	4.976	1735.486	215	0.4443	1.3830	0.7900	0.2080	0.2080		
5.000	4.976	4.976	1740.462	215	0.9429	0.8320	0.6280	0.2080	0.2080		
5.000	4.976	4.976	1745.437	216	0.4415	0.5830	0.5830	0.2080	0.2080		
5.000	4.976	4.976	1750.413	216	0.9400	0.5830	0.5830	0.2080	0.2080		
5.000	4.976	4.976	1755.388	217	0.4385	0.5850	0.5850	0.2080	0.2080		
5.000	4.976	4.976	1760.364	217	0.9370	0.6680	0.6680	0.2080	0.2080		
5.000	4.976	4.976	1765.340	218	0.4354	0.8810	0.8810	0.2080	0.2080		
5.000	4.976	4.976	1770.315	218	0.9338	1.2240	1.2240	0.2080	0.2080		
5.000	4.976	4.976	1775.291	219	0.4322	1.6950	1.6950	0.2080	0.2080		
5.000	4.976	4.976	1780.267	219	0.9305	2.2160	2.2160	0.2100	0.2100		
5.000	4.976	4.976	1785.242	220	0.5360	2.7360	2.7360	0.3320	0.3320		
5.000	4.976	4.976	1790.218	221	0.1129	3.2560	3.2560	0.6490	0.6490		
5.000	4.976	4.976	1795.194	221	0.5558	3.7770	3.7770	1.1590	1.1590		
5.000	4.976	4.976	1800.169	221	0.9987	4.2970	4.2970	1.8620	1.8620		
5.000	4.976	4.976	1805.145	222	0.4414	4.8180	4.8180	2.6400	2.6400		
5.000	4.976	4.976	1810.121	222	0.8842	5.3380	5.3380	3.4180	3.4180		
5.000	4.976	4.976	1815.096	223	0.4598	5.8580	5.8580	4.1960	4.1960		
5.000	4.976	4.976	1820.072	224	0.0659	6.3790	6.3790	4.9740	4.9740		
5.000	4.976	4.976	1825.047	224	0.5639	6.8990	6.8990	5.7520	5.7520		
5.000	4.976	4.976	1830.023	225	0.0619	7.4200	7.4200	6.5300	6.5300		
5.000	4.976	4.976	1834.999	225	0.5598	7.9400	7.9400	7.3080	7.3080		
5.000	4.976	4.976	1839.974	226	0.2311	8.4070	8.4070	8.0070	8.0070		
5.000	4.976	4.976	1844.950	228	0.0557	8.4450	8.3450	7.9430	7.8500	P204	
5.000	4.976	4.976	1849.926	228	0.5535	8.3680	7.8630	7.3430	6.8570		
5.000	4.976	4.976	1854.901	229	0.1024	8.2200	7.3700	6.7300	5.8420		
5.000	4.976	4.976	1859.877	230	0.0601	8.0020	6.8760	6.1160	4.8260		
5.000	4.976	4.976	1864.853	230	0.6823	7.7130	6.3830	5.5020	3.8110		
5.000	4.976	4.976	1869.828	231	0.2214	7.3540	5.8890	4.8890	2.7950		
5.000	4.976	4.976	1874.804	231	0.6738	6.9250	5.3950	4.2750	1.8380		
5.000	4.976	4.976	1879.780	232	0.8329	6.4310	4.9020	3.6610	1.2520		
5.000	4.976	4.976	1884.755	233	0.5872	5.9240	4.4080	3.0480	1.0320		
5.831	5.803	5.802	1890.558	234	1.0000	5.3320	3.8330	2.3320	0.8330	CJ 7	Unit III
191.663	190.7293										



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT III | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	1699.8284

		DL	X	ELEM	x/l	T3X	Y from BOTTOM flange			
		BEGIN								
			1699.828							CJ
	T35	-32.459	1667.370	206	0.0000	0.3333				
	T36	-10.471	1689.358	209	0.0000	0.3333				
		0.000								
	T36	94.865	1794.693	221	0.5112	0.3333				
	T35	119.865	1819.693	223	1.0000	0.3333				

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

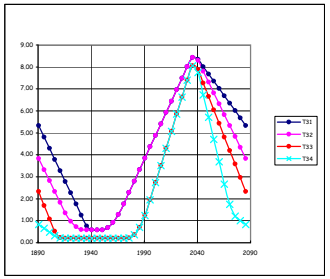
DESCRP: PT DEFINITION - RAMP A, UNIT IV | CHECKED BY: IC BY PT | DATE: 02/10/09

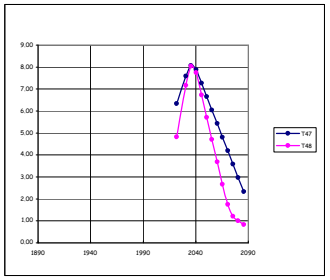
DX at BEG =

DX at END =

	->TO CJ
Span =	1890.5577

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T31	T32	T33	T34		
		BEGIN									
		0.000	1890.558	235	0.0000	5.3320	3.8330	2.3320	0.8330	CJ 7	Unit I
5.211	5.201	5.201	1895.758	236	0.2965	4.8040	3.3180	1.6930	0.6550		
5.000	4.990	4.990	1900.748	236	0.9689	4.2970	2.8250	1.0790	0.4850		
5.000	4.990	4.990	1905.738	237	0.4758	3.7900	2.3310	0.5180	0.3200		
5.000	4.990	4.990	1910.729	237	0.9747	3.2830	1.8380	0.2360	0.2250		
5.000	4.990	4.990	1915.719	238	0.4735	2.7770	1.3580	0.2080	0.2080		
5.000	4.990	4.990	1920.709	238	0.9723	2.2700	0.9830	0.2080	0.2080		
5.000	4.990	4.990	1925.699	239	0.4711	1.7630	0.7310	0.2080	0.2080		
5.000	4.990	4.990	1930.689	239	0.9698	1.2560	0.6020	0.2080	0.2080		
5.000	4.990	4.990	1935.679	240	0.4685	0.7510	0.5830	0.2080	0.2080		
5.000	4.990	4.990	1940.669	240	0.9671	0.5830	0.5830	0.2080	0.2080		
5.000	4.990	4.990	1945.659	241	0.4657	0.5830	0.5830	0.2080	0.2080		
5.000	4.990	4.990	1950.649	241	0.9643	0.5880	0.5880	0.2080	0.2080		
5.000	4.990	4.990	1955.639	242	0.4628	0.6870	0.6870	0.2080	0.2080		
5.000	4.990	4.990	1960.629	242	0.9614	0.9170	0.9170	0.2080	0.2080		
5.000	4.990	4.990	1965.619	243	0.4598	1.2750	1.2750	0.2080	0.2080		
5.000	4.990	4.990	1970.609	243	0.9583	1.7600	1.7600	0.2080	0.2080		
5.000	4.990	4.990	1975.599	244	0.4567	2.2800	2.2800	0.2150	0.2150		
5.000	4.990	4.990	1980.589	244	0.9551	2.8010	2.8010	0.3610	0.3610		
5.000	4.990	4.990	1985.579	245	0.5667	3.3210	3.3210	0.7020	0.7020		
5.000	4.990	4.990	1990.569	246	0.2159	3.8410	3.8410	1.2360	1.2360		
5.000	4.990	4.990	1995.559	246	0.9251	4.3620	4.3620	1.9580	1.9580		
5.000	4.990	4.990	2000.549	247	0.6342	4.8820	4.8820	2.7360	2.7360		
5.000	4.990	4.990	2005.539	248	0.3015	5.4030	5.4030	3.5140	3.5140		
5.000	4.990	4.990	2010.529	248	0.9242	5.9230	5.9230	4.2920	4.2920		
5.000	4.990	4.990	2015.519	249	0.4126	6.4430	6.4430	5.0700	5.0700		
5.000	4.990	4.990	2020.509	249	0.8824	6.9640	6.9640	5.8480	5.8480		
5.000	4.990	4.990	2025.499	250	0.2987	7.4840	7.4840	6.6260	6.6260		
5.000	4.990	4.990	2030.489	250	0.6971	8.0050	8.0050	7.4040	7.4040		
5.000	4.990	4.990	2035.479	251	0.4775	8.4340	8.4340	8.0470	8.0470	P203	
5.000	4.990	4.990	2040.470	253	0.1375	8.3480	8.2940	7.8790	7.7440		
5.000	4.990	4.990	2045.460	253	0.7212	8.0150	7.8020	7.2670	6.7310		
5.000	4.990	4.990	2050.450	254	0.3048	7.6820	7.3080	6.6530	5.7160		
5.000	4.990	4.990	2055.440	254	0.8884	7.3480	6.8150	6.0400	4.7000		
5.000	4.990	4.990	2060.430	255	0.5033	7.0150	6.3210	5.4260	3.6850		
5.000	4.990	4.990	2065.420	256	0.1066	6.6810	5.8280	4.8130	2.6690		
5.000	4.990	4.990	2070.410	256	0.6349	6.3480	5.3340	4.1990	1.7420		
5.000	4.990	4.990	2075.400	257	0.4156	6.0140	4.8410	3.5850	1.2090		
5.000	4.990	4.990	2080.390	258	0.3518	5.6810	4.3470	2.9720	1.0110		
5.210	5.200	5.200	2085.589	258	1.0000	5.3330	3.8330	2.3320	0.8330	CJ 8	Unit V





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT IV | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	1890.5577

195.421 195.0317 195.032

		DL	X	ELEM	x/l	Y from BOTTOM flange T4X				
		BEGIN								
			1890.558							**CJ**
	T45	**-31.162**	1859.396	230	0.0000	**0.3333**				
	T46	**-10.500**	1880.058	233	0.0000	**0.3333**				
		0.000								
	T46	**98.492**	1989.050	245	1.0000	**0.3333**				
	T45	**120.579**	2011.136	248	1.0000	**0.3333**				

		DL	X	ELEM	x/l	Y from BOTTOM flange T47	T48			
		BEGIN								
		0.000	2036.788							**P203**
		-15.000	2021.788	250	0.0024	**6.3320**	**4.8270**			
			2030.489	250	0.6971	**7.5940**	**7.1720**			
			2035.479	251	0.4775	**8.0610**	**8.0420**			
			2040.470	253	0.1375	7.8790	7.7440			
			2045.460	253	0.7212	7.2670	6.7310			
			2050.450	254	0.3048	6.6530	5.7160			
			2055.440	254	0.8884	6.0400	4.7000			
			2060.430	255	0.5033	5.4260	3.6850			
			2065.420	256	0.1066	4.8130	2.6690			
			2070.410	256	0.6349	4.1990	1.7420			
			2075.400	257	0.4156	3.5850	1.2090			
			2080.390	258	0.3518	2.9720	1.0110			
			2085.589	258	1.0000	2.3320	0.8330			

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

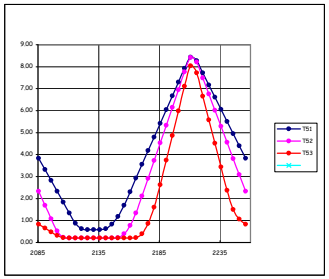
DESCRP: PT DEFINITION - RAMP A, UNIT V | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	2085.5895

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T51	T52	T53		
		BEGIN								
		0.000	2085.590	259	0.0000	3.8330	2.3320	0.8330		CJ 8
5.184	5.184	5.184	2090.774	260	0.2980	3.3210	1.6960	0.6560		
5.000	5.000	5.000	2095.774	260	0.9829	2.8280	1.0820	0.4860		
5.000	5.000	5.000	2100.774	261	0.4861	2.3340	0.5200	0.3210		
5.000	5.000	5.000	2105.775	261	0.9847	1.8410	0.2360	0.2250		
5.000	5.000	5.000	2110.775	262	0.4831	1.3470	0.2080	0.2080		
5.000	5.000	5.000	2115.775	262	0.9816	0.8790	0.2080	0.2080		
5.000	5.000	5.000	2120.776	263	0.4800	0.6210	0.2080	0.2080		
5.000	5.000	5.000	2125.776	263	0.9784	0.5830	0.2080	0.2080		
5.000	5.000	5.000	2130.776	264	0.4768	0.5830	0.2080	0.2080		
5.000	5.000	5.000	2135.776	264	0.9751	0.5830	0.2080	0.2080		
5.000	5.000	5.000	2140.777	265	0.5917	0.6290	0.2080	0.2080		
5.000	5.000	5.000	2145.777	266	0.2326	0.8250	0.2080	0.2080		
5.000	5.000	5.000	2150.777	266	0.9076	1.1770	0.2210	0.2080		
5.000	5.000	5.000	2155.777	267	0.5827	1.6850	0.3940	0.2080		
5.000	5.000	5.000	2160.778	268	0.2577	2.3030	0.7680	0.2080		
5.000	5.000	5.000	2165.778	268	0.9326	2.9270	1.3430	0.2120		
5.000	5.000	5.000	2170.778	269	0.5604	3.5510	2.1070	0.3940		
5.000	5.000	5.000	2175.779	270	0.1587	4.1740	2.9140	0.8560		
5.000	5.000	5.000	2180.779	270	0.6987	4.7980	3.7210	1.5970		
5.000	5.000	5.000	2185.779	271	0.2387	5.4220	4.5280	2.6160		
5.000	5.000	5.000	2190.779	271	0.7787	6.0450	5.3350	3.7380		
5.000	5.000	5.000	2195.780	272	0.3186	6.6690	6.1420	4.8610		
5.000	5.000	5.000	2200.780	272	0.8585	7.2930	6.9490	5.9830		
5.000	5.000	5.000	2205.780	273	0.4912	7.9160	7.7560	7.1060		
5.000	5.000	5.000	2210.781	274	0.4693	8.4300	8.4220	8.0330		P202
5.000	5.000	5.000	2215.781	276	0.0996	8.2730	8.2120	7.7220		
5.000	5.000	5.000	2220.781	276	0.5301	7.7210	7.4820	6.6530		
5.000	5.000	5.000	2225.781	276	0.9605	7.1690	6.7500	5.5810		
5.000	5.000	5.000	2230.782	277	0.5654	6.6160	6.0180	4.5100		
5.000	5.000	5.000	2235.782	278	0.1592	6.0630	5.2860	3.4380		
5.000	5.000	5.000	2240.782	278	0.6870	5.5110	4.5540	2.3670		
5.000	5.000	5.000	2245.783	279	0.4862	4.9580	3.8220	1.4990		
5.000	5.000	5.000	2250.783	280	0.3548	4.4050	3.0900	1.0560		
5.183	5.183	5.183	2255.966	280	1.0000	3.8320	2.3320	0.8330		CJ 9
170.367	170.3765	170.376								



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT V | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	2085.5895

		DL	X	ELEM	x/l	T5X	Y from BOTTOM flange			
		BEGIN								
			2085.590							CJ
	T54	-29.196	2056.394	255	0.0000	0.3333				
	T55	-8.022	2077.568	258	0.0000	0.3333				
		0.000								
	T55	58.465	2144.054	265	1.0000	0.3333				
	T54	88.719	2174.309	269	1.0000	0.3333				

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

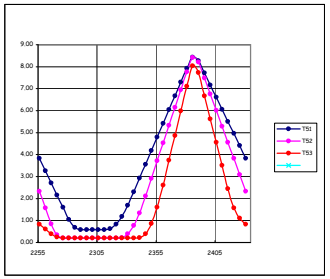
DESCRP: PT DEFINITION - RAMP A, UNIT VI | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	2255.9660

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T51	T52	T53		
		BEGIN								
		0.000	2255.966	281	0.0000	3.8320	2.3320	0.8330		CJ 9
5.189	5.180	5.180	2261.146	282	0.2385	3.2590	1.5720	0.6100		
5.000	4.991	4.991	2266.137	282	0.7877	2.7060	0.8440	0.3960		
5.000	4.991	4.991	2271.128	283	0.3049	2.1530	0.3450	0.2490		
5.000	4.991	4.991	2276.119	283	0.8019	1.6000	0.2080	0.2080		
5.000	4.991	4.991	2281.110	284	0.3001	1.0510	0.2080	0.2080		
5.000	4.991	4.991	2286.101	284	0.7991	0.6810	0.2080	0.2080		
5.000	4.991	4.991	2291.092	285	0.2982	0.5830	0.2080	0.2080		
5.000	4.991	4.991	2296.083	285	0.7973	0.5830	0.2080	0.2080		
5.000	4.991	4.991	2301.074	286	0.2964	0.5830	0.2080	0.2080		
5.000	4.991	4.991	2306.065	286	0.7955	0.5830	0.2080	0.2080		
5.000	4.991	4.991	2311.056	287	0.2946	0.5830	0.2080	0.2080		
5.000	4.991	4.991	2316.048	287	0.7937	0.6290	0.2080	0.2080		
5.000	4.991	4.991	2321.039	288	0.2928	0.8250	0.2080	0.2080		
5.000	4.991	4.991	2326.030	288	0.7919	1.1770	0.2210	0.2080		
5.000	4.991	4.991	2331.021	289	0.8161	1.6840	0.3940	0.2080		
5.000	4.991	4.991	2336.012	290	0.5419	2.3030	0.7670	0.2080		
5.000	4.991	4.991	2341.003	291	0.1057	2.9260	1.3420	0.2120		
5.000	4.991	4.991	2345.994	291	0.5033	3.5500	2.1060	0.3940		
5.000	4.991	4.991	2350.985	291	0.9009	4.1740	2.9130	0.8550		
5.000	4.991	4.991	2355.976	292	0.2986	4.7970	3.7200	1.5960		
5.000	4.991	4.991	2360.967	292	0.6962	5.4210	4.5270	2.6140		
5.000	4.991	4.991	2365.958	293	0.1472	6.0450	5.3340	3.7370		
5.000	4.991	4.991	2370.949	293	0.7711	6.6680	6.1410	4.8600		
5.000	4.991	4.991	2375.940	294	0.2633	7.2920	6.9480	5.9820		
5.000	4.991	4.991	2380.931	294	0.6792	7.9160	7.7560	7.1050		
5.000	4.991	4.991	2385.923	295	0.4567	8.4300	8.4220	8.0320		P201
5.000	4.991	4.991	2390.914	297	0.1247	8.2730	8.2130	7.7280		
5.000	4.991	4.991	2395.905	297	0.6742	7.7220	7.4830	6.6740		
5.000	4.991	4.991	2400.896	298	0.2032	7.1690	6.7510	5.6170		
5.000	4.991	4.991	2405.887	298	0.7023	6.6170	6.0190	4.5600		
5.000	4.991	4.991	2410.878	299	0.2014	6.0640	5.2870	3.5030		
5.000	4.991	4.991	2415.869	299	0.7005	5.5110	4.5550	2.4460		
5.000	4.991	4.991	2420.860	300	0.1641	4.9590	3.8230	1.5770		
5.000	4.991	4.991	2425.851	300	0.5743	4.4060	3.0910	1.1050		
5.189	5.180	5.180	2431.031	300	1.0000	3.8320	2.3320	0.8330		CJ 10
175.378	175.0647	175.065								



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT VI | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ
Span =	2255.9660

		DL	X	ELEM	x/l	T6X	Y from BOTTOM flange			
		BEGIN								
			2255.966							CJ
	T64/T66	-29.726	2226.240	277	0.0000	0.3333				
	T65	-8.034	2247.932	280	0.0000	0.3333				
		0.000								
	T65	83.711	2339.677	290	1.0000	0.3333				
	T64/T66	116.815	2372.781	293	1.0000	0.3333				

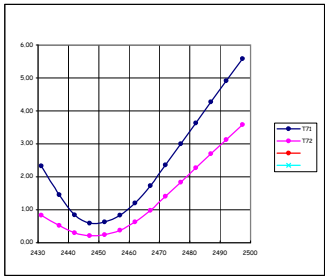
URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP A, UNIT VII | CHECKED BY: IC BY PT | DATE: 02/10/09

		->TO CJ
DX at BEG =	Span =	2431.0307
DX at END =		

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T71	T72			
		BEGIN								
		0.000	2431.031	301	0.0000	2.3320	0.8330			CJ 10
		5.947	2436.978	302	0.2947	1.4610	0.5220			
		5.000	2441.978	302	0.7947	0.8470	0.3030			
		5.000	2446.978	303	0.2947	0.5910	0.2110			
		5.000	2451.978	303	0.7947	0.6340	0.2420			
		5.000	2456.978	304	0.2947	0.8390	0.3810			
		5.000	2461.978	304	0.7947	1.2040	0.6270			
		5.000	2466.978	305	0.2947	1.7270	0.9810			
		5.000	2471.978	305	0.7947	2.3610	1.4080			
		5.000	2476.978	306	0.2947	2.9980	1.8380			
		5.000	2481.978	306	0.7947	3.6350	2.2680			
		5.000	2486.978	307	0.3275	4.2720	2.6990			
		5.000	2491.978	307	0.8830	4.9090	3.1290			
		5.279	2497.364	309	0.7333	5.5820	3.5830			A200



URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP B, UNIT I

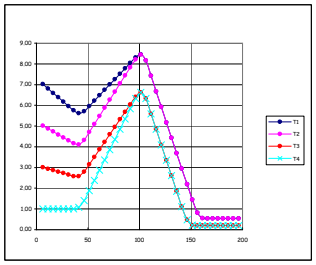
COMPUTED BY: DEM
CHECKED BY: IC BY PT

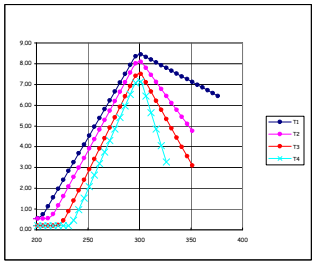
DATE: 02/10/09
DATE: 02/10/09

DX at BEG =
DX at END =

	->TO BEG	->P302	->P303
Span =	0.0000	102.0833	299.0833

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	
		BEGIN	0.000															
		0.667	0.667	1	0.3200	7.3333	5.2500	3.1667	1.0833									A301
		5.457	6.124	4	0.2222	7.0190	5.0130	3.0060	1.0000									
		5.000	11.124	4	0.7453	6.8080	4.8720	2.9360	1.0000									
		5.000	16.124	5	0.2684	6.5970	4.7320	2.8660	1.0000									
		5.000	21.124	5	0.7915	6.3850	4.5910	2.7950	1.0000									
		5.000	26.124	6	0.3146	6.1740	4.4510	2.7250	1.0000									
		5.000	31.124	6	0.8377	5.9630	4.3100	2.6540	1.0000									
		5.000	36.124	7	0.3608	5.7510	4.1690	2.5840	1.0000									
		5.000	41.124	7	0.8839	5.6160	4.1140	2.5830	1.0790									
		5.000	46.124	8	0.4070	5.7110	4.3190	2.7930	1.3990									
		5.000	51.124	8	0.9301	5.9650	4.7040	3.1500	1.8870									
		5.000	56.124	9	0.4533	6.2250	5.0950	3.5120	2.3800									
		5.000	61.124	9	0.9764	6.4840	5.4860	3.8740	2.8730									
		5.000	66.124	10	0.4995	6.7440	5.8760	4.2350	3.3660									
		5.000	71.124	11	0.0226	7.0030	6.2670	4.5970	3.8590									
		5.000	76.124	11	0.5457	7.2630	6.6580	4.9580	4.3530									
		5.000	81.124	12	0.0688	7.5220	7.0480	5.3200	4.8460									
		5.000	86.124	12	0.5919	7.7820	7.4390	5.6820	5.3390									
		5.000	91.124	13	0.1150	8.0410	7.8300	6.0430	5.8320									
		5.000	96.124	13	0.6381	8.3000	8.2200	6.4050	6.3250									
		5.000	101.124	14	0.6163	8.4540	8.4510	6.6190	6.6160									P302
		5.000	106.124	16	0.1605	8.1640	8.1640	6.3310	6.3310									
		5.000	111.124	16	0.6813	7.4180	7.4180	5.5860	5.5860									
		5.000	116.124	17	0.2022	6.6720	6.6720	4.8400	4.8400									
		5.000	121.124	17	0.7230	5.9260	5.9260	4.0950	4.0950									
		5.000	126.124	18	0.2438	5.1790	5.1790	3.3490	3.3490									
		5.000	131.124	18	0.7647	4.4330	4.4330	2.6040	2.6040									
		5.000	136.124	19	0.2855	3.6870	3.6870	1.8580	1.8580									
		5.000	141.124	19	0.8063	2.9410	2.9410	1.1130	1.1130									
		5.000	146.124	20	0.3272	2.1940	2.1940	0.4830	0.4830									
		5.000	151.124	20	0.8480	1.4480	1.4480	0.2170	0.2170									
		5.000	156.124	21	0.3688	0.8170	0.8170	0.2080	0.2080									
		5.000	161.124	21	0.8897	0.5500	0.5500	0.2080	0.2080									
		5.000	166.124	22	0.4105	0.5420	0.5420	0.2080	0.2080									
		5.000	171.124	22	0.9313	0.5420	0.5420	0.2080	0.2080									





URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP B, UNIT I

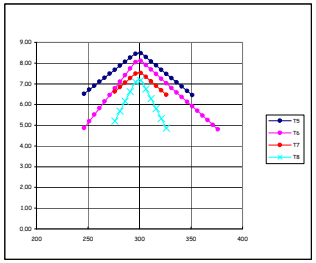
COMPUTED BY: DEM
CHECKED BY: IC BY PT

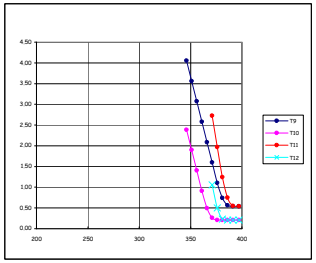
DATE: 02/10/09
DATE: 02/10/09

DX at BEG =
DX at END =

	->TO BEG	->P302	->P303
Span =	0.0000	102.0833	299.0833

left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	
		5.000	176.124	23	0.4522	0.5420	0.5420	0.2080	0.2080									
		5.000	181.124	23	0.9730	0.5420	0.5420	0.2080	0.2080									
		5.000	186.124	24	0.4938	0.5420	0.5420	0.2080	0.2080									
		5.000	191.124	25	0.0147	0.5420	0.5420	0.2080	0.2080									
		5.000	196.124	25	0.5355	0.5420	0.5420	0.2080	0.2080									
		5.000	201.124	26	0.0563	0.5570	0.5420	0.2080	0.2080									
		5.000	206.124	26	0.5772	0.7430	0.5420	0.2080	0.2080									
		5.000	211.124	27	0.0980	1.1260	0.5580	0.2080	0.2080									
		5.000	216.124	27	0.6188	1.5520	0.7570	0.2080	0.2080									
		5.000	221.124	28	0.1397	1.9770	1.1680	0.2260	0.2080									
		5.000	226.124	28	0.6605	2.4030	1.6250	0.4450	0.2080									
		5.000	231.124	29	0.1813	2.8280	2.0820	0.8970	0.2080									
		5.000	236.124	29	0.7022	3.2540	2.5390	1.3990	0.4690									
		5.000	241.124	30	0.2230	3.6790	2.9950	1.9010	0.9700									
		5.000	246.124	30	0.7438	4.1050	3.4520	2.4030	1.5250	6.5190	4.8680							
		5.000	251.124	31	0.2647	4.5300	3.9090	2.9060	2.0800	6.7120	5.1860							
		5.000	256.124	31	0.7855	4.9560	4.3650	3.4080	2.6360	6.9050	5.5050							
		5.000	261.124	32	0.3063	5.3810	4.8220	3.9100	3.1910	7.0970	5.8230							
		5.000	266.124	32	0.8272	5.8070	5.2790	4.4120	3.7470	7.2900	6.1410							
		5.000	271.124	33	0.3480	6.2320	5.7360	4.9140	4.3020	7.4820	6.4600							
		5.000	276.124	33	0.8688	6.6580	6.1920	5.4160	4.8580	7.6750	6.7780	6.6260	5.2080					
		5.000	281.124	34	0.3897	7.0830	6.6490	5.9190	5.4130	7.8670	7.0960	6.8430	5.6810					
		5.000	286.124	34	0.9105	7.5090	7.1060	6.4210	5.9690	8.0600	7.4150	7.0590	6.1530					
		5.000	291.124	35	0.4313	7.9340	7.5630	6.9230	6.5240	8.2530	7.7330	7.2750	6.6260					
		5.000	296.124	35	0.9522	8.3520	8.0110	7.4160	7.0700	8.4420	8.0460	7.4880	7.0910					P303
		5.000	301.124	37	0.8163	8.4470	8.0960	7.5030	7.1400	8.4720	8.1060	7.5230	7.1680					
		5.000	306.124	38	0.4756	8.3280	7.7970	7.1090	6.4370	8.2920	7.9100	7.3320	6.7490					
		5.000	311.124	38	0.9993	8.1940	7.4600	6.6630	5.6440	8.0810	7.6880	7.1150	6.2770					
		5.000	316.124	39	0.5230	8.0590	7.1230	6.2170	4.8510	7.8830	7.4660	6.8990	5.8040					
		5.000	321.124	40	0.0467	7.9250	6.7850	5.7720	4.0580	7.6790	7.2440	6.6830	5.3310					
		5.000	326.124	40	0.5704	7.7910	6.4480	5.3260	3.2650	7.4750	7.0220	6.4670	4.8590					
		5.000	331.124	41	0.0941	7.6570	6.1100	4.8800		7.2710	6.8000							
		5.000	336.124	41	0.6178	7.5220	5.7730	4.4340		7.0670	6.5780							
		5.000	341.124	42	0.1415	7.3880	5.4350	3.9890		6.8630	6.3560							
		5.000	346.124	42	0.6652	7.2540	5.0980	3.5430		6.6590	6.1340			4.0530	2.3870			
		5.000	351.124	43	0.1889	7.1190	4.7610	3.0970		6.4540	5.9120			3.5620	1.8950			
		5.000	356.124	43	0.7126	6.9850					5.6900			3.0700	1.4040			
		5.000	361.124	44	0.2363	6.8510					5.4680			2.5790	0.9120			
		5.000	366.124	44	0.7600	6.7170					5.2460			2.0870	0.4920			
		5.000	371.124	45	0.2837	6.5820					5.0240			1.5960	0.2590	2.7220	1.0610	
		5.000	376.124	45	0.8074	6.4480					4.8020			1.1070	0.2080	1.9700	0.5040	
		5.000	381.124	46	0.3311									0.7390	0.2080	1.2410	0.2350	
		5.000	386.124	46	0.8548									0.5600	0.2080	0.7500	0.2080	
		5.000	391.124	47	0.3785									0.5420	0.2080	0.5470	0.2080	
		6.124	397.248	47	1.0000									0.5420	0.2080	0.5420	0.2080	CJ





URS CORPORATION

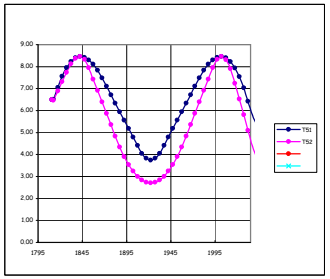
JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP C, UNIT I(1)

COMPUTED BY: DEM — DATE: 02/10/09
CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG =
DX at END =

rigth on dwg	CJ2-P405	->TO P405	->TO P404	P404-CJ1	left on dwg
Span =	35.0000	1842.2592	2002.2592	40.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T51	T52				
			BEGIN									
			0.000	1807.259								CJ2 Unit II (EJ C1)
			3.333	1810.592	241	0.5728	6.5000	6.5000				
46	6.6667	6.6667	1.667	1812.259	241	0.7606	6.5150	6.4720				
45	5.0000	5.0000	5.000	1817.259	242	0.3239	7.0550	6.8920				
44	5.0000	5.0000	5.000	1822.259	242	0.8873	7.5590	7.3110				
43	5.0000	5.0000	5.000	1827.259	243	0.4507	7.9520	7.7310				
42	5.0000	5.0000	5.000	1832.259	244	0.0141	8.2340	8.1270				
41	5.0000	5.0000	5.000	1837.259	244	0.5775	8.4020	8.3760				
40	5.0000	5.0000	5.000	1842.259	246	0.0000	8.4590	8.4590				P405
39	5.0000	5.0000	5.000	1847.259	247	0.4762	8.4200	8.3310				
38	5.0000	5.0000	5.000	1852.259	248	0.1111	8.3040	7.9470				
37	5.0000	5.0000	5.000	1857.259	248	0.7460	8.1100	7.4290				
36	5.0000	5.0000	5.000	1862.259	249	0.3810	7.8390	6.9110				
35	5.0000	5.0000	5.000	1867.259	250	0.0159	7.4910	6.3930				
34	5.0000	5.0000	5.000	1872.259	250	0.6508	7.1050	5.8750				
33	5.0000	5.0000	5.000	1877.259	251	0.2857	6.7200	5.3570				
32	5.0000	5.0000	5.000	1882.259	251	0.9206	6.3340	4.8390				
31	5.0000	5.0000	5.000	1887.259	252	0.5556	5.9490	4.3400				
30	5.0000	5.0000	5.000	1892.259	253	0.1905	5.5630	3.9070				
29	5.0000	5.0000	5.000	1897.259	253	0.8254	5.1780	3.5410				
28	5.0000	5.0000	5.000	1902.259	254	0.4603	4.7920	3.2410				
27	5.0000	5.0000	5.000	1907.259	255	0.0952	4.4070	3.0070				
26	5.0000	5.0000	5.000	1912.259	255	0.7302	4.0470	2.8410				
25	5.0000	5.0000	5.000	1917.259	256	0.3651	3.8240	2.7410				
24	5.0000	5.0000	5.000	1922.259	257	0.0000	3.7490	2.7080				
23	5.0000	5.0000	5.000	1927.259	257	0.6349	3.8240	2.7410				
22	5.0000	5.0000	5.000	1932.259	258	0.2698	4.0470	2.8410				
21	5.0000	5.0000	5.000	1937.259	258	0.9048	4.4070	3.0070				
20	5.0000	5.0000	5.000	1942.259	259	0.5397	4.7920	3.2410				
19	5.0000	5.0000	5.000	1947.259	260	0.1746	5.1780	3.5410				
18	5.0000	5.0000	5.000	1952.259	260	0.8095	5.5630	3.9070				
17	5.0000	5.0000	5.000	1957.259	261	0.4444	5.9490	4.3400				
16	5.0000	5.0000	5.000	1962.259	262	0.0794	6.3340	4.8390				
15	5.0000	5.0000	5.000	1967.259	262	0.7143	6.7200	5.3570				
14	5.0000	5.0000	5.000	1972.259	263	0.3492	7.1050	5.8750				
13	5.0000	5.0000	5.000	1977.259	263	0.9841	7.4910	6.3930				
12	5.0000	5.0000	5.000	1982.259	264	0.6190	7.8390	6.9110				
11	5.0000	5.0000	5.000	1987.259	265	0.2540	8.1100	7.4290				
10	5.0000	5.0000	5.000	1992.259	265	0.8889	8.3040	7.9470				
9	5.0000	5.0000	5.000	1997.259	266	0.5238	8.4200	8.3310				
8	5.0000	5.0000	5.000	2002.259	268	0.0000	8.4590	8.4590				P404



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP C, UNIT I(1) | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ2-P405	->TO P405	->TO P404	P404-CJ1	left on dwg
Span =	35.0000	1842.2592	2002.2592	40.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T51	T52				
7	5.0000	5.0000	5.000	2007.259	269	0.4762	**8.4010**	**8.3210**				
6	5.0000	5.0000	5.000	2012.259	270	0.1111	**8.2300**	**7.9070**				
5	5.0000	5.0000	5.000	2017.259	270	0.7460	**7.9440**	**7.2410**				
4	5.0000	5.0000	5.000	2022.259	271	0.3810	**7.5440**	**6.5260**				
3	5.0000	5.0000	5.000	2027.259	272	0.0159	**7.0300**	**5.8110**				
2	5.0000	5.0000	5.000	2032.259	272	0.6508	**6.4170**	**5.0960**				
1	5.0000	5.0000	5.000	2037.259	273	0.3105	**5.7920**	**4.3810**				
0	5.0000	5.0000	5.000	2042.259	**273**	**1.0000**	5.3333	3.8333				***CJ1*** Unit VI
			END									

TENDON END LOCATIONS

TENDON	TENDON BEGIN REF	DL	X	ELEM	x/l	Y From Bottom to CG of duct	
CONTINUITY TENDON #55 - TOP							
BEG	1807.259	3.333	1810.592	241	0.5728	**8.333**	
END	1842.259	15.0000	1857.259	248	0.7460	**8.333**	

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP C, UNIT I(2)

COMPUTED BY: DEM
CHECKED BY: IC BY PT

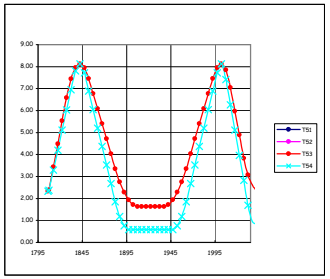
DATE: 02/10/09
DATE: 02/10/09

DX at BEG =
DX at END =

rigth on dwg	CJ2-P405	->TO P405	->TO P404	P404-CJ1	left on dwg
Span =	35.0000	1842.2592	2002.2592	40.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T51	T52	T53	T54	T55	
			BEGIN									
			0.000	1807.259								CJ2
			-1.000	1806.259					2.3333	2.3333		
			1.000	1807.259	241	0.1972			2.3940	2.3680		
46	5.0000	5.0000	5.000	1812.259	241	0.7606			3.4420	3.2840		
45	5.0000	5.0000	5.000	1817.259	242	0.3239			4.4900	4.2010		
44	5.0000	5.0000	5.000	1822.259	242	0.8873			5.5380	5.1170		
43	5.0000	5.0000	5.000	1827.259	243	0.4507			6.5850	6.0340		
42	5.0000	5.0000	5.000	1832.259	244	0.0141			7.4410	6.9500		
41	5.0000	5.0000	5.000	1837.259	244	0.5775			7.9540	7.8060		
40	5.0000	5.0000	5.000	1842.259	246	0.0000			8.1250	8.1250		P405
39	5.0000	5.0000	5.000	1847.259	247	0.4762			7.9570	7.7220		
38	5.0000	5.0000	5.000	1852.259	248	0.1111			7.4540	6.8830		
37	5.0000	5.0000	5.000	1857.259	248	0.7460			6.7690	6.0430		
36	5.0000	5.0000	5.000	1862.259	249	0.3810			6.0850	5.2030		
35	5.0000	5.0000	5.000	1867.259	250	0.0159			5.4000	4.3630		
34	5.0000	5.0000	5.000	1872.259	250	0.6508			4.7160	3.5230		
33	5.0000	5.0000	5.000	1877.259	251	0.2857			4.0310	2.6830		
32	5.0000	5.0000	5.000	1882.259	251	0.9206			3.3490	1.8470		
31	5.0000	5.0000	5.000	1887.259	252	0.5556			2.7510	1.1800		
30	5.0000	5.0000	5.000	1892.259	253	0.1905			2.2800	0.7600		
29	5.0000	5.0000	5.000	1897.259	253	0.8254			1.9360	0.5870		
28	5.0000	5.0000	5.000	1902.259	254	0.4603			1.7180	0.5830		
27	5.0000	5.0000	5.000	1907.259	255	0.0952			1.6280	0.5830		
26	5.0000	5.0000	5.000	1912.259	255	0.7302			1.6250	0.5830		
25	5.0000	5.0000	5.000	1917.259	256	0.3651			1.6250	0.5830		
24	5.0000	5.0000	5.000	1922.259	257	0.0000			1.6250	0.5830		
23	5.0000	5.0000	5.000	1927.259	257	0.6349			1.6250	0.5830		
22	5.0000	5.0000	5.000	1932.259	258	0.2698			1.6250	0.5830		
21	5.0000	5.0000	5.000	1937.259	258	0.9048			1.6280	0.5830		
20	5.0000	5.0000	5.000	1942.259	259	0.5397			1.7180	0.5830		
19	5.0000	5.0000	5.000	1947.259	260	0.1746			1.9360	0.5870		
18	5.0000	5.0000	5.000	1952.259	260	0.8095			2.2800	0.7600		
17	5.0000	5.0000	5.000	1957.259	261	0.4444			2.7510	1.1800		
16	5.0000	5.0000	5.000	1962.259	262	0.0794			3.3490	1.8470		
15	5.0000	5.0000	5.000	1967.259	262	0.7143			4.0310	2.6830		
14	5.0000	5.0000	5.000	1972.259	263	0.3492			4.7160	3.5230		
13	5.0000	5.0000	5.000	1977.259	263	0.9841			5.4010	4.3630		
12	5.0000	5.0000	5.000	1982.259	264	0.6190			6.0850	5.2030		
11	5.0000	5.0000	5.000	1987.259	265	0.2540			6.7700	6.0430		
10	5.0000	5.0000	5.000	1992.259	265	0.8889			7.4540	6.8830		
9	5.0000	5.0000	5.000	1997.259	266	0.5238			7.9570	7.7220		

Unit II (EJ C1)



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP C, UNIT I(2) | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ2-P405	->TO P405	->TO P404	P404-CJ1	left on dwg
Span =	35.0000	1842.2592	2002.2592	40.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T51	T52	T53	T54	T55		
8	5.0000	5.0000	5.000	2002.259	268	0.0000			8.1250	8.1250		**P404**	
7	5.0000	5.0000	5.000	2007.259	269	0.4762			7.8560	7.4080			
6	5.0000	5.0000	5.000	2012.259	270	0.1111			7.0490	6.2610			
5	5.0000	5.0000	5.000	2017.259	270	0.7460			5.9720	5.1150			
4	5.0000	5.0000	5.000	2022.259	271	0.3810			4.8950	3.9680			
3	5.0000	5.0000	5.000	2027.259	272	0.0159			3.8270	2.8220			
2	5.0000	5.0000	5.000	2032.259	272	0.6508			3.0660	1.6870			
1	5.0000	5.0000	5.000	2037.259	273	0.3105			2.6120	0.9420			
0	5.0000	5.0000	5.000	2042.259	273	1.0000			2.3333	0.8333		**CJ1**	Unit VI
			END										

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

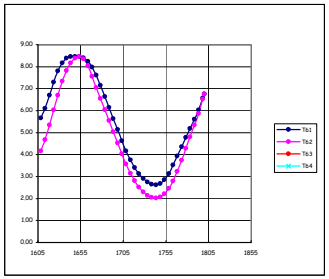
DESCRP: PT DEFINITION - RAMP C, UNIT II(1) — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ3-P406	->TO P406	P406-CJ2	left on dwg
Span =	45.0000	1653.3842	145.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T61	T62	T63	T64		
			BEGIN									
			0.000	1608.384	217	0.0000	5.6667	4.1667			CJ3	Unit III
37	5.0000	5.0000	5.000	1613.384	217	0.6063	6.1010	4.6760				
36	5.0000	5.0000	5.000	1618.384	218	0.1972	6.7030	5.3510				
35	5.0000	5.0000	5.000	1623.384	218	0.7606	7.3030	6.0270				
34	5.0000	5.0000	5.000	1628.384	219	0.3239	7.8070	6.7020				
33	5.0000	5.0000	5.000	1633.384	219	0.8873	8.1670	7.3330				
32	5.0000	5.0000	5.000	1638.384	220	0.4507	8.3850	7.8250				
31	5.0000	5.0000	5.000	1643.384	221	0.0141	8.4590	8.1770				
30	5.0000	5.0000	5.000	1648.384	221	0.5775	8.4590	8.3880				
29	5.0000	5.0000	5.000	1653.384	223	0.0000	8.4590	8.4590			P406	
28	5.0000	5.0000	5.000	1658.384	224	0.4225	8.4060	8.3540				
27	5.0000	5.0000	5.000	1663.384	224	0.9859	8.2490	8.0390				
26	5.0000	5.0000	5.000	1668.384	225	0.5493	7.9870	7.5540				
25	5.0000	5.0000	5.000	1673.384	226	0.1127	7.6200	7.0510				
24	5.0000	5.0000	5.000	1678.384	226	0.6761	7.1510	6.5480				
23	5.0000	5.0000	5.000	1683.384	227	0.2394	6.6480	6.0450				
22	5.0000	5.0000	5.000	1688.384	227	0.8028	6.1450	5.5420				
21	5.0000	5.0000	5.000	1693.384	228	0.3662	5.6420	5.0390				
20	5.0000	5.0000	5.000	1698.384	228	0.9296	5.1390	4.5360				
19	5.0000	5.0000	5.000	1703.384	229	0.4930	4.6360	4.0330				
18	5.0000	5.0000	5.000	1708.384	230	0.0563	4.1640	3.5610				
17	5.0000	5.0000	5.000	1713.384	230	0.6197	3.7560	3.1520				
16	5.0000	5.0000	5.000	1718.384	231	0.1831	3.4100	2.8060				
15	5.0000	5.0000	5.000	1723.384	231	0.7465	3.1270	2.5230				
14	5.0000	5.0000	5.000	1728.384	232	0.3099	2.9070	2.3030				
13	5.0000	5.0000	5.000	1733.384	232	0.8732	2.7500	2.1460				
12	5.0000	5.0000	5.000	1738.384	233	0.4366	2.6560	2.0520				
11	5.0000	5.0000	5.000	1743.384	234	0.0000	2.6250	2.0210				
10	5.0000	5.0000	5.000	1748.384	234	0.5634	2.6810	2.0700				
9	5.0000	5.0000	5.000	1753.384	235	0.1268	2.8490	2.2150				
8	5.0000	5.0000	5.000	1758.384	235	0.6901	3.1290	2.4560				
7	5.0000	5.0000	5.000	1763.384	236	0.2535	3.5180	2.7930				
6	5.0000	5.0000	5.000	1768.384	236	0.8169	3.9360	3.2260				
5	5.0000	5.0000	5.000	1773.384	237	0.3803	4.3540	3.7450				
4	5.0000	5.0000	5.000	1778.384	237	0.9437	4.7720	4.2770				
3	5.0000	5.0000	5.000	1783.384	238	0.5070	5.1900	4.8100				
2	5.0000	5.0000	5.000	1788.384	239	0.0588	5.6080	5.3420				
1	5.0000	5.0000	5.000	1793.384	239	0.5296	6.0260	5.8750				
			5.000	1798.384	239	1.0000	6.5690	6.5312				
			1.667	1800.051			6.7500	6.7500			CJ2	Unit I (EJ C1)
			END									



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

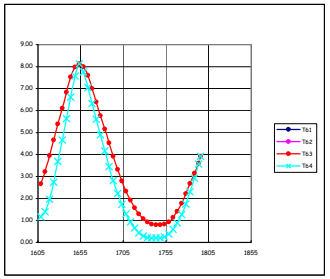
DESCRP: PT DEFINITION - RAMP C, UNIT II(2) — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ3-P406	->TO P406	P406-CJ2	left on dwg
Span =	45.0000	1653.3842	145.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T61	T62	T63	T64		
			BEGIN									
			0.000	1608.384	217	0.0000			2.6667	1.1667	CJ3	Unit III
37	5.0000	5.0000	5.000	1613.384	217	0.6063			3.2200	1.3930		
36	5.0000	5.0000	5.000	1618.384	218	0.1972			3.9410	1.9610		
35	5.0000	5.0000	5.000	1623.384	218	0.7606			4.6620	2.7400		
34	5.0000	5.0000	5.000	1628.384	219	0.3239			5.3830	3.6910		
33	5.0000	5.0000	5.000	1633.384	219	0.8873			6.1040	4.6630		
32	5.0000	5.0000	5.000	1638.384	220	0.4507			6.8250	5.6340		
31	5.0000	5.0000	5.000	1643.384	221	0.0141			7.5230	6.6060		
30	5.0000	5.0000	5.000	1648.384	221	0.5775			7.9740	7.5770		
29	5.0000	5.0000	5.000	1653.384	223	0.0000			8.1250	8.1250	P406	
28	5.0000	5.0000	5.000	1658.384	224	0.4225			7.9950	7.7640		
27	5.0000	5.0000	5.000	1663.384	224	0.9859			7.6080	7.0450		
26	5.0000	5.0000	5.000	1668.384	225	0.5493			7.0100	6.3250		
25	5.0000	5.0000	5.000	1673.384	226	0.1127			6.3900	5.6060		
24	5.0000	5.0000	5.000	1678.384	226	0.6761			5.7710	4.8860		
23	5.0000	5.0000	5.000	1683.384	227	0.2394			5.1510	4.1670		
22	5.0000	5.0000	5.000	1688.384	227	0.8028			4.5320	3.4560		
21	5.0000	5.0000	5.000	1693.384	228	0.3662			3.9120	2.8090		
20	5.0000	5.0000	5.000	1698.384	228	0.9296			3.3210	2.2330		
19	5.0000	5.0000	5.000	1703.384	229	0.4930			2.7930	1.7290		
18	5.0000	5.0000	5.000	1708.384	230	0.0563			2.3260	1.2970		
17	5.0000	5.0000	5.000	1713.384	230	0.6197			1.9220	0.9380		
16	5.0000	5.0000	5.000	1718.384	231	0.1831			1.5800	0.6500		
15	5.0000	5.0000	5.000	1723.384	231	0.7465			1.3000	0.4340		
14	5.0000	5.0000	5.000	1728.384	232	0.3099			1.0820	0.2900		
13	5.0000	5.0000	5.000	1733.384	232	0.8732			0.9270	0.2180		
12	5.0000	5.0000	5.000	1738.384	233	0.4366			0.8330	0.2090		
11	5.0000	5.0000	5.000	1743.384	234	0.0000			0.8020	0.2090		
10	5.0000	5.0000	5.000	1748.384	234	0.5634			0.8020	0.2090		
9	5.0000	5.0000	5.000	1753.384	235	0.1268			0.8290	0.2510		
8	5.0000	5.0000	5.000	1758.384	235	0.6901			0.9380	0.3790		
7	5.0000	5.0000	5.000	1763.384	236	0.2535			1.1310	0.5910		
6	5.0000	5.0000	5.000	1768.384	236	0.8169			1.4090	0.8890		
5	5.0000	5.0000	5.000	1773.384	237	0.3803			1.7700	1.2730		
4	5.0000	5.0000	5.000	1778.384	237	0.9437			2.2120	1.7410		
3	5.0000	5.0000	5.000	1783.384	238	0.5070			2.6760	2.2940		
2	5.0000	5.0000	5.000	1788.384	239	0.0588			3.1400	2.9230		
1	5.0000	5.0000	5.000	1793.384	239	0.5296			3.6040	3.5640		
			2.458	1795.842	239	0.7611			3.9167	3.9167		
			4.875	1800.717	240	0.3279					CJ2	Unit I (EJ C1)
			END									



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

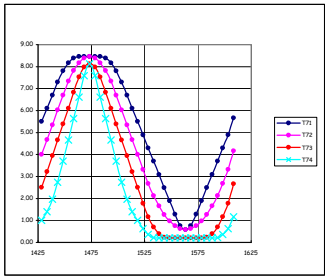
DESCRP: PT DEFINITION - RAMP C, UNIT III — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ-P407	->TO P407	P407-CJ	left on dwg
Span =	45.0000	1473.3842	135.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T71	T72	T73	T74		
			BEGIN									
			0.000	1428.384	195	0.0000	5.4990	4.0000	2.5000	0.9990	CJ4	Unit IV
35	5.0000	5.0000	5.000	1433.384	195	0.6063	6.1010	4.6760	3.2210	1.3930		
34	5.0000	5.0000	5.000	1438.384	196	0.1972	6.7030	5.3510	3.9420	1.9600		
33	5.0000	5.0000	5.000	1443.384	196	0.7606	7.3030	6.0270	4.6630	2.7400		
32	5.0000	5.0000	5.000	1448.384	197	0.3239	7.8070	6.7020	5.3840	3.6950		
31	5.0000	5.0000	5.000	1453.384	197	0.8873	8.1670	7.3330	6.1050	4.6660		
30	5.0000	5.0000	5.000	1458.384	198	0.4507	8.3850	7.8250	6.8260	5.6380		
29	5.0000	5.0000	5.000	1463.384	199	0.0141	8.4590	8.1770	7.5240	6.6090		
28	5.0000	5.0000	5.000	1468.384	199	0.5775	8.4590	8.3880	7.9750	7.5810		
27	5.0000	5.0000	5.000	1473.384	201	0.0000	8.4590	8.4590	8.1250	8.1250	P408	
26	5.0000	5.0000	5.000	1478.384	202	0.4225	8.4590	8.3880	7.9750	7.5810		
25	5.0000	5.0000	5.000	1483.384	202	0.9859	8.4590	8.1770	7.5240	6.6090		
24	5.0000	5.0000	5.000	1488.384	203	0.5493	8.3850	7.8250	6.8260	5.6380		
23	5.0000	5.0000	5.000	1493.384	204	0.1127	8.1680	7.3330	6.1050	4.6600		
22	5.0000	5.0000	5.000	1498.384	204	0.6761	7.8070	6.7020	5.3840	3.6950		
21	5.0000	5.0000	5.000	1503.384	205	0.2394	7.3030	6.0270	4.6630	2.7400		
20	5.0000	5.0000	5.000	1508.384	205	0.8028	6.7040	5.3510	3.9420	1.9610		
19	5.0000	5.0000	5.000	1513.384	206	0.3662	6.1020	4.6760	3.2210	1.3930		
18	5.0000	5.0000	5.000	1518.384	206	0.9296	5.5000	4.0000	2.5000	1.0000		
17	5.0000	5.0000	5.000	1523.384	207	0.4930	4.8980	3.3250	1.7820	0.6290		
16	5.0000	5.0000	5.000	1528.384	208	0.0563	4.2960	2.6830	1.1670	0.3600		
15	5.0000	5.0000	5.000	1533.384	208	0.6197	3.6940	2.1260	0.7040	0.2250		
14	5.0000	5.0000	5.000	1538.384	209	0.1831	3.0920	1.6540	0.3920	0.2090		
13	5.0000	5.0000	5.000	1543.384	209	0.7465	2.4900	1.2690	0.2320	0.2090		
12	5.0000	5.0000	5.000	1548.384	210	0.3099	1.8880	0.9690	0.2090	0.2090		
11	5.0000	5.0000	5.000	1553.384	210	0.8732	1.2860	0.7550	0.2090	0.2090		
10	5.0000	5.0000	5.000	1558.384	211	0.4366	0.7640	0.6260	0.2090	0.2090		
9	5.0000	5.0000	5.000	1563.384	212	0.0000	0.5840	0.5830	0.2090	0.2090		
8	5.0000	5.0000	5.000	1568.384	212	0.5634	0.7640	0.6260	0.2090	0.2090		
7	5.0000	5.0000	5.000	1573.384	213	0.1268	1.2860	0.7550	0.2090	0.2090		
6	5.0000	5.0000	5.000	1578.384	213	0.6901	1.8880	0.9690	0.2090	0.2090		
5	5.0000	5.0000	5.000	1583.384	214	0.2535	2.4900	1.2690	0.2320	0.2090		
4	5.0000	5.0000	5.000	1588.384	214	0.8169	3.0920	1.6540	0.3920	0.2090		
3	5.0000	5.0000	5.000	1593.384	215	0.3803	3.6940	2.1260	0.7040	0.2250		
2	5.0000	5.0000	5.000	1598.384	215	0.9437	4.2960	2.6830	1.1670	0.3600		
1	5.0000	5.0000	5.000	1603.384	216	0.4739	4.8980	3.3250	1.7820	0.6290		
0	5.0000	5.0000	5.000	1608.384	216	1.0000	5.6667	4.1667	2.6667	1.1667	CJ3	Unit II
			END									



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

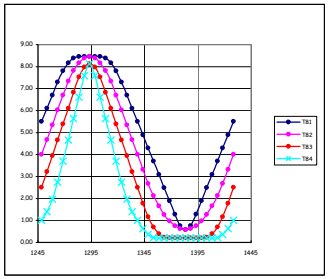
DESCRP: PT DEFINITION - RAMP C, UNIT IV — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ-P408	->TO P408	P408-CJ	left on dwg
Span =	45.0000	1293.3842	135.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T81	T82	T83	T84		
			BEGIN									
			0.000	1248.384	173	0.0000	5.4990	4.0000	2.5000	0.9990	CJ5	Unit V
35	4.9688	5.0521	5.010	1253.395	173	0.6069	6.1010	4.6760	3.2210	1.3930		
34	4.9479	5.0521	5.000	1258.395	174	0.2024	6.7030	5.3510	3.9420	1.9600		
33	4.9479	5.0521	5.000	1263.395	174	0.7629	7.3030	6.0270	4.6630	2.7400		
32	4.9479	5.0521	5.000	1268.395	175	0.3251	7.8070	6.7020	5.3840	3.6950		
31	4.9688	5.0313	5.000	1273.395	175	0.8885	8.1670	7.3330	6.1050	4.6660		
30	5.0000	5.0000	5.000	1278.395	176	0.4519	8.3850	7.8250	6.8260	5.6380		
29	5.0000	5.0000	5.000	1283.395	177	0.0153	8.4590	8.1770	7.5240	6.6090		
28	5.0000	5.0000	5.000	1288.395	177	0.5786	8.4590	8.3880	7.9750	7.5810		
27	5.0000	5.0000	5.000	1293.384	179	0.0000	8.4590	8.4590	8.1250	8.1250	P408	
26	5.0000	5.0000	5.000	1298.384	180	0.4225	8.4590	8.3880	7.9750	7.5810		
25	5.0000	5.0000	5.000	1303.384	180	0.9859	8.4590	8.1770	7.5240	6.6090		
24	5.0000	5.0000	5.000	1308.384	181	0.5493	8.3850	7.8250	6.8260	5.6380		
23	5.0000	5.0000	5.000	1313.384	182	0.1127	8.1680	7.3330	6.1050	4.6600		
22	5.0000	5.0000	5.000	1318.384	182	0.6761	7.8070	6.7020	5.3840	3.6950		
21	5.0000	5.0000	5.000	1323.384	183	0.2394	7.3030	6.0270	4.6630	2.7400		
20	5.0000	5.0000	5.000	1328.384	183	0.8028	6.7040	5.3510	3.9420	1.9610		
19	5.0000	5.0000	5.000	1333.384	184	0.3662	6.1020	4.6760	3.2210	1.3930		
18	5.0000	5.0000	5.000	1338.384	184	0.9296	5.5000	4.0000	2.5000	1.0000		
17	5.0000	5.0000	5.000	1343.384	185	0.4930	4.8980	3.3250	1.7820	0.6290		
16	5.0000	5.0000	5.000	1348.384	186	0.0563	4.2960	2.6830	1.1670	0.3600		
15	5.0000	5.0000	5.000	1353.384	186	0.6197	3.6940	2.1260	0.7040	0.2250		
14	5.0000	5.0000	5.000	1358.384	187	0.1831	3.0920	1.6540	0.3920	0.2090		
13	5.0000	5.0000	5.000	1363.384	187	0.7465	2.4900	1.2690	0.2320	0.2090		
12	5.0000	5.0000	5.000	1368.384	188	0.3099	1.8880	0.9690	0.2090	0.2090		
11	5.0000	5.0000	5.000	1373.384	188	0.8732	1.2860	0.7550	0.2090	0.2090		
10	5.0000	5.0000	5.000	1378.384	189	0.4366	0.7640	0.6260	0.2090	0.2090		
9	5.0000	5.0000	5.000	1383.384	190	0.0000	0.5840	0.5830	0.2090	0.2090		
8	5.0000	5.0000	5.000	1388.384	190	0.5634	0.7640	0.6260	0.2090	0.2090		
7	5.0000	5.0000	5.000	1393.384	191	0.1268	1.2860	0.7550	0.2090	0.2090		
6	5.0000	5.0000	5.000	1398.384	191	0.6901	1.8880	0.9690	0.2090	0.2090		
5	5.0000	5.0000	5.000	1403.384	192	0.2535	2.4900	1.2690	0.2320	0.2090		
4	5.0000	5.0000	5.000	1408.384	192	0.8169	3.0920	1.6540	0.3920	0.2090		
3	5.0000	5.0000	5.000	1413.384	193	0.3803	3.6940	2.1260	0.7040	0.2250		
2	5.0000	5.0000	5.000	1418.384	193	0.9437	4.2960	2.6830	1.1670	0.3600		
1	5.0000	5.0000	5.000	1423.384	194	0.4739	4.8980	3.3250	1.7820	0.6290		
0	5.0000	5.0000	5.000	1428.384	194	1.0000	5.4990	4.0000	2.5000	0.9990	CJ4	Unit III
			END									



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

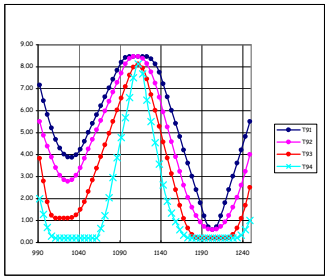
DESCRP: PT DEFINITION - RAMP C, UNIT V | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	EJ6-P409	->TO P409	P409-CJ	left on dwg
Span =	127.1563	1112.1403	136.3229	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T91	T92	T93	T94	
			BEGIN								
			0.000	984.984	141	0.0004					EJ 6
			7.146	992.130	141	0.8518	7.1667	5.5000	3.8333	2.0000	
50	4.3125	4.3750	4.344	996.474	142	0.3693	6.4470	4.8850	2.8000	1.2840	
49	4.9479	5.0521	5.000	1001.474	142	0.9651	5.8310	4.3850	1.8510	0.6820	
48	4.9479	5.0521	5.000	1006.474	143	0.5608	5.2170	3.8840	1.2440	0.2970	
47	4.9479	5.0521	5.000	1011.474	144	0.1565	4.6900	3.4100	1.1040	0.2090	
46	4.9479	5.0521	5.000	1016.474	144	0.7522	4.2920	3.0640	1.1040	0.2090	
45	4.9479	5.0521	5.000	1021.474	145	0.3479	4.0230	2.8560	1.1040	0.2090	
44	4.9479	5.0521	5.000	1026.474	145	0.9436	3.8820	2.7850	1.1040	0.2090	
43	4.9479	5.0521	5.000	1031.474	146	0.5393	3.8710	2.8520	1.1290	0.2090	
42	4.9479	5.0521	5.000	1036.474	147	0.1351	3.9890	3.0560	1.2570	0.2090	
41	4.9479	5.0521	5.000	1041.474	147	0.7308	4.2360	3.3980	1.4970	0.2090	
40	4.9479	5.0521	5.000	1046.474	148	0.3265	4.6050	3.8270	1.8480	0.2090	
39	4.9479	5.0521	5.000	1051.474	148	0.9222	5.0090	4.2590	2.3090	0.2090	
38	4.9479	5.0521	5.000	1056.474	149	0.5179	5.4130	4.6900	2.8400	0.2090	
37	4.9479	5.0521	5.000	1061.474	150	0.1136	5.8170	5.1220	3.3720	0.2090	
36	4.9479	5.0521	5.000	1066.474	150	0.7093	6.2210	5.5530	3.9040	0.6370	
35	4.9479	5.0521	5.000	1071.474	151	0.3050	6.6250	5.9850	4.4360	1.2200	
34	4.9479	5.0521	5.000	1076.474	151	0.9008	7.0290	6.4160	4.9680	2.0460	
33	4.9479	5.0521	5.000	1081.474	152	0.4965	7.4330	6.8480	5.5000	2.9560	
32	4.9479	5.0521	5.000	1086.474	153	0.0922	7.8370	7.2790	6.0320	3.8660	
31	4.9479	5.0521	5.000	1091.474	153	0.6879	8.2040	7.7110	6.5640	4.7760	
30	4.9479	5.0521	5.000	1096.474	154	0.2836	8.4130	8.1230	7.0960	5.6860	
29	4.9479	5.0521	5.000	1101.474	154	0.8793	8.4590	8.3800	7.6200	6.5960	
28	4.9479	5.0521	5.000	1106.474	155	0.4750	8.4590	8.4590	7.9820	7.5060	
27	5.6042	5.7292	5.667	1112.140	157	0.0000	8.4590	8.4590	8.1250	8.1250	P409
26	5.6042	5.7292	5.667	1117.807	158	0.4923	8.4590	8.3680	7.9310	7.6790	
25	4.9479	5.0521	5.000	1122.807	159	0.0511	8.4570	8.1380	7.4400	6.4800	
24	4.9479	5.0521	5.000	1127.807	159	0.6098	8.3640	7.7680	6.7300	5.5080	
23	4.9479	5.0521	5.000	1132.807	160	0.1685	8.1280	7.2560	6.0090	4.5370	
22	4.9479	5.0521	5.000	1137.807	160	0.7272	7.7480	6.6120	5.2880	3.5650	
21	4.9479	5.0521	5.000	1142.807	161	0.2859	7.2250	5.9370	4.5670	2.6240	
20	4.9479	5.0521	5.000	1147.807	161	0.8446	6.6230	5.2610	3.8460	1.8730	
19	4.9479	5.0521	5.000	1152.807	162	0.4033	6.0210	4.5860	3.1250	1.3340	
18	4.9479	5.0521	5.000	1157.807	162	0.9620	5.4190	3.9100	2.4040	0.9500	
17	4.9479	5.0521	5.000	1162.807	163	0.5207	4.8170	3.2350	1.6910	0.5850	
16	4.9479	5.0521	5.000	1167.807	164	0.0794	4.2150	2.6030	1.0960	0.3340	
15	4.9479	5.0521	5.000	1172.807	164	0.6381	3.6130	2.0580	0.6530	0.2170	
14	4.9479	5.0521	5.000	1177.807	165	0.1968	3.0110	1.5980	0.3620	0.2090	
13	4.9479	5.0521	5.000	1182.807	165	0.7555	2.4090	1.2240	0.2220	0.2090	
12	4.9479	5.0521	5.000	1187.807	166	0.3142	1.8070	0.9360	0.2090	0.2090	



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP C, UNIT V — CHECKED BY: **IC BY PT** — DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	EJ6-P409	->TO P409	P409-CJ	left on dwg
Span =	127.1563	1112.1403	136.3229	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T91	T92	T93	T94	
11	4.9479	5.0521	5.000	1192.807	166	0.8729	1.2050	0.7330	0.2090	0.2090	
10	4.9479	5.0521	5.000	1197.807	167	0.4316	0.7190	0.6160	0.2090	0.2090	
9	4.9479	5.0521	5.000	1202.807	167	0.9903	0.5840	0.5840	0.2090	0.2090	
8	4.9479	5.0521	5.000	1207.807	168	0.5490	0.7190	0.6160	0.2090	0.2090	
7	4.9479	5.0521	5.000	1212.807	169	0.1077	1.2050	0.7330	0.2090	0.2090	
6	4.9479	5.0521	5.000	1217.807	169	0.6664	1.8070	0.9360	0.2090	0.2090	
5	4.9479	5.0521	5.000	1222.807	170	0.2251	2.4090	1.2240	0.2220	0.2090	
4	4.9479	5.0521	5.000	1227.807	170	0.7838	3.0110	1.5980	0.3620	0.2090	
3	4.9479	5.0521	5.000	1232.807	171	0.3425	3.6130	2.0580	0.6530	0.2170	
2	4.9479	5.0521	5.000	1237.807	171	0.9012	4.2150	2.6040	1.0960	0.3340	
1	4.9479	5.0521	5.000	1242.807	172	0.4212	4.8170	3.2350	1.6910	0.5850	
0	5.6042	5.7292	5.667	1248.474	172	1.0000	5.4990	4.0000	2.5000	0.9990	**CJ5** Unit IV
			END								

TENDON END LOCATIONS

TENDON	TENDON BEGIN REF	DL	X	ELEM	x/l	Y From Bottom
CONTINUITY TENDON #95 - TOP						
30	1112.140	15.135	1097.005	154	0.3469	6.750
29	1112.140	10.667	1101.474	154	0.8793	7.285
28	1112.140	5.667	1106.474	155	0.4750	7.954
27	1112.140	0.000	1112.140	157	0.0000	8.221
26	1112.140	5.667	1117.807	158	0.4923	8.221
25	1112.140	10.667	1122.807	159	0.0511	8.221
24'	1112.140	15.000	1127.140	159	0.5353	8.221

URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

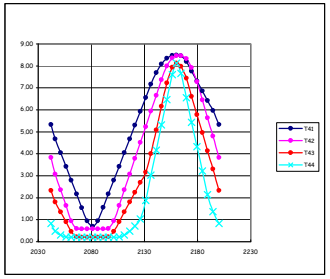
DESCRP: PT DEFINITION - RAMP C, UNIT VI — CHECKED BY: IC BY PT — DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ1-P403	->TO P403	P403-CJ6	left on dwg
Span =	118.2500	2160.2337	40.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T41	T42	T43	T44		
			BEGIN									
			0.000	2041.984	274	0.0000	5.3333	3.8333	2.3333	0.8333	CJ1	Unit I
31	4.1250	4.1250	4.125	2046.109	274	0.4532	4.6760	3.0760	1.8000	0.4770		
30	5.0000	5.0000	5.000	2051.109	275	0.0444	4.0510	2.3610	1.3550	0.2990		
29	5.0000	5.0000	5.000	2056.109	275	0.6793	3.4250	1.6460	0.9100	0.2150		
28	5.0000	5.0000	5.000	2061.109	276	0.3142	2.8000	0.9440	0.4650	0.2090		
27	5.0000	5.0000	5.000	2066.109	276	0.9491	2.1740	0.5930	0.2140	0.2090		
26	5.0000	5.0000	5.000	2071.109	277	0.5841	1.5490	0.5840	0.2090	0.2090		
25	5.0000	5.0000	5.000	2076.109	278	0.2190	0.9410	0.5840	0.2090	0.2090		
24	5.0000	5.0000	5.000	2081.109	278	0.8539	0.6960	0.5840	0.2090	0.2090		
23	5.0000	5.0000	5.000	2086.109	279	0.4899	0.9410	0.5840	0.2090	0.2090		
22	5.0000	5.0000	5.000	2091.109	280	0.1296	1.5510	0.5840	0.2090	0.2090		
21	5.0000	5.0000	5.000	2096.109	280	0.7827	2.1770	0.5930	0.2140	0.2090		
20	4.8542	5.1458	5.000	2101.109	281	0.4358	2.8020	0.9440	0.4650	0.2090		
19	4.8125	5.1875	5.000	2106.109	282	0.0889	3.4280	1.6480	0.9100	0.2150		
18	4.8125	5.1875	5.000	2111.109	282	0.7420	4.0530	2.3630	1.3550	0.2990		
17	4.8125	5.1875	5.000	2116.109	283	0.3951	4.6790	3.0780	1.8000	0.4770		
16	4.8125	5.1875	5.000	2121.109	284	0.0482	5.3040	3.7930	2.2450	0.7070		
15	4.8125	5.1875	5.000	2126.109	284	0.7013	5.9300	4.5080	2.6900	1.0310		
14	4.8125	5.1875	5.000	2131.109	285	0.3544	6.5550	5.2230	3.1670	1.8760		
13	4.8125	5.1875	5.000	2136.109	286	0.0075	7.1720	5.9380	4.0070	3.0220		
12	4.8125	5.1875	5.000	2141.109	286	0.6606	7.6890	6.6530	5.0840	4.1690		
11	4.8125	5.1875	5.000	2146.109	287	0.3137	8.0770	7.3680	6.1610	5.3150		
10	4.8125	5.1875	5.000	2151.109	287	0.9668	8.3380	8.0010	7.2290	6.4620		
9	4.8125	5.1875	5.000	2156.109	288	0.6199	8.4710	8.3650	7.9420	7.6080		
8	3.9688	4.3125	4.141	2160.234	290	0.0000	8.4900	8.4590	8.1250	8.1250	P403	
7	3.9688	4.3125	4.141	2164.374	291	0.5122	8.4620	8.4580	7.9840	7.6600		
6	4.8125	5.1875	5.000	2169.374	292	0.3876	8.2010	8.3230	7.4360	6.5490		
5	4.8125	5.1875	5.000	2174.374	293	0.2630	7.7580	7.9290	6.6150	5.4370		
4	4.8125	5.1875	5.000	2179.374	294	0.1384	7.3120	7.2780	5.7880	4.3260		
3	4.8125	5.1875	5.000	2184.374	295	0.0138	6.8650	6.4560	4.9600	3.2140		
2	4.8125	5.1875	5.000	2189.374	295	0.8892	6.4190	5.6300	4.1330	2.1450		
1	4.8125	5.1875	5.000	2194.374	296	0.7646	5.9720	4.8040	3.3050	1.3670		
0	5.6563	6.0938	5.875	2200.234	297	1.0000	5.3333	3.8333	2.3333	0.8333	CJ6	Unit VII
			END									



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

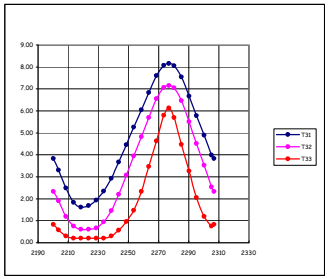
DESCRP: PT DEFINITION - RAMP C, UNIT VII | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

rigth on dwg	CJ6-P402	->TO P402	P402-CJ7	left on dwg
Span =	76.6667	2276.8964	30.0000	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct T31	T32	T33			
			BEGIN									
			0.000	2200.230	298	0.0000	3.8333	2.3333	0.8333		CJ6	Unit VI
22	3.2083	3.4583	3.333	2203.563	298	0.4823	3.3120	1.9120	0.5770			
21	4.8125	5.1875	5.000	2208.563	299	0.2488	2.4870	1.1930	0.3040			
20	4.8125	5.1875	5.000	2213.563	300	0.1242	1.8330	0.7590	0.2090			
19	4.8125	5.1875	5.000	2218.563	300	0.9996	1.6150	0.6150	0.2090			
18	4.8125	5.1875	5.000	2223.563	301	0.8751	1.6930	0.6150	0.2090			
17	4.8125	5.1875	5.000	2228.563	302	0.7505	1.9380	0.6720	0.2090			
16	4.8125	5.1875	5.000	2233.563	303	0.6259	2.3500	0.9500	0.2090			
15	4.8125	5.1875	5.000	2238.563	304	0.5013	2.9290	1.4590	0.3030			
14	4.8125	5.1875	5.000	2243.563	305	0.3767	3.6680	2.1990	0.5750			
13	4.8125	5.1875	5.000	2248.563	306	0.2521	4.4600	3.0730	0.9610			
12	4.8125	5.1875	5.000	2253.563	307	0.1275	5.2520	3.9480	1.4690			
11	4.8125	5.1875	5.000	2258.563	308	0.0029	6.0430	4.8230	2.3280			
10	4.8125	5.1875	5.000	2263.563	308	0.8783	6.8350	5.6980	3.4660			
9	4.8125	5.1875	5.000	2268.563	309	0.7538	7.6050	6.5490	4.6250			
8	4.8125	5.1875	5.000	2273.563	310	0.6292	8.0670	7.0580	5.7980			
7	3.2083	3.4583	3.333	2276.896	312	0.0000	8.1560	7.1560	6.1250		P402	
6	3.2083	3.4583	3.333	2280.230	313	0.3708	8.0590	7.0500	5.6900			
5	4.8125	5.1875	5.000	2285.230	314	0.2462	7.5370	6.4710	4.4750			
4	4.8125	5.1875	5.000	2290.230	315	0.1217	6.6700	5.5030	3.2640			
3	4.8125	5.1875	5.000	2295.230	315	0.9971	5.7780	4.5110	2.0580			
2	4.8125	5.1875	5.000	2300.230	316	0.8725	4.8860	3.5200	1.1970			
1	4.8125	5.1875	5.000	2305.230	317	0.7200	3.9950	2.5280	0.7610			
0	1.6042	1.7292	1.667	2306.896	317	1.0000	3.8333	2.3333	0.8333		CJ7	Unit VIII
			END									



URS CORPORATION

JOB: CLINE AVENUE — COMPUTED BY: DEM — DATE: 02/10/09

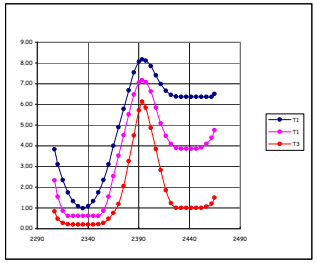
DESCRP: PT DEFINITION - RAMP C, UNIT VIII — CHECKED BY: IC BY PT — DATE: 02/10/09

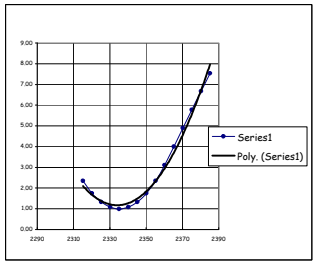
DX at BEG =

DX at END =

rigth on dwg	CJ7-P401	-->TO P401	P401-A400	left on dwg
Span =	86.6667	2393.5591	72.0229	

	left web	right web	DL	X	ELEM	x/l	Y from BOTTOM flange to BOTTOM of tendon duct				
							T1	T1	T3		
			BEGIN								
			0.000	2306.892	318	0.0000	3.8333	2.3333	0.8333		CJ7 Unit VII
32	3.2083	3.4583	3.333	2310.226	318	0.6074	3.1100	1.5480	0.4780		
31	4.8125	5.1875	5.000	2315.226	319	0.4980	2.3440	0.8600	0.2800		
30	4.8125	5.1875	5.000	2320.226	320	0.3734	1.7500	0.6170	0.2090		
29	4.8125	5.1875	5.000	2325.226	321	0.2488	1.3280	0.6170	0.2080		
28	4.8125	5.1875	5.000	2330.226	322	0.1242	1.0760	0.6170	0.2080		
27	**4.8125**	**5.1875**	**5.000**	**2335.226**	**322**	**0.9996**	0.9920	0.6170	0.2080		
26	4.8125	5.1875	5.000	2340.226	323	0.8751	1.0760	0.6170	0.2080		
25	4.8125	5.1875	5.000	2345.226	324	0.7505	1.3280	0.6170	0.2080		
24	4.8125	5.1875	5.000	2350.226	325	0.6259	1.7500	0.6170	0.2090		
23	4.8125	5.1875	5.000	2355.226	326	0.5013	2.3440	0.8600	0.2800		
22	4.8125	5.1875	5.000	2360.226	327	0.3767	3.1100	1.5480	0.4780		
21	4.8125	5.1875	5.000	2365.226	328	0.2521	3.9980	2.5310	0.7620		
20	4.8125	5.1875	5.000	2370.226	329	0.1275	4.8890	3.5230	1.1950		
19	4.8125	5.1875	5.000	2375.226	330	0.0029	5.7810	4.5140	2.0550		
18	4.8125	5.1875	5.000	2380.226	330	0.8783	6.6730	5.5060	3.2640		
17	4.8125	5.1875	5.000	2385.226	331	0.7538	7.5410	6.4720	4.4980		
16	4.8125	5.1875	5.000	2390.226	332	0.6292	8.0610	7.0500	5.7130		
15	3.2083	3.4583	3.333	2393.559	334	0.0000	8.1590	7.1590	6.1250		P401
14	3.2083	3.4583	3.333	2396.892	335	0.3098	8.1080	7.0730	5.8430		
13	4.8125	5.1875	5.000	2401.892	336	0.0410	7.8430	6.6160	4.8610		
12	4.8125	5.1875	5.000	2406.892	336	0.7722	7.3970	5.8420	3.8450		
11	4.8125	5.1875	5.000	2411.892	337	0.5035	6.9720	5.0730	2.8290		
10	4.8125	5.1875	5.000	2416.892	338	0.2347	6.6580	4.4840	1.8580		
9	4.8125	5.1875	5.000	2421.892	338	0.9660	6.4580	4.0920	1.2340		
8	4.8125	5.1875	5.000	2426.892	339	0.6972	6.3710	3.8940	1.0020		
7	4.8125	5.1875	5.000	2431.892	340	0.4284	6.3670	3.8670	1.0000		
6	4.8125	5.1875	5.000	2436.892	341	0.1597	6.3670	3.8670	1.0000		
5	4.8125	5.1875	5.000	2441.892	341	0.8909	6.3670	3.8670	1.0000		
4	4.8125	5.1875	5.000	2446.892	342	0.6222	6.3670	3.8670	1.0000		
3	4.8125	5.1875	5.000	2451.892	343	0.3534	6.3670	3.9210	1.0040		
2	4.8125	5.1875	5.000	2456.892	344	0.0846	6.3670	4.0910	1.0660		
1	4.8125	5.1875	5.000	2461.892	344	0.8159	6.3670	4.3850	1.2060		
0			0.667	2464.915	346	0.6709	6.5000	4.7500	1.5000		
			END	2465.582							A400





URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

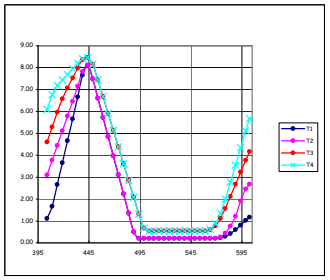
DESCRP: PT DEFINITION - RAMP D, UNIT I | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ	->TO P104	
Span =	398.0833	443.0833	

	DL	X	ELEM	x/l	Y from BOTTOM flange T1	T2	T3	T4	
Sum	BEGIN								
0.000	0.000	398.083	54	0.0000	0.8330	2.3320	3.8320	5.3320	CJ
5.688	5.688	403.771	55	0.1251	1.1170	3.0980	4.6050	6.0990	
10.688	5.000	408.771	55	0.6514	1.6590	3.7710	5.2840	6.7710	
15.688	5.000	413.771	56	0.1777	2.6590	4.4450	5.9620	7.1920	
20.688	5.000	418.771	56	0.7040	3.6590	5.1180	6.5700	7.4420	
25.688	5.000	423.771	57	0.2303	4.6590	5.7910	7.0670	7.6920	
30.688	5.000	428.771	57	0.7566	5.6580	6.4650	7.5210	7.9420	
35.688	5.000	433.771	58	0.2829	6.6580	7.1380	7.9750	8.1920	
40.688	5.000	438.771	58	0.8093	7.6580	7.8110	8.3520	8.4000	
45.688	5.000	443.771	60	0.2752	8.1150	8.1150	8.4540	8.4540	
50.688	5.000	448.771	61	0.3892	7.4790	7.4790	8.1490	8.1490	
55.688	5.000	453.771	61	0.9996	6.6040	6.6040	7.4360	7.4360	
60.688	5.000	458.771	62	0.6099	5.7300	5.7300	6.6710	6.6710	
65.688	5.000	463.771	63	0.2203	4.8550	4.8550	5.9070	5.9070	
70.688	5.000	468.771	63	0.8307	3.9800	3.9800	5.1430	5.1430	
75.688	5.000	473.771	64	0.4411	3.1050	3.1050	4.3780	4.3780	
80.688	5.000	478.771	65	0.0514	2.2300	2.2300	3.6140	3.6140	
85.688	5.000	483.771	65	0.6618	1.3550	1.3550	2.8500	2.8500	
90.688	5.000	488.771	66	0.2722	0.4900	0.4900	2.0850	2.0850	
95.688	5.000	493.771	66	0.8826	0.2080	0.2080	1.3210	1.3210	
100.688	5.000	498.771	67	0.4929	0.2080	0.2080	0.6730	0.6730	
105.688	5.000	503.771	68	0.1033	0.2080	0.2080	0.5410	0.5410	
110.688	5.000	508.771	68	0.7137	0.2080	0.2080	0.5410	0.5410	
115.688	5.000	513.771	69	0.3241	0.2080	0.2080	0.5410	0.5410	
120.688	5.000	518.771	69	0.9344	0.2080	0.2080	0.5410	0.5410	
125.688	5.000	523.771	70	0.5448	0.2080	0.2080	0.5410	0.5410	
130.688	5.000	528.771	71	0.1552	0.2080	0.2080	0.5410	0.5410	
135.688	5.000	533.771	71	0.7656	0.2080	0.2080	0.5410	0.5410	
140.688	5.000	538.771	72	0.3760	0.2080	0.2080	0.5410	0.5410	
145.688	5.000	543.771	72	0.9863	0.2080	0.2080	0.5410	0.5410	
150.688	5.000	548.771	73	0.5967	0.2080	0.2080	0.5410	0.5410	
155.688	5.000	553.771	74	0.2071	0.2080	0.2080	0.5410	0.5410	
160.688	5.000	558.771	74	0.8175	0.2080	0.2080	0.5410	0.5410	
165.688	5.000	563.771	75	0.4278	0.2080	0.2080	0.5920	0.6140	
170.688	5.000	568.771	76	0.0382	0.2080	0.2080	0.7800	0.8790	
175.688	5.000	573.771	76	0.6486	0.2270	0.2580	1.1060	1.3400	
180.688	5.000	578.771	77	0.2590	0.2990	0.4410	1.5690	1.9960	
185.688	5.000	583.771	77	0.8693	0.4230	0.7590	2.1220	2.7750	
190.688	5.000	588.771	78	0.4797	0.5990	1.2110	2.6740	3.5550	
195.688	5.000	593.771	79	0.0901	0.8090	1.9150	3.2250	4.3350	
200.688	5.000	598.771	79	0.7005	1.0180	2.4530	3.7760	5.1150	



URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP D, UNIT I | CHECKED BY: **IC BY PT** | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO CJ	->TO P104	
Span =	398.0833	443.0833	

	DL	X	ELEM		Y from BOTTOM flange				
				x/l	T1	T2	T3	T4	
204.311	3.623	602.395	80	0.1428	**1.1670**	**2.6670**	**4.1670**	**5.6670**	
204.311									**EJ 9**

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

DESCRP: PT DEFINITION - RAMP D, UNIT II | CHECKED BY: IC BY PT | DATE: 02/10/09

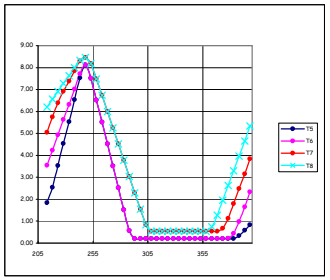
DX at BEG =

DX at END =

	->TO CJ	->TO P103	
Span =	208.0833	248.0833	

Sum	DL	X	ELEM	x/l	Y from BOTTOM flange T5	T6	T7	T8	
	BEGIN								
0.000	0.000	208.083	32	0.0000	1.3330	2.8320	4.3320	5.8330	CJ
5.076	5.076	213.159	32	0.7809	1.8400	3.5380	5.0420	6.1980	
10.076	5.000	218.159	33	0.4614	2.5360	4.2350	5.7410	6.5570	
15.076	5.000	223.159	34	0.1066	3.5350	4.9300	6.3820	6.9160	
20.076	5.000	228.159	34	0.7517	4.5340	5.6250	6.9090	7.2760	
25.076	5.000	233.159	35	0.3969	5.5330	6.3210	7.3800	7.6350	
30.076	5.000	238.159	36	0.0421	6.5320	7.0170	7.8500	7.9940	
35.076	5.000	243.159	36	0.6872	7.5320	7.7130	8.2930	8.3320	
40.076	5.000	248.159	38	0.0304	8.1250	8.1250	8.4580	8.4580	
45.076	5.000	253.159	39	0.2712	7.5140	7.5140	8.1880	8.1880	
50.076	5.000	258.159	39	0.7975	6.5150	6.5150	7.4850	7.4850	
55.076	5.000	263.159	40	0.3238	5.5160	5.5160	6.7430	6.7430	
60.076	5.000	268.159	40	0.8501	4.5170	4.5170	6.0010	6.0010	
65.076	5.000	273.159	41	0.3764	3.5170	3.5170	5.2580	5.2580	
70.076	5.000	278.159	41	0.9027	2.5180	2.5180	4.5160	4.5160	
75.076	5.000	283.159	42	0.4291	1.5190	1.5190	3.7740	3.7740	
80.076	5.000	288.159	42	0.9554	0.5710	0.5710	3.0310	3.0310	
85.076	5.000	293.159	43	0.4817	0.2080	0.2080	2.2890	2.2890	
90.076	5.000	298.159	44	0.0080	0.2080	0.2080	1.5470	1.5470	
95.076	5.000	303.159	44	0.5343	0.2080	0.2080	0.8290	0.8290	
100.076	5.000	308.159	45	0.0606	0.2080	0.2080	0.5420	0.5420	
105.076	5.000	313.159	45	0.5869	0.2080	0.2080	0.5420	0.5420	
110.076	5.000	318.159	46	0.1133	0.2080	0.2080	0.5420	0.5420	
115.076	5.000	323.159	46	0.6396	0.2080	0.2080	0.5420	0.5420	
120.076	5.000	328.159	47	0.1659	0.2080	0.2080	0.5420	0.5420	
125.076	5.000	333.159	47	0.6922	0.2080	0.2080	0.5420	0.5420	
130.076	5.000	338.159	48	0.2185	0.2080	0.2080	0.5420	0.5420	
135.076	5.000	343.159	48	0.7448	0.2080	0.2080	0.5420	0.5420	
140.076	5.000	348.159	49	0.2712	0.2080	0.2080	0.5420	0.5420	
145.076	5.000	353.159	49	0.7975	0.2080	0.2080	0.5420	0.5420	
150.076	5.000	358.159	50	0.3238	0.2080	0.2080	0.5420	0.5430	
155.076	5.000	363.159	50	0.8501	0.2080	0.2080	0.5420	0.7410	
160.076	5.000	368.159	51	0.3764	0.2080	0.2080	0.5420	1.2750	
165.076	5.000	373.159	51	0.9027	0.2080	0.2080	0.6680	1.9490	
170.076	5.000	378.159	52	0.4291	0.2080	0.2150	1.1270	2.6240	
175.076	5.000	383.159	52	0.9554	0.2080	0.4380	1.7980	3.2980	
180.076	5.000	388.159	53	0.3156	0.3300	0.9730	2.4730	3.9730	
185.076	5.000	393.159	53	0.6604	0.5800	1.6470	3.1470	4.6470	
190.000	4.924	398.083	53	1.0000	0.8330	2.3320	3.8320	5.3320	CJ

190.000



URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP D, UNIT II

COMPUTED BY: DEM
CHECKED BY: **IC BY PT**

DATE: 02/10/09
DATE: 02/10/09

DX at BEG =
DX at END =

	->TO CJ	->TO P103	
Span =	208.0833	248.0833	

		DL	X	ELEM	x/l	Y from BOTTOM flange T13			
		BEGIN							
			248.083						
		18.000	266.083	40	0.6316	**0.3333**			
		20.000	418.083	56	0.6316	**0.3333**			

URS CORPORATION

JOB: CLINE AVENUE | COMPUTED BY: DEM | DATE: 02/10/09

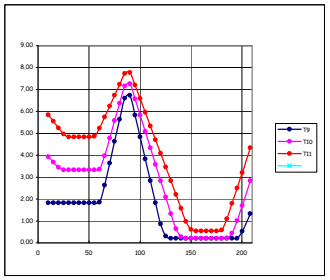
DESCRP: PT DEFINITION - RAMP D, UNIT III | CHECKED BY: IC BY PT | DATE: 02/10/09

DX at BEG =

DX at END =

	->TO BEG	->TO A101	->TO P102
Span =	0.0000	2.0833	88.0833

	DL	X	ELEM	x/l	Y from BOTTOM flange T9	T10	T11		
Sum	BEGIN								
0.000		2.083	2	0.0000	1.8330	4.2670	6.2530		A101
8.082	8.082	10.165	5	0.0219	1.8330	3.9290	5.8480		
13.082	5.000	15.165	5	0.6834	1.8330	3.6800	5.5490		
18.082	5.000	20.165	6	0.3449	1.8330	3.4430	5.2490		
23.082	5.000	25.165	7	0.0064	1.8330	3.3360	4.9650		
28.082	5.000	30.165	7	0.6680	1.8330	3.3330	4.8370		
33.082	5.000	35.165	8	0.3295	1.8330	3.3330	4.8330		
38.082	5.000	40.165	8	0.9910	1.8330	3.3330	4.8330		
43.082	5.000	45.165	9	0.6525	1.8330	3.3330	4.8330		
48.082	5.000	50.165	10	0.3140	1.8330	3.3330	4.8330		
53.082	5.000	55.165	10	0.9756	1.8330	3.3330	4.8680		
58.082	5.000	60.165	11	0.6371	1.8600	3.3550	5.2360		
63.082	5.000	65.165	12	0.2986	2.6360	3.9760	5.7360		
68.082	5.000	70.165	12	0.9601	3.6360	4.7760	6.2350		
73.082	5.000	75.165	13	0.6217	4.6350	5.5750	6.7350		
78.082	5.000	80.165	14	0.2832	5.6340	6.3740	7.2350		
83.082	5.000	85.165	14	0.9447	6.6090	7.1540	7.7220		
88.082	5.000	90.165	16	0.8328	6.7310	7.2570	7.7700		
93.082	5.000	95.165	17	0.5912	5.8280	6.5800	7.2060		
98.082	5.000	100.165	18	0.2364	4.8290	5.8310	6.5820		
103.082	5.000	105.165	18	0.8815	3.8300	5.0810	5.9570		
108.082	5.000	110.165	19	0.5267	2.8310	4.3320	5.3330		
113.082	5.000	115.165	20	0.1719	1.8320	3.5830	4.7080		
118.082	5.000	120.165	20	0.8170	0.8680	2.8330	4.0840		
123.082	5.000	125.165	21	0.4622	0.3070	2.0840	3.4590		
128.082	5.000	130.165	22	0.1074	0.2080	1.3340	2.8350		
133.082	5.000	135.165	22	0.7525	0.2080	0.6460	2.2100		
138.082	5.000	140.165	23	0.3977	0.2080	0.2710	1.5850		
143.082	5.000	145.165	24	0.0428	0.2080	0.2080	0.9780		
148.082	5.000	150.165	24	0.6880	0.2080	0.2080	0.6120		
153.082	5.000	155.165	25	0.3332	0.2080	0.2080	0.5420		
158.082	5.000	160.165	25	0.9783	0.2080	0.2080	0.5420		
163.082	5.000	165.165	26	0.6235	0.2080	0.2080	0.5420		
168.082	5.000	170.165	27	0.2686	0.2080	0.2080	0.5420		
173.082	5.000	175.165	27	0.9138	0.2080	0.2080	0.5420		
178.082	5.000	180.165	28	0.5590	0.2080	0.2080	0.5890		
183.082	5.000	185.165	29	0.2041	0.2080	0.2140	1.1030		
188.082	5.000	190.165	29	0.8493	0.2080	0.4420	1.8020		
193.082	5.000	195.165	30	0.4945	0.2080	1.0020	2.5020		
198.082	5.000	200.165	31	0.1202	0.5250	1.7010	3.2010		
206.000	7.918	208.083	31	1.0000	1.3330	2.8320	4.3320		CJ



URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - RAMP D, UNIT III

COMPUTED BY: DEM
CHECKED BY: **IC BY PT**

DATE: 02/10/09
DATE: 02/10/09

DX at BEG =
DX at END =

	->TO BEG	->TO A101	->TO P102
Span =	0.0000	2.0833	88.0833

206.000

		DL	X	ELEM		Y from BOTTOM flange			
					x/l	T12			
		BEGIN							
			88.083						
		18.000	106.083	19	0.0000	**0.3333**			
		20.000	228.083	34	0.7419	**0.3333**			

2.5.7 Post-Tensioning Stressing Forces

2.5.7 Post-Tensioning Stressing Forces

Since there was not indication on the drawings, the mainline segments tendons were stressed at 80% of their ultimate strength. In some cases were the tendon lengths were short, the stressing force was reduced to meet the AASHTO requirements of 70% at the anchorages, and 74% at internal locations. For the ramps, the jacking forces are based on the drawings.

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM DATE: 2/9/2009
CHECKED BY: IC BY PT DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
Sgmt 1 Continuity	201	1, 3, 5	Tendon - 201	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S1	S	E	0.8000	0.031
SOUTHERLY 1/2	202	2, 4, 6	Tendon - 202	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S1	S	E	0.8000	0.031
NORTHERLY 2/3	203	7, 11, 15	Tendon - 203	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	204	8,12, 16	Tendon - 204	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	205	9, 13, 17	Tendon - 205	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	206	10, 14, 18	Tendon - 206	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	301	19, 21, 23	Tendon - 301	3	0.5	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S1	S	E	0.8000	0.031
SOUTHERLY 1/2	302	20, 22, 24	Tendon - 302	3	0.5	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S1	S	E	0.8000	0.031
NORTHERLY 2/3	303	25, 29, 33	Tendon - 303	3	0.5	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	304	26, 30, 34	Tendon - 304	3	0.5	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	305	27, 31, 35	Tendon - 305	3	0.5	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	306	28, 33, 36	Tendon - 306	3	0.5	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N1	S	E	0.8000	0.031
	401	37, 39, 41	Tendon - 401	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S2	S	E	0.8000	0.031
SOUTHERLY 1/2	402	38, 40, 42	Tendon - 402	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S2	S	E	0.8000	0.031
NORTHERLY 2/3	403	43, 47, 51	Tendon - 403	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N2	S	E	0.8000	0.031
	404	44, 48, 52	Tendon - 404	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N2	S	E	0.8000	0.031
	405	45, 49, 53	Tendon - 405	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N2	S	E	0.8000	0.031
	406	46, 50, 54	Tendon - 406	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N2	S	E	0.8000	0.031
	501	55, 57, 59	Tendon - 501	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S3	S	E	0.8000	0.031
SOUTHERLY 1/2	502	56, 58, 60	Tendon - 502	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S3	S	E	0.8000	0.031
NORTHERLY 2/3	503	61, 65, 69	Tendon - 503	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N3	S	E	0.8000	0.031
	504	62, 66, 70	Tendon - 504	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N3	S	E	0.8000	0.031
	505	63, 67, 71	Tendon - 505	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N3	S	E	0.8000	0.031
	506	64, 68, 72	Tendon - 506	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N3	S	E	0.8000	0.031
	601	73, 75, 77	Tendon - 601	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S4	S	E	0.8000	0.031
SOUTHERLY 1/2	602	74, 76, 78	Tendon - 602	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S4	S	E	0.8000	0.031
NORTHERLY 2/3	603	79, 83, 87	Tendon - 603	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	604	80, 84, 88	Tendon - 604	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	605	81, 85, 89	Tendon - 605	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	606	82, 86, 90	Tendon - 606	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	701	91, 93, 95	Tendon - 701	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S4	S	E	0.8000	0.031
SOUTHERLY 1/2	702	92, 94, 96	Tendon - 702	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1S4	S	E	0.8000	0.031
NORTHERLY 2/3	703	97, 101, 105	Tendon - 703	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	704	98, 102, 106	Tendon - 704	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	705	99, 103, 107	Tendon - 705	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
	706	100, 104, 108	Tendon - 706	3	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	1N4	S	E	0.8000	0.031
Sgmt 2 Continuity	801	1, 4, 7	Tendon - 801	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E3	S	B	0.8000	0.031

2.5.7/ 2

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
EASTBOUND	802	2, 5, 8	Tendon - 802	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E3	S	B	0.8000	0.031
	803	3, 6, 9	Tendon - 803	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E3	S	B	0.8000	0.031
	804	1, 4, 7	Tendon - 804	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W3	S	B	0.8000	0.031
WESTBOUND	805	2, 5, 8	Tendon - 805	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W3	S	B	0.8000	0.031
	807	3, 6, 9	Tendon - 807	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W3	S	B	0.8000	0.031
	811	10, 13, 16	Tendon - 811	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E3	S	B	0.8000	0.031
EASTBOUND	812	11, 14, 17	Tendon - 812	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E3	S	B	0.8000	0.031
	813	12, 15, 18	Tendon - 813	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E3	S	B	0.8000	0.031
	814	10, 13, 16	Tendon - 814	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W3	S	B	0.8000	0.031
WESTBOUND	815	11, 14, 17	Tendon - 815	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W3	S	B	0.8000	0.031
	817	12, 15, 18	Tendon - 817	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W3	S	B	0.8000	0.031
	901	19, 22, 25	Tendon - 901	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E2	S	B	0.8000	0.031
EASTBOUND	902	20, 23, 26	Tendon - 902	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E2	S	B	0.8000	0.031
	903	21, 24, 27	Tendon - 903	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E2	S	B	0.8000	0.031
	904	19, 22, 25	Tendon - 904	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W2	S	B	0.8000	0.031
WESTBOUND	905	20, 23, 26	Tendon - 905	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W2	S	B	0.8000	0.031
	907	21, 24, 27	Tendon - 907	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W2	S	B	0.8000	0.031
	1001	28, 31, 34	Tendon - 1001	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E1	S	B	0.8000	0.031
EASTBOUND	1002	29, 32, 35	Tendon - 1002	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E1	S	B	0.8000	0.031
	1003	30, 33, 36	Tendon - 1003	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E1	S	B	0.8000	0.031
	1004	28, 31, 34	Tendon - 1004	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
WESTBOUND	1005	29, 32, 35	Tendon - 1005	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
	1006	37, 38, 39, 40, 41, 42	Tendon - 1006	6	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
	1007	30, 33, 36	Tendon - 1007	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
	1101	37, 40, 43	Tendon - 1101	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E1	S	B	0.8000	0.031
EASTBOUND	1102	38, 41, 44	Tendon - 1102	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E1	S	B	0.8000	0.031
	1103	39, 42, 45	Tendon - 1103	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2E1	S	B	0.8000	0.031
	1104	43, 46, 49	Tendon - 1104	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
WESTBOUND	1105	44, 47, 50	Tendon - 1105	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
	1107	45, 48, 51	Tendon - 1107	3	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	2W1	S	B	0.8000	0.031
Sgmt 3 Continuity	1211	T37,T38	Tendon - 1211	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
SPAN 12-13	11211		Tendon - 11211	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
EASTBOUND	1212	T36,T40	Tendon - 1212	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	B	0.7400	0.031
	11212		Tendon - 11212	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1213	T35,T39	Tendon - 1213	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	11213		Tendon - 11213	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1214	T33	Tendon - 1214	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1215	T41	Tendon - 1215	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES			4W5	JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	1216	T34	Tendon - 1216	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1221	T47,T48	Tendon - 1221	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	11221		Tendon - 11221	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1222	T46,T50	Tendon - 1222	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	B	0.7400	0.031
	11222		Tendon - 11222	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1223	T45,T49	Tendon - 1223	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	11223		Tendon - 11223	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1224	T43	Tendon - 1224	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1225	T51	Tendon - 1225	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1226	T44	Tendon - 1226	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1227	T52	Tendon - 1227	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1231	T37,T38	Tendon - 1231	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	11231		Tendon - 11231	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1232	T36,T40	Tendon - 1232	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	B	0.7400	0.031
	11232		Tendon - 11232	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1233	T35,T39	Tendon - 1233	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	11233		Tendon - 11233	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E4	S	E	0.7400	0.031
	1234	T33	Tendon - 1234	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1235	T41	Tendon - 1235	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1236	T34	Tendon - 1236	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E1	S	B	0.7400	0.031
	1261	T91,T92	Tendon - 1261	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
SPAN 12-13	11261		Tendon - 11261	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
WESTBOUND	1262	T90,T94	Tendon - 1262	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11262		Tendon - 11262	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1263	T89,T93	Tendon - 1263	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11263		Tendon - 11263	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1264	T95	Tendon - 1264	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1265	T87	Tendon - 1265	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1266	T96	Tendon - 1266	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1267	T88	Tendon - 1267	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1271	T81,T82	Tendon - 1271	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11271		Tendon - 11271	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1272	T80,T84	Tendon - 1272	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11272		Tendon - 11272	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1273	T79,T83	Tendon - 1273	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11273		Tendon - 11273	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1274	T77	Tendon - 1274	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1275	T85	Tendon - 1275	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1276	T78	Tendon - 1276	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1277	T86	Tendon - 1277	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES			4W5	JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	1291	T71,T72	Tendon - 1291	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
SPAN 12-13	11291		Tendon - 11291	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
RAMP A	1292	T70,T74	Tendon - 1292	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11292		Tendon - 11292	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1293	T69,T73	Tendon - 1293	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11293		Tendon - 11293	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1294	T75	Tendon - 1294	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1295	T67	Tendon - 1295	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1296	T76	Tendon - 1296	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1297	T68	Tendon - 1297	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1201	T61,T62	Tendon - 1201	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11201		Tendon - 11201	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1202	T60,T64	Tendon - 1202	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11202		Tendon - 11202	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1203	T59,T63	Tendon - 1203	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	11203		Tendon - 11203	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W4	S	E	0.7400	0.031
	1204	T57	Tendon - 1204	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1205	T65	Tendon - 1205	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1206	T58	Tendon - 1206	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1207	T66	Tendon - 1207	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W1	S	B	0.7400	0.031
	1311		Tendon - 1311	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	B	0.7400	0.031
SPAN 13-14	1312		Tendon - 1312	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	E	0.7400	0.031
EASTBOUND	1313		Tendon - 1313	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	B	0.7400	0.031
	1321		Tendon - 1321	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	E	0.7400	0.031
	1322		Tendon - 1322	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	B	0.7400	0.031
	1323		Tendon - 1323	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	E	0.7400	0.031
	1331		Tendon - 1331	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	B	0.7400	0.031
	1332		Tendon - 1332	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	E	0.7400	0.031
	1333		Tendon - 1333	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E7	S	B	0.7400	0.031
	1361		Tendon - 1361	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	B	0.7400	0.031
SPAN 13-14	1362		Tendon - 1362	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	E	0.7400	0.031
WESTBOUND	1363		Tendon - 1363	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	B	0.7400	0.031
	1371		Tendon - 1371	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	E	0.7400	0.031
	1372		Tendon - 1372	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	B	0.7400	0.031
	1373		Tendon - 1373	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	E	0.7400	0.031
	1381		Tendon - 1381	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	B	0.7400	0.031
	1382		Tendon - 1382	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	E	0.7400	0.031
	1383		Tendon - 1383	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W7	S	B	0.7400	0.031
	1391		Tendon - 1391	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A3	S	B	0.7400	0.031
SPAN 13-14	1392		Tendon - 1392	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A3	S	E	0.7400	0.031

2.5.7/ 5

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
RAMP A	1393		Tendon - 1393	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A3	S	B	0.7400	0.031
	1301		Tendon - 1301	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A3	S	E	0.7400	0.031
	1302		Tendon - 1302	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A3	S	B	0.7400	0.031
	1303		Tendon - 1303	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A3	S	E	0.7400	0.031
	1411	T36',T35'	Tendon - 1411	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
SPAN 14-15	11411		Tendon - 11411	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
RAMP C	1412	T38',T34'	Tendon - 1412	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11412		Tendon - 11412	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1413	T37',T33'	Tendon - 1413	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11413		Tendon - 11413	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1414	T39'	Tendon - 1414	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	1421	T36',T35'	Tendon - 1421	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11421		Tendon - 11421	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1422	T38',T34'	Tendon - 1422	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11422		Tendon - 11422	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1423	T37',T33'	Tendon - 1423	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11423		Tendon - 11423	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1424	T39'	Tendon - 1424	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	1441	T36',T35'	Tendon - 1441	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
SPAN 14-15	11441		Tendon - 11441	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
EASTBOUND	1442	T38',T34'	Tendon - 1442	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11442		Tendon - 11442	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1443	T37',T33'	Tendon - 1443	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11443		Tendon - 11443	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1444	T39'	Tendon - 1444	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	1451	T36',T35'	Tendon - 1451	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11451		Tendon - 11451	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1452	T38',T34'	Tendon - 1452	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11452		Tendon - 11452	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1453	T37',T33'	Tendon - 1453	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	11453		Tendon - 11453	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E6	S	B	0.7400	0.031
	1454	T39'	Tendon - 1454	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E2	S	E	0.7400	0.031
	1461	T48',T50'	Tendon - 1461	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
SPAN 14-15	11461		Tendon - 11461	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
WESTBOUND	1462	T47',T49'	Tendon - 1462	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11462		Tendon - 11462	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1463	T46',T52'	Tendon - 1463	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11463		Tendon - 11463	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1464	T45',T51'	Tendon - 1464	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	E	0.7400	0.031
	11464		Tendon - 11464	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM DATE: 2/9/2009
CHECKED BY: IC BY PT DATE: 2/9/2009

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES			4W5	JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	1465	T53'	Tendon - 1465	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	1471	T59',T60'	Tendon - 1471	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11471		Tendon - 11471	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1472	T58',T62'	Tendon - 1472	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11472		Tendon - 11472	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1473	T57', T61'	Tendon - 1473	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11473		Tendon - 11473	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1474	T55',T63'	Tendon - 1474	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11474		Tendon - 11474	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1475	T56'	Tendon - 1475	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	1476	T64'	Tendon - 1476	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	1481	T48',T50'	Tendon - 1481	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11481		Tendon - 11481	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1482	T47',T49'	Tendon - 1482	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11482		Tendon - 11482	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1483	T46',T52'	Tendon - 1483	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	11483		Tendon - 11483	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1484	T45',T51'	Tendon - 1484	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	E	0.7400	0.031
	11484		Tendon - 11484	2	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W6	S	B	0.7400	0.031
	1485	T53'	Tendon - 1485	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W2	S	E	0.7400	0.031
	1491	T11- T14	Tendon - 1491	4	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7512	0.031
RAMP A	1401	T11- T14	Tendon - 1401	4	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7512	0.031
	1492	T15	Tendon - 1492	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7808	0.031
	1402	T15	Tendon - 1402	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7808	0.031
Sgmt 4 Continuity	1501	1, 5, 9	Tendon - 1501	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E1	S	E	0.8000	0.031
RAMP C	1502	2, 6, 10	Tendon - 1502	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E1	S	E	0.8000	0.031
	1504	3, 7, 11	Tendon - 1504	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E1	S	E	0.8000	0.031
EASTBOUND	1505	4, 8, 12	Tendon - 1505	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E1	S	E	0.8000	0.031
	1506	1, 4, 7	Tendon - 1506	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W1	S	E	0.8000	0.031
WESTBOUND	1507	2, 5, 8	Tendon - 1507	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W1	S	E	0.8000	0.031
	1508	3, 6, 9	Tendon - 1508	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W1	S	E	0.8000	0.031
RAMP C	1511	13, 17, 21	Tendon - 1511	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E2	S	E	0.8000	0.031
	1512	14, 18, 22	Tendon - 1512	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E2	S	E	0.8000	0.031
EASTBOUND	1514	15, 19, 23	Tendon - 1514	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E2	S	E	0.8000	0.031
	1515	16, 20, 24	Tendon - 1515	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E2	S	E	0.8000	0.031
	1516	10, 13, 16	Tendon - 1516	3	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W2	S	E	0.8000	0.031
WESTBOUND	1517	11, 14, 17	Tendon - 1517	3	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W2	S	E	0.8000	0.031
	1518	12, 15, 18	Tendon - 1518	3	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W2	S	E	0.8000	0.031
RAMP C	1601	25, 27	Tendon - 1601	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	E	0.8000	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	1602	26, 28	Tendon - 1602	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	E	0.8000	0.031
EASTBOUND	1604	29, 31, 33	Tendon - 1604	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	E	0.8000	0.031
	1605	30, 32, 34	Tendon - 1605	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	E	0.8000	0.031
	1606	19, 22, 25	Tendon - 1606	3	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W3	S	E	0.8000	0.031
WESTBOUND	1607	20, 23, 26	Tendon - 1607	3	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W3	S	E	0.8000	0.031
	1608	21, 24, 27	Tendon - 1608	3	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W3	S	E	0.8000	0.031
	1703	39, 42, 45	Tendon - 1703	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E4	S	E	0.8000	0.031
EASTBOUND	1704	40, 43, 46	Tendon - 1704	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E4	S	E	0.8000	0.031
	1705	41, 44, 47	Tendon - 1705	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E4	S	E	0.8000	0.031
	1706	28, 31, 34	Tendon - 1706	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W4	S	E	0.8000	0.031
WESTBOUND	1707	29, 32, 35	Tendon - 1707	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W4	S	E	0.8000	0.031
	1708	30, 33, 36	Tendon - 1708	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W4	S	E	0.8000	0.031
EASTBOUND	1713	48, 49, 50	Tendon - 1713	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E5	S	E	0.8000	0.031
	11713		Tendon - 11713	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E6	S	E	0.8000	0.031
RAMP C	1721	35, 37	Tendon - 1721	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	B	0.8000	0.031
	1722	36, 38	Tendon - 1722	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	B	0.8000	0.031
RAMP C	1811	51, 53	Tendon - 1811	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	B	0.8000	0.031
	1812	52, 54	Tendon - 1812	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	B	0.8000	0.031
EASTBOUND	1804	55, 57, 59	Tendon - 1804	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E5	S	E	0.8000	0.031
	11804		Tendon - 11804	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E6	S	E	0.8000	0.031
	1805	56, 58, 60	Tendon - 1805	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E5	S	E	0.8000	0.031
	11805		Tendon - 11805	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E6	S	E	0.8000	0.031
	1806	37, 40, 43	Tendon - 1806	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W5	S	E	0.8000	0.031
	11806		Tendon - 11806	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W6	S	E	0.8000	0.031
WESTBOUND	1807	38, 41, 44	Tendon - 1807	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W5	S	E	0.8000	0.031
	11807		Tendon - 11807	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W6	S	E	0.8000	0.031
	1808	39, 42, 45	Tendon - 1808	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W5	S	E	0.8000	0.031
	11808		Tendon - 11808	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W6	S	E	0.8000	0.031
RAMP C	1821	70, 72	Tendon - 1821	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	B	0.8000	0.031
	1822	71, 73	Tendon - 1822	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E3	S	B	0.8000	0.031
	1903	61, 64, 67	Tendon - 1903	3	0.5	18	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E6	S	E	0.8000	0.031
EASTBOUND	1904	62, 65, 68	Tendon - 1904	3	0.5	18	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E6	S	E	0.8000	0.031
	1905	63, 66, 69	Tendon - 1905	3	0.5	18	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4E6	S	E	0.8000	0.031
	1906	46, 49, 52	Tendon - 1906	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W6	S	E	0.8000	0.031
WESTBOUND	1907	47, 50, 53	Tendon - 1907	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W6	S	E	0.8000	0.031
	1908	48, 51, 54	Tendon - 1908	3	0.5	21	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	4W6	S	E	0.8000	0.031
Sgmt 5 Continuity	2001	13, 16	Tendon - 2001	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
EASTBOUND	2002	14, 17	Tendon - 2002	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
	2003	15, 18	Tendon - 2003	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	2004	13, 16	Tendon - 2004	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
WESTBOUND	2005	14, 17	Tendon - 2005	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
	2006	15, 18	Tendon - 2006	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
	2011	7, 10	Tendon - 2011	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
EASTBOUND	2012	8, 11	Tendon - 2012	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
	2013	9, 12	Tendon - 2013	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
	2014	7, 10	Tendon - 2014	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
WESTBOUND	2015	8, 11	Tendon - 2015	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
	2016	9, 12	Tendon - 2016	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
	2021	1, 4	Tendon - 2021	2	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
EASTBOUND	2022	2, 5	Tendon - 2022	2	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
	2023	3, 6	Tendon - 2023	2	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E5	S	B	0.8000	0.031
	2024	1, 4	Tendon - 2024	2	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
WESTBOUND	2025	2, 5	Tendon - 2025	2	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
	2026	3, 6	Tendon - 2026	2	0.5	22	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W5	S	B	0.8000	0.031
	2101	19, 22	Tendon - 2101	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E4	S	B	0.8000	0.031
EASTBOUND	2102	20, 23	Tendon - 2102	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E4	S	B	0.8000	0.031
	2103	21, 24	Tendon - 2103	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E4	S	B	0.8000	0.031
	2104	19, 22	Tendon - 2104	2	0.5	17	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W4	S	B	0.8000	0.031
WESTBOUND	2105	20, 23	Tendon - 2105	2	0.5	17	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W4	S	B	0.8000	0.031
	2106	21, 24	Tendon - 2106	2	0.5	17	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W4	S	B	0.8000	0.031
	2201	25, 28	Tendon - 2201	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E3	S	B	0.8000	0.031
EASTBOUND	2202	26, 29	Tendon - 2202	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E3	S	B	0.8000	0.031
	2203	27, 30	Tendon - 2203	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E3	S	B	0.8000	0.031
	2204	25, 28	Tendon - 2204	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W3	S	B	0.8000	0.031
WESTBOUND	2205	26, 29	Tendon - 2205	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W3	S	B	0.8000	0.031
	2206	27, 30	Tendon - 2206	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W3	S	B	0.8000	0.031
	2301	31, 34	Tendon - 2301	2	0.5	30	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E2	S	B	0.8000	0.031
EASTBOUND	2302	32, 35	Tendon - 2302	2	0.5	30	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E2	S	B	0.8000	0.031
	2303	33, 36	Tendon - 2303	2	0.5	30	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E2	S	B	0.8000	0.031
	2304	31, 34	Tendon - 2304	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W2	S	B	0.8000	0.031
WESTBOUND	2305	32, 35	Tendon - 2305	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W2	S	B	0.8000	0.031
	2306	33, 36	Tendon - 2306	2	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W2	S	B	0.8000	0.031
	2401	37, 40, 43	Tendon - 2401	3	0.5	23	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E1	S	B	0.8000	0.031
EASTBOUND	2402	38, 41, 44	Tendon - 2402	3	0.5	23	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E1	S	B	0.8000	0.031
	2403	39, 42, 45	Tendon - 2403	3	0.5	23	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5E1	S	B	0.8000	0.031
	2404	37, 40	Tendon - 2404	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W1	S	B	0.8000	0.031
WESTBOUND	2405	38, 41	Tendon - 2405	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W1	S	B	0.8000	0.031
	2406	39, 42	Tendon - 2406	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	5W1	S	B	0.8000	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM DATE: 2/9/2009
CHECKED BY: IC BY PT DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
Sgmt 6 Continuity	2503	10, 13, 16	Tendon - 2503	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E1	S	B	0.8000	0.031
	12503		Tendon - 12503	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E2	S	B	0.8000	0.031
EASTBOUND	2504	11, 14, 17	Tendon - 2504	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E1	S	B	0.8000	0.031
	12504		Tendon - 12504	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E2	S	B	0.8000	0.031
	2505	12, 15, 18	Tendon - 2505	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E1	S	B	0.8000	0.031
	12505		Tendon - 12505	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E2	S	B	0.8000	0.031
	2506	7, 7A,10	Tendon - 2506	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	12506		Tendon - 12506	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W2	S	B	0.8000	0.031
WESTBOUND	2507	8, 8A, 11	Tendon - 2507	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	12507		Tendon - 12507	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W2	S	B	0.8000	0.031
	2508	9, 9A, 12	Tendon - 2508	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	12508		Tendon - 12508	3	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W2	S	B	0.8000	0.031
	2513	1, 4, 7	Tendon - 2513	3	0.5	32	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E1	S	B	0.8000	0.031
EASTBOUND	2514	2, 5, 8	Tendon - 2514	3	0.5	32	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E1	S	B	0.8000	0.031
	2515	3, 6, 9	Tendon - 2515	3	0.5	32	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E1	S	B	0.8000	0.031
	2516	1, 4	Tendon - 2516	2	0.5	20	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
WESTBOUND	2517	2, 5	Tendon - 2517	2	0.5	20	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	2518	3, 6	Tendon - 2518	2	0.5	20	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	2526	13, 16	Tendon - 2526	2	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
WESTBOUND	2527	14, 17	Tendon - 2527	2	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	2528	15, 18	Tendon - 2528	2	0.5	28	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W1	S	B	0.8000	0.031
	2603	19, 22, 25	Tendon - 2603	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E3	S	B	0.8000	0.031
EASTBOUND	2604	20, 23, 26	Tendon - 2604	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E3	S	B	0.8000	0.031
	2605	21, 24, 27	Tendon - 2605	3	0.5	24	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E3	S	B	0.8000	0.031
	2606	19, 22	Tendon - 2606	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W3	S	B	0.8000	0.031
WESTBOUND	2607	20, 23	Tendon - 2607	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W3	S	B	0.8000	0.031
	2608	21, 24	Tendon - 2608	2	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W3	S	B	0.8000	0.031
	2703	28, 31, 34	Tendon - 2703	3	0.5	23	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E4	S	B	0.8000	0.031
EASTBOUND	2704	29, 32, 35	Tendon - 2704	3	0.5	23	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E4	S	B	0.8000	0.031
	2705	30, 33, 36	Tendon - 2705	3	0.5	23	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E4	S	B	0.8000	0.031
	2706	25, 28	Tendon - 2706	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W4	S	B	0.8000	0.031
WESTBOUND	2707	26, 29	Tendon - 2707	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W4	S	B	0.8000	0.031
	2708	27, 30	Tendon - 2708	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W4	S	B	0.8000	0.031
	2803	37, 40	Tendon - 2803	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E4	S	B	0.8000	0.031
EASTBOUND	2804	38, 41	Tendon - 2804	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E4	S	B	0.8000	0.031
	2805	39, 42	Tendon - 2805	3	0.5	25	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6E4	S	B	0.8000	0.031
	2806	31, 34	Tendon - 2806	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W4	S	B	0.8000	0.031
WESTBOUND	2807	32, 35	Tendon - 2807	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W4	S	B	0.8000	0.031
	2808	33, 36	Tendon - 2808	2	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	6W4	S	B	0.8000	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM DATE: 2/9/2009
CHECKED BY: IC BY PT DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
RAMP D	2651	58, 60, 62	Tendon - 2651	3	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.8000	0.031
	2652	59, 61, 63	Tendon - 2652	3	0.5	26	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.8000	0.031
	2661	46, 48, 50	Tendon - 2661	2	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.7100	0.031
	2662	47, 49, 51	Tendon - 2662	2	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.7100	0.031
	2671	52, 54, 56	Tendon - 2671	2	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.7140	0.031
	2672	53, 55, 57	Tendon - 2672	2	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.7140	0.031
	2681	52, 54, 56	Tendon - 2681	2	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.7160	0.031
	2682	53, 55, 57	Tendon - 2682	2	0.5	29	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D5	S	E	0.7160	0.031
	2751	64, 66, 69	Tendon - 2751	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D6	S	E	0.8000	0.031
	2752	65, 67, 70	Tendon - 2752	3	0.5	31	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D6	S	E	0.8000	0.031
RAMP B	2951	39, 41, 43	Tendon - 2951	3	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B2	S	B	0.8000	0.031
	2952	40, 42, 44	Tendon - 2952	3	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B2	S	B	0.8000	0.031
	2961	45	Tendon - 2961	1	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B2	S	B	0.8000	0.031
	2962	46	Tendon - 2962	1	0.5	27	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B2	S	B	0.8000	0.031
Ramp C	5011	#1	Tendon - 5011	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C8	S	E	0.7496	0.031
UNIT 8	5021	#2	Tendon - 5021	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C8	S	E	0.7923	0.031
	5031	#3	Tendon - 5031	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C8	S	E	0.7564	0.031
	5012	#1	Tendon - 5012	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C8	S	E	0.7496	0.031
	5022	#2	Tendon - 5022	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C8	S	E	0.7923	0.031
	5032	#3	Tendon - 5032	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C8	S	E	0.7564	0.031
UNIT 7	5311	#31	Tendon - 5311	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C7	S	E	0.7624	0.031
	5321	#32	Tendon - 5321	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C7	S	E	0.7923	0.031
	5331	#33	Tendon - 5331	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C7	S	E	0.7923	0.031
	5312	#31	Tendon - 5312	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C7	S	E	0.7624	0.031
	5322	#32	Tendon - 5322	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C7	S	E	0.7923	0.031
	5332	#33	Tendon - 5332	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C7	S	E	0.7923	0.031
UNIT 6	5411	#41	Tendon - 5411	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7496	0.031
	5421	#42	Tendon - 5421	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7564	0.031
	5431	#43	Tendon - 5431	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7438	0.031
	5441	#44	Tendon - 5441	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7806	0.031
	5412	#41	Tendon - 5412	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7496	0.031
	5422	#42	Tendon - 5422	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7564	0.031
	5432	#43	Tendon - 5432	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7438	0.031
	5442	#44	Tendon - 5442	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C6	S	E	0.7806	0.031
UNIT 1	5511	#51	Tendon - 5511	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7689	0.031
	5521	#52	Tendon - 5521	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7564	0.031
	5531	#53	Tendon - 5531	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7689	0.031
	5541	#54	Tendon - 5541	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7689	0.031
	5551	#55	Tendon - 5551	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	S	E	0.7624	0.031
	5512	#51	Tendon - 5512	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7689	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM — DATE: 2/9/2009
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4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	5522	#52	Tendon - 5522	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7564	0.031
	5532	#53	Tendon - 5532	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7689	0.031
	5542	#54	Tendon - 5542	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	D	B	0.7689	0.031
	5552	#55	Tendon - 5552	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C1	S	E	0.7624	0.031
	5611	#61	Tendon - 5611	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7564	0.031
	5621	#62	Tendon - 5621	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7564	0.031
	5631	#63	Tendon - 5631	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7438	0.031
UNIT 2	5641	#64	Tendon - 5641	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7689	0.031
	5612	#61	Tendon - 5612	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7564	0.031
	5622	#62	Tendon - 5622	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7564	0.031
	5632	#63	Tendon - 5632	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7438	0.031
	5642	#64	Tendon - 5642	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C2	S	B	0.7689	0.031
	5711	#71	Tendon - 5711	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7564	0.031
	5721	#72	Tendon - 5721	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7564	0.031
	5731	#73	Tendon - 5731	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7438	0.031
UNIT 3	5741	#74	Tendon - 5741	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7689	0.031
	5712	#71	Tendon - 5712	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7564	0.031
	5722	#72	Tendon - 5722	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7564	0.031
	5732	#73	Tendon - 5732	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7438	0.031
	5742	#74	Tendon - 5742	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C3	S	B	0.7689	0.031
	5811	#81	Tendon - 5811	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7564	0.031
	5821	#82	Tendon - 5821	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7564	0.031
	5831	#83	Tendon - 5831	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7438	0.031
UNIT 4	5841	#84	Tendon - 5841	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7689	0.031
	5812	#81	Tendon - 5812	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7564	0.031
	5822	#82	Tendon - 5822	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7564	0.031
	5832	#83	Tendon - 5832	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7438	0.031
	5842	#84	Tendon - 5842	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C4	S	B	0.7689	0.031
	5911	#91	Tendon - 5911	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5921	#92	Tendon - 5921	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5931	#93	Tendon - 5931	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5941	#94	Tendon - 5941	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
UNIT 5	5951	#95	Tendon - 5951	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7752	0.031
	5912	#91	Tendon - 5912	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5922	#92	Tendon - 5922	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5932	#93	Tendon - 5932	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5942	#94	Tendon - 5942	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7564	0.031
	5952	#95	Tendon - 5952	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	C5	S	B	0.7752	0.031
Ramp A	6111	#11	Tendon - 6111	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7438	0.031
	6121	#12	Tendon - 6121	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7438	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
UNIT 1	6131	#13	Tendon - 6131	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7438	0.031
	6141	#14	Tendon - 6141	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7734	0.031
	6151	#15	Tendon - 6151	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7808	0.031
	6112	#11	Tendon - 6112	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7438	0.031
	6122	#12	Tendon - 6122	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7438	0.031
	6132	#13	Tendon - 6132	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7438	0.031
	6142	#14	Tendon - 6142	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7734	0.031
	6152	#15	Tendon - 6152	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A1	S	E	0.7808	0.031
UNIT 2	6211	#21	Tendon - 6211	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7438	0.031
	6221	#22	Tendon - 6221	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7438	0.031
	6231	#23	Tendon - 6231	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7438	0.031
	6241	#24	Tendon - 6241	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7636	0.031
	6251	#25	Tendon - 6251	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7734	0.031
	6261	#26	Tendon - 6261	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7734	0.031
	6212	#21	Tendon - 6212	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7438	0.031
	6222	#22	Tendon - 6222	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7438	0.031
	6232	#23	Tendon - 6232	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7438	0.031
	6242	#24	Tendon - 6242	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7636	0.031
	6252	#25	Tendon - 6252	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7734	0.031
	6262	#26	Tendon - 6262	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A2	S	E	0.7734	0.031
UNIT 3	6311	#31	Tendon - 6311	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7438	0.031
	6321	#32	Tendon - 6321	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7438	0.031
	6331	#33	Tendon - 6331	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7438	0.031
	6341	#34	Tendon - 6341	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7636	0.031
	6351	#35	Tendon - 6351	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7808	0.031
	6361	#36	Tendon - 6361	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7808	0.031
	6312	#31	Tendon - 6312	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7438	0.031
	6322	#32	Tendon - 6322	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7438	0.031
	6332	#33	Tendon - 6332	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7438	0.031
	6342	#34	Tendon - 6342	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7636	0.031
	6352	#35	Tendon - 6352	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7808	0.031
	6362	#36	Tendon - 6362	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A3	S	E	0.7808	0.031
UNIT 4	6411	#41	Tendon - 6411	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031
	6421	#42	Tendon - 6421	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031
	6431	#43	Tendon - 6431	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031
	6441	#44	Tendon - 6441	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7636	0.031
	6451	#45	Tendon - 6451	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7734	0.031
	6461	#46	Tendon - 6461	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7734	0.031
	6471	#47	Tendon - 6471	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031
	6412	#41	Tendon - 6412	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031

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	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	6422	#42	Tendon - 6422	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031
	6432	#43	Tendon - 6432	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7438	0.031
	6442	#44	Tendon - 6442	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7636	0.031
	6452	#45	Tendon - 6452	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7734	0.031
	6462	#46	Tendon - 6462	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7734	0.031
	6481	#48	Tendon - 6481	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A4	S	E	0.7636	0.031
UNIT 5	6511	#51	Tendon - 6511	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7438	0.031
	6521	#52	Tendon - 6521	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7438	0.031
	6531	#53	Tendon - 6531	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7636	0.031
	6541	#54	Tendon - 6541	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7734	0.031
	6551	#55	Tendon - 6551	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7734	0.031
	6512	#51	Tendon - 6512	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7438	0.031
	6522	#52	Tendon - 6522	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7438	0.031
	6532	#53	Tendon - 6532	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7636	0.031
	6542	#54	Tendon - 6542	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7734	0.031
	6552	#55	Tendon - 6552	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7734	0.031
	6513	#51	Tendon - 6513	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7438	0.031
	6523	#52	Tendon - 6523	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7438	0.031
	6533	#53	Tendon - 6533	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A5	S	E	0.7636	0.031
UNIT 6	6611	#61	Tendon - 6611	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7438	0.031
	6621	#62	Tendon - 6621	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7438	0.031
	6631	#63	Tendon - 6631	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7636	0.031
	6641	#64	Tendon - 6641	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7734	0.031
	6651	#65	Tendon - 6651	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7734	0.031
	6661	#66	Tendon - 6661	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7808	0.031
	6612	#61	Tendon - 6612	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7438	0.031
	6622	#62	Tendon - 6622	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7438	0.031
	6632	#63	Tendon - 6632	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7636	0.031
	6642	#64	Tendon - 6642	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7734	0.031
	6652	#65	Tendon - 6652	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7734	0.031
	6662	#66	Tendon - 6662	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7808	0.031
	6613	#61	Tendon - 6613	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7438	0.031
	6623	#62	Tendon - 6623	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7438	0.031
	6633	#63	Tendon - 6633	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A6	S	E	0.7636	0.031
UNIT 7	6711	#71	Tendon - 6711	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A7	S	E	0.7438	0.031
	6721	#72	Tendon - 6721	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A7	S	E	0.7438	0.031
	6712	#71	Tendon - 6712	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A7	S	E	0.7438	0.031
	6722	#72	Tendon - 6722	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A7	S	E	0.7438	0.031
	6713	#71	Tendon - 6713	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A7	S	E	0.7438	0.031
	6723	#72	Tendon - 6723	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	A7	S	E	0.7438	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
Ramp B	7011	#1	Tendon - 7011	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7438	0.031
	7021	#2	Tendon - 7021	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7438	0.031
	7031	#3	Tendon - 7031	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7636	0.031
	7041	#4	Tendon - 7041	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7734	0.031
	7051	#5	Tendon - 7051	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7709	0.031
	7061	#6	Tendon - 7061	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7636	0.031
	7071	#7	Tendon - 7071	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7734	0.031
	7081	#8	Tendon - 7081	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7734	0.031
	7012	#1	Tendon - 7012	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7438	0.031
	7022	#2	Tendon - 7022	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7438	0.031
	7032	#3	Tendon - 7032	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7636	0.031
	7042	#4	Tendon - 7042	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7734	0.031
	7052	#5	Tendon - 7052	1	0.6	12	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7709	0.031
	7062	#6	Tendon - 7062	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7636	0.031
	7072	#7	Tendon - 7072	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7734	0.031
	7082	#8	Tendon - 7082	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	B1	D	B	0.7734	0.031
Ramp D	8011	#1	Tendon - 8011	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7636	0.031
	8021	#2	Tendon - 8021	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7438	0.031
	8031	#3	Tendon - 8031	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7636	0.031
UNIT 1	8041	#4	Tendon - 8041	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7438	0.031
	8012	#1	Tendon - 8012	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7636	0.031
	8022	#2	Tendon - 8022	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7438	0.031
	8032	#3	Tendon - 8032	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7636	0.031
	8042	#4	Tendon - 8042	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D1	S	B	0.7438	0.031
	8051	#5	Tendon - 8051	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7636	0.031
	8061	#6	Tendon - 8061	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7438	0.031
	8071	#7	Tendon - 8071	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7636	0.031
	8081	#8	Tendon - 8081	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7537	0.031
UNIT 2	8131	#13	Tendon - 8131	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7932	0.031
	8052	#5	Tendon - 8052	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7636	0.031
	8062	#6	Tendon - 8062	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7438	0.031
	8072	#7	Tendon - 8072	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7636	0.031
	8082	#8	Tendon - 8082	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7537	0.031
	8132	#13	Tendon - 8132	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D2	S	B	0.7932	0.031
	8091	#9	Tendon - 8091	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
	8101	#10	Tendon - 8101	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
	8111	#11	Tendon - 8111	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
UNIT 3	8121	#12	Tendon - 8121	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
	8092	#9	Tendon - 8092	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
	8102	#10	Tendon - 8102	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

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	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	8112	#11	Tendon - 8112	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
	8122	#12	Tendon - 8122	1	0.6	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	D3	S	B	0.7438	0.031
Sgmt 3E Cantilever	13101	T1	Tendon - 13101	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.0058
	13102	T2	Tendon - 13102	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
PIER 13	13103	T3	Tendon - 13103	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
EASTBOUND	13104	T4	Tendon - 13104	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13105	T5	Tendon - 13105	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13106	T6	Tendon - 13106	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13107	T7	Tendon - 13107	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13108	T8	Tendon - 13108	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13109	T9	Tendon - 13109	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13110	T10	Tendon - 13110	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13111	T11	Tendon - 13111	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13112	T12	Tendon - 13112	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13113	T13	Tendon - 13113	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13114	T14	Tendon - 13114	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13115	T15	Tendon - 13115	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13116	T16	Tendon - 13116	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13117	T17	Tendon - 13117	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13219	T19	Tendon - 13219	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13220	T20	Tendon - 13220	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13221	T21	Tendon - 13221	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13222	T22	Tendon - 13222	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13223	T23	Tendon - 13223	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13224	T24	Tendon - 13224	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13225	T25	Tendon - 13225	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13226	T26	Tendon - 13226	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13227	T27	Tendon - 13227	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13228	T28	Tendon - 13228	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13229	T29	Tendon - 13229	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13230	T30	Tendon - 13230	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13231	T31	Tendon - 13231	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13232	T32	Tendon - 13232	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13301	T1	Tendon - 13301	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13302	T2	Tendon - 13302	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13303	T3	Tendon - 13303	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13304	T4	Tendon - 13304	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13305	T5	Tendon - 13305	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13306	T6	Tendon - 13306	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13307	T7	Tendon - 13307	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006

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	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	13308	T8	Tendon - 13308	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13309	T9	Tendon - 13309	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13310	T10	Tendon - 13310	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13311	T11	Tendon - 13311	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13312	T12	Tendon - 13312	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13313	T13	Tendon - 13313	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13314	T14	Tendon - 13314	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13315	T15	Tendon - 13315	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13316	T16	Tendon - 13316	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13317	T17	Tendon - 13317	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E3	S	B	0.7150	0.006
	13639	T39	Tendon - 13639	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
PIER 13	13640	T40	Tendon - 13640	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
WESTBOUND	13641	T41	Tendon - 13641	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13642	T42	Tendon - 13642	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13643	T43	Tendon - 13643	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13644	T44	Tendon - 13644	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13645	T45	Tendon - 13645	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13646	T46	Tendon - 13646	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13647	T47	Tendon - 13647	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13648	T48	Tendon - 13648	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13649	T49	Tendon - 13649	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13650	T50	Tendon - 13650	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13651	T51	Tendon - 13651	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13652	T52	Tendon - 13652	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13653	T53	Tendon - 13653	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13654	T54	Tendon - 13654	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13655	T55	Tendon - 13655	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13725	T25	Tendon - 13725	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13726	T26	Tendon - 13726	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13727	T27	Tendon - 13727	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13728	T28	Tendon - 13728	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13729	T29	Tendon - 13729	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13730	T30	Tendon - 13730	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13731	T31	Tendon - 13731	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13732	T32	Tendon - 13732	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13733	T33	Tendon - 13733	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13734	T34	Tendon - 13734	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13735	T35	Tendon - 13735	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13736	T36	Tendon - 13736	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13737	T37	Tendon - 13737	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	13738	T38	Tendon - 13738	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13813	T13	Tendon - 13813	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13814	T14	Tendon - 13814	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13815	T15	Tendon - 13815	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13816	T16	Tendon - 13816	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13817	T17	Tendon - 13817	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13818	T18	Tendon - 13818	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13819	T19	Tendon - 13819	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13820	T20	Tendon - 13820	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13821	T21	Tendon - 13821	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13822	T22	Tendon - 13822	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13823	T23	Tendon - 13823	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13824	T24	Tendon - 13824	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13901	T1	Tendon - 13901	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
PIER 13	13902	T2	Tendon - 13902	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
RAMP A	13903	T3	Tendon - 13903	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13904	T4	Tendon - 13904	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13905	T5	Tendon - 13905	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13906	T6	Tendon - 13906	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13907	T7	Tendon - 13907	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13908	T8	Tendon - 13908	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13909	T9	Tendon - 13909	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13910	T10	Tendon - 13910	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13911	T11	Tendon - 13911	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13001	T1	Tendon - 13001	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13002	T2	Tendon - 13002	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13003	T3	Tendon - 13003	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13004	T4	Tendon - 13004	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13005	T5	Tendon - 13005	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13006	T6	Tendon - 13006	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13007	T7	Tendon - 13007	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13008	T8	Tendon - 13008	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13009	T9	Tendon - 13009	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13010	T10	Tendon - 13010	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	13011	T11	Tendon - 13011	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W3	S	B	0.7150	0.006
	14101	T1'	Tendon - 14101	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
PIER 14	14102	T2'	Tendon - 14102	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
EASTBOUND	14103	T3'	Tendon - 14103	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14104	T4'	Tendon - 14104	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14105	T5'	Tendon - 14105	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006

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TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
14106	T6'	Tendon - 14106	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14107	T7'	Tendon - 14107	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14108	T8'	Tendon - 14108	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14109	T9'	Tendon - 14109	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14110	T10'	Tendon - 14110	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14111	T11'	Tendon - 14111	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14112	T12'	Tendon - 14112	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14113	T13'	Tendon - 14113	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14114	T14'	Tendon - 14114	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14115	T15'	Tendon - 14115	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14116	T16'	Tendon - 14116	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14117	T17'	Tendon - 14117	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14118	T18'	Tendon - 14118	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14219	T19'	Tendon - 14219	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14220	T20'	Tendon - 14220	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14221	T21'	Tendon - 14221	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14222	T22'	Tendon - 14222	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14223	T23'	Tendon - 14223	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14224	T24'	Tendon - 14224	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14225	T25'	Tendon - 14225	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14226	T26'	Tendon - 14226	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14227	T27'	Tendon - 14227	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14228	T28'	Tendon - 14228	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14229	T29'	Tendon - 14229	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14230	T30'	Tendon - 14230	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14231	T31'	Tendon - 14231	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14232	T32'	Tendon - 14232	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14301	T1'	Tendon - 14301	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14302	T2'	Tendon - 14302	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14303	T3'	Tendon - 14303	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14304	T4'	Tendon - 14304	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14305	T5'	Tendon - 14305	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14306	T6'	Tendon - 14306	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14307	T7'	Tendon - 14307	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14308	T8'	Tendon - 14308	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14309	T9'	Tendon - 14309	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14310	T10'	Tendon - 14310	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14311	T11'	Tendon - 14311	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14312	T12'	Tendon - 14312	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
14313	T13'	Tendon - 14313	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
CHECKED BY: IC BY PT

DATE: 2/9/2009
DATE: 2/9/2009

4W5

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES				JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	14314	T14'	Tendon - 14314	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14315	T15'	Tendon - 14315	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14316	T16'	Tendon - 14316	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14317	T17'	Tendon - 14317	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14318	T18'	Tendon - 14318	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3E5	S	B	0.7150	0.006
	14613	T13'	Tendon - 14613	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
PIER 14	14614	T14'	Tendon - 14614	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
WESTBOUND	14615	T15'	Tendon - 14615	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14616	T16'	Tendon - 14616	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14617	T17'	Tendon - 14617	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14618	T18'	Tendon - 14618	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14619	T19'	Tendon - 14619	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14620	T20'	Tendon - 14620	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14621	T21'	Tendon - 14621	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14622	T22'	Tendon - 14622	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14623	T23'	Tendon - 14623	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14624	T24'	Tendon - 14624	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14625	T25'	Tendon - 14625	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14626	T26'	Tendon - 14626	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14627	T27'	Tendon - 14627	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14628	T28'	Tendon - 14628	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14629	T29'	Tendon - 14629	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14731	T31'	Tendon - 14731	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14732	T32'	Tendon - 14732	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14733	T33'	Tendon - 14733	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14734	T34'	Tendon - 14734	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14735	T35'	Tendon - 14735	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14736	T36'	Tendon - 14736	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14737	T37'	Tendon - 14737	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14738	T38'	Tendon - 14738	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14739	T39'	Tendon - 14739	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14740	T40'	Tendon - 14740	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14741	T41'	Tendon - 14741	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14742	T42'	Tendon - 14742	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14743	T43'	Tendon - 14743	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14744	T44'	Tendon - 14744	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14813	T13'	Tendon - 14813	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14814	T14'	Tendon - 14814	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14815	T15'	Tendon - 14815	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14816	T16'	Tendon - 14816	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: PT DEFINITION - SUMMARY

COMPUTED BY: DEM
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DATE: 2/9/2009
DATE: 2/9/2009

	TENDON INFO				STRAND INFO		DUCT INFO		MATERIAL PROPERTIES			4W5	JACKING DETAILS			
	ID		DESCRPN	COUNT	DIAMETER (in)	COUNT	SIZE (mm)	TYPE	ID	FRICTION COEFF.	WOBBLE FACTOR	STRESS LABEL	SINGLE/ DOUBLE	BEGIN OR END?	FACTOR % Fpu	WEDGE SLIP
	14817	T17'	Tendon - 14817	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14818	T18'	Tendon - 14818	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14819	T19'	Tendon - 14819	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14820	T20'	Tendon - 14820	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14821	T21'	Tendon - 14821	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14822	T22'	Tendon - 14822	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14823	T23'	Tendon - 14823	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14824	T24'	Tendon - 14824	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14825	T25'	Tendon - 14825	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14826	T26'	Tendon - 14826	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14827	T27'	Tendon - 14827	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14828	T28'	Tendon - 14828	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14829	T29'	Tendon - 14829	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3W5	S	B	0.7150	0.006
	14901	T1'	Tendon - 14901	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
PIER 14	14902	T2'	Tendon - 14902	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
RAMP A	14903	T3'	Tendon - 14903	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14904	T4'	Tendon - 14904	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14905	T5'	Tendon - 14905	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14906	T6'	Tendon - 14906	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14907	T7'	Tendon - 14907	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14908	T8'	Tendon - 14908	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14909	T9'	Tendon - 14909	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14910	T10'	Tendon - 14910	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14911	T11'	Tendon - 14911	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14001	T1'	Tendon - 14001	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14002	T2'	Tendon - 14002	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14003	T3'	Tendon - 14003	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14004	T4'	Tendon - 14004	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14005	T5'	Tendon - 14005	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14006	T6'	Tendon - 14006	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14007	T7'	Tendon - 14007	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14008	T8'	Tendon - 14008	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A1	S	B	0.7150	0.006
	14009	T9'	Tendon - 14009	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14010	T10'	Tendon - 14010	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006
	14011	T11'	Tendon - 14011	1	0.5	19	102	D	AASHTO_LRFD:_PT-1	0.250	0.0458	3A2	S	B	0.7150	0.006

2.5.7/ 21

2.6 Erection Sequence

2.6 Erection Sequence

The erection sequence is based on the drawings, however, there are certain locations that either the drawings are not clear or do not show the required information. In those case assumptions are made to complete the erection sequence.

URS CORPORATION

JOB: CLINE AVENUE
DESCRP: ERECTION SCHEDULE

COMPUTED BY: DEM DATE: 2/9/2009
CHECKED BY: IC BY PT DATE: 2/9/2009

Start Date = Stage at T=1 :

Constr. Stage	Item	Concrete Age	Duration Time		Start Day	End Time	Duration Time	SUBSTRUCTURE ELEMENTS Activate Piers Elements W/Weight	Activate Spring E.J.'s Elements W/O Weight	Activate Spring Supports Elements W/O Weight	Activate Temporary Supports	DeActivate Temporary Supports	SUPERSTRUCTURE ELEMENTS Activate Elements Series 1	Series 2	Series 3	CROSS MEMBERS		LOAD CASES SW	EL	PT	CS	TOTAL
SUBS-1	Erect Piers 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14		90		0	90												DC-SUB1			CS-1	STG-SUM1
ERECT SEGMENTS 2 & 3																						
SGMT-3E1	**Segment 3, Eastbound (EJ 3 - Tmp CJ)**	30	30		90	120				11215, 11225	501		1325-1345					DC-3E1		PT-3E1	CS-2	STG-SUM2
SGMT-2E1	Segment 2, Eastbound Lanes (Blister No. 1 - EJ 3)	7	60		120	180			33001-33004	11015, 11025, 11115, 11125			1247-1323					DC-2E1		PT-2E1	CS-3	STG-SUM3
SGMT-2E2	Segment 2, Eastbound Lanes (Blister No. 2 - Blister No. 1)	7	30		180	210				10915, 10925			1209-1246					DC-2E2		PT-2E2	CS-4	STG-SUM4
SGMT-2E3	Segment 2, Eastbound Lanes (EJ 2 - Blister No. 2)	7	30		210	240				10815, 10825			1174-1208					DC-2E3		PT-2E3	CS-5	STG-SUM5
SGMT-3W1	**Segment 3, Westbound Lanes (EJ 3 - Tmp CJ)**	7	30		240	270				11235, 11245	601, 701		2325-2345	4073-4093		7325-7346		DC-3W1		PT-3W1	CS-6	STG-SUM6
SGMT-2W1	Segment 2, Westbound Lanes & Ramp A (Blister No. 1 - EJ 3)	7	60		270	330			33005-33010	11035, 11045, 11135, 11145			2247-2323	4001-4071		7253-7324	6253	DC-2W1		PT-2W1	CS-7	STG-SUM7
SGMT-2W2	Segment 2, Westbound Lanes (Blister No. 2 - Blister No. 1)	7	30		330	360				10935, 10945			2209-2246					DC-2W2		PT-2W2	CS-8	STG-SUM8
SGMT-2W3	Segment 2, Westbound Lanes (EJ 2 - Blister No. 2)	7	30		360	390				10835, 10845			2174-2208					DC-2W3		PT-2W3	CS-9	STG-SUM9
ERECT SEGMENT 1																						
SGMT-1N1	Segment 1, Northerly Two Thirds (EJ 1 - Blister No. 1)	7	60		390	450				10225, 10226, 10229, 10235, 10236, 10239, 10325, 10335, 10425, 10435, 10525, 10535			2001-2076	3001-3076		6001-6077		DC-1N1		PT-1N1	CS-10	STG-SUM10
SGMT-1N2	Segment 1, Northerly Two Thirds (Blister No. 1 - Blister No. 2)	7	30		450	480				10625, 10635			2077-2112	3077-3112		6078-6113		DC-1N2		PT-1N2	CS-11	STG-SUM11
SGMT-1N3	Segment 1, Northerly Two Thirds (Blister No. 2 - Blister No. 3)	7	30		480	510				10725, 10735, 10745			2113-2148	3113-3148		6114-6149		DC-1N3		PT-1N3	CS-12	STG-SUM12
SGMT-1N4	Segment 1, Northerly Two Thirds (Blister No. 3 - EJ 2)	7	30		510	540			32004-32010				2149-2172	3149-3172		7174		DC-1N4		PT-1N4	CS-13	STG-SUM13
SGMT-1S1	Segment 1, Southerly One Third (EJ 1 - Blister No. 1)	7	60		540	600				10215, 10216, 10219, 10315, 10415, 10515			1001-1076					DC-1S1		PT-1S1	CS-14	STG-SUM14
SGMT-1S2	Segment 1, Southerly One Third (Blister No. 1 - Blister No. 2)	7	30		600	630				10615			1077-1112					DC-1S2		PT-1S2	CS-15	STG-SUM15
SGMT-1S3	Segment 1, Southerly One Third (Blister No. 2 - Blister No. 3)	7	30		630	660				10715			1113-1148					DC-1S3		PT-1S3	CS-16	STG-SUM16
SGMT-1S4	Segment 1, Southerly One Third (Blister No. 3 - EJ 2)	7	30		660	690			32001-32003				1149-1172			7173		DC-1S4		PT-1S4	CS-17	STG-SUM17
SGMT-1LC	Segment 1, Longitudinal Closure		30		690	720										7001-7172					CS-18	STG-SUM18
SUBS-2	Erect Piers 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 401, 207, 304	30	90		720	810												DC-SUB2			CS-19	STG-SUM19
ERECT SEGMENTS 3 & 4																						
SGMT-3W2	**Segment 3, Westbound (Tmp CJ - EJ 5)**	7	30		810	840				11535, 11545	602, 603		2423-2440					DC-3W2		PT-3W2	CS-20	STG-SUM20
SGMT-4W1	Segment 4, Westbound Lanes (EJ 5 - Blister No. 1)	7	30		840	870			35007-35010	11645, 11646, 11655, 11656			2442-2474					DC-4W1		PT-4W1	CS-21	STG-SUM21
SGMT-4W2	Segment 4, Westbound Lanes (Blister No. 1 - Blister No. 2)	7	30		870	900				11745, 11746,11755, 11756			2475-2503					DC-4W2		PT-4W2	CS-22	STG-SUM22
SGMT-4W3	Segment 4, Westbound Lanes (Blister No. 2 - Blister No. 3)	7	30		900	930				11835, 11845			2504-2532					DC-4W3		PT-4W3	CS-23	STG-SUM23
SGMT-4W4	Segment 4, Westbound Lanes (Blister No. 3 - Tmp CJ)	7	30		930	960				11935, 11945			2532-2565					DC-4W4		PT-4W4	CS-24	STG-SUM24
SGMT-4W5	Remove Rest of Formwork	7	30		960	990												DC-4W5		PT-4W5	CS-25	STG-SUM25
SGMT-3E2	**Segment 3, Eastbound Lanes & Ramp C (Tmp CJ - EJ 5)**	7	30		990	1020				11515, 11525	502-503, 702-703		1422-1440	5027-5045		6422-6442		DC-3E2		PT-3E2	CS-26	STG-SUM26
SGMT-4E1	Segment 4, Eastbound Lanes & Ramp C (EJ 5 - Blister No. 1)	7	30		1020	1050			35001-35006	11615, 11625			1442-1474	5047-5079		6441-6475		DC-4E1		PT-4E1	CS-27	STG-SUM27
SGMT-4E2	Segment 4, Eastbound Lanes & Ramp C (Blister No. 1 - Blister No	7	30		1050	1080				11616, 11636, 11715, 11725			1475-1503	5080-5108		6476-6504	7494	DC-4E2		PT-4E2	CS-28	STG-SUM28
SGMT-4E3	Segment 4, Eastbound Lanes & Ramp C (Blister No. 2 - Blister No	7	30		1080	1110				11815, 11825			1504-1532	5109-5139		6505-6528		DC-4E3		PT-4E3	CS-29	STG-SUM29
SGMT-4E4	Segment 4, Eastbound Lanes (Blister No. 3 - Tmp CJ)	7	30		1110	1140				11915-11925			1533-1565					DC-4E4		PT-4E4	CS-30	STG-SUM30
SGMT-4E5	Remove Rest of Formwork	7	30		1140	1170												DC-4E5		PT-4E5	CS-31	STG-SUM31
ERECT SEGMENTS 5 & 6																						
SGMT-6W1	**Segment 6, Westbound Lanes (EJ 8 - Tmp CJ)**	7	30		1170	1200				12535, 12545, 12635, 12636, 12645, 12646			2708-2748					DC-6W1		PT-6W1	CS-32	STG-SUM32
SGMT-5W1	Segment 5, Westbound Lanes (Blister No. 5 - EJ 8)	7	30		1200	1230			38005-38008	12435, 12436, 12445, 12446			2681-2706					DC-5W1		PT-5W1	CS-33	STG-SUM33
SGMT-5W2	Segment 5, Westbound Lanes (Blister No. 6 - Blister No. 5)	7	30		1230	1260				12335, 12545			2654-2680					DC-5W2		PT-5W2	CS-34	STG-SUM34
SGMT-5W3	Segment 5, Westbound Lanes (Blister No. 7 - Blister No. 6)	7	30		1260	1290				12235, 12245, 12436, 12446			2630-2653					DC-5W3		PT-5W3	CS-35	STG-SUM35
SGMT-5W4	Segment 5, Westbound Lanes (Blister No. 7 - Blister No. 6)	7	30		1290	1320				12135, 12145			2606-2629					DC-5W4		PT-5W4	CS-36	STG-SUM36
SGMT-5W5	Segment 5, Westbound Lanes (Blister No. 5 - EJ 8)	7	30		1320	1350				12035, 12045			2580-2607					DC-5W5		PT-5W5	CS-37	STG-SUM37
SGMT-4W6	Segment 4, Westbound Lanes (Tmp CJ - EJ 7)	7	30		1350	1380			37005-37008				2565-2578					DC-4W6		PT-4W6	CS-38	STG-SUM38
SGMT-6E1	**Segment 6, Eastbound Lanes (EJ 8 - Tmp CJ)**	7	30		1380	1410				12515, 12525, 12615, 12616, 12625, 12626			1718-1761					DC-6E1		PT-6E1	CS-39	STG-SUM39
SGMT-5E1	Segment 5, Eastbound Lanes (Blister No. 5 - EJ 8)	7	30		1410	1440			38001-38004	12415, 12425, 12416, 12426			1689-1716					DC-5E1		PT-5E1	CS-40	STG-SUM40
SGMT-5E2	Segment 5, Eastbound Lanes (Blister No. 6 - Blister No. 5)	7	30		1440	1470				12315, 12325			1661-1688					DC-5E2		PT-5E2	CS-41	STG-SUM41
SGMT-5E3	Segment 5, Eastbound Lanes (Blister No. 7 - Blister No. 6)	7	30		1470	1500				12215, 12225, 12416, 12426			1634-1660					DC-5E3		PT-5E3	CS-42	STG-SUM42

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URS CORPORATION

JOB: CLINE AVENUE
DESCRP: ERECTION SCHEDULE

COMPUTED BY: DEM DATE: 2/9/2009
CHECKED BY: IC BY PT DATE: 2/9/2009

Start Date = Stage at T=1 :

Constr. Stage	Item	Concrete Age	Duration Time		Start Day	End Time	Duration Time	SUBSTRUCTURE ELEMENTS: Activate Piers Elements W/Weight	Activate Spring E.J.'s Elements W/O Weight	Activate Spring Supports Elements W/O Weight	Activate Temporary Supports	DeActivate Temporary Supports	SUPERSTRUCTURE ELEMENTS Activate Elements Series 1	Series 2	Series 3	CROSS MEMBERS		LOAD CASES SW	EL	PT	CS	TOTAL
SGMT-5E4	Segment 5, Eastbound Lanes (Blister No. 8 - Blister No. 7)	7	30		1500	1530				12115, 12125			1607-1633					DC-5E4		PT-5E4	CS-43	STG-SUM43
SGMT-5E5	Segment 5, Eastbound Lanes (Blister No. 8 - EJ 8)	7	30		1530	1560				12015, 12025			1580-1606					DC-5E5		PT-5E5	CS-44	STG-SUM44
SGMT-4E6	Segment 4, Eastbound Lanes (Tmp CJ - EJ 7)	7	30		1560	1590			37001-37004				1566-1578					DC-4E6		PT-4E6	CS-45	STG-SUM45
ERECT REMAINDER SEGMENT 3																						
SGMT-3E3	**Segment 3, Eastbound Lanes (Pier 13 Cantilever)**	7	30		1590	1620				11315, 11325	507		1347-1382					DC-3E3		PT-3E3	CS-46	STG-SUM46
SGMT-3E4	Segment 3, Eastbound Lanes (Span 12 Closure)	4	30		1620	1650						501, 507	1346					DC-3E4		PT-3E4	CS-47	STG-SUM47
SGMT-3W3	**Segment 3, Westbound Lanes (Pier 13)**	7	30		1650	1680				11335, 11345, 11355	607, 707		2347-2382	4095-4130		7347-7383	6360	DC-3W3		PT-3W3	CS-48	STG-SUM48
SGMT-3W4	Segment 3, Westbound Lanes(Closure 1, Span 12)	4	30		1680	1710						601, 607, 701, 707	2346	4094				DC-3W4		PT-3W4	CS-49	STG-SUM49
SGMT-3E5	**Segment 3, Eastbound Lanes (Pier 14)**	7	30		1710	1740				11415, 11425	508, 708		1384-1420	5001-5025		6396-6421	8396	DC-3E5		PT-3E5	CS-50	STG-SUM50
SGMT-3E6	Segment 3, Eastbound Lanes (Closure 2, Span 14)	4	30		1740	1770						502, 503, 508, 702, 703, 708	1421	5026				DC-3E6		PT-3E6	CS-51	STG-SUM51
SGMT-3E7	Segment 3, Eastbound Lanes (Closure 3, Span 13)	4	30		1770	1800							1383					DC-3E7		PT-3E7	CS-52	STG-SUM52
SGMT-3W5	**Segment 3, Westbound Lanes (Cantilever Pier 14)**	7	30		1800	1830				11435, 11445	608		2384-2421					DC-3W5		PT-3W5	CS-53	STG-SUM53
SGMT-3W6	Segment 3, Westbound Lanes (Span 14 Closure)	4	30		1830	1860						602, 603, 608	2422					DC-3W6		PT-3W6	CS-54	STG-SUM54
SGMT-3W7	Segment 3, Weastbound Lanes (Span 13 Closure)	4	30		1860	1890							2383					DC-3W7		PT-3W7	CS-55	STG-SUM55
ERECT RAMP A																						
SGMT-3A1	**Segment 3, Ramp A (CJ 6' - CJ 4')**	7			1890	1890		34001-34002		22075	808		4139-4154			7391-7400		DC-3A1		PT-3A1		STG-SUM56
SGMT-3A2	Segment 3, Ramp A (CJ 16' - CJ 10')	7			1890	1890			34001, 34002, 34009		704		4132-4138	4156-4164		7384-7390		DC-3A2		PT-3A2		STG-SUM57
SGMT-3A3	Segment 3, Ramp A (Span 13 Transverse Closure)	4			1890	1890						808	4131					DC-3A3		PT-3A3		STG-SUM58
CONTINUE ERECTION SEGMENT 6																						
SGMT-6E2	Segment 6, Eastbound Lanes (Tmp CJ - Blister No. 1)	7	30		1890	1920				12616, 12626, 12715, 12725			1762-1787					DC-6E2		PT-6E2	CS-59	STG-SUM59
SGMT-6E3	Segment 6, Eastbound Lanes (Blister No. 1 - Blister No. 2)	7	30		1920	1950				12815, 12825			1788-1817					DC-6E3		PT-6E3	CS-60	STG-SUM60
SGMT-6E4	Segment 6, Eastbound Lanes (Blister No. 2 - EJ 11)	7	30		1950	1980				12915-12917, 12919			1818-1838					DC-6E4		PT-6E4	CS-61	STG-SUM61
ERECT RAMP D																						
SUBS-D	Erect Piers 102,103,104	7	30		1980	2010												DC-SUBD			CS-62	STG-SUM62
RAMP-D1	Ramp D, Unit 1	7	30		2010	2040				21045, 21046	706		5554-5580					DC-D1		PT-D1	CS-63	STG-SUM63
RAMP-D2	Ramp D, Unit 2	7	30		2040	2070				21035, 21036			5532-5553					DC-D2		PT-D2	CS-64	STG-SUM64
RAMP-D3	Ramp D, Unit 3	7	30		2070	2100				21015, 21016, 21019 21025, 21026			5501-5531					DC-D3		PT-D3	CS-65	STG-SUM65
RAMP-D4	Ramp D, Remove Formwork Spans 101 & 102	7	30		2100	2130												DC-D4			CS-66	STG-SUM66
RAMP-D5	Segment 6, Ramp D (EJ 9 - Blister No. 2)	7	30		2130	2160				21055, 21056, 21065, 21075			5582-5660					DC-D5		PT-D5	CS-67	STG-SUM67
RAMP-D6	Segment 6, Ramp D (Blister No. 2 - EJ 11)	7	30		2160	2190				21085, 21086, 21089			5661-5680					DC-D6		PT-D6	CS-68	STG-SUM68
RAMP-D7	Segment 6, Ramp D (Longitudinal Closure)	7	30		2190	2220			39001, 39002			706, 707				6753-6839					CS-69	STG-SUM69
ERECT REMAINDER SEGMENT 6			30																			
SGMT-6W2	Segment 6, Westbound Lanes (Tmp CJ - Blister No. 1)	7	30		2220	2250				12636, 12646, 12735, 12745			2749-2771					DC-6W2		PT-6W2	CS-70	STG-SUM70
SGMT-6W3	Segment 6, Westbound Lanes (Blister No. 1 - Blister No. 2)	7	30		2250	2280				12835, 12845			2772-2796					DC-6W3		PT-6W3	CS-71	STG-SUM71
SGMT-6W4	Segment 6, Westbound Lanes (Blister No. 2 - EJ 11)	7	30		2280	2310				12935, 12945, 13015-13017, 13019			2797-2839					DC-6W4		PT-6W4	CS-72	STG-SUM72
SUBS-B	Erect Piers 302,303	7	30		2310	2340												DC-SUBB			CS-73	STG-SUM73
RAMP-B1	Ramp B, Unit 1	7	30		2340	2370				23015, 23016, 23019, 23025			4501-4547					DC-B1		PT-B1	CS-74	STG-SUM74
RAMP-B2	Segment 6, Ramp B (CJ - EJ 11)	7	30		2370	2400				23045, 23046, 23055, 23056, 23059			4548-4581			7808-7840		DC-B2		PT-B2	CS-75	STG-SUM75
SUBS-A	Erect Piers 201,202,203,204,205,206	7	30		2400	2430												DC-SUBA			CS-76	STG-SUM76
RAMP-A1	Ramp A, Unit I	7	30		2430	2460		34009		22065, 22066		704	4165-4184					DC-A1		PT-A1	CS-77	STG-SUM77

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