



BRIDGE DESIGN COMPUTATIONS

LAK-06-2.06

PID 112996

CHA Project Number: 75926.000

January 2025

Prepared for:

ODOT District 12

5500 Transportation Boulevard
Garfield Heights, OH 44125

Prepared by:

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**Department of
Transportation**



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1.1 Beam Design



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Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:54 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

Completed By: CAE Date: 05/01/2024 Checked By: DOR Date: 05/08/2024

Bridge 1

Roadway Elements

Alignments

Alignment Name: ALG01

Begin Station: 0+00.0000

Coordinate Tie:

 Northing: 0.0000

 Easting: 0.0000

Segment	Shape	Start Direction	Radius (ft)	End Station	Spiral In (ft)	Spiral Out (ft)	Sense
1	Tangent	N 90 00 00.00 E		7+00.0000			

Profiles

Profile Name: PROF01

VPI	Station	Elevation	Transition	LVC-1 (ft)	LVC-2 (ft)
1	0+00.0000	100.0000			
2	7+00.0000	100.0000			

Cross Sections

Cross Section Name: XSECT01

Template Name: TMPL 0

Template Station: 0+00.0000

PG Offset: 0.0000

PG Node: 2

Plane	Width Type	Width (ft)	Vertical Type	Vertical %
1	Distance	18.3333	Slope	1.6000
2	Distance	18.3333	Slope	-1.6000

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Roadways

No.	Name	Align	Profile	Cross Section	Min. Station	Max. Station
1	RDWY01	ALG01	PROF01	XSECT01	0+00.0000	7+00.0000

Superstructure

Pier/Abutment Locations

Roadway: RDWY01

Offset to Bridge CL: 0.0000 ft

No.	Type	Name	Input Method	Station/Distance(ft)	Skew/Bearing
1	Abutment	Support 01	Station	1+00.0000	SKEW 31 52 50.00
2	Pier	Support 02	Distance from Support 01	65.1771	SKEW 31 52 50.00
3	Pier	Support 03	Distance from Support 02	92.0000	SKEW 31 52 50.00
4	Pier	Support 04	Distance from Support 03	84.0000	SKEW 31 52 50.00
5	Pier	Support 05	Distance from Support 04	84.0000	SKEW 31 52 50.00
6	Pier	Support 06	Distance from Support 05	95.2500	SKEW 31 52 50.00
7	Abutment	Support 07	Distance from Support 06	68.1771	SKEW 31 52 50.00

Deck Slab

Deck Thickness: 7.5000 in

Haunch Thickness: 0.0000 in

Sacrificial Wearing Surface: 1.0000 in

No.	Name	Material	Ref. Back	Ref. Method	Offset/Station	Ref. Ahead	Ref. Method	Offset/Station
1	Slab 01	Concrete 4.5ksi	Support 01	Perpendicular to Support	0.000000	Support 07	Perpendicular to Support	0.000000

Deck Reinforcing Steel

Transverse Steel

No.	Back Slab Ref.	Slab Side	Offset (ft)	Ahead Slab Ref.	Slab Side	Offset (ft)	Space (in)	Cover (in)	Vert. Ref.	Vert. Dist.	Bar Size

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1	Slab 01	Start of Slab	0.2500	Slab 01	End of Slab	0.2500	6.0500	2.0000	Top of Slab	2.5000	US#5[M16]
2	Slab 01	Start of Slab	0.2500	Slab 01	End of Slab	0.2500	6.0500	2.0000	Top of Slab	1.5000	US#5[M16]

Longitudinal Steel

No.	Back Slab Ref.	Slab Side	Offset (ft)	Ahead Slab Ref.	Slab Side	Offset (ft)	Space (in)	Cover (in)	Vert. Ref.	Vert. Dist.	Bar Size
3	Slab 01	Start of Slab	0.2500	Slab 01	End of Slab	-0.2500	12.0000	2.0000	Top of Slab	2.5000	US#4[M13]
4	Slab 01	Start of Slab	0.2500	Slab 01	End of Slab	-0.2500	10.2500	2.0000	Bot. of Slab	1.5000	US#5[M16]

Member Groups

Member Group Name: Group01
Back Reference: Support 01
Ahead Reference: Support 07
Number of Members: 5
Path: Concentric to align.

Back Location

Left Fascia Member

Reference: Left edge of slab
Direction: Perp. to reference
Offset(ft): 3.3333

Interior Members

Spacing Type: Equally spaced
Spacing(ft): 8.8323

Right Fascia Member

Reference: Right edge of slab
Direction: Perp. to reference
Offset(ft): 3.3333

Ahead Location

Left Fascia Member

Reference: Left edge of slab
Direction: Along support
Offset(ft): 0.0000

Interior Members

Spacing Type: Equally spaced
Spacing(ft): 8.8323

Right Fascia Member

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Reference: Right edge of slab
Direction: Along support
Offset(ft): 0.0000

Member Definition

Member Group: Group01

Member 01:

Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			
	1	1	0.0000	65.1771	Grade 50	W40X199			
	2	2	0.0000	22.8220	Grade 50	W40X199			
	3	2	22.8220	69.1780	Grade 50	W40X199			
	4	3	0.0000	29.5720	Grade 50	W40X199			
	5	3	29.5720	54.4280	Grade 50	W40X199			
	6	4	0.0000	54.4270	Grade 50	W40X199			
	7	4	54.4270	29.5730	Grade 50	W40X199			
	8	5	0.0000	71.4270	Grade 50	W40X199			
	9	5	71.4270	23.8230	Grade 50	W40X199			
	10	6	0.0000	68.1771	Grade 50	W40X199			

Member 02:

Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			
	1	1	0.0000	65.1771	Grade 50	W40X199			
	2	2	0.0000	22.8220	Grade 50	W40X199			
	3	2	22.8220	69.1780	Grade 50	W40X199			
	4	3	0.0000	29.5720	Grade 50	W40X199			
	5	3	29.5720	54.4280	Grade 50	W40X199			
	6	4	0.0000	54.4270	Grade 50	W40X199			
	7	4	54.4270	29.5730	Grade 50	W40X199			
	8	5	0.0000	71.4270	Grade 50	W40X199			
	9	5	71.4270	23.8230	Grade 50	W40X199			

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Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			
	10	6	0.0000	68.1771	Grade 50	W40X199			

Member 03:

Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			
	1	1	0.0000	65.1771	Grade 50	W40X199			
	2	2	0.0000	22.8220	Grade 50	W40X199			
	3	2	22.8220	69.1780	Grade 50	W40X199			
	4	3	0.0000	29.5720	Grade 50	W40X199			
	5	3	29.5720	54.4280	Grade 50	W40X199			
	6	4	0.0000	54.4270	Grade 50	W40X199			
	7	4	54.4270	29.5730	Grade 50	W40X199			
	8	5	0.0000	71.4270	Grade 50	W40X199			
	9	5	71.4270	23.8230	Grade 50	W40X199			
	10	6	0.0000	68.1771	Grade 50	W40X199			

Member 04:

Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			
	1	1	0.0000	65.1771	Grade 50	W40X199			
	2	2	0.0000	22.8220	Grade 50	W40X199			
	3	2	22.8220	69.1780	Grade 50	W40X199			
	4	3	0.0000	29.5720	Grade 50	W40X199			
	5	3	29.5720	54.4280	Grade 50	W40X199			
	6	4	0.0000	54.4270	Grade 50	W40X199			
	7	4	54.4270	29.5730	Grade 50	W40X199			
	8	5	0.0000	71.4270	Grade 50	W40X199			
	9	5	71.4270	23.8230	Grade 50	W40X199			
	10	6	0.0000	68.1771	Grade 50	W40X199			

Member 05:

Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			

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Std Section	No.	Ref. Span	Start (ft)	Length (ft)	Material	Section			
	1	1	0.0000	65.1771	Grade 50	W40X199			
	2	2	0.0000	22.8220	Grade 50	W40X199			
	3	2	22.8220	69.1780	Grade 50	W40X199			
	4	3	0.0000	29.5720	Grade 50	W40X199			
	5	3	29.5720	54.4280	Grade 50	W40X199			
	6	4	0.0000	54.4270	Grade 50	W40X199			
	7	4	54.4270	29.5730	Grade 50	W40X199			
	8	5	0.0000	71.4270	Grade 50	W40X199			
	9	5	71.4270	23.8230	Grade 50	W40X199			
	10	6	0.0000	68.1771	Grade 50	W40X199			

Cross-frame/Diaphragm Definition

Frame Name: CFD01

Frame Type: Frame X

Top Strut

Enabled: Yes
 Top Left Distance (in): 2.000000
 Top Right Distance (in): 2.000000
 Begin Offset (in): 1.000000
 End Offset (in): 1.000000
 Section: L3X3X3/8
 Double Section: No
 Gap Between Sections (in): 0
 Material: Grade 50
 Center Line Reference: Top
 Vertical Orientation: Long leg vertical
 Horizontal Orientation: N/A

Bottom Strut

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Enabled: Yes
 Bottom Left Distance (in): 2.000000
 Bottom Right Distance (in): 2.000000
 Begin Offset (in): 1.000000
 End Offset (in): 1.000000
 Section: L3X3X3/8
 Double Section: No
 Gap Between Sections (in): 0
 Material: Grade 50
 Center Line Reference: Bottom
 Vertical Orientation: Long leg horizontal
 Horizontal Orientation: N/A

Left Diagonal

Bottom Left Distance (in): 8.000000
 Top Right Distance (in): 8.000000
 Begin Offset (in): 3.000000
 End Offset (in): 3.000000
 Section: L3X3X3/8
 Double Section: No
 Gap Between Sections (in): 0
 Material: Grade 50
 Center Line Reference: Middle
 Vertical Orientation: Long leg vertical
 Horizontal Orientation: N/A

Right Diagonal

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Top Left Distance (in): 8.000000
 Bottom Right Distance (in): 8.000000
 Begin Offset (in): 3.000000
 End Offset (in): 3.000000
 Section: L3X3X3/8
 Double Section: No
 Gap Between Sections (in): 0
 Material: Grade 50
 Center Line Reference: Middle
 Vertical Orientation: Long leg vertical
 Horizontal Orientation: N/A

Frame Name: CFD02

Frame Type: Frame X

Top Strut

Enabled: Yes
 Top Left Distance (in): 2.000000
 Top Right Distance (in): 2.000000
 Begin Offset (in): 0.000000
 End Offset (in): 0.000000
 Section: L3X3X3/8
 Double Section: No
 Gap Between Sections (in): 0
 Material: Grade 50
 Center Line Reference: Top
 Vertical Orientation: Long leg vertical
 Horizontal Orientation: N/A

Bottom Strut

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Enabled: Yes
 Bottom Left Distance (in): 2.000000
 Bottom Right Distance (in): 2.000000
 Begin Offset (in): 0.000000
 End Offset (in): 0.000000
 Section: L3X3X3/8
 Double Section: No
 Gap Between Sections (in): 0
 Material: Grade 50
 Center Line Reference: Bottom
 Vertical Orientation: Long leg vertical
 Horizontal Orientation: N/A

Left Diagonal

Bottom Left Distance (in): 0.000000
 Top Right Distance (in): 0.000000
 Begin Offset (in): 0.000000
 End Offset (in): 0.000000
 Section: None
 Double Section: No
 Gap Between Sections (in): 0
 Material: None
 Center Line Reference: Middle
 Vertical Orientation: N/A
 Horizontal Orientation: N/A

Right Diagonal

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Top Left Distance (in): 0.000000
Bottom Right Distance (in): 0.000000
Begin Offset (in): 0.000000
End Offset (in): 0.000000
Section: None
Double Section: No
Gap Between Sections (in): 0
Material: None
Center Line Reference: Middle
Vertical Orientation: N/A
Horizontal Orientation: N/A

Cross-frame/Diaphragm Location

Member Group:

Bay 01

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/Diaphragm	CFD Orientation	Connection Type	Permanent/Temporary
1	Absolute (ft)	0.0000	0.0000	Yes	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	6.6771	11.3421	No	CFD02	Upstation	Welded	Permanent
3	Absolute (ft)	23.2917	27.9567	No	CFD02	Upstation	Welded	Permanent
4	Absolute (ft)	39.8750	44.5400	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	48.2083	52.8733	No	CFD01	Upstation	Welded	Permanent
6	Absolute (ft)	56.5416	61.2066	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	65.1771	65.1771	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	70.4271	75.0921	No	CFD02	Upstation	Welded	Permanent
9	Absolute (ft)	81.0104	85.6754	No	CFD02	Upstation	Welded	Permanent
10	Absolute (ft)	98.0104	102.6754	No	CFD02	Upstation	Welded	Permanent
11	Absolute (ft)	115.0104	119.6754	No	CFD02	Upstation	Welded	Permanent
12	Absolute (ft)	132.0104	136.6754	No	CFD01	Upstation	Welded	Permanent
13	Absolute (ft)	140.2604	144.9254	No	CFD01	Upstation	Welded	Permanent
14	Absolute (ft)	148.5104	153.1754	No	CFD01	Upstation	Welded	Permanent
15	Absolute (ft)	157.1771	157.1771	No	CFD01	Upstation	Welded	Permanent

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Bay 01

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
16	Absolute (ft)	162.4271	167.0921	No	CFD02	Upstation	Welded	Temporary
17	Absolute (ft)	179.7604	184.4254	No	CFD02	Upstation	Welded	Permanent
18	Absolute (ft)	197.5937	202.2587	No	CFD02	Upstation	Welded	Permanent
19	Absolute (ft)	215.4270	220.0920	No	CFD01	Upstation	Welded	Permanent
20	Absolute (ft)	223.9687	228.6337	No	CFD01	Upstation	Welded	Permanent
21	Absolute (ft)	232.5104	237.1754	No	CFD01	Upstation	Welded	Permanent
22	Absolute (ft)	241.1771	241.1771	No	CFD01	Upstation	Welded	Permanent
23	Absolute (ft)	248.2604	252.9254	No	CFD02	Upstation	Welded	Permanent
24	Absolute (ft)	266.0937	270.7587	No	CFD02	Upstation	Welded	Permanent
25	Absolute (ft)	283.9270	288.5920	No	CFD02	Upstation	Welded	Permanent
26	Absolute (ft)	300.0520	304.7170	No	CFD01	Upstation	Welded	Permanent
27	Absolute (ft)	308.2812	312.9462	No	CFD01	Upstation	Welded	Permanent
28	Absolute (ft)	316.5104	321.1754	No	CFD01	Upstation	Welded	Permanent
29	Absolute (ft)	325.1771	325.1771	No	CFD01	Upstation	Welded	Permanent
30	Absolute (ft)	330.9271	335.5921	No	CFD02	Upstation	Welded	Permanent
31	Absolute (ft)	345.5941	350.2591	No	CFD02	Upstation	Welded	Permanent
32	Absolute (ft)	360.2611	364.9261	No	CFD02	Upstation	Welded	Permanent
33	Absolute (ft)	374.9281	379.5931	No	CFD02	Upstation	Welded	Permanent
34	Absolute (ft)	389.5951	394.2601	No	CFD02	Upstation	Welded	Permanent
35	Absolute (ft)	404.1368	408.8018	No	CFD01	Upstation	Welded	Permanent
36	Absolute (ft)	411.7618	416.4268	No	CFD01	Upstation	Welded	Permanent
37	Absolute (ft)	420.4271	420.4271	No	CFD01	Upstation	Welded	Permanent
38	Absolute (ft)	427.5208	432.1858	No	CFD02	Upstation	Welded	Permanent
39	Absolute (ft)	445.1875	449.8525	No	CFD02	Upstation	Welded	Permanent
40	Absolute (ft)	462.8542	467.5192	No	CFD01	Upstation	Welded	Permanent
41	Absolute (ft)	471.3959	476.0609	No	CFD01	Upstation	Welded	Permanent
42	Absolute (ft)	479.9376	484.6026	No	CFD01	Upstation	Welded	Permanent
43	Absolute (ft)	488.6042	488.6042	No	CFD01	Upstation	Welded	Permanent

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Bay 02

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	0.0000	0.0000	Yes	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	11.3421	16.0071	No	CFD02	Upstation	Welded	Permanent
3	Absolute (ft)	27.9567	32.6217	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	44.5400	49.2050	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	52.8733	57.5383	No	CFD02	Upstation	Welded	Permanent
6	Absolute (ft)	65.1771	65.1771	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	75.0921	79.7571	No	CFD02	Upstation	Welded	Permanent
8	Absolute (ft)	85.6754	90.3404	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	102.6754	107.3404	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	119.6754	124.3404	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	136.6754	141.3404	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	144.9254	149.5904	No	CFD02	Upstation	Welded	Permanent
13	Absolute (ft)	157.1771	157.1771	No	CFD01	Upstation	Welded	Permanent
14	Absolute (ft)	167.0921	171.7571	No	CFD02	Upstation	Welded	Permanent
15	Absolute (ft)	184.4254	189.0904	No	CFD01	Upstation	Welded	Permanent
16	Absolute (ft)	202.2587	206.9237	No	CFD01	Upstation	Welded	Permanent
17	Absolute (ft)	220.0920	224.7570	No	CFD01	Upstation	Welded	Permanent
18	Absolute (ft)	228.6337	233.2987	No	CFD02	Upstation	Welded	Permanent
19	Absolute (ft)	241.1771	241.1771	No	CFD01	Upstation	Welded	Permanent
20	Absolute (ft)	252.9254	257.5904	No	CFD02	Upstation	Welded	Permanent
21	Absolute (ft)	270.7587	275.4237	No	CFD01	Upstation	Welded	Permanent
22	Absolute (ft)	288.5920	293.2570	No	CFD01	Upstation	Welded	Permanent
23	Absolute (ft)	304.7170	309.3820	No	CFD01	Upstation	Welded	Permanent
24	Absolute (ft)	312.9462	317.6112	No	CFD02	Upstation	Welded	Permanent
25	Absolute (ft)	325.1771	325.1771	No	CFD01	Upstation	Welded	Permanent
26	Absolute (ft)	335.5921	340.2571	No	CFD02	Upstation	Welded	Permanent
27	Absolute (ft)	350.2591	354.9241	No	CFD01	Upstation	Welded	Permanent
28	Absolute (ft)	364.9261	369.5911	No	CFD01	Upstation	Welded	Permanent
29	Absolute (ft)	379.5931	384.2581	No	CFD01	Upstation	Welded	Permanent

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Bay 02

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
30	Absolute (ft)	394.2601	398.9251	No	CFD01	Upstation	Welded	Permanent
31	Absolute (ft)	401.1228	405.7878	No	CFD01	Upstation	Welded	Permanent
32	Absolute (ft)	408.8018	413.4668	No	CFD02	Upstation	Welded	Permanent
33	Absolute (ft)	420.4271	420.4271	No	CFD01	Upstation	Welded	Permanent
34	Absolute (ft)	432.1858	436.8508	No	CFD02	Upstation	Welded	Permanent
35	Absolute (ft)	449.8525	454.5175	No	CFD01	Upstation	Welded	Permanent
36	Absolute (ft)	467.5192	472.1842	No	CFD01	Upstation	Welded	Permanent
37	Absolute (ft)	476.0609	480.7259	No	CFD02	Upstation	Welded	Permanent
38	Absolute (ft)	488.6042	488.6042	No	CFD01	Upstation	Welded	Permanent

Bay 03

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	0.0000	0.0000	Yes	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	7.6680	12.3330	No	CFD02	Upstation	Welded	Permanent
3	Absolute (ft)	16.0071	20.6721	No	CFD01	Upstation	Welded	Permanent
4	Absolute (ft)	32.6217	37.2867	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	49.2050	53.8700	No	CFD02	Upstation	Welded	Permanent
6	Absolute (ft)	65.1771	65.1771	No	CFD01	Upstation	Welded	Permanent
7	Absolute (ft)	72.0951	76.7601	No	CFD02	Upstation	Welded	Permanent
8	Absolute (ft)	79.7571	84.4221	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	90.3404	95.0054	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	107.3404	112.0054	No	CFD01	Upstation	Welded	Permanent
11	Absolute (ft)	124.3404	129.0054	No	CFD01	Upstation	Welded	Permanent
12	Absolute (ft)	141.3404	146.0054	No	CFD02	Upstation	Welded	Permanent
13	Absolute (ft)	157.1771	157.1771	No	CFD01	Upstation	Welded	Permanent
14	Absolute (ft)	164.0961	168.7611	No	CFD02	Upstation	Welded	Permanent
15	Absolute (ft)	171.7571	176.4221	No	CFD01	Upstation	Welded	Permanent
16	Absolute (ft)	189.0904	193.7554	No	CFD01	Upstation	Welded	Permanent

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Bay 03

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
17	Absolute (ft)	206.9237	211.5887	No	CFD01	Upstation	Welded	Permanent
18	Absolute (ft)	224.7570	229.4220	No	CFD02	Upstation	Welded	Permanent
19	Absolute (ft)	241.1771	241.1771	No	CFD01	Upstation	Welded	Permanent
20	Absolute (ft)	249.0541	253.7191	No	CFD02	Upstation	Welded	Permanent
21	Absolute (ft)	257.5904	262.2554	No	CFD01	Upstation	Welded	Permanent
22	Absolute (ft)	275.4237	280.0887	No	CFD01	Upstation	Welded	Permanent
23	Absolute (ft)	293.2570	297.9220	No	CFD01	Upstation	Welded	Permanent
24	Absolute (ft)	309.3820	314.0470	No	CFD02	Upstation	Welded	Permanent
25	Absolute (ft)	325.1771	325.1771	No	CFD01	Upstation	Welded	Permanent
26	Absolute (ft)	332.3871	337.0521	No	CFD02	Upstation	Welded	Permanent
27	Absolute (ft)	340.2571	344.9221	No	CFD01	Upstation	Welded	Permanent
28	Absolute (ft)	354.9241	359.5891	No	CFD01	Upstation	Welded	Permanent
29	Absolute (ft)	369.5911	374.2561	No	CFD01	Upstation	Welded	Permanent
30	Absolute (ft)	384.2581	388.9231	No	CFD01	Upstation	Welded	Permanent
31	Absolute (ft)	398.9251	403.5901	No	CFD01	Upstation	Welded	Permanent
32	Absolute (ft)	405.7878	410.4528	No	CFD02	Upstation	Welded	Permanent
33	Absolute (ft)	420.4271	420.4271	No	CFD01	Upstation	Welded	Permanent
34	Absolute (ft)	428.2961	432.9611	No	CFD02	Upstation	Welded	Permanent
35	Absolute (ft)	436.8508	441.5158	No	CFD01	Upstation	Welded	Permanent
36	Absolute (ft)	454.5175	459.1825	No	CFD01	Upstation	Welded	Permanent
37	Absolute (ft)	472.1842	476.8492	No	CFD02	Upstation	Welded	Permanent
38	Absolute (ft)	488.6042	488.6042	No	CFD01	Upstation	Welded	Permanent

Bay 04

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
1	Absolute (ft)	0.0000	0.0000	Yes	CFD01	Upstation	Welded	Permanent
2	Absolute (ft)	4.0000	8.6670	No	CFD01	Upstation	Welded	Permanent
3	Absolute (ft)	12.3330	16.9980	No	CFD01	Upstation	Welded	Permanent

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Bay 04

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
4	Absolute (ft)	20.6721	25.3371	No	CFD01	Upstation	Welded	Permanent
5	Absolute (ft)	37.2867	41.9517	No	CFD02	Upstation	Welded	Permanent
6	Absolute (ft)	53.8700	58.5350	No	CFD02	Upstation	Welded	Permanent
7	Absolute (ft)	65.1771	65.1771	No	CFD01	Upstation	Welded	Permanent
8	Absolute (ft)	69.1771	73.8421	No	CFD01	Upstation	Welded	Permanent
9	Absolute (ft)	76.7601	81.4251	No	CFD01	Upstation	Welded	Permanent
10	Absolute (ft)	95.0054	99.6704	No	CFD02	Upstation	Welded	Permanent
11	Absolute (ft)	112.0054	116.6704	No	CFD02	Upstation	Welded	Permanent
12	Absolute (ft)	129.0054	133.6704	No	CFD02	Upstation	Welded	Permanent
13	Absolute (ft)	146.0054	150.6704	No	CFD02	Upstation	Welded	Permanent
14	Absolute (ft)	157.1771	157.1771	No	CFD01	Upstation	Welded	Permanent
15	Absolute (ft)	161.1771	165.8421	No	CFD01	Upstation	Welded	Permanent
16	Absolute (ft)	168.7611	173.4261	No	CFD01	Upstation	Welded	Permanent
17	Absolute (ft)	176.4221	181.0871	No	CFD01	Upstation	Welded	Permanent
18	Absolute (ft)	193.7554	198.4204	No	CFD02	Upstation	Welded	Permanent
19	Absolute (ft)	211.5887	216.2537	No	CFD02	Upstation	Welded	Permanent
20	Absolute (ft)	229.4220	234.0870	No	CFD02	Upstation	Welded	Permanent
21	Absolute (ft)	241.1771	241.1771	No	CFD01	Upstation	Welded	Permanent
22	Absolute (ft)	245.1771	249.8421	No	CFD01	Upstation	Welded	Permanent
23	Absolute (ft)	253.7191	258.3841	No	CFD01	Upstation	Welded	Permanent
24	Absolute (ft)	262.2554	266.9204	No	CFD01	Upstation	Welded	Permanent
25	Absolute (ft)	280.0887	284.7537	No	CFD02	Upstation	Welded	Permanent
26	Absolute (ft)	297.9220	302.5870	No	CFD02	Upstation	Welded	Permanent
27	Absolute (ft)	314.0470	318.7120	No	CFD02	Upstation	Welded	Permanent
28	Absolute (ft)	325.1771	325.1771	No	CFD01	Upstation	Welded	Permanent
29	Absolute (ft)	329.1771	333.8421	No	CFD01	Upstation	Welded	Permanent
30	Absolute (ft)	337.0521	341.7171	No	CFD01	Upstation	Welded	Permanent
31	Absolute (ft)	344.9221	349.5871	No	CFD01	Upstation	Welded	Permanent
32	Absolute (ft)	359.5891	364.2541	No	CFD02	Upstation	Welded	Permanent

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Bay 04

No.	Location Type	Left Location	Right Location	Link Left-Right	Cross-Frame/ Diaphragm	CFD Orientation	Connection Type	Permanent/ Temporary
33	Absolute (ft)	374.2561	378.9211	No	CFD02	Upstation	Welded	Permanent
34	Absolute (ft)	388.9231	393.5881	No	CFD02	Upstation	Welded	Permanent
35	Absolute (ft)	403.5901	408.2551	No	CFD02	Upstation	Welded	Permanent
36	Absolute (ft)	410.4528	415.1178	No	CFD02	Upstation	Welded	Permanent
37	Absolute (ft)	420.4271	420.4271	No	CFD01	Upstation	Welded	Permanent
38	Absolute (ft)	424.4271	429.0921	No	CFD01	Upstation	Welded	Permanent
39	Absolute (ft)	432.9611	437.6261	No	CFD01	Upstation	Welded	Permanent
40	Absolute (ft)	441.5158	446.1808	No	CFD01	Upstation	Welded	Permanent
41	Absolute (ft)	459.1825	463.8475	No	CFD02	Upstation	Welded	Permanent
42	Absolute (ft)	476.8492	481.5142	No	CFD02	Upstation	Welded	Permanent
43	Absolute (ft)	488.6042	488.6042	No	CFD01	Upstation	Welded	Permanent

Stiffener Definition

Stiff01

Function: Connection plate

Width (in): 7.5000

Thickness (in): 0.7500

Material: Grade 50

Corner Clip:

Top Inner H (in): 1.0000

Top Inner V(in): 2.5000

Top Outer H (in): 0.0000

Top Outer V (in): 0.0000

Bottom Inner H (in): 1.0000

Bottom Inner V(in): 2.5000

Bottom Outer H (in): 0.0000

Bottom Outer V (in): 0.0000

Shear Connector Locations

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Shear Connector Type: Generic

Member Group:

Member 01

No.	Location Type	Begin Location	End Location	Type
1	Absolute (ft)	0.0000	488.6042	Composite

Member 02

No.	Location Type	Begin Location	End Location	Type
1	Absolute (ft)	0.0000	488.6042	Composite

Member 03

No.	Location Type	Begin Location	End Location	Type
1	Absolute (ft)	0.0000	488.6042	Composite

Member 04

No.	Location Type	Begin Location	End Location	Type
1	Absolute (ft)	0.0000	488.6042	Composite

Member 05

No.	Location Type	Begin Location	End Location	Type
1	Absolute (ft)	0.0000	488.6042	Composite

Appurtenance Locations

Parapet

No.	Appurtenance Name	Reference Element	Reference Offset(ft)	Refrence Location	Reference Back	Reference Method	Offset (ft)	Reference Ahead	Reference Method	Offset (ft)
1	SBR-3-20 (36")	Left edge of slab	0.1667	Outside face	Support 01	Along alignment	0.0000	Support 07	Along alignment	0.0000
2	SBR-3-20 (36")	Right edge of slab	0.1667	Outside face	Support 01	Along alignment	0.0000	Support 07	Along alignment	0.0000

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Substructure

Abutments

Abutment Location: Support 01

Start Elevation: 0.0000 ft

Keep top of the cap straight: Yes

End Elevation: 0.0000 ft

Skew Angle: 31.8806 deg

Factor of Reduced Moment of Inertia: 1.0000

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Abutment Type: Pile Cap

Cap:

Cap Length (ft): 43.180307

Back Wall Width (ft): 1.000000

Back Wall Depth (ft): 4.250000

Seat Width (ft): 6.000000

Seat Depth (ft): 5.000000

Wing Wall/Approach Slab:

Wing Wall Width (ft): 0.000000

Wing Wall Height (ft): 0.000000

Wing Wall Thickness (ft): 0.000000

Wing Wall Skew (deg): 0.000000

Approach Slab Width (ft): 0.000000

Approach Slab Length (ft): 0.000000

Approach Slab Thickness (ft): 0.000000

Piles:

Support 01 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Rotation (deg): 0.000000

Diameter (in) 12.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Abutment Location: Support 07

Start Elevation: 0.0000 ft

Keep top of the cap straight: Yes

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End Elevation: 0.0000 ft Skew Angle: 31.8806 deg

Factor of Reduced Moment of Inertia: 1.0000

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Abutment Type: Pile Cap

Cap:

Cap Length (ft): 43.180307

Back Wall Width (ft): 1.000000

Back Wall Depth (ft): 4.250000

Seat Width (ft): 6.000000

Seat Depth (ft): 5.000000

Wing Wall/Approach Slab:

Wing Wall Width (ft): 0.000000

Wing Wall Height (ft): 0.000000

Wing Wall Thickness (ft): 0.000000

Wing Wall Skew (deg): 0.000000

Approach Slab Width (ft): 0.000000

Approach Slab Length (ft): 0.000000

Approach Slab Thickness (ft): 0.000000

Piles:

Support 07 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in): 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Piers

Pier Location: Support 02

Start Elevation: 0.0000 ft

Keep top of the cap straight: Yes

End Elevation: 0.0000 ft

Skew Angle: 31.8806 deg

Factor of Reduced Moment of Inertia: 1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
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Bearings:

Line 1 Offset: 0.0000 in
Line 2 Offset: 0.0000 in

Pier Type: Multi columns

Cap Shape: Straight

Column Shape: Round

Cap:

Cap Length (ft): 43.180307
Height (ft): 5.000000
Width (ft): 5.000000

Cap Edge:

Edge Type:	Top Offset
Top Offset (ft):	0.000000
Fillet Radius (ft):	0.000000
Chamfer X (ft):	0.000000
Chamfer Y (ft):	0.000000

Columns:

Number of Columns: 2

Support 02 Column 01

Distance from edge (ft): 14.393436
Bottom Elevation (ft): 0.000000
Length (ft): 20.000000
Diameter (ft): 5.000000

Footing Type: Rectangular Isolated

Support 02 Column 02

Distance from edge (ft): 28.786872
Bottom Elevation (ft): 0.000000
Length (ft): 20.000000
Diameter (ft): 5.000000

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
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Footing Type: Rectangular Isolated

Footings:

Support 02 Column 01 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Support 02 Column 02 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 02 Column 01 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in) 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Support 02 Column 02 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in) 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
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Pier Location: Support 03

Start Elevation: 0.0000 ft Keep top of the cap straight: Yes
End Elevation: 0.0000 ft Skew Angle: 31.8806 deg
Factor of Reduced Moment of Inertia: 1

Bearings:

Line 1 Offset: 0.0000 in
Line 2 Offset: 0.0000 in

Pier Type: Multi columns

Cap Shape: Straight

Column Shape: Round

Cap:

Cap Length (ft): 43.180307
Height (ft): 5.000000
Width (ft): 5.000000

Cap Edge:

Edge Type:	Top Offset
Top Offset (ft):	0.000000
Fillet Radius (ft):	0.000000
Chamfer X (ft):	0.000000
Chamfer Y (ft):	0.000000

Columns:

Number of Columns: 2

Support 03 Column 01

Distance from edge (ft): 14.393436
Bottom Elevation (ft): 0.000000
Length (ft): 20.000000
Diameter (ft): 5.000000

Footing Type: Rectangular Isolated

Support 03 Column 02

Distance from edge (ft): 28.786872
Bottom Elevation (ft): 0.000000

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
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Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Footings:

Support 03 Column 01 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Support 03 Column 02 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 03 Column 01 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in) 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Support 03 Column 02 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Rotation (deg): 0.000000

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
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Diameter (in) 12.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Pier Location: Support 04

Start Elevation: 0.0000 ft

Keep top of the cap straight: Yes

End Elevation: 0.0000 ft

Skew Angle: 31.8806 deg

Factor of Reduced Moment of Inertia: 1

Bearings:

Line 1 Offset: 0.0000 in

Line 2 Offset: 0.0000 in

Pier Type: Multi columns

Cap Shape: Straight

Column Shape: Round

Cap:

Cap Length (ft): 43.180307

Height (ft): 5.000000

Width (ft): 5.000000

Cap Edge:

Edge Type: Top Offset

Top Offset (ft): 0.000000

Fillet Radius (ft): 0.000000

Chamfer X (ft): 0.000000

Chamfer Y (ft): 0.000000

Columns:

Number of Columns: 2

Support 04 Column 01

Distance from edge (ft): 14.393436

Bottom Elevation (ft): 0.000000

Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
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Support 04 Column 02

Distance from edge (ft): 28.786872

Bottom Elevation (ft): 0.000000

Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Footings:

Support 04 Column 01 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Support 04 Column 02 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 04 Column 01 PilePattern

Enable Piles: Yes

Pile Shape: Circular

Diameter (in) 12.000000

Rotation (deg): 0.000000

Length (in): 360.000000

Embed Length (in): 0.000000

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:54 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

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Support 04 Column 02 PilePattern

Enable Piles:	Yes	Rotation (deg):	0.000000
Pile Shape:	Circular	Length (in):	360.000000
Diameter (in)	12.000000	Embed Length (in):	0.000000

Pier Location: Support 05

Start Elevation:	0.0000	ft	Keep top of the cap straight:	Yes
End Elevation:	0.0000	ft	Skew Angle:	31.8806 deg
Factor of Reduced Moment of Inertia:	1			

Bearings:

Line 1 Offset:	0.0000 in
Line 2 Offset:	0.0000 in

Pier Type: Multi columns
 Cap Shape: Straight
 Column Shape: Round

Cap:

Cap Length (ft):	43.180307
Height (ft):	5.000000
Width (ft):	5.000000
Cap Edge:	
Edge Type:	Top Offset
Top Offset (ft):	0.000000
Fillet Radius (ft):	0.000000
Chamfer X (ft):	0.000000
Chamfer Y (ft):	0.000000

Columns:

Number of Columns: 2

Support 05 Column 01

Distance from edge (ft):	14.393436
Bottom Elevation (ft):	0.000000

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Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Support 05 Column 02

Distance from edge (ft): 28.786872

Bottom Elevation (ft): 0.000000

Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Footings:

Support 05 Column 01 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Support 05 Column 02 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Piles:

Support 05 Column 01 PilePattern

Enable Piles: Yes

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Pile Shape:	Circular	Rotation (deg):	0.000000
Diameter (in)	12.000000	Length (in):	360.000000
		Embed Length (in):	0.000000

Support 05 Column 02 PilePattern

Enable Piles:	Yes		
Pile Shape:	Circular	Rotation (deg):	0.000000
Diameter (in)	12.000000	Length (in):	360.000000
		Embed Length (in):	0.000000

Pier Location: Support 06

Start Elevation:	0.0000	ft	Keep top of the cap straight:	Yes
End Elevation:	0.0000	ft	Skew Angle:	31.8806 deg
Factor of Reduced Moment of Inertia:	1			

Bearings:

Line 1 Offset:	0.0000 in
Line 2 Offset:	0.0000 in

Pier Type:	Multi columns
Cap Shape:	Straight
Column Shape:	Round

Cap:

Cap Length (ft):	43.180307
Height (ft):	5.000000
Width (ft):	5.000000
Cap Edge:	
Edge Type:	Top Offset
Top Offset (ft):	0.000000
Fillet Radius (ft):	0.000000
Chamfer X (ft):	0.000000
Chamfer Y (ft):	0.000000

Columns:

Number of Columns: 2

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Support 06 Column 01

Distance from edge (ft): 14.393436

Bottom Elevation (ft): 0.000000

Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Support 06 Column 02

Distance from edge (ft): 28.786872

Bottom Elevation (ft): 0.000000

Length (ft): 20.000000

Diameter (ft) 5.000000

Footing Type: Rectangular Isolated

Footings:

Support 06 Column 01 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

Support 06 Column 02 Footing

Footing Length(ft): 12.000000

Footing Width(ft): 12.000000

Footing Depth(ft): 3.000000

Footing Position under Column: Concentric under Column

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Piles:

Support 06 Column 01 PilePattern

Enable Piles:	Yes	Rotation (deg):	0.000000
Pile Shape:	Circular	Length (in):	360.000000
Diameter (in)	12.000000	Embed Length (in):	0.000000

Support 06 Column 02 PilePattern

Enable Piles:	Yes	Rotation (deg):	0.000000
Pile Shape:	Circular	Length (in):	360.000000
Diameter (in)	12.000000	Embed Length (in):	0.000000

Support Condition

Abutment/Pier Location: Support 01

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
2	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	Group01.Member 05	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 02

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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Abutment/Pier Location: Support 02

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 05	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 03

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 05	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 04

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Fixed	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Fixed	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Fixed	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Fixed	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 05	Fixed	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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Abutment/Pier Location: Support 05

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 05	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 06

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 05	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Abutment/Pier Location: Support 07

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 01	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 02	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 03	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
1	Group01.Member 04	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

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Abutment/Pier Location: Support 07

Bearing Line	Member	Support Type	Angle (deg)	KFX (k/ft)	KFZ (k/ft)	KMX (k-ft/deg)	KMY (k-ft/deg)	KMZ (k-ft/deg)
1	Group01.Member 05	Roller	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Loads

Dead Loads / DC1 Group

Additional Overhang & Haunch

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Trapezoidal	Group	---	ft	0.1210	0.0000	0.1210	486.2500
Group01	2	Trapezoidal	Group	---	ft	0.0329	0.0000	0.0329	486.2500
Group01	5	Trapezoidal	Group	---	ft	0.1210	0.0000	0.1210	486.2500
Group01	3	Trapezoidal	Group	---	ft	0.0329	0.0000	0.0329	486.2500
Group01	4	Trapezoidal	Group	---	ft	0.0329	0.0000	0.0329	486.2500

Initial - Self Weight Steel

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Trapezoidal	Group	---	ft	0.1959	0.0000	0.1959	65.1771
Group01	1	Trapezoidal	Group	---	ft	0.1959	65.1771	0.1959	87.9991
Group01	1	Trapezoidal	Group	---	ft	0.1959	87.9991	0.1959	157.1771
Group01	1	Trapezoidal	Group	---	ft	0.1959	157.1771	0.1959	186.7491
Group01	1	Trapezoidal	Group	---	ft	0.1959	186.7491	0.1959	241.1771
Group01	1	Trapezoidal	Group	---	ft	0.1959	241.1771	0.1959	295.6041
Group01	1	Trapezoidal	Group	---	ft	0.1959	295.6041	0.1959	325.1771
Group01	1	Trapezoidal	Group	---	ft	0.1959	325.1771	0.1959	396.6041
Group01	1	Trapezoidal	Group	---	ft	0.1959	396.6041	0.1959	420.4271
Group01	1	Trapezoidal	Group	---	ft	0.1959	420.4271	0.1959	488.6042
Group01	2	Trapezoidal	Group	---	ft	0.1959	0.0000	0.1959	65.1771
Group01	2	Trapezoidal	Group	---	ft	0.1959	65.1771	0.1959	87.9991
Group01	2	Trapezoidal	Group	---	ft	0.1959	87.9991	0.1959	157.1771
Group01	2	Trapezoidal	Group	---	ft	0.1959	157.1771	0.1959	186.7491
Group01	2	Trapezoidal	Group	---	ft	0.1959	186.7491	0.1959	241.1771

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	2	Trapezoidal	Group	---	ft	0.1959	241.1771	0.1959	295.6041
Group01	2	Trapezoidal	Group	---	ft	0.1959	295.6041	0.1959	325.1771
Group01	2	Trapezoidal	Group	---	ft	0.1959	325.1771	0.1959	396.6041
Group01	2	Trapezoidal	Group	---	ft	0.1959	396.6041	0.1959	420.4271
Group01	2	Trapezoidal	Group	---	ft	0.1959	420.4271	0.1959	488.6042
Group01	3	Trapezoidal	Group	---	ft	0.1959	0.0000	0.1959	65.1771
Group01	3	Trapezoidal	Group	---	ft	0.1959	65.1771	0.1959	87.9991
Group01	3	Trapezoidal	Group	---	ft	0.1959	87.9991	0.1959	157.1771
Group01	3	Trapezoidal	Group	---	ft	0.1959	157.1771	0.1959	186.7491
Group01	3	Trapezoidal	Group	---	ft	0.1959	186.7491	0.1959	241.1771
Group01	3	Trapezoidal	Group	---	ft	0.1959	241.1771	0.1959	295.6041
Group01	3	Trapezoidal	Group	---	ft	0.1959	295.6041	0.1959	325.1771
Group01	3	Trapezoidal	Group	---	ft	0.1959	325.1771	0.1959	396.6041
Group01	3	Trapezoidal	Group	---	ft	0.1959	396.6041	0.1959	420.4271
Group01	3	Trapezoidal	Group	---	ft	0.1959	420.4271	0.1959	488.6042
Group01	4	Trapezoidal	Group	---	ft	0.1959	0.0000	0.1959	65.1771
Group01	4	Trapezoidal	Group	---	ft	0.1959	65.1771	0.1959	87.9991
Group01	4	Trapezoidal	Group	---	ft	0.1959	87.9991	0.1959	157.1771
Group01	4	Trapezoidal	Group	---	ft	0.1959	157.1771	0.1959	186.7491
Group01	4	Trapezoidal	Group	---	ft	0.1959	186.7491	0.1959	241.1771
Group01	4	Trapezoidal	Group	---	ft	0.1959	241.1771	0.1959	295.6041
Group01	4	Trapezoidal	Group	---	ft	0.1959	295.6041	0.1959	325.1771
Group01	4	Trapezoidal	Group	---	ft	0.1959	325.1771	0.1959	396.6041
Group01	4	Trapezoidal	Group	---	ft	0.1959	396.6041	0.1959	420.4271
Group01	4	Trapezoidal	Group	---	ft	0.1959	420.4271	0.1959	488.6042
Group01	5	Trapezoidal	Group	---	ft	0.1959	0.0000	0.1959	65.1771
Group01	5	Trapezoidal	Group	---	ft	0.1959	65.1771	0.1959	87.9991
Group01	5	Trapezoidal	Group	---	ft	0.1959	87.9991	0.1959	157.1771
Group01	5	Trapezoidal	Group	---	ft	0.1959	157.1771	0.1959	186.7491
Group01	5	Trapezoidal	Group	---	ft	0.1959	186.7491	0.1959	241.1771
Group01	5	Trapezoidal	Group	---	ft	0.1959	241.1771	0.1959	295.6041
Group01	5	Trapezoidal	Group	---	ft	0.1959	295.6041	0.1959	325.1771
Group01	5	Trapezoidal	Group	---	ft	0.1959	325.1771	0.1959	396.6041
Group01	5	Trapezoidal	Group	---	ft	0.1959	396.6041	0.1959	420.4271
Group01	5	Trapezoidal	Group	---	ft	0.1959	420.4271	0.1959	488.6042

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Stage 01 - Self Weight Slab

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Trapezoidal	Group	---	ft	0.7526	0.0000	0.7526	488.6042
Group01	2	Trapezoidal	Group	---	ft	0.7969	0.0000	0.7969	488.6042
Group01	3	Trapezoidal	Group	---	ft	0.7969	0.0000	0.7969	488.6042
Group01	4	Trapezoidal	Group	---	ft	0.7969	0.0000	0.7969	488.6042
Group01	5	Trapezoidal	Group	---	ft	0.7526	0.0000	0.7526	488.6042

Final - Self Weight Slab

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Trapezoidal	Group	---	ft	0.7526	0.0000	0.7526	488.6042
Group01	2	Trapezoidal	Group	---	ft	0.7969	0.0000	0.7969	488.6042
Group01	3	Trapezoidal	Group	---	ft	0.7969	0.0000	0.7969	488.6042
Group01	4	Trapezoidal	Group	---	ft	0.7969	0.0000	0.7969	488.6042
Group01	5	Trapezoidal	Group	---	ft	0.7526	0.0000	0.7526	488.6042

Initial - Self Weight X-Frames

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Point	Group	---	%	0.1298	0.0000	---	---
Group01	2	Point	Group	---	%	0.2595	0.0000	---	---
Group01	1	Point	Group	---	%	0.0538	1.3666	---	---
Group01	2	Point	Group	---	%	0.1077	2.3213	---	---
Group01	1	Point	Group	---	%	0.0538	4.7670	---	---
Group01	2	Point	Group	---	%	0.1650	5.7217	---	---
Group01	1	Point	Group	---	%	0.1111	8.1610	---	---
Group01	2	Point	Group	---	%	0.2222	9.1158	---	---
Group01	1	Point	Group	---	%	0.1111	9.8665	---	---
Group01	2	Point	Group	---	%	0.1650	10.8213	---	---
Group01	1	Point	Group	---	%	0.1111	11.5721	---	---
Group01	2	Point	Group	---	%	0.1111	12.5268	---	---
Group01	1	Point	Group	---	%	0.1298	13.3394	---	---
Group01	2	Point	Group	---	%	0.2595	13.3394	---	---
Group01	1	Point	Group	---	%	0.0538	14.4139	---	---

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	2	Point	Group	---	%	0.1077	15.3687	---	---
Group01	1	Point	Group	---	%	0.0538	16.5800	---	---
Group01	2	Point	Group	---	%	0.1650	17.5347	---	---
Group01	1	Point	Group	---	%	0.0538	20.0593	---	---
Group01	2	Point	Group	---	%	0.1650	21.0140	---	---
Group01	1	Point	Group	---	%	0.0538	23.5386	---	---
Group01	2	Point	Group	---	%	0.1650	24.4933	---	---
Group01	1	Point	Group	---	%	0.1111	27.0179	---	---
Group01	2	Point	Group	---	%	0.2222	27.9726	---	---
Group01	1	Point	Group	---	%	0.1111	28.7063	---	---
Group01	2	Point	Group	---	%	0.1650	29.6611	---	---
Group01	1	Point	Group	---	%	0.1111	30.3948	---	---
Group01	2	Point	Group	---	%	0.1111	31.3496	---	---
Group01	1	Point	Group	---	%	0.1298	32.1686	---	---
Group01	2	Point	Group	---	%	0.2595	32.1686	---	---
Group01	1	Point	Group	---	%	0.0538	33.2431	---	---
Group01	2	Point	Group	---	%	0.1077	34.1978	---	---
Group01	1	Point	Group	---	%	0.0538	36.7906	---	---
Group01	2	Point	Group	---	%	0.1650	37.7454	---	---
Group01	1	Point	Group	---	%	0.0538	40.4405	---	---
Group01	2	Point	Group	---	%	0.1650	41.3952	---	---
Group01	1	Point	Group	---	%	0.1111	44.0903	---	---
Group01	2	Point	Group	---	%	0.2222	45.0451	---	---
Group01	1	Point	Group	---	%	0.1111	45.8385	---	---
Group01	2	Point	Group	---	%	0.1650	46.7932	---	---
Group01	1	Point	Group	---	%	0.1111	47.5867	---	---
Group01	2	Point	Group	---	%	0.1111	48.5414	---	---
Group01	1	Point	Group	---	%	0.1298	49.3604	---	---
Group01	2	Point	Group	---	%	0.2595	49.3604	---	---
Group01	1	Point	Group	---	%	0.0538	50.8101	---	---
Group01	2	Point	Group	---	%	0.1077	51.7649	---	---
Group01	1	Point	Group	---	%	0.0538	54.4600	---	---
Group01	2	Point	Group	---	%	0.1650	55.4147	---	---
Group01	1	Point	Group	---	%	0.0538	58.1098	---	---
Group01	2	Point	Group	---	%	0.1650	59.0646	---	---

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Point	Group	---	%	0.1111	61.4100	---	---
Group01	2	Point	Group	---	%	0.2222	62.3648	---	---
Group01	1	Point	Group	---	%	0.1111	63.0943	---	---
Group01	2	Point	Group	---	%	0.1650	64.0490	---	---
Group01	1	Point	Group	---	%	0.1111	64.7785	---	---
Group01	2	Point	Group	---	%	0.1111	65.7332	---	---
Group01	1	Point	Group	---	%	0.1298	66.5523	---	---
Group01	2	Point	Group	---	%	0.2595	66.5523	---	---
Group01	1	Point	Group	---	%	0.0538	67.7291	---	---
Group01	2	Point	Group	---	%	0.1077	68.6838	---	---
Group01	1	Point	Group	---	%	0.0538	70.7309	---	---
Group01	2	Point	Group	---	%	0.1650	71.6857	---	---
Group01	1	Point	Group	---	%	0.0538	73.7327	---	---
Group01	2	Point	Group	---	%	0.1650	74.6875	---	---
Group01	1	Point	Group	---	%	0.0538	76.7345	---	---
Group01	2	Point	Group	---	%	0.1650	77.6893	---	---
Group01	1	Point	Group	---	%	0.0538	79.7363	---	---
Group01	2	Point	Group	---	%	0.1650	80.6911	---	---
Group01	1	Point	Group	---	%	0.1111	82.7125	---	---
Group01	2	Point	Group	---	%	0.1650	83.6673	---	---
Group01	1	Point	Group	---	%	0.1111	84.2731	---	---
Group01	2	Point	Group	---	%	0.1111	85.2278	---	---
Group01	1	Point	Group	---	%	0.1298	86.0466	---	---
Group01	2	Point	Group	---	%	0.2595	86.0466	---	---
Group01	1	Point	Group	---	%	0.0538	87.4984	---	---
Group01	2	Point	Group	---	%	0.1077	88.4532	---	---
Group01	1	Point	Group	---	%	0.0538	91.1141	---	---
Group01	2	Point	Group	---	%	0.1650	92.0689	---	---
Group01	1	Point	Group	---	%	0.1111	94.7299	---	---
Group01	2	Point	Group	---	%	0.2222	95.6846	---	---
Group01	1	Point	Group	---	%	0.1111	96.4781	---	---
Group01	2	Point	Group	---	%	0.1650	97.4328	---	---
Group01	1	Point	Group	---	%	0.1111	98.2263	---	---
Group01	2	Point	Group	---	%	0.1111	99.1810	---	---
Group01	1	Point	Group	---	%	0.1298	100.0000	---	---

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	2	Point	Group	---	%	0.2595	100.0000	---	---
Group01	3	Point	Group	---	%	0.2595	0.0000	---	---
Group01	3	Point	Group	---	%	0.1650	3.2761	---	---
Group01	3	Point	Group	---	%	0.2222	6.6765	---	---
Group01	3	Point	Group	---	%	0.1650	10.0705	---	---
Group01	3	Point	Group	---	%	0.0538	11.7761	---	---
Group01	3	Point	Group	---	%	0.2595	13.3394	---	---
Group01	3	Point	Group	---	%	0.1650	16.3235	---	---
Group01	3	Point	Group	---	%	0.2222	18.4895	---	---
Group01	3	Point	Group	---	%	0.2222	21.9688	---	---
Group01	3	Point	Group	---	%	0.2222	25.4481	---	---
Group01	3	Point	Group	---	%	0.1650	28.9274	---	---
Group01	3	Point	Group	---	%	0.0538	30.6159	---	---
Group01	3	Point	Group	---	%	0.2595	32.1686	---	---
Group01	3	Point	Group	---	%	0.1650	35.1526	---	---
Group01	3	Point	Group	---	%	0.2222	38.7001	---	---
Group01	3	Point	Group	---	%	0.2222	42.3500	---	---
Group01	3	Point	Group	---	%	0.1650	45.9998	---	---
Group01	3	Point	Group	---	%	0.0538	47.7480	---	---
Group01	3	Point	Group	---	%	0.2595	49.3604	---	---
Group01	3	Point	Group	---	%	0.1650	52.7196	---	---
Group01	3	Point	Group	---	%	0.2222	56.3695	---	---
Group01	3	Point	Group	---	%	0.2222	60.0193	---	---
Group01	3	Point	Group	---	%	0.1650	63.3196	---	---
Group01	3	Point	Group	---	%	0.0538	65.0038	---	---
Group01	3	Point	Group	---	%	0.2595	66.5523	---	---
Group01	3	Point	Group	---	%	0.1650	69.6386	---	---
Group01	3	Point	Group	---	%	0.2222	72.6404	---	---
Group01	3	Point	Group	---	%	0.2222	75.6422	---	---
Group01	3	Point	Group	---	%	0.2222	78.6440	---	---
Group01	3	Point	Group	---	%	0.2222	81.6459	---	---
Group01	2	Point	Group	---	%	0.1111	82.0956	---	---
Group01	3	Point	Group	---	%	0.1650	83.0504	---	---
Group01	3	Point	Group	---	%	0.0538	84.6220	---	---
Group01	3	Point	Group	---	%	0.2595	86.0466	---	---

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	3	Point	Group	---	%	0.1650	89.4079	---	---
Group01	3	Point	Group	---	%	0.2222	93.0237	---	---
Group01	3	Point	Group	---	%	0.1650	96.6394	---	---
Group01	3	Point	Group	---	%	0.0538	98.3876	---	---
Group01	3	Point	Group	---	%	0.2595	100.0000	---	---
Group01	4	Point	Group	---	%	0.2595	0.0000	---	---
Group01	3	Point	Group	---	%	0.0538	1.5694	---	---
Group01	4	Point	Group	---	%	0.1650	2.5241	---	---
Group01	4	Point	Group	---	%	0.2222	4.2308	---	---
Group01	4	Point	Group	---	%	0.1650	7.6313	---	---
Group01	4	Point	Group	---	%	0.1077	11.0253	---	---
Group01	4	Point	Group	---	%	0.2595	13.3394	---	---
Group01	3	Point	Group	---	%	0.0538	14.7553	---	---
Group01	4	Point	Group	---	%	0.1650	15.7101	---	---
Group01	4	Point	Group	---	%	0.1111	17.2782	---	---
Group01	4	Point	Group	---	%	0.1650	19.4443	---	---
Group01	4	Point	Group	---	%	0.1650	22.9235	---	---
Group01	4	Point	Group	---	%	0.1650	26.4028	---	---
Group01	4	Point	Group	---	%	0.1077	29.8821	---	---
Group01	4	Point	Group	---	%	0.2595	32.1686	---	---
Group01	3	Point	Group	---	%	0.0538	33.5847	---	---
Group01	4	Point	Group	---	%	0.1650	34.5394	---	---
Group01	4	Point	Group	---	%	0.2222	36.1074	---	---
Group01	4	Point	Group	---	%	0.1650	39.6549	---	---
Group01	4	Point	Group	---	%	0.1650	43.3047	---	---
Group01	4	Point	Group	---	%	0.1077	46.9546	---	---
Group01	4	Point	Group	---	%	0.2595	49.3604	---	---
Group01	3	Point	Group	---	%	0.0538	50.9726	---	---
Group01	4	Point	Group	---	%	0.1650	51.9273	---	---
Group01	4	Point	Group	---	%	0.2222	53.6744	---	---
Group01	4	Point	Group	---	%	0.1650	57.3243	---	---
Group01	4	Point	Group	---	%	0.1650	60.9741	---	---
Group01	4	Point	Group	---	%	0.1077	64.2743	---	---
Group01	4	Point	Group	---	%	0.2595	66.5523	---	---
Group01	3	Point	Group	---	%	0.0538	68.0279	---	---

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	4	Point	Group	---	%	0.1650	68.9826	---	---
Group01	4	Point	Group	---	%	0.2222	70.5934	---	---
Group01	4	Point	Group	---	%	0.1650	73.5952	---	---
Group01	4	Point	Group	---	%	0.1650	76.5970	---	---
Group01	4	Point	Group	---	%	0.1650	79.5988	---	---
Group01	4	Point	Group	---	%	0.1650	82.6006	---	---
Group01	4	Point	Group	---	%	0.1077	84.0052	---	---
Group01	4	Point	Group	---	%	0.2595	86.0466	---	---
Group01	3	Point	Group	---	%	0.0538	87.6571	---	---
Group01	4	Point	Group	---	%	0.1650	88.6118	---	---
Group01	4	Point	Group	---	%	0.2222	90.3627	---	---
Group01	4	Point	Group	---	%	0.1650	93.9784	---	---
Group01	4	Point	Group	---	%	0.1077	97.5942	---	---
Group01	4	Point	Group	---	%	0.2595	100.0000	---	---
Group01	5	Point	Group	---	%	0.1298	0.0000	---	---
Group01	4	Point	Group	---	%	0.1111	0.8187	---	---
Group01	5	Point	Group	---	%	0.1111	1.7738	---	---
Group01	5	Point	Group	---	%	0.1111	3.4789	---	---
Group01	5	Point	Group	---	%	0.1111	5.1856	---	---
Group01	5	Point	Group	---	%	0.0538	8.5860	---	---
Group01	5	Point	Group	---	%	0.0538	11.9801	---	---
Group01	5	Point	Group	---	%	0.1298	13.3394	---	---
Group01	4	Point	Group	---	%	0.1111	14.1581	---	---
Group01	5	Point	Group	---	%	0.1111	15.1129	---	---
Group01	5	Point	Group	---	%	0.1111	16.6648	---	---
Group01	5	Point	Group	---	%	0.0538	20.3990	---	---
Group01	5	Point	Group	---	%	0.0538	23.8783	---	---
Group01	5	Point	Group	---	%	0.0538	27.3576	---	---
Group01	5	Point	Group	---	%	0.0538	30.8369	---	---
Group01	5	Point	Group	---	%	0.1298	32.1686	---	---
Group01	4	Point	Group	---	%	0.1111	32.9873	---	---
Group01	5	Point	Group	---	%	0.1111	33.9420	---	---
Group01	5	Point	Group	---	%	0.1111	35.4942	---	---
Group01	5	Point	Group	---	%	0.1111	37.0621	---	---
Group01	5	Point	Group	---	%	0.0538	40.6096	---	---

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	5	Point	Group	---	%	0.0538	44.2595	---	---
Group01	5	Point	Group	---	%	0.0538	47.9093	---	---
Group01	5	Point	Group	---	%	0.1298	49.3604	---	---
Group01	4	Point	Group	---	%	0.1111	50.1791	---	---
Group01	5	Point	Group	---	%	0.1111	51.1338	---	---
Group01	5	Point	Group	---	%	0.1111	52.8821	---	---
Group01	5	Point	Group	---	%	0.1111	54.6292	---	---
Group01	5	Point	Group	---	%	0.0538	58.2790	---	---
Group01	5	Point	Group	---	%	0.0538	61.9289	---	---
Group01	5	Point	Group	---	%	0.0538	65.2291	---	---
Group01	5	Point	Group	---	%	0.1298	66.5523	---	---
Group01	4	Point	Group	---	%	0.1111	67.3709	---	---
Group01	5	Point	Group	---	%	0.1111	68.3257	---	---
Group01	5	Point	Group	---	%	0.1111	69.9374	---	---
Group01	5	Point	Group	---	%	0.1111	71.5481	---	---
Group01	5	Point	Group	---	%	0.0538	74.5499	---	---
Group01	5	Point	Group	---	%	0.0538	77.5518	---	---
Group01	5	Point	Group	---	%	0.0538	80.5536	---	---
Group01	5	Point	Group	---	%	0.0538	83.5554	---	---
Group01	5	Point	Group	---	%	0.0538	84.9599	---	---
Group01	5	Point	Group	---	%	0.1298	86.0466	---	---
Group01	4	Point	Group	---	%	0.1111	86.8652	---	---
Group01	5	Point	Group	---	%	0.1111	87.8200	---	---
Group01	5	Point	Group	---	%	0.1111	89.5666	---	---
Group01	5	Point	Group	---	%	0.1111	91.3174	---	---
Group01	5	Point	Group	---	%	0.0538	94.9332	---	---
Group01	5	Point	Group	---	%	0.0538	98.5489	---	---
Group01	5	Point	Group	---	%	0.1298	100.0000	---	---

Dead Loads / DC2 Group

Fence

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Trapezoidal	Group	---	ft	0.0120	0.0000	0.0120	486.2500

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Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	2	Trapezoidal	Group	---	ft	0.0120	0.0000	0.0120	486.2500
Group01	3	Trapezoidal	Group	---	ft	0.0120	0.0000	0.0120	486.2500
Group01	4	Trapezoidal	Group	---	ft	0.0120	0.0000	0.0120	486.2500
Group01	5	Trapezoidal	Group	---	ft	0.0120	0.0000	0.0120	486.2500

Final - Self Weight Appurtenance - Parapets

Member Group	Girder	Load Type	Reference Type	Reference	Dist Unit	Val 1 (Kips, Kip/ft, Kip-ft)	Loc 1 (ft or %)	Val 2 (Kips or Kip/ft)	Loc 2 (ft or %)
Group01	1	Trapezoidal	Group	---	ft	0.2184	0.0000	0.2184	488.6042
Group01	2	Trapezoidal	Group	---	ft	0.2184	0.0000	0.2184	488.6042
Group01	3	Trapezoidal	Group	---	ft	0.2184	0.0000	0.2184	488.6042
Group01	4	Trapezoidal	Group	---	ft	0.2184	0.0000	0.2184	488.6042
Group01	5	Trapezoidal	Group	---	ft	0.2184	0.0000	0.2184	488.6042

Live Loads

HL-93

Truck Name		Include Lane	Notional	Special Envelope	Special Env. Factor	Lane Intensity (k/ft)
Double Tandem		Yes	Yes	Yes	1.0000	0.6400
Axle No.	Intensity (k/ft)	Max Spacing (ft)		Min Spacing (ft)		Increment (ft)
1	25.0000	0.0000		0.0000		0.0000
2	25.0000	4.0000		4.0000		0.0000
3	25.0000	40.0000		26.0000		4.0000
4	25.0000	4.0000		4.0000		0.0000
Double Truck		Yes	Yes	Yes	0.9000	0.6400
Axle No.	Intensity (k/ft)	Max Spacing (ft)		Min Spacing (ft)		Increment (ft)
1	8.0000	0.0000		0.0000		0.0000
2	32.0000	14.0000		14.0000		0.0000
3	32.0000	14.0000		14.0000		0.0000
4	8.0000	300.0000		50.0000		14.0000
5	32.0000	14.0000		14.0000		0.0000
6	32.0000	14.0000		14.0000		0.0000
Design Lane		No	No	No	---	---
Axle No.	Intensity (k/ft)	Max Spacing (ft)		Min Spacing (ft)		Increment (ft)

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Truck Name	Include Lane	Notional	Special Envelope	Special Env. Factor	Lane Intensity (k/ft)
Design Tandem	Yes	Yes	No	---	0.6400
Axle No.	Intensity (k/ft)	Max Spacing (ft)	Min Spacing (ft)	Increment (ft)	
1	25.0000	0.0000	0.0000	0.0000	
2	25.0000	4.0000	4.0000	0.0000	
Design Truck	Yes	Yes	No	---	0.6400
Axle No.	Intensity (k/ft)	Max Spacing (ft)	Min Spacing (ft)	Increment (ft)	
1	8.0000	0.0000	0.0000	0.0000	
2	32.0000	14.0000	14.0000	0.0000	
3	32.0000	30.0000	14.0000	2.0000	

Fatigue Load

Truck Name	Include Lane	Notional	Special Envelope	Special Env. Factor	Lane Intensity (k/ft)
Fatigue Truck	No	No	No	---	---
Axle No.	Intensity (k/ft)	Max Spacing (ft)	Min Spacing (ft)	Increment (ft)	
1	8.0000	0.0000	0.0000	0.0000	
2	32.0000	14.0000	14.0000	0.0000	
3	32.0000	30.0000	30.0000	0.0000	

HL-93 (Deflection per AASHTO)

Truck Name	Include Lane	Notional	Special Envelope	Special Env. Factor	Lane Intensity (k/ft)
Design Lane	No	No	No	---	---
Axle No.	Intensity (k/ft)	Max Spacing (ft)	Min Spacing (ft)	Increment (ft)	
Design Truck	No	No	No	---	---
Axle No.	Intensity (k/ft)	Max Spacing (ft)	Min Spacing (ft)	Increment (ft)	
1	8.0000	0.0000	0.0000	0.0000	
2	32.0000	14.0000	14.0000	0.0000	
3	32.0000	30.0000	14.0000	2.0000	
Design Truck 25%	Yes	No	No	---	0.6400
Axle No.	Intensity (k/ft)	Max Spacing (ft)	Min Spacing (ft)	Increment (ft)	
1	2.0000	0.0000	0.0000	0.0000	
2	8.0000	14.0000	14.0000	0.0000	
3	8.0000	30.0000	14.0000	2.0000	

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Code Checker Results

Group01

Member 01

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.7.3-1 0.354
0.100	1.002	Final - Strength I 6.10.7.3-1 0.354
3.339	1.051	Final - Strength I 6.10.7.3-1 0.354
6.515	1.100	Final - Strength I 6.10.7.3-1 0.354
6.677	1.102	Final - Strength I 6.10.7.3-1 0.354
13.029	1.200	Final - Strength I 6.10.7.3-1 0.354
14.984	1.230	Final - Strength I 6.10.7.3-1 0.354
19.544	1.300	Final - Service II 6.10.4.2.2-2 0.368
23.292	1.357	Final - Fatigue 6.6.1.2.2-1 0.476
26.071	1.400	Final - Service II 6.10.4.2.2-2 0.393
31.583	1.485	Final - Service II 6.10.4.2.2-2

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POI Location (ft)	Span Fraction	Critical Load Combination
		0.375
32.589	1.500	Final - Service II 6.10.4.2.2-2 0.368
39.106	1.600	Final - Fatigue 6.6.1.2.2-1 0.372
39.875	1.612	Final - Fatigue 6.6.1.2.2-1 0.526
39.875	1.612	Final - Fatigue 6.6.1.2.2-1 0.526
44.042	1.676	Final - Fatigue 6.6.1.2.2-1 0.365
44.042	1.676	Final - Fatigue 6.6.1.2.2-1 0.365
45.624	1.700	Final - Fatigue 6.6.1.2.2-1 0.356
45.624	1.700	Final - Fatigue 6.6.1.2.2-1 0.356
48.208	1.740	Final - Strength I 6.10.8.1.1-1 0.501
52.142	1.800	Final - Strength I 6.10.8.1.1-1 0.501
52.375	1.804	Final - Strength I 6.10.8.1.1-1 0.501
56.542	1.868	Final - Strength I 6.10.8.1.1-1 0.876

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POI Location (ft)	Span Fraction	Critical Load Combination
58.659	1.900	Final - Strength I 6.10.8.1.1-1 0.876
60.859	1.934	Final - Strength I 6.10.8.1.1-1 0.876
65.077	1.998	Final - Strength I 6.10.8.1.1-1 0.876
65.177	2.000	Final - Strength I 6.10.8.1.1-1 0.876
65.277	2.001	Final - Strength I 6.10.8.1.1-1 0.876
67.802	2.029	Final - Strength I 6.10.8.1.1-1 0.876
70.427	2.057	Final - Strength I 6.10.8.1.1-1 0.614
74.377	2.100	Final - Strength I 6.10.8.1.1-1 0.614
75.719	2.115	Final - Strength I 6.10.8.1.1-1 0.614
81.010	2.172	Final - Strength I 6.10.7.3-1 0.354
83.577	2.200	Final - Strength I 6.10.7.3-1 0.354
87.899	2.247	Final - Strength I 6.10.7.3-1 0.354
		Final - Strength I

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POI Location (ft)	Span Fraction	Critical Load Combination
88.099	2.249	6.10.7.3-1 0.354
89.510	2.264	Final - Strength I 6.10.7.3-1 0.354
92.777	2.300	Final - Service II 6.10.4.2.2-2 0.357
98.010	2.357	Final - Fatigue 6.6.1.2.2-1 0.509
101.977	2.400	Final - Service II 6.10.4.2.2-2 0.474
106.510	2.449	Final - Service II 6.10.4.2.2-2 0.500
111.177	2.500	Final - Service II 6.10.4.2.2-2 0.508
115.010	2.542	Final - Fatigue 6.6.1.2.2-1 0.518
120.377	2.600	Final - Service II 6.10.4.2.2-2 0.471
123.510	2.634	Final - Service II 6.10.4.2.2-2 0.439
129.577	2.700	Final - Strength I 6.10.7.3-1 0.354
132.010	2.726	Final - Fatigue 6.6.1.2.2-1 0.448
136.135	2.771	Final - Strength I 6.10.7.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.354
138.777	2.800	Final - Strength I 6.10.7.3-1 0.354
140.260	2.816	Final - Strength I 6.10.8.1.1-1 0.486
144.385	2.861	Final - Strength I 6.10.8.1.1-1 0.486
147.977	2.900	Final - Strength I 6.10.8.1.1-1 0.486
148.510	2.906	Final - Strength I 6.10.8.1.1-1 0.908
152.844	2.953	Final - Strength I 6.10.8.1.1-1 0.908
157.077	2.999	Final - Strength I 6.10.8.1.1-1 0.908
157.177	3.000	Final - Strength I 6.10.8.1.1-1 0.908
157.277	3.001	Final - Strength I 6.10.8.1.1-1 0.908
159.802	3.031	Final - Strength I 6.10.8.1.1-1 0.908
162.427	3.063	Final - Strength I 6.10.8.1.1-1 0.656
165.577	3.100	Final - Strength I 6.10.8.1.1-1 0.656

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
171.094	3.166	Final - Strength I 6.10.8.1.1-1 0.656
173.977	3.200	Final - Strength I 6.10.8.1.1-1 0.656
179.760	3.269	Final - Fatigue 6.6.1.2.2-1 0.485
179.760	3.269	Final - Fatigue 6.6.1.2.2-1 0.485
182.377	3.300	Final - Strength I 6.10.7.3-1 0.354
186.649	3.351	Final - Strength I 6.10.7.3-1 0.354
186.849	3.353	Final - Strength I 6.10.7.3-1 0.354
188.677	3.375	Final - Strength I 6.10.7.3-1 0.354
190.777	3.400	Final - Strength I 6.10.7.3-1 0.354
197.594	3.481	Final - Fatigue 6.6.1.2.2-1 0.419
199.177	3.500	Final - Service II 6.10.4.2.2-2 0.362
206.510	3.587	Final - Strength I 6.10.7.3-1 0.354
		Final - Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
207.577	3.600	6.10.7.3-1 0.354
215.427	3.693	Final - Strength I 6.10.7.3-1 0.354
215.977	3.700	Final - Strength I 6.10.7.3-1 0.354
219.698	3.744	Final - Strength I 6.10.7.3-1 0.354
223.969	3.795	Final - Strength I 6.10.8.1.1-1 0.477
224.377	3.800	Final - Strength I 6.10.8.1.1-1 0.477
228.240	3.846	Final - Strength I 6.10.8.1.1-1 0.477
232.510	3.897	Final - Strength I 6.10.8.1.1-1 0.932
232.777	3.900	Final - Strength I 6.10.8.1.1-1 0.932
236.844	3.948	Final - Strength I 6.10.8.1.1-1 0.932
241.077	3.999	Final - Strength I 6.10.8.1.1-1 0.932
241.177	4.000	Final - Strength I 6.10.8.1.1-1 0.932
241.277	4.001	Final - Strength I 6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.932
244.719	4.042	Final - Strength I 6.10.8.1.1-1 0.932
248.260	4.084	Final - Strength I 6.10.8.1.1-1 0.550
249.577	4.100	Final - Strength I 6.10.8.1.1-1 0.550
257.177	4.190	Final - Strength I 6.10.8.1.1-1 0.550
257.977	4.200	Final - Strength I 6.10.8.1.1-1 0.550
266.094	4.297	Final - Strength I 6.10.7.3-1 0.354
266.377	4.300	Final - Strength I 6.10.7.3-1 0.354
274.777	4.400	Final - Strength I 6.10.7.3-1 0.354
275.010	4.403	Final - Strength I 6.10.7.3-1 0.354
283.177	4.500	Final - Service II 6.10.4.2.2-2 0.360
283.927	4.509	Final - Fatigue 6.6.1.2.2-1 0.422
291.577	4.600	Final - Strength I 6.10.7.3-1 0.354

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
291.990	4.605	Final - Strength I 6.10.7.3-1 0.354
295.504	4.647	Final - Fatigue 6.6.1.2.2-1 0.356
295.704	4.649	Final - Fatigue 6.6.1.2.2-1 0.358
299.977	4.700	Final - Fatigue 6.6.1.2.2-1 0.363
299.977	4.700	Final - Fatigue 6.6.1.2.2-1 0.363
300.052	4.701	Final - Fatigue 6.6.1.2.2-1 0.507
300.052	4.701	Final - Fatigue 6.6.1.2.2-1 0.507
304.167	4.750	Final - Strength I 6.10.7.3-1 0.354
308.281	4.799	Final - Strength I 6.10.8.1.1-1 0.551
308.377	4.800	Final - Strength I 6.10.8.1.1-1 0.551
312.396	4.848	Final - Strength I 6.10.8.1.1-1 0.551
316.510	4.897	Final - Strength I 6.10.8.1.1-1 0.945
		Final - Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
316.777	4.900	6.10.8.1.1-1 0.945
320.844	4.948	Final - Strength I 6.10.8.1.1-1 0.945
325.077	4.999	Final - Strength I 6.10.8.1.1-1 0.945
325.177	5.000	Final - Strength I 6.10.8.1.1-1 0.945
325.277	5.001	Final - Strength I 6.10.8.1.1-1 0.945
328.052	5.030	Final - Strength I 6.10.8.1.1-1 0.945
330.927	5.060	Final - Strength I 6.10.8.1.1-1 0.646
334.702	5.100	Final - Strength I 6.10.8.1.1-1 0.646
338.261	5.137	Final - Strength I 6.10.8.1.1-1 0.646
344.227	5.200	Final - Strength I 6.10.8.1.1-1 0.646
345.594	5.214	Final - Fatigue 6.6.1.2.2-1 0.385
345.594	5.214	Final - Fatigue 6.6.1.2.2-1 0.385
352.928	5.291	Final - Service II 6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.355
353.752	5.300	Final - Service II 6.10.4.2.2-2 0.372
360.261	5.368	Final - Fatigue 6.6.1.2.2-1 0.532
363.277	5.400	Final - Service II 6.10.4.2.2-2 0.497
367.595	5.445	Final - Service II 6.10.4.2.2-2 0.525
372.802	5.500	Final - Service II 6.10.4.2.2-2 0.538
374.928	5.522	Final - Fatigue 6.6.1.2.2-1 0.540
382.262	5.599	Final - Service II 6.10.4.2.2-2 0.501
382.327	5.600	Final - Service II 6.10.4.2.2-2 0.500
389.595	5.676	Final - Fatigue 6.6.1.2.2-1 0.516
391.852	5.700	Final - Service II 6.10.4.2.2-2 0.379
396.504	5.749	Final - Strength I 6.10.7.3-1 0.354
396.704	5.751	Final - Strength I 6.10.7.3-1 0.354

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
396.866	5.753	Final - Strength I 6.10.7.3-1 0.354
401.377	5.800	Final - Strength I 6.10.7.3-1 0.354
404.137	5.829	Final - Strength I 6.10.8.1.1-1 0.508
407.949	5.869	Final - Strength I 6.10.8.1.1-1 0.508
410.902	5.900	Final - Strength I 6.10.8.1.1-1 0.508
411.762	5.909	Final - Strength I 6.10.8.1.1-1 0.939
416.094	5.955	Final - Strength I 6.10.8.1.1-1 0.939
420.327	5.999	Final - Strength I 6.10.8.1.1-1 0.939
420.427	6.000	Final - Strength I 6.10.8.1.1-1 0.939
420.527	6.001	Final - Strength I 6.10.8.1.1-1 0.939
423.974	6.052	Final - Strength I 6.10.8.1.1-1 0.939
427.245	6.100	Final - Strength I 6.10.8.1.1-1 0.939
		Final - Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
427.521	6.104	6.10.8.1.1-1 0.595
434.063	6.200	Final - Strength I 6.10.8.1.1-1 0.595
436.354	6.234	Final - Strength I 6.10.8.1.1-1 0.595
440.880	6.300	Final - Strength I 6.10.8.1.1-1 0.595
445.187	6.363	Final - Fatigue 6.6.1.2.2-1 0.548
445.187	6.363	Final - Fatigue 6.6.1.2.2-1 0.548
447.698	6.400	Final - Fatigue 6.6.1.2.2-1 0.398
454.021	6.493	Final - Service II 6.10.4.2.2-2 0.396
454.516	6.500	Final - Service II 6.10.4.2.2-2 0.398
461.333	6.600	Final - Service II 6.10.4.2.2-2 0.420
462.854	6.622	Final - Fatigue 6.6.1.2.2-1 0.515
467.125	6.685	Final - Service II 6.10.4.2.2-2 0.402
468.151	6.700	Final - Service II 6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.396
471.396	6.748	Final - Fatigue 6.6.1.2.2-1 0.420
474.969	6.800	Final - Strength I 6.10.7.3-1 0.354
475.667	6.810	Final - Strength I 6.10.7.3-1 0.354
479.938	6.873	Final - Strength I 6.10.7.3-1 0.354
481.786	6.900	Final - Strength I 6.10.7.3-1 0.354
484.271	6.936	Final - Strength I 6.10.7.3-1 0.354
488.504	6.999	Final - Strength I 6.10.7.3-1 0.354
488.604	7.000	Final - Strength I 6.10.7.3-1 0.354

Summary Flexure Report

Load combination: Deck Design Stress Check Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2
0.100	1.002	15.80	1.07	0.0003	6.10.4.2.2-1	15.80	1.07	0.0003	6.10.4.2.2-2
0.100	1.002	15.80	1.07	0.0004	6.10.4.2.2-1	15.80	1.07	0.0023	6.10.4.2.2-2
3.339	1.051	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0078	6.10.4.2.2-2
3.339	1.051	15.80	1.07	0.0141	6.10.4.2.2-1	15.80	1.07	0.0728	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
6.515	1.100	15.80	1.07	0.0007	6.10.4.2.2-1	15.80	1.07	0.0159	6.10.4.2.2-2
6.515	1.100	15.80	1.07	0.0258	6.10.4.2.2-1	15.80	1.07	0.1333	6.10.4.2.2-2
6.677	1.102	15.80	1.07	0.0008	6.10.4.2.2-1	15.80	1.07	0.0163	6.10.4.2.2-2
6.677	1.102	15.80	1.07	0.0262	6.10.4.2.2-1	15.80	1.07	0.1351	6.10.4.2.2-2
13.029	1.200	15.80	1.07	0.0026	6.10.4.2.2-1	15.80	1.07	0.0345	6.10.4.2.2-2
13.029	1.200	15.80	1.07	0.0433	6.10.4.2.2-1	15.80	1.07	0.2236	6.10.4.2.2-2
14.984	1.230	15.80	1.07	0.0035	6.10.4.2.2-1	15.80	1.07	0.0407	6.10.4.2.2-2
14.984	1.230	15.80	1.07	0.0467	6.10.4.2.2-1	15.80	1.07	0.2412	6.10.4.2.2-2
19.544	1.300	15.80	1.07	0.0058	6.10.4.2.2-1	15.80	1.07	0.0559	6.10.4.2.2-2
19.544	1.300	15.80	1.07	0.0535	6.10.4.2.2-1	15.80	1.07	0.2770	6.10.4.2.2-2
23.292	1.357	15.80	1.07	0.0081	6.10.4.2.2-1	15.80	1.07	0.0694	6.10.4.2.2-2
23.292	1.357	15.80	1.07	0.0566	6.10.4.2.2-1	15.80	1.07	0.2936	6.10.4.2.2-2
26.071	1.400	15.80	1.07	0.0101	6.10.4.2.2-1	15.80	1.07	0.0801	6.10.4.2.2-2
26.071	1.400	15.80	1.07	0.0580	6.10.4.2.2-1	15.80	1.07	0.3022	6.10.4.2.2-2
31.583	1.485	15.80	1.07	0.0146	6.10.4.2.2-1	15.80	1.07	0.1026	6.10.4.2.2-2
31.583	1.485	15.80	1.07	0.0564	6.10.4.2.2-1	15.80	1.07	0.2959	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.0156	6.10.4.2.2-1	15.80	1.07	0.1069	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.0556	6.10.4.2.2-1	15.80	1.07	0.2924	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0222	6.10.4.2.2-1	15.80	1.07	0.1365	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0488	6.10.4.2.2-1	15.80	1.07	0.2625	6.10.4.2.2-2
39.875	1.612	15.80	1.07	0.0231	6.10.4.2.2-1	15.80	1.07	0.1401	6.10.4.2.2-2
39.875	1.612	15.80	1.07	0.0481	6.10.4.2.2-1	15.80	1.07	0.2593	6.10.4.2.2-2
44.042	1.676	15.80	1.07	0.0281	6.10.4.2.2-1	15.80	1.07	0.1607	6.10.4.2.2-2
44.042	1.676	15.80	1.07	0.0397	6.10.4.2.2-1	15.80	1.07	0.2201	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0301	6.10.4.2.2-1	15.80	1.07	0.1688	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0365	6.10.4.2.2-1	15.80	1.07	0.2051	6.10.4.2.2-2
48.208	1.740	15.80	1.07	0.1983	6.10.4.2.2-1	15.80	1.07	0.2271	6.10.4.2.2-2
48.208	1.740	15.80	1.07	0.0298	6.10.4.2.2-1	15.80	1.07	0.1732	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.2231	6.10.4.2.2-1	15.80	1.07	0.2547	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.0194	6.10.4.2.2-1	15.80	1.07	0.1250	6.10.4.2.2-2
52.375	1.804	15.80	1.07	0.2245	6.10.4.2.2-1	15.80	1.07	0.2563	6.10.4.2.2-2
52.375	1.804	15.80	1.07	0.0186	6.10.4.2.2-1	15.80	1.07	0.1214	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
56.542	1.868	15.80	1.07	0.2544	6.10.4.2.2-1	15.80	1.07	0.2897	6.10.4.2.2-2
56.542	1.868	15.80	1.07	0.0062	6.10.4.2.2-1	15.80	1.07	0.0636	6.10.4.2.2-2
58.659	1.900	15.80	1.07	0.2813	6.10.4.2.2-1	15.80	1.07	0.3200	6.10.4.2.2-2
58.659	1.900	15.80	1.07	0.0007	6.10.4.2.2-1	15.80	1.07	0.0396	6.10.4.2.2-2
60.859	1.934	15.80	1.07	0.3235	6.10.4.2.2-1	15.80	1.07	0.3678	6.10.4.2.2-2
60.859	1.934	15.80	1.07	0.0038	6.10.4.2.2-1	15.80	1.07	0.0221	6.10.4.2.2-2
65.077	1.998	15.80	1.07	0.4153	6.10.4.2.2-1	15.80	1.07	0.4720	6.10.4.2.2-2
65.077	1.998	15.80	1.07	0.0101	6.10.4.2.2-1	15.80	1.07	0.0023	6.10.4.2.2-2
65.177	2.000	15.80	1.07	0.4176	6.10.4.2.2-1	15.80	1.07	0.4746	6.10.4.2.2-2
65.177	2.000	15.80	1.07	0.0102	6.10.4.2.2-1	15.80	1.07	0.0021	6.10.4.2.2-2
65.277	2.001	15.80	1.07	0.4153	6.10.4.2.2-1	15.80	1.07	0.4720	6.10.4.2.2-2
65.277	2.001	15.80	1.07	0.0101	6.10.4.2.2-1	15.80	1.07	0.0026	6.10.4.2.2-2
67.802	2.029	15.80	1.07	0.3583	6.10.4.2.2-1	15.80	1.07	0.4074	6.10.4.2.2-2
67.802	2.029	15.80	1.07	0.0069	6.10.4.2.2-1	15.80	1.07	0.0099	6.10.4.2.2-2
70.427	2.057	15.80	1.07	0.3021	6.10.4.2.2-1	15.80	1.07	0.3436	6.10.4.2.2-2
70.427	2.057	15.80	1.07	0.0022	6.10.4.2.2-1	15.80	1.07	0.0260	6.10.4.2.2-2
74.377	2.100	15.80	1.07	0.2268	6.10.4.2.2-1	15.80	1.07	0.2583	6.10.4.2.2-2
74.377	2.100	15.80	1.07	0.0069	6.10.4.2.2-1	15.80	1.07	0.0631	6.10.4.2.2-2
75.719	2.115	15.80	1.07	0.2036	6.10.4.2.2-1	15.80	1.07	0.2321	6.10.4.2.2-2
75.719	2.115	15.80	1.07	0.0097	6.10.4.2.2-1	15.80	1.07	0.0745	6.10.4.2.2-2
81.010	2.172	15.80	1.07	0.0222	6.10.4.2.2-1	15.80	1.07	0.1208	6.10.4.2.2-2
81.010	2.172	15.80	1.07	0.0222	6.10.4.2.2-1	15.80	1.07	0.1287	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0188	6.10.4.2.2-1	15.80	1.07	0.1083	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0286	6.10.4.2.2-1	15.80	1.07	0.1578	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0143	6.10.4.2.2-1	15.80	1.07	0.0932	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0410	6.10.4.2.2-1	15.80	1.07	0.2177	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0141	6.10.4.2.2-1	15.80	1.07	0.0926	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0415	6.10.4.2.2-1	15.80	1.07	0.2200	6.10.4.2.2-2
89.510	2.264	15.80	1.07	0.0129	6.10.4.2.2-1	15.80	1.07	0.0884	6.10.4.2.2-2
89.510	2.264	15.80	1.07	0.0448	6.10.4.2.2-1	15.80	1.07	0.2355	6.10.4.2.2-2
92.777	2.300	15.80	1.07	0.0102	6.10.4.2.2-1	15.80	1.07	0.0792	6.10.4.2.2-2
92.777	2.300	15.80	1.07	0.0523	6.10.4.2.2-1	15.80	1.07	0.2716	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
98.010	2.357	15.80	1.07	0.0065	6.10.4.2.2-1	15.80	1.07	0.0659	6.10.4.2.2-2
98.010	2.357	15.80	1.07	0.0624	6.10.4.2.2-1	15.80	1.07	0.3209	6.10.4.2.2-2
101.977	2.400	15.80	1.07	0.0042	6.10.4.2.2-1	15.80	1.07	0.0570	6.10.4.2.2-2
101.977	2.400	15.80	1.07	0.0674	6.10.4.2.2-1	15.80	1.07	0.3448	6.10.4.2.2-2
106.510	2.449	15.80	1.07	0.0021	6.10.4.2.2-1	15.80	1.07	0.0480	6.10.4.2.2-2
106.510	2.449	15.80	1.07	0.0706	6.10.4.2.2-1	15.80	1.07	0.3602	6.10.4.2.2-2
111.177	2.500	15.80	1.07	0.0006	6.10.4.2.2-1	15.80	1.07	0.0402	6.10.4.2.2-2
111.177	2.500	15.80	1.07	0.0716	6.10.4.2.2-1	15.80	1.07	0.3650	6.10.4.2.2-2
115.010	2.542	15.80	1.07	0.0018	6.10.4.2.2-1	15.80	1.07	0.0466	6.10.4.2.2-2
115.010	2.542	15.80	1.07	0.0705	6.10.4.2.2-1	15.80	1.07	0.3597	6.10.4.2.2-2
120.377	2.600	15.80	1.07	0.0044	6.10.4.2.2-1	15.80	1.07	0.0576	6.10.4.2.2-2
120.377	2.600	15.80	1.07	0.0670	6.10.4.2.2-1	15.80	1.07	0.3435	6.10.4.2.2-2
123.510	2.634	15.80	1.07	0.0063	6.10.4.2.2-1	15.80	1.07	0.0649	6.10.4.2.2-2
123.510	2.634	15.80	1.07	0.0631	6.10.4.2.2-1	15.80	1.07	0.3247	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.0107	6.10.4.2.2-1	15.80	1.07	0.0808	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.0518	6.10.4.2.2-1	15.80	1.07	0.2704	6.10.4.2.2-2
132.010	2.726	15.80	1.07	0.0128	6.10.4.2.2-1	15.80	1.07	0.0879	6.10.4.2.2-2
132.010	2.726	15.80	1.07	0.0463	6.10.4.2.2-1	15.80	1.07	0.2435	6.10.4.2.2-2
136.135	2.771	15.80	1.07	0.0166	6.10.4.2.2-1	15.80	1.07	0.1007	6.10.4.2.2-2
136.135	2.771	15.80	1.07	0.0354	6.10.4.2.2-1	15.80	1.07	0.1913	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0197	6.10.4.2.2-1	15.80	1.07	0.1114	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0273	6.10.4.2.2-1	15.80	1.07	0.1526	6.10.4.2.2-2
140.260	2.816	15.80	1.07	0.0217	6.10.4.2.2-1	15.80	1.07	0.1185	6.10.4.2.2-2
140.260	2.816	15.80	1.07	0.0237	6.10.4.2.2-1	15.80	1.07	0.1364	6.10.4.2.2-2
144.385	2.861	15.80	1.07	0.0313	6.10.4.2.2-1	15.80	1.07	0.1606	6.10.4.2.2-2
144.385	2.861	15.80	1.07	0.0140	6.10.4.2.2-1	15.80	1.07	0.0940	6.10.4.2.2-2
147.977	2.900	15.80	1.07	0.2338	6.10.4.2.2-1	15.80	1.07	0.2662	6.10.4.2.2-2
147.977	2.900	15.80	1.07	0.0059	6.10.4.2.2-1	15.80	1.07	0.0603	6.10.4.2.2-2
148.510	2.906	15.80	1.07	0.2438	6.10.4.2.2-1	15.80	1.07	0.2775	6.10.4.2.2-2
148.510	2.906	15.80	1.07	0.0046	6.10.4.2.2-1	15.80	1.07	0.0550	6.10.4.2.2-2
152.844	2.953	15.80	1.07	0.3308	6.10.4.2.2-1	15.80	1.07	0.3761	6.10.4.2.2-2
152.844	2.953	15.80	1.07	0.0051	6.10.4.2.2-1	15.80	1.07	0.0166	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
157.077	2.999	15.80	1.07	0.4267	6.10.4.2.2-1	15.80	1.07	0.4848	6.10.4.2.2-2
157.077	2.999	15.80	1.07	0.0110	6.10.4.2.2-1	15.80	1.07	0.0004	6.10.4.2.2-2
157.177	3.000	15.80	1.07	0.4291	6.10.4.2.2-1	15.80	1.07	0.4876	6.10.4.2.2-2
157.177	3.000	15.80	1.07	0.0111	6.10.4.2.2-1	15.80	1.07	0.0003	6.10.4.2.2-2
157.277	3.001	15.80	1.07	0.4268	6.10.4.2.2-1	15.80	1.07	0.4849	6.10.4.2.2-2
157.277	3.001	15.80	1.07	0.0111	6.10.4.2.2-1	15.80	1.07	0.0004	6.10.4.2.2-2
159.802	3.031	15.80	1.07	0.3706	6.10.4.2.2-1	15.80	1.07	0.4212	6.10.4.2.2-2
159.802	3.031	15.80	1.07	0.0069	6.10.4.2.2-1	15.80	1.07	0.0141	6.10.4.2.2-2
162.427	3.063	15.80	1.07	0.3178	6.10.4.2.2-1	15.80	1.07	0.3613	6.10.4.2.2-2
162.427	3.063	15.80	1.07	0.0017	6.10.4.2.2-1	15.80	1.07	0.0332	6.10.4.2.2-2
165.577	3.100	15.80	1.07	0.2615	6.10.4.2.2-1	15.80	1.07	0.2976	6.10.4.2.2-2
165.577	3.100	15.80	1.07	0.0052	6.10.4.2.2-1	15.80	1.07	0.0613	6.10.4.2.2-2
171.094	3.166	15.80	1.07	0.2146	6.10.4.2.2-1	15.80	1.07	0.2451	6.10.4.2.2-2
171.094	3.166	15.80	1.07	0.0195	6.10.4.2.2-1	15.80	1.07	0.1249	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0333	6.10.4.2.2-1	15.80	1.07	0.1789	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0265	6.10.4.2.2-1	15.80	1.07	0.1568	6.10.4.2.2-2
179.760	3.269	15.80	1.07	0.0248	6.10.4.2.2-1	15.80	1.07	0.1443	6.10.4.2.2-2
179.760	3.269	15.80	1.07	0.0394	6.10.4.2.2-1	15.80	1.07	0.2166	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0213	6.10.4.2.2-1	15.80	1.07	0.1294	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0443	6.10.4.2.2-1	15.80	1.07	0.2390	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0160	6.10.4.2.2-1	15.80	1.07	0.1062	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0494	6.10.4.2.2-1	15.80	1.07	0.2610	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.0158	6.10.4.2.2-1	15.80	1.07	0.1051	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.0494	6.10.4.2.2-1	15.80	1.07	0.2612	6.10.4.2.2-2
188.677	3.375	15.80	1.07	0.0137	6.10.4.2.2-1	15.80	1.07	0.0955	6.10.4.2.2-2
188.677	3.375	15.80	1.07	0.0510	6.10.4.2.2-1	15.80	1.07	0.2675	6.10.4.2.2-2
190.777	3.400	15.80	1.07	0.0114	6.10.4.2.2-1	15.80	1.07	0.0848	6.10.4.2.2-2
190.777	3.400	15.80	1.07	0.0518	6.10.4.2.2-1	15.80	1.07	0.2700	6.10.4.2.2-2
197.594	3.481	15.80	1.07	0.0048	6.10.4.2.2-1	15.80	1.07	0.0519	6.10.4.2.2-2
197.594	3.481	15.80	1.07	0.0523	6.10.4.2.2-1	15.80	1.07	0.2690	6.10.4.2.2-2
199.177	3.500	15.80	1.07	0.0035	6.10.4.2.2-1	15.80	1.07	0.0446	6.10.4.2.2-2
199.177	3.500	15.80	1.07	0.0517	6.10.4.2.2-1	15.80	1.07	0.2649	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
206.510	3.587	15.80	1.07	0.0019	6.10.4.2.2-1	15.80	1.07	0.0133	6.10.4.2.2-2
206.510	3.587	15.80	1.07	0.0439	6.10.4.2.2-1	15.80	1.07	0.2228	6.10.4.2.2-2
207.577	3.600	15.80	1.07	0.0025	6.10.4.2.2-1	15.80	1.07	0.0090	6.10.4.2.2-2
207.577	3.600	15.80	1.07	0.0427	6.10.4.2.2-1	15.80	1.07	0.2164	6.10.4.2.2-2
215.427	3.693	15.80	1.07	0.0271	6.10.4.2.2-1	15.80	1.07	0.1365	6.10.4.2.2-2
215.977	3.700	15.80	1.07	0.0261	6.10.4.2.2-1	15.80	1.07	0.1320	6.10.4.2.2-2
219.698	3.744	15.80	1.07	0.0032	6.10.4.2.2-1	15.80	1.07	0.0269	6.10.4.2.2-2
219.698	3.744	15.80	1.07	0.0197	6.10.4.2.2-1	15.80	1.07	0.1020	6.10.4.2.2-2
223.969	3.795	15.80	1.07	0.0146	6.10.4.2.2-1	15.80	1.07	0.0823	6.10.4.2.2-2
223.969	3.795	15.80	1.07	0.0123	6.10.4.2.2-1	15.80	1.07	0.0686	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0159	6.10.4.2.2-1	15.80	1.07	0.0885	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0165	6.10.4.2.2-1	15.80	1.07	0.0932	6.10.4.2.2-2
228.240	3.846	15.80	1.07	0.0292	6.10.4.2.2-1	15.80	1.07	0.1541	6.10.4.2.2-2
228.240	3.846	15.80	1.07	0.0123	6.10.4.2.2-1	15.80	1.07	0.0786	6.10.4.2.2-2
232.510	3.897	15.80	1.07	0.2601	6.10.4.2.2-1	15.80	1.07	0.2968	6.10.4.2.2-2
232.510	3.897	15.80	1.07	0.0087	6.10.4.2.2-1	15.80	1.07	0.0706	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.2664	6.10.4.2.2-1	15.80	1.07	0.3040	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.0087	6.10.4.2.2-1	15.80	1.07	0.0711	6.10.4.2.2-2
236.844	3.948	15.80	1.07	0.3660	6.10.4.2.2-1	15.80	1.07	0.4172	6.10.4.2.2-2
236.844	3.948	15.80	1.07	0.0079	6.10.4.2.2-1	15.80	1.07	0.0796	6.10.4.2.2-2
241.077	3.999	15.80	1.07	0.4797	6.10.4.2.2-1	15.80	1.07	0.5466	6.10.4.2.2-2
241.077	3.999	15.80	1.07	0.0067	6.10.4.2.2-1	15.80	1.07	0.0878	6.10.4.2.2-2
241.177	4.000	15.80	1.07	0.4825	6.10.4.2.2-1	15.80	1.07	0.5498	6.10.4.2.2-2
241.177	4.000	15.80	1.07	0.0067	6.10.4.2.2-1	15.80	1.07	0.0880	6.10.4.2.2-2
241.277	4.001	15.80	1.07	0.4806	6.10.4.2.2-1	15.80	1.07	0.5477	6.10.4.2.2-2
241.277	4.001	15.80	1.07	0.0085	6.10.4.2.2-1	15.80	1.07	0.0968	6.10.4.2.2-2
244.719	4.042	15.80	1.07	0.3874	6.10.4.2.2-1	15.80	1.07	0.4417	6.10.4.2.2-2
244.719	4.042	15.80	1.07	0.0093	6.10.4.2.2-1	15.80	1.07	0.0891	6.10.4.2.2-2
248.260	4.084	15.80	1.07	0.2990	6.10.4.2.2-1	15.80	1.07	0.3411	6.10.4.2.2-2
248.260	4.084	15.80	1.07	0.0099	6.10.4.2.2-1	15.80	1.07	0.0807	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.2671	6.10.4.2.2-1	15.80	1.07	0.3048	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.0100	6.10.4.2.2-1	15.80	1.07	0.0775	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
257.177	4.190	15.80	1.07	0.0184	6.10.4.2.2-1	15.80	1.07	0.1015	6.10.4.2.2-2
257.177	4.190	15.80	1.07	0.0162	6.10.4.2.2-1	15.80	1.07	0.0928	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0158	6.10.4.2.2-1	15.80	1.07	0.0890	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0171	6.10.4.2.2-1	15.80	1.07	0.0961	6.10.4.2.2-2
266.094	4.297	15.80	1.07	0.0256	6.10.4.2.2-1	15.80	1.07	0.1295	6.10.4.2.2-2
266.377	4.300	15.80	1.07	0.0261	6.10.4.2.2-1	15.80	1.07	0.1319	6.10.4.2.2-2
274.777	4.400	15.80	1.07	0.0021	6.10.4.2.2-1	15.80	1.07	0.0109	6.10.4.2.2-2
274.777	4.400	15.80	1.07	0.0423	6.10.4.2.2-1	15.80	1.07	0.2145	6.10.4.2.2-2
275.010	4.403	15.80	1.07	0.0020	6.10.4.2.2-1	15.80	1.07	0.0119	6.10.4.2.2-2
275.010	4.403	15.80	1.07	0.0425	6.10.4.2.2-1	15.80	1.07	0.2157	6.10.4.2.2-2
283.177	4.500	15.80	1.07	0.0044	6.10.4.2.2-1	15.80	1.07	0.0492	6.10.4.2.2-2
283.177	4.500	15.80	1.07	0.0515	6.10.4.2.2-1	15.80	1.07	0.2646	6.10.4.2.2-2
283.927	4.509	15.80	1.07	0.0051	6.10.4.2.2-1	15.80	1.07	0.0528	6.10.4.2.2-2
283.927	4.509	15.80	1.07	0.0521	6.10.4.2.2-1	15.80	1.07	0.2683	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.0129	6.10.4.2.2-1	15.80	1.07	0.0920	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.0518	6.10.4.2.2-1	15.80	1.07	0.2710	6.10.4.2.2-2
291.990	4.605	15.80	1.07	0.0134	6.10.4.2.2-1	15.80	1.07	0.0943	6.10.4.2.2-2
291.990	4.605	15.80	1.07	0.0518	6.10.4.2.2-1	15.80	1.07	0.2715	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0176	6.10.4.2.2-1	15.80	1.07	0.1136	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0496	6.10.4.2.2-1	15.80	1.07	0.2633	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0178	6.10.4.2.2-1	15.80	1.07	0.1148	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0495	6.10.4.2.2-1	15.80	1.07	0.2631	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0234	6.10.4.2.2-1	15.80	1.07	0.1394	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0442	6.10.4.2.2-1	15.80	1.07	0.2403	6.10.4.2.2-2
300.052	4.701	15.80	1.07	0.0235	6.10.4.2.2-1	15.80	1.07	0.1399	6.10.4.2.2-2
300.052	4.701	15.80	1.07	0.0441	6.10.4.2.2-1	15.80	1.07	0.2399	6.10.4.2.2-2
304.167	4.750	15.80	1.07	0.0294	6.10.4.2.2-1	15.80	1.07	0.1648	6.10.4.2.2-2
304.167	4.750	15.80	1.07	0.0363	6.10.4.2.2-1	15.80	1.07	0.2041	6.10.4.2.2-2
308.281	4.799	15.80	1.07	0.2075	6.10.4.2.2-1	15.80	1.07	0.2374	6.10.4.2.2-2
308.281	4.799	15.80	1.07	0.0270	6.10.4.2.2-1	15.80	1.07	0.1610	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.2085	6.10.4.2.2-1	15.80	1.07	0.2385	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.0267	6.10.4.2.2-1	15.80	1.07	0.1598	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
312.396	4.848	15.80	1.07	0.2384	6.10.4.2.2-1	15.80	1.07	0.2719	6.10.4.2.2-2
312.396	4.848	15.80	1.07	0.0166	6.10.4.2.2-1	15.80	1.07	0.1141	6.10.4.2.2-2
316.510	4.897	15.80	1.07	0.2748	6.10.4.2.2-1	15.80	1.07	0.3127	6.10.4.2.2-2
316.510	4.897	15.80	1.07	0.0051	6.10.4.2.2-1	15.80	1.07	0.0624	6.10.4.2.2-2
316.777	4.900	15.80	1.07	0.2774	6.10.4.2.2-1	15.80	1.07	0.3156	6.10.4.2.2-2
316.777	4.900	15.80	1.07	0.0042	6.10.4.2.2-1	15.80	1.07	0.0580	6.10.4.2.2-2
320.844	4.948	15.80	1.07	0.3505	6.10.4.2.2-1	15.80	1.07	0.3985	6.10.4.2.2-2
320.844	4.948	15.80	1.07	0.0049	6.10.4.2.2-1	15.80	1.07	0.0211	6.10.4.2.2-2
325.077	4.999	15.80	1.07	0.4436	6.10.4.2.2-1	15.80	1.07	0.5040	6.10.4.2.2-2
325.077	4.999	15.80	1.07	0.0112	6.10.4.2.2-1	15.80	1.07	0.0022	6.10.4.2.2-2
325.177	5.000	15.80	1.07	0.4460	6.10.4.2.2-1	15.80	1.07	0.5067	6.10.4.2.2-2
325.177	5.000	15.80	1.07	0.0113	6.10.4.2.2-1	15.80	1.07	0.0020	6.10.4.2.2-2
325.277	5.001	15.80	1.07	0.4436	6.10.4.2.2-1	15.80	1.07	0.5040	6.10.4.2.2-2
325.277	5.001	15.80	1.07	0.0112	6.10.4.2.2-1	15.80	1.07	0.0022	6.10.4.2.2-2
328.052	5.030	15.80	1.07	0.3781	6.10.4.2.2-1	15.80	1.07	0.4298	6.10.4.2.2-2
328.052	5.030	15.80	1.07	0.0074	6.10.4.2.2-1	15.80	1.07	0.0117	6.10.4.2.2-2
330.927	5.060	15.80	1.07	0.3144	6.10.4.2.2-1	15.80	1.07	0.3576	6.10.4.2.2-2
330.927	5.060	15.80	1.07	0.0026	6.10.4.2.2-1	15.80	1.07	0.0273	6.10.4.2.2-2
334.702	5.100	15.80	1.07	0.2391	6.10.4.2.2-1	15.80	1.07	0.2722	6.10.4.2.2-2
334.702	5.100	15.80	1.07	0.0064	6.10.4.2.2-1	15.80	1.07	0.0633	6.10.4.2.2-2
338.261	5.137	15.80	1.07	0.0321	6.10.4.2.2-1	15.80	1.07	0.1648	6.10.4.2.2-2
338.261	5.137	15.80	1.07	0.0147	6.10.4.2.2-1	15.80	1.07	0.0982	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0190	6.10.4.2.2-1	15.80	1.07	0.1085	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0292	6.10.4.2.2-1	15.80	1.07	0.1620	6.10.4.2.2-2
345.594	5.214	15.80	1.07	0.0173	6.10.4.2.2-1	15.80	1.07	0.1028	6.10.4.2.2-2
345.594	5.214	15.80	1.07	0.0332	6.10.4.2.2-1	15.80	1.07	0.1806	6.10.4.2.2-2
352.928	5.291	15.80	1.07	0.0104	6.10.4.2.2-1	15.80	1.07	0.0798	6.10.4.2.2-2
352.928	5.291	15.80	1.07	0.0523	6.10.4.2.2-1	15.80	1.07	0.2720	6.10.4.2.2-2
353.752	5.300	15.80	1.07	0.0097	6.10.4.2.2-1	15.80	1.07	0.0776	6.10.4.2.2-2
353.752	5.300	15.80	1.07	0.0545	6.10.4.2.2-1	15.80	1.07	0.2828	6.10.4.2.2-2
360.261	5.368	15.80	1.07	0.0051	6.10.4.2.2-1	15.80	1.07	0.0614	6.10.4.2.2-2
360.261	5.368	15.80	1.07	0.0666	6.10.4.2.2-1	15.80	1.07	0.3412	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
363.277	5.400	15.80	1.07	0.0034	6.10.4.2.2-1	15.80	1.07	0.0548	6.10.4.2.2-2
363.277	5.400	15.80	1.07	0.0702	6.10.4.2.2-1	15.80	1.07	0.3581	6.10.4.2.2-2
367.595	5.445	15.80	1.07	0.0013	6.10.4.2.2-1	15.80	1.07	0.0464	6.10.4.2.2-2
367.595	5.445	15.80	1.07	0.0737	6.10.4.2.2-1	15.80	1.07	0.3749	6.10.4.2.2-2
372.802	5.500	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0412	6.10.4.2.2-2
372.802	5.500	15.80	1.07	0.0754	6.10.4.2.2-1	15.80	1.07	0.3833	6.10.4.2.2-2
374.928	5.522	15.80	1.07	0.0009	6.10.4.2.2-1	15.80	1.07	0.0449	6.10.4.2.2-2
374.928	5.522	15.80	1.07	0.0753	6.10.4.2.2-1	15.80	1.07	0.3828	6.10.4.2.2-2
382.262	5.599	15.80	1.07	0.0042	6.10.4.2.2-1	15.80	1.07	0.0597	6.10.4.2.2-2
382.262	5.599	15.80	1.07	0.0709	6.10.4.2.2-1	15.80	1.07	0.3618	6.10.4.2.2-2
382.327	5.600	15.80	1.07	0.0042	6.10.4.2.2-1	15.80	1.07	0.0599	6.10.4.2.2-2
382.327	5.600	15.80	1.07	0.0707	6.10.4.2.2-1	15.80	1.07	0.3611	6.10.4.2.2-2
389.595	5.676	15.80	1.07	0.0090	6.10.4.2.2-1	15.80	1.07	0.0780	6.10.4.2.2-2
389.595	5.676	15.80	1.07	0.0598	6.10.4.2.2-1	15.80	1.07	0.3087	6.10.4.2.2-2
391.852	5.700	15.80	1.07	0.0108	6.10.4.2.2-1	15.80	1.07	0.0844	6.10.4.2.2-2
391.852	5.700	15.80	1.07	0.0555	6.10.4.2.2-1	15.80	1.07	0.2884	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0150	6.10.4.2.2-1	15.80	1.07	0.0985	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0442	6.10.4.2.2-1	15.80	1.07	0.2337	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0152	6.10.4.2.2-1	15.80	1.07	0.0991	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0435	6.10.4.2.2-1	15.80	1.07	0.2304	6.10.4.2.2-2
396.866	5.753	15.80	1.07	0.0153	6.10.4.2.2-1	15.80	1.07	0.0996	6.10.4.2.2-2
396.866	5.753	15.80	1.07	0.0432	6.10.4.2.2-1	15.80	1.07	0.2287	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0202	6.10.4.2.2-1	15.80	1.07	0.1161	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0302	6.10.4.2.2-1	15.80	1.07	0.1670	6.10.4.2.2-2
404.137	5.829	15.80	1.07	0.0241	6.10.4.2.2-1	15.80	1.07	0.1300	6.10.4.2.2-2
404.137	5.829	15.80	1.07	0.0229	6.10.4.2.2-1	15.80	1.07	0.1337	6.10.4.2.2-2
407.949	5.869	15.80	1.07	0.0342	6.10.4.2.2-1	15.80	1.07	0.1752	6.10.4.2.2-2
407.949	5.869	15.80	1.07	0.0137	6.10.4.2.2-1	15.80	1.07	0.0935	6.10.4.2.2-2
410.902	5.900	15.80	1.07	0.2403	6.10.4.2.2-1	15.80	1.07	0.2736	6.10.4.2.2-2
410.902	5.900	15.80	1.07	0.0065	6.10.4.2.2-1	15.80	1.07	0.0632	6.10.4.2.2-2
411.762	5.909	15.80	1.07	0.2561	6.10.4.2.2-1	15.80	1.07	0.2916	6.10.4.2.2-2
411.762	5.909	15.80	1.07	0.0046	6.10.4.2.2-1	15.80	1.07	0.0556	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
416.094	5.955	15.80	1.07	0.3448	6.10.4.2.2-1	15.80	1.07	0.3921	6.10.4.2.2-2
416.094	5.955	15.80	1.07	0.0053	6.10.4.2.2-1	15.80	1.07	0.0166	6.10.4.2.2-2
420.327	5.999	15.80	1.07	0.4424	6.10.4.2.2-1	15.80	1.07	0.5027	6.10.4.2.2-2
420.327	5.999	15.80	1.07	0.0118	6.10.4.2.2-1	15.80	1.07	0.0020	6.10.4.2.2-2
420.427	6.000	15.80	1.07	0.4448	6.10.4.2.2-1	15.80	1.07	0.5055	6.10.4.2.2-2
420.427	6.000	15.80	1.07	0.0119	6.10.4.2.2-1	15.80	1.07	0.0021	6.10.4.2.2-2
420.527	6.001	15.80	1.07	0.4424	6.10.4.2.2-1	15.80	1.07	0.5027	6.10.4.2.2-2
420.527	6.001	15.80	1.07	0.0119	6.10.4.2.2-1	15.80	1.07	0.0023	6.10.4.2.2-2
423.974	6.052	15.80	1.07	0.3631	6.10.4.2.2-1	15.80	1.07	0.4127	6.10.4.2.2-2
423.974	6.052	15.80	1.07	0.0057	6.10.4.2.2-1	15.80	1.07	0.0188	6.10.4.2.2-2
427.245	6.100	15.80	1.07	0.2967	6.10.4.2.2-1	15.80	1.07	0.3375	6.10.4.2.2-2
427.245	6.100	15.80	1.07	0.0006	6.10.4.2.2-1	15.80	1.07	0.0423	6.10.4.2.2-2
427.521	6.104	15.80	1.07	0.2914	6.10.4.2.2-1	15.80	1.07	0.3315	6.10.4.2.2-2
427.521	6.104	15.80	1.07	0.0013	6.10.4.2.2-1	15.80	1.07	0.0454	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.2327	6.10.4.2.2-1	15.80	1.07	0.2656	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.0204	6.10.4.2.2-1	15.80	1.07	0.1315	6.10.4.2.2-2
436.354	6.234	15.80	1.07	0.2175	6.10.4.2.2-1	15.80	1.07	0.2487	6.10.4.2.2-2
436.354	6.234	15.80	1.07	0.0267	6.10.4.2.2-1	15.80	1.07	0.1607	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0313	6.10.4.2.2-1	15.80	1.07	0.1756	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0383	6.10.4.2.2-1	15.80	1.07	0.2151	6.10.4.2.2-2
445.187	6.363	15.80	1.07	0.0258	6.10.4.2.2-1	15.80	1.07	0.1537	6.10.4.2.2-2
445.187	6.363	15.80	1.07	0.0476	6.10.4.2.2-1	15.80	1.07	0.2583	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0229	6.10.4.2.2-1	15.80	1.07	0.1415	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0524	6.10.4.2.2-1	15.80	1.07	0.2815	6.10.4.2.2-2
454.021	6.493	15.80	1.07	0.0163	6.10.4.2.2-1	15.80	1.07	0.1126	6.10.4.2.2-2
454.021	6.493	15.80	1.07	0.0598	6.10.4.2.2-1	15.80	1.07	0.3144	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.0158	6.10.4.2.2-1	15.80	1.07	0.1105	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.0599	6.10.4.2.2-1	15.80	1.07	0.3146	6.10.4.2.2-2
461.333	6.600	15.80	1.07	0.0101	6.10.4.2.2-1	15.80	1.07	0.0824	6.10.4.2.2-2
461.333	6.600	15.80	1.07	0.0615	6.10.4.2.2-1	15.80	1.07	0.3193	6.10.4.2.2-2
462.854	6.622	15.80	1.07	0.0089	6.10.4.2.2-1	15.80	1.07	0.0766	6.10.4.2.2-2
462.854	6.622	15.80	1.07	0.0609	6.10.4.2.2-1	15.80	1.07	0.3156	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
467.125	6.685	15.80	1.07	0.0062	6.10.4.2.2-1	15.80	1.07	0.0609	6.10.4.2.2-2
467.125	6.685	15.80	1.07	0.0581	6.10.4.2.2-1	15.80	1.07	0.3001	6.10.4.2.2-2
468.151	6.700	15.80	1.07	0.0056	6.10.4.2.2-1	15.80	1.07	0.0573	6.10.4.2.2-2
468.151	6.700	15.80	1.07	0.0572	6.10.4.2.2-1	15.80	1.07	0.2952	6.10.4.2.2-2
471.396	6.748	15.80	1.07	0.0039	6.10.4.2.2-1	15.80	1.07	0.0464	6.10.4.2.2-2
471.396	6.748	15.80	1.07	0.0528	6.10.4.2.2-1	15.80	1.07	0.2723	6.10.4.2.2-2
474.969	6.800	15.80	1.07	0.0024	6.10.4.2.2-1	15.80	1.07	0.0352	6.10.4.2.2-2
474.969	6.800	15.80	1.07	0.0461	6.10.4.2.2-1	15.80	1.07	0.2371	6.10.4.2.2-2
475.667	6.810	15.80	1.07	0.0022	6.10.4.2.2-1	15.80	1.07	0.0331	6.10.4.2.2-2
475.667	6.810	15.80	1.07	0.0451	6.10.4.2.2-1	15.80	1.07	0.2323	6.10.4.2.2-2
479.938	6.873	15.80	1.07	0.0009	6.10.4.2.2-1	15.80	1.07	0.0210	6.10.4.2.2-2
479.938	6.873	15.80	1.07	0.0335	6.10.4.2.2-1	15.80	1.07	0.1723	6.10.4.2.2-2
481.786	6.900	15.80	1.07	0.0006	6.10.4.2.2-1	15.80	1.07	0.0161	6.10.4.2.2-2
481.786	6.900	15.80	1.07	0.0275	6.10.4.2.2-1	15.80	1.07	0.1412	6.10.4.2.2-2
484.271	6.936	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0099	6.10.4.2.2-2
484.271	6.936	15.80	1.07	0.0185	6.10.4.2.2-1	15.80	1.07	0.0951	6.10.4.2.2-2
488.504	6.999	15.80	1.07	0.0003	6.10.4.2.2-1	15.80	1.07	0.0003	6.10.4.2.2-2
488.504	6.999	15.80	1.07	0.0005	6.10.4.2.2-1	15.80	1.07	0.0024	6.10.4.2.2-2
488.604	7.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1
0.100	1.002	15.80	1.07	0.0002	6.10.3.2.1-1	15.80	1.07	0.0002	6.10.3.2.2-1
3.339	1.051	15.80	1.07	0.0056	6.10.3.2.1-1	15.80	1.07	0.0056	6.10.3.2.2-1
6.515	1.100	15.80	1.07	0.0102	6.10.3.2.1-1	15.80	1.07	0.0102	6.10.3.2.2-1
6.677	1.102	15.80	1.07	0.0104	6.10.3.2.1-1	15.80	1.07	0.0104	6.10.3.2.2-1
13.029	1.200	15.80	1.07	0.0169	6.10.3.2.1-1	15.80	1.07	0.0169	6.10.3.2.2-1
14.984	1.230	15.80	1.07	0.0183	6.10.3.2.1-1	15.80	1.07	0.0183	6.10.3.2.2-1
19.544	1.300	15.80	1.07	0.0203	6.10.3.2.1-1	15.80	1.07	0.0203	6.10.3.2.2-1
23.292	1.357	15.80	1.07	0.0208	6.10.3.2.1-1	15.80	1.07	0.0208	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
26.071	1.400	15.80	1.07	0.0204	6.10.3.2.1-1	15.80	1.07	0.0204	6.10.3.2.2-1
31.583	1.485	15.80	1.07	0.0178	6.10.3.2.1-1	15.80	1.07	0.0178	6.10.3.2.2-1
32.589	1.500	15.80	1.07	0.0171	6.10.3.2.1-1	15.80	1.07	0.0171	6.10.3.2.2-1
39.106	1.600	15.80	1.07	0.0104	6.10.3.2.1-1	15.80	1.07	0.0104	6.10.3.2.2-1
39.875	1.612	15.80	1.07	0.0094	6.10.3.2.1-1	15.80	1.07	0.0094	6.10.3.2.2-1
44.042	1.676	15.80	1.07	0.0030	6.10.3.2.1-1	15.80	1.07	0.0030	6.10.3.2.2-1
45.624	1.700	15.80	1.07	0.0003	6.10.3.2.1-1	15.80	1.07	0.0003	6.10.3.2.2-1
48.208	1.740	15.80	1.07	0.0047	6.10.3.2.2-1	15.80	1.07	0.0047	6.10.3.2.1-1
52.142	1.800	15.80	1.07	0.0134	6.10.3.2.2-1	15.80	1.07	0.0134	6.10.3.2.1-1
52.375	1.804	15.80	1.07	0.0140	6.10.3.2.2-1	15.80	1.07	0.0140	6.10.3.2.1-1
56.542	1.868	15.80	1.07	0.0246	6.10.3.2.2-1	15.80	1.07	0.0246	6.10.3.2.1-1
58.659	1.900	15.80	1.07	0.0306	6.10.3.2.2-1	15.80	1.07	0.0306	6.10.3.2.1-1
60.859	1.934	15.80	1.07	0.0373	6.10.3.2.2-1	15.80	1.07	0.0373	6.10.3.2.1-1
65.077	1.998	15.80	1.07	0.0510	6.10.3.2.2-1	15.80	1.07	0.0510	6.10.3.2.1-1
65.177	2.000	15.80	1.07	0.0514	6.10.3.2.2-1	15.80	1.07	0.0514	6.10.3.2.1-1
65.277	2.001	15.80	1.07	0.0510	6.10.3.2.2-1	15.80	1.07	0.0510	6.10.3.2.1-1
67.802	2.029	15.80	1.07	0.0421	6.10.3.2.2-1	15.80	1.07	0.0421	6.10.3.2.1-1
70.427	2.057	15.80	1.07	0.0333	6.10.3.2.2-1	15.80	1.07	0.0333	6.10.3.2.1-1
74.377	2.100	15.80	1.07	0.0213	6.10.3.2.2-1	15.80	1.07	0.0213	6.10.3.2.1-1
75.719	2.115	15.80	1.07	0.0175	6.10.3.2.2-1	15.80	1.07	0.0175	6.10.3.2.1-1
81.010	2.172	15.80	1.07	0.0038	6.10.3.2.2-1	15.80	1.07	0.0038	6.10.3.2.1-1
83.577	2.200	15.80	1.07	0.0020	6.10.3.2.1-1	15.80	1.07	0.0020	6.10.3.2.2-1
87.899	2.247	15.80	1.07	0.0106	6.10.3.2.1-1	15.80	1.07	0.0106	6.10.3.2.2-1
88.099	2.249	15.80	1.07	0.0110	6.10.3.2.1-1	15.80	1.07	0.0110	6.10.3.2.2-1
89.510	2.264	15.80	1.07	0.0135	6.10.3.2.1-1	15.80	1.07	0.0135	6.10.3.2.2-1
92.777	2.300	15.80	1.07	0.0186	6.10.3.2.1-1	15.80	1.07	0.0186	6.10.3.2.2-1
98.010	2.357	15.80	1.07	0.0251	6.10.3.2.1-1	15.80	1.07	0.0251	6.10.3.2.2-1
101.977	2.400	15.80	1.07	0.0285	6.10.3.2.1-1	15.80	1.07	0.0285	6.10.3.2.2-1
106.510	2.449	15.80	1.07	0.0309	6.10.3.2.1-1	15.80	1.07	0.0309	6.10.3.2.2-1
111.177	2.500	15.80	1.07	0.0317	6.10.3.2.1-1	15.80	1.07	0.0317	6.10.3.2.2-1
115.010	2.542	15.80	1.07	0.0311	6.10.3.2.1-1	15.80	1.07	0.0311	6.10.3.2.2-1
120.377	2.600	15.80	1.07	0.0283	6.10.3.2.1-1	15.80	1.07	0.0283	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
123.510	2.634	15.80	1.07	0.0255	6.10.3.2.1-1	15.80	1.07	0.0255	6.10.3.2.2-1
129.577	2.700	15.80	1.07	0.0181	6.10.3.2.1-1	15.80	1.07	0.0181	6.10.3.2.2-1
132.010	2.726	15.80	1.07	0.0143	6.10.3.2.1-1	15.80	1.07	0.0143	6.10.3.2.2-1
136.135	2.771	15.80	1.07	0.0067	6.10.3.2.1-1	15.80	1.07	0.0067	6.10.3.2.2-1
138.777	2.800	15.80	1.07	0.0011	6.10.3.2.1-1	15.80	1.07	0.0011	6.10.3.2.2-1
140.260	2.816	15.80	1.07	0.0023	6.10.3.2.2-1	15.80	1.07	0.0023	6.10.3.2.1-1
144.385	2.861	15.80	1.07	0.0128	6.10.3.2.2-1	15.80	1.07	0.0128	6.10.3.2.1-1
147.977	2.900	15.80	1.07	0.0230	6.10.3.2.2-1	15.80	1.07	0.0230	6.10.3.2.1-1
148.510	2.906	15.80	1.07	0.0246	6.10.3.2.2-1	15.80	1.07	0.0246	6.10.3.2.1-1
152.844	2.953	15.80	1.07	0.0386	6.10.3.2.2-1	15.80	1.07	0.0386	6.10.3.2.1-1
157.077	2.999	15.80	1.07	0.0537	6.10.3.2.2-1	15.80	1.07	0.0537	6.10.3.2.1-1
157.177	3.000	15.80	1.07	0.0541	6.10.3.2.2-1	15.80	1.07	0.0541	6.10.3.2.1-1
157.277	3.001	15.80	1.07	0.0537	6.10.3.2.2-1	15.80	1.07	0.0537	6.10.3.2.1-1
159.802	3.031	15.80	1.07	0.0452	6.10.3.2.2-1	15.80	1.07	0.0452	6.10.3.2.1-1
162.427	3.063	15.80	1.07	0.0369	6.10.3.2.2-1	15.80	1.07	0.0369	6.10.3.2.1-1
165.577	3.100	15.80	1.07	0.0278	6.10.3.2.2-1	15.80	1.07	0.0278	6.10.3.2.1-1
171.094	3.166	15.80	1.07	0.0136	6.10.3.2.2-1	15.80	1.07	0.0136	6.10.3.2.1-1
173.977	3.200	15.80	1.07	0.0071	6.10.3.2.2-1	15.80	1.07	0.0071	6.10.3.2.1-1
179.760	3.269	15.80	1.07	0.0040	6.10.3.2.1-1	15.80	1.07	0.0040	6.10.3.2.2-1
182.377	3.300	15.80	1.07	0.0080	6.10.3.2.1-1	15.80	1.07	0.0080	6.10.3.2.2-1
186.649	3.351	15.80	1.07	0.0136	6.10.3.2.1-1	15.80	1.07	0.0136	6.10.3.2.2-1
186.849	3.353	15.80	1.07	0.0138	6.10.3.2.1-1	15.80	1.07	0.0138	6.10.3.2.2-1
188.677	3.375	15.80	1.07	0.0157	6.10.3.2.1-1	15.80	1.07	0.0157	6.10.3.2.2-1
190.777	3.400	15.80	1.07	0.0176	6.10.3.2.1-1	15.80	1.07	0.0176	6.10.3.2.2-1
197.594	3.481	15.80	1.07	0.0213	6.10.3.2.1-1	15.80	1.07	0.0213	6.10.3.2.2-1
199.177	3.500	15.80	1.07	0.0216	6.10.3.2.1-1	15.80	1.07	0.0216	6.10.3.2.2-1
206.510	3.587	15.80	1.07	0.0205	6.10.3.2.1-1	15.80	1.07	0.0205	6.10.3.2.2-1
207.577	3.600	15.80	1.07	0.0199	6.10.3.2.1-1	15.80	1.07	0.0199	6.10.3.2.2-1
215.427	3.693	15.80	1.07	0.0135	6.10.3.2.1-1	15.80	1.07	0.0135	6.10.3.2.2-1
215.977	3.700	15.80	1.07	0.0128	6.10.3.2.1-1	15.80	1.07	0.0128	6.10.3.2.2-1
219.698	3.744	15.80	1.07	0.0077	6.10.3.2.1-1	15.80	1.07	0.0077	6.10.3.2.2-1
223.969	3.795	15.80	1.07	0.0006	6.10.3.2.1-1	15.80	1.07	0.0006	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
224.377	3.800	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
228.240	3.846	15.80	1.07	0.0082	6.10.3.2.2-1	15.80	1.07	0.0082	6.10.3.2.1-1
232.510	3.897	15.80	1.07	0.0184	6.10.3.2.2-1	15.80	1.07	0.0184	6.10.3.2.1-1
232.777	3.900	15.80	1.07	0.0190	6.10.3.2.2-1	15.80	1.07	0.0190	6.10.3.2.1-1
236.844	3.948	15.80	1.07	0.0303	6.10.3.2.2-1	15.80	1.07	0.0303	6.10.3.2.1-1
241.077	3.999	15.80	1.07	0.0434	6.10.3.2.2-1	15.80	1.07	0.0434	6.10.3.2.1-1
241.177	4.000	15.80	1.07	0.0437	6.10.3.2.2-1	15.80	1.07	0.0437	6.10.3.2.1-1
241.277	4.001	15.80	1.07	0.0420	6.10.3.2.2-1	15.80	1.07	0.0420	6.10.3.2.1-1
244.719	4.042	15.80	1.07	0.0315	6.10.3.2.2-1	15.80	1.07	0.0315	6.10.3.2.1-1
248.260	4.084	15.80	1.07	0.0218	6.10.3.2.2-1	15.80	1.07	0.0218	6.10.3.2.1-1
249.577	4.100	15.80	1.07	0.0184	6.10.3.2.2-1	15.80	1.07	0.0184	6.10.3.2.1-1
257.177	4.190	15.80	1.07	0.0017	6.10.3.2.2-1	15.80	1.07	0.0017	6.10.3.2.1-1
257.977	4.200	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
266.094	4.297	15.80	1.07	0.0122	6.10.3.2.1-1	15.80	1.07	0.0122	6.10.3.2.2-1
266.377	4.300	15.80	1.07	0.0125	6.10.3.2.1-1	15.80	1.07	0.0125	6.10.3.2.2-1
274.777	4.400	15.80	1.07	0.0196	6.10.3.2.1-1	15.80	1.07	0.0196	6.10.3.2.2-1
275.010	4.403	15.80	1.07	0.0197	6.10.3.2.1-1	15.80	1.07	0.0197	6.10.3.2.2-1
283.177	4.500	15.80	1.07	0.0212	6.10.3.2.1-1	15.80	1.07	0.0212	6.10.3.2.2-1
283.927	4.509	15.80	1.07	0.0210	6.10.3.2.1-1	15.80	1.07	0.0210	6.10.3.2.2-1
291.577	4.600	15.80	1.07	0.0171	6.10.3.2.1-1	15.80	1.07	0.0171	6.10.3.2.2-1
291.990	4.605	15.80	1.07	0.0167	6.10.3.2.1-1	15.80	1.07	0.0167	6.10.3.2.2-1
295.504	4.647	15.80	1.07	0.0133	6.10.3.2.1-1	15.80	1.07	0.0133	6.10.3.2.2-1
295.704	4.649	15.80	1.07	0.0131	6.10.3.2.1-1	15.80	1.07	0.0131	6.10.3.2.2-1
299.977	4.700	15.80	1.07	0.0075	6.10.3.2.1-1	15.80	1.07	0.0075	6.10.3.2.2-1
300.052	4.701	15.80	1.07	0.0074	6.10.3.2.1-1	15.80	1.07	0.0074	6.10.3.2.2-1
304.167	4.750	15.80	1.07	0.0005	6.10.3.2.1-1	15.80	1.07	0.0005	6.10.3.2.2-1
308.281	4.799	15.80	1.07	0.0077	6.10.3.2.2-1	15.80	1.07	0.0077	6.10.3.2.1-1
308.377	4.800	15.80	1.07	0.0079	6.10.3.2.2-1	15.80	1.07	0.0079	6.10.3.2.1-1
312.396	4.848	15.80	1.07	0.0174	6.10.3.2.2-1	15.80	1.07	0.0174	6.10.3.2.1-1
316.510	4.897	15.80	1.07	0.0285	6.10.3.2.2-1	15.80	1.07	0.0285	6.10.3.2.1-1
316.777	4.900	15.80	1.07	0.0293	6.10.3.2.2-1	15.80	1.07	0.0293	6.10.3.2.1-1
320.844	4.948	15.80	1.07	0.0417	6.10.3.2.2-1	15.80	1.07	0.0417	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
325.077	4.999	15.80	1.07	0.0561	6.10.3.2.2-1	15.80	1.07	0.0561	6.10.3.2.1-1
325.177	5.000	15.80	1.07	0.0564	6.10.3.2.2-1	15.80	1.07	0.0564	6.10.3.2.1-1
325.277	5.001	15.80	1.07	0.0560	6.10.3.2.2-1	15.80	1.07	0.0560	6.10.3.2.1-1
328.052	5.030	15.80	1.07	0.0458	6.10.3.2.2-1	15.80	1.07	0.0458	6.10.3.2.1-1
330.927	5.060	15.80	1.07	0.0359	6.10.3.2.2-1	15.80	1.07	0.0359	6.10.3.2.1-1
334.702	5.100	15.80	1.07	0.0239	6.10.3.2.2-1	15.80	1.07	0.0239	6.10.3.2.1-1
338.261	5.137	15.80	1.07	0.0136	6.10.3.2.2-1	15.80	1.07	0.0136	6.10.3.2.1-1
344.227	5.200	15.80	1.07	0.0014	6.10.3.2.1-1	15.80	1.07	0.0014	6.10.3.2.2-1
345.594	5.214	15.80	1.07	0.0045	6.10.3.2.1-1	15.80	1.07	0.0045	6.10.3.2.2-1
352.928	5.291	15.80	1.07	0.0182	6.10.3.2.1-1	15.80	1.07	0.0182	6.10.3.2.2-1
353.752	5.300	15.80	1.07	0.0195	6.10.3.2.1-1	15.80	1.07	0.0195	6.10.3.2.2-1
360.261	5.368	15.80	1.07	0.0278	6.10.3.2.1-1	15.80	1.07	0.0278	6.10.3.2.2-1
363.277	5.400	15.80	1.07	0.0305	6.10.3.2.1-1	15.80	1.07	0.0305	6.10.3.2.2-1
367.595	5.445	15.80	1.07	0.0330	6.10.3.2.1-1	15.80	1.07	0.0330	6.10.3.2.2-1
372.802	5.500	15.80	1.07	0.0342	6.10.3.2.1-1	15.80	1.07	0.0342	6.10.3.2.2-1
374.928	5.522	15.80	1.07	0.0341	6.10.3.2.1-1	15.80	1.07	0.0341	6.10.3.2.2-1
382.262	5.599	15.80	1.07	0.0308	6.10.3.2.1-1	15.80	1.07	0.0308	6.10.3.2.2-1
382.327	5.600	15.80	1.07	0.0307	6.10.3.2.1-1	15.80	1.07	0.0307	6.10.3.2.2-1
389.595	5.676	15.80	1.07	0.0233	6.10.3.2.1-1	15.80	1.07	0.0233	6.10.3.2.2-1
391.852	5.700	15.80	1.07	0.0201	6.10.3.2.1-1	15.80	1.07	0.0201	6.10.3.2.2-1
396.504	5.749	15.80	1.07	0.0123	6.10.3.2.1-1	15.80	1.07	0.0123	6.10.3.2.2-1
396.704	5.751	15.80	1.07	0.0119	6.10.3.2.1-1	15.80	1.07	0.0119	6.10.3.2.2-1
396.866	5.753	15.80	1.07	0.0116	6.10.3.2.1-1	15.80	1.07	0.0116	6.10.3.2.2-1
401.377	5.800	15.80	1.07	0.0023	6.10.3.2.1-1	15.80	1.07	0.0023	6.10.3.2.2-1
404.137	5.829	15.80	1.07	0.0042	6.10.3.2.2-1	15.80	1.07	0.0042	6.10.3.2.1-1
407.949	5.869	15.80	1.07	0.0143	6.10.3.2.2-1	15.80	1.07	0.0143	6.10.3.2.1-1
410.902	5.900	15.80	1.07	0.0229	6.10.3.2.2-1	15.80	1.07	0.0229	6.10.3.2.1-1
411.762	5.909	15.80	1.07	0.0255	6.10.3.2.2-1	15.80	1.07	0.0255	6.10.3.2.1-1
416.094	5.955	15.80	1.07	0.0399	6.10.3.2.2-1	15.80	1.07	0.0399	6.10.3.2.1-1
420.327	5.999	15.80	1.07	0.0553	6.10.3.2.2-1	15.80	1.07	0.0553	6.10.3.2.1-1
420.427	6.000	15.80	1.07	0.0557	6.10.3.2.2-1	15.80	1.07	0.0557	6.10.3.2.1-1
420.527	6.001	15.80	1.07	0.0553	6.10.3.2.2-1	15.80	1.07	0.0553	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
423.974	6.052	15.80	1.07	0.0436	6.10.3.2.2-1	15.80	1.07	0.0436	6.10.3.2.1-1
427.245	6.100	15.80	1.07	0.0334	6.10.3.2.2-1	15.80	1.07	0.0334	6.10.3.2.1-1
427.521	6.104	15.80	1.07	0.0326	6.10.3.2.2-1	15.80	1.07	0.0326	6.10.3.2.1-1
434.063	6.200	15.80	1.07	0.0148	6.10.3.2.2-1	15.80	1.07	0.0148	6.10.3.2.1-1
436.354	6.234	15.80	1.07	0.0094	6.10.3.2.2-1	15.80	1.07	0.0094	6.10.3.2.1-1
440.880	6.300	15.80	1.07	0.0001	6.10.3.2.1-1	15.80	1.07	0.0001	6.10.3.2.2-1
445.187	6.363	15.80	1.07	0.0076	6.10.3.2.1-1	15.80	1.07	0.0076	6.10.3.2.2-1
447.698	6.400	15.80	1.07	0.0113	6.10.3.2.1-1	15.80	1.07	0.0113	6.10.3.2.2-1
454.021	6.493	15.80	1.07	0.0184	6.10.3.2.1-1	15.80	1.07	0.0184	6.10.3.2.2-1
454.516	6.500	15.80	1.07	0.0188	6.10.3.2.1-1	15.80	1.07	0.0188	6.10.3.2.2-1
461.333	6.600	15.80	1.07	0.0228	6.10.3.2.1-1	15.80	1.07	0.0228	6.10.3.2.2-1
462.854	6.622	15.80	1.07	0.0231	6.10.3.2.1-1	15.80	1.07	0.0231	6.10.3.2.2-1
467.125	6.685	15.80	1.07	0.0231	6.10.3.2.1-1	15.80	1.07	0.0231	6.10.3.2.2-1
468.151	6.700	15.80	1.07	0.0228	6.10.3.2.1-1	15.80	1.07	0.0228	6.10.3.2.2-1
471.396	6.748	15.80	1.07	0.0216	6.10.3.2.1-1	15.80	1.07	0.0216	6.10.3.2.2-1
474.969	6.800	15.80	1.07	0.0191	6.10.3.2.1-1	15.80	1.07	0.0191	6.10.3.2.2-1
475.667	6.810	15.80	1.07	0.0185	6.10.3.2.1-1	15.80	1.07	0.0185	6.10.3.2.2-1
479.938	6.873	15.80	1.07	0.0139	6.10.3.2.1-1	15.80	1.07	0.0139	6.10.3.2.2-1
481.786	6.900	15.80	1.07	0.0114	6.10.3.2.1-1	15.80	1.07	0.0114	6.10.3.2.2-1
484.271	6.936	15.80	1.07	0.0077	6.10.3.2.1-1	15.80	1.07	0.0077	6.10.3.2.2-1
488.504	6.999	15.80	1.07	0.0002	6.10.3.2.1-1	15.80	1.07	0.0002	6.10.3.2.2-1
488.604	7.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1

Load combination: Stage 01 Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1
0.100	1.002	15.80	1.07	0.0009	6.10.3.2.1-1	15.80	1.07	0.0009	6.10.3.2.2-1
3.339	1.051	15.80	1.07	0.0267	6.10.3.2.1-1	15.80	1.07	0.0267	6.10.3.2.2-1
6.515	1.100	15.80	1.07	0.0481	6.10.3.2.1-1	15.80	1.07	0.0481	6.10.3.2.2-1
6.677	1.102	15.80	1.07	0.0491	6.10.3.2.1-1	15.80	1.07	0.0491	6.10.3.2.2-1
13.029	1.200	15.80	1.07	0.0802	6.10.3.2.1-1	15.80	1.07	0.0802	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
14.984	1.230	15.80	1.07	0.0866	6.10.3.2.1-1	15.80	1.07	0.0866	6.10.3.2.2-1
19.544	1.300	15.80	1.07	0.0962	6.10.3.2.1-1	15.80	1.07	0.0962	6.10.3.2.2-1
23.292	1.357	15.80	1.07	0.0982	6.10.3.2.1-1	15.80	1.07	0.0982	6.10.3.2.2-1
26.071	1.400	15.80	1.07	0.0962	6.10.3.2.1-1	15.80	1.07	0.0962	6.10.3.2.2-1
31.583	1.485	15.80	1.07	0.0836	6.10.3.2.1-1	15.80	1.07	0.0836	6.10.3.2.2-1
32.589	1.500	15.80	1.07	0.0800	6.10.3.2.1-1	15.80	1.07	0.0800	6.10.3.2.2-1
39.106	1.600	15.80	1.07	0.0479	6.10.3.2.1-1	15.80	1.07	0.0479	6.10.3.2.2-1
39.875	1.612	15.80	1.07	0.0431	6.10.3.2.1-1	15.80	1.07	0.0431	6.10.3.2.2-1
44.042	1.676	15.80	1.07	0.0128	6.10.3.2.1-1	15.80	1.07	0.0128	6.10.3.2.2-1
45.624	1.700	15.80	1.07	0.0005	6.10.3.2.2-1	15.80	1.07	0.0005	6.10.3.2.1-1
48.208	1.740	15.80	1.07	0.0241	6.10.3.2.2-1	15.80	1.07	0.0241	6.10.3.2.1-1
52.142	1.800	15.80	1.07	0.0650	6.10.3.2.2-1	15.80	1.07	0.0650	6.10.3.2.1-1
52.375	1.804	15.80	1.07	0.0676	6.10.3.2.2-1	15.80	1.07	0.0676	6.10.3.2.1-1
56.542	1.868	15.80	1.07	0.1178	6.10.3.2.2-1	15.80	1.07	0.1178	6.10.3.2.1-1
58.659	1.900	15.80	1.07	0.1458	6.10.3.2.2-1	15.80	1.07	0.1458	6.10.3.2.1-1
60.859	1.934	15.80	1.07	0.1768	6.10.3.2.2-1	15.80	1.07	0.1768	6.10.3.2.1-1
65.077	1.998	15.80	1.07	0.2412	6.10.3.2.2-1	15.80	1.07	0.2412	6.10.3.2.1-1
65.177	2.000	15.80	1.07	0.2428	6.10.3.2.2-1	15.80	1.07	0.2428	6.10.3.2.1-1
65.277	2.001	15.80	1.07	0.2411	6.10.3.2.2-1	15.80	1.07	0.2411	6.10.3.2.1-1
67.802	2.029	15.80	1.07	0.1988	6.10.3.2.2-1	15.80	1.07	0.1988	6.10.3.2.1-1
70.427	2.057	15.80	1.07	0.1574	6.10.3.2.2-1	15.80	1.07	0.1574	6.10.3.2.1-1
74.377	2.100	15.80	1.07	0.1000	6.10.3.2.2-1	15.80	1.07	0.1000	6.10.3.2.1-1
75.719	2.115	15.80	1.07	0.0818	6.10.3.2.2-1	15.80	1.07	0.0818	6.10.3.2.1-1
81.010	2.172	15.80	1.07	0.0169	6.10.3.2.2-1	15.80	1.07	0.0169	6.10.3.2.1-1
83.577	2.200	15.80	1.07	0.0108	6.10.3.2.1-1	15.80	1.07	0.0108	6.10.3.2.2-1
87.899	2.247	15.80	1.07	0.0517	6.10.3.2.1-1	15.80	1.07	0.0517	6.10.3.2.2-1
88.099	2.249	15.80	1.07	0.0535	6.10.3.2.1-1	15.80	1.07	0.0535	6.10.3.2.2-1
89.510	2.264	15.80	1.07	0.0652	6.10.3.2.1-1	15.80	1.07	0.0652	6.10.3.2.2-1
92.777	2.300	15.80	1.07	0.0895	6.10.3.2.1-1	15.80	1.07	0.0895	6.10.3.2.2-1
98.010	2.357	15.80	1.07	0.1201	6.10.3.2.1-1	15.80	1.07	0.1201	6.10.3.2.2-1
101.977	2.400	15.80	1.07	0.1363	6.10.3.2.1-1	15.80	1.07	0.1363	6.10.3.2.2-1
106.510	2.449	15.80	1.07	0.1476	6.10.3.2.1-1	15.80	1.07	0.1476	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
111.177	2.500	15.80	1.07	0.1511	6.10.3.2.1-1	15.80	1.07	0.1511	6.10.3.2.2-1
115.010	2.542	15.80	1.07	0.1478	6.10.3.2.1-1	15.80	1.07	0.1478	6.10.3.2.2-1
120.377	2.600	15.80	1.07	0.1339	6.10.3.2.1-1	15.80	1.07	0.1339	6.10.3.2.2-1
123.510	2.634	15.80	1.07	0.1207	6.10.3.2.1-1	15.80	1.07	0.1207	6.10.3.2.2-1
129.577	2.700	15.80	1.07	0.0847	6.10.3.2.1-1	15.80	1.07	0.0847	6.10.3.2.2-1
132.010	2.726	15.80	1.07	0.0664	6.10.3.2.1-1	15.80	1.07	0.0664	6.10.3.2.2-1
136.135	2.771	15.80	1.07	0.0300	6.10.3.2.1-1	15.80	1.07	0.0300	6.10.3.2.2-1
138.777	2.800	15.80	1.07	0.0034	6.10.3.2.1-1	15.80	1.07	0.0034	6.10.3.2.2-1
140.260	2.816	15.80	1.07	0.0127	6.10.3.2.2-1	15.80	1.07	0.0127	6.10.3.2.1-1
144.385	2.861	15.80	1.07	0.0621	6.10.3.2.2-1	15.80	1.07	0.0621	6.10.3.2.1-1
147.977	2.900	15.80	1.07	0.1103	6.10.3.2.2-1	15.80	1.07	0.1103	6.10.3.2.1-1
148.510	2.906	15.80	1.07	0.1178	6.10.3.2.2-1	15.80	1.07	0.1178	6.10.3.2.1-1
152.844	2.953	15.80	1.07	0.1835	6.10.3.2.2-1	15.80	1.07	0.1835	6.10.3.2.1-1
157.077	2.999	15.80	1.07	0.2545	6.10.3.2.2-1	15.80	1.07	0.2545	6.10.3.2.1-1
157.177	3.000	15.80	1.07	0.2563	6.10.3.2.2-1	15.80	1.07	0.2563	6.10.3.2.1-1
157.277	3.001	15.80	1.07	0.2546	6.10.3.2.2-1	15.80	1.07	0.2546	6.10.3.2.1-1
159.802	3.031	15.80	1.07	0.2143	6.10.3.2.2-1	15.80	1.07	0.2143	6.10.3.2.1-1
162.427	3.063	15.80	1.07	0.1749	6.10.3.2.2-1	15.80	1.07	0.1749	6.10.3.2.1-1
165.577	3.100	15.80	1.07	0.1311	6.10.3.2.2-1	15.80	1.07	0.1311	6.10.3.2.1-1
171.094	3.166	15.80	1.07	0.0635	6.10.3.2.2-1	15.80	1.07	0.0635	6.10.3.2.1-1
173.977	3.200	15.80	1.07	0.0327	6.10.3.2.2-1	15.80	1.07	0.0327	6.10.3.2.1-1
179.760	3.269	15.80	1.07	0.0197	6.10.3.2.1-1	15.80	1.07	0.0197	6.10.3.2.2-1
182.377	3.300	15.80	1.07	0.0391	6.10.3.2.1-1	15.80	1.07	0.0391	6.10.3.2.2-1
186.649	3.351	15.80	1.07	0.0654	6.10.3.2.1-1	15.80	1.07	0.0654	6.10.3.2.2-1
186.849	3.353	15.80	1.07	0.0665	6.10.3.2.1-1	15.80	1.07	0.0665	6.10.3.2.2-1
188.677	3.375	15.80	1.07	0.0755	6.10.3.2.1-1	15.80	1.07	0.0755	6.10.3.2.2-1
190.777	3.400	15.80	1.07	0.0843	6.10.3.2.1-1	15.80	1.07	0.0843	6.10.3.2.2-1
197.594	3.481	15.80	1.07	0.1013	6.10.3.2.1-1	15.80	1.07	0.1013	6.10.3.2.2-1
199.177	3.500	15.80	1.07	0.1028	6.10.3.2.1-1	15.80	1.07	0.1028	6.10.3.2.2-1
206.510	3.587	15.80	1.07	0.0971	6.10.3.2.1-1	15.80	1.07	0.0971	6.10.3.2.2-1
207.577	3.600	15.80	1.07	0.0946	6.10.3.2.1-1	15.80	1.07	0.0946	6.10.3.2.2-1
215.427	3.693	15.80	1.07	0.0629	6.10.3.2.1-1	15.80	1.07	0.0629	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
215.977	3.700	15.80	1.07	0.0598	6.10.3.2.1-1	15.80	1.07	0.0598	6.10.3.2.2-1
219.698	3.744	15.80	1.07	0.0357	6.10.3.2.1-1	15.80	1.07	0.0357	6.10.3.2.2-1
223.969	3.795	15.80	1.07	0.0016	6.10.3.2.1-1	15.80	1.07	0.0016	6.10.3.2.2-1
224.377	3.800	15.80	1.07	0.0020	6.10.3.2.2-1	15.80	1.07	0.0020	6.10.3.2.1-1
228.240	3.846	15.80	1.07	0.0395	6.10.3.2.2-1	15.80	1.07	0.0395	6.10.3.2.1-1
232.510	3.897	15.80	1.07	0.0874	6.10.3.2.2-1	15.80	1.07	0.0874	6.10.3.2.1-1
232.777	3.900	15.80	1.07	0.0907	6.10.3.2.2-1	15.80	1.07	0.0907	6.10.3.2.1-1
236.844	3.948	15.80	1.07	0.1433	6.10.3.2.2-1	15.80	1.07	0.1433	6.10.3.2.1-1
241.077	3.999	15.80	1.07	0.2048	6.10.3.2.2-1	15.80	1.07	0.2048	6.10.3.2.1-1
241.177	4.000	15.80	1.07	0.2063	6.10.3.2.2-1	15.80	1.07	0.2063	6.10.3.2.1-1
241.277	4.001	15.80	1.07	0.1988	6.10.3.2.2-1	15.80	1.07	0.1988	6.10.3.2.1-1
244.719	4.042	15.80	1.07	0.1493	6.10.3.2.2-1	15.80	1.07	0.1493	6.10.3.2.1-1
248.260	4.084	15.80	1.07	0.1029	6.10.3.2.2-1	15.80	1.07	0.1029	6.10.3.2.1-1
249.577	4.100	15.80	1.07	0.0869	6.10.3.2.2-1	15.80	1.07	0.0869	6.10.3.2.1-1
257.177	4.190	15.80	1.07	0.0073	6.10.3.2.2-1	15.80	1.07	0.0073	6.10.3.2.1-1
257.977	4.200	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
266.094	4.297	15.80	1.07	0.0583	6.10.3.2.1-1	15.80	1.07	0.0583	6.10.3.2.2-1
266.377	4.300	15.80	1.07	0.0599	6.10.3.2.1-1	15.80	1.07	0.0599	6.10.3.2.2-1
274.777	4.400	15.80	1.07	0.0933	6.10.3.2.1-1	15.80	1.07	0.0933	6.10.3.2.2-1
275.010	4.403	15.80	1.07	0.0938	6.10.3.2.1-1	15.80	1.07	0.0938	6.10.3.2.2-1
283.177	4.500	15.80	1.07	0.1001	6.10.3.2.1-1	15.80	1.07	0.1001	6.10.3.2.2-1
283.927	4.509	15.80	1.07	0.0994	6.10.3.2.1-1	15.80	1.07	0.0994	6.10.3.2.2-1
291.577	4.600	15.80	1.07	0.0802	6.10.3.2.1-1	15.80	1.07	0.0802	6.10.3.2.2-1
291.990	4.605	15.80	1.07	0.0785	6.10.3.2.1-1	15.80	1.07	0.0785	6.10.3.2.2-1
295.504	4.647	15.80	1.07	0.0617	6.10.3.2.1-1	15.80	1.07	0.0617	6.10.3.2.2-1
295.704	4.649	15.80	1.07	0.0606	6.10.3.2.1-1	15.80	1.07	0.0606	6.10.3.2.2-1
299.977	4.700	15.80	1.07	0.0336	6.10.3.2.1-1	15.80	1.07	0.0336	6.10.3.2.2-1
300.052	4.701	15.80	1.07	0.0331	6.10.3.2.1-1	15.80	1.07	0.0331	6.10.3.2.2-1
304.167	4.750	15.80	1.07	0.0003	6.10.3.2.1-1	15.80	1.07	0.0003	6.10.3.2.2-1
308.281	4.799	15.80	1.07	0.0388	6.10.3.2.2-1	15.80	1.07	0.0388	6.10.3.2.1-1
308.377	4.800	15.80	1.07	0.0398	6.10.3.2.2-1	15.80	1.07	0.0398	6.10.3.2.1-1
312.396	4.848	15.80	1.07	0.0846	6.10.3.2.2-1	15.80	1.07	0.0846	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
316.510	4.897	15.80	1.07	0.1367	6.10.3.2.2-1	15.80	1.07	0.1367	6.10.3.2.1-1
316.777	4.900	15.80	1.07	0.1403	6.10.3.2.2-1	15.80	1.07	0.1403	6.10.3.2.1-1
320.844	4.948	15.80	1.07	0.1986	6.10.3.2.2-1	15.80	1.07	0.1986	6.10.3.2.1-1
325.077	4.999	15.80	1.07	0.2659	6.10.3.2.2-1	15.80	1.07	0.2659	6.10.3.2.1-1
325.177	5.000	15.80	1.07	0.2676	6.10.3.2.2-1	15.80	1.07	0.2676	6.10.3.2.1-1
325.277	5.001	15.80	1.07	0.2658	6.10.3.2.2-1	15.80	1.07	0.2658	6.10.3.2.1-1
328.052	5.030	15.80	1.07	0.2173	6.10.3.2.2-1	15.80	1.07	0.2173	6.10.3.2.1-1
330.927	5.060	15.80	1.07	0.1700	6.10.3.2.2-1	15.80	1.07	0.1700	6.10.3.2.1-1
334.702	5.100	15.80	1.07	0.1128	6.10.3.2.2-1	15.80	1.07	0.1128	6.10.3.2.1-1
338.261	5.137	15.80	1.07	0.0638	6.10.3.2.2-1	15.80	1.07	0.0638	6.10.3.2.1-1
344.227	5.200	15.80	1.07	0.0077	6.10.3.2.1-1	15.80	1.07	0.0077	6.10.3.2.2-1
345.594	5.214	15.80	1.07	0.0222	6.10.3.2.1-1	15.80	1.07	0.0222	6.10.3.2.2-1
352.928	5.291	15.80	1.07	0.0878	6.10.3.2.1-1	15.80	1.07	0.0878	6.10.3.2.2-1
353.752	5.300	15.80	1.07	0.0939	6.10.3.2.1-1	15.80	1.07	0.0939	6.10.3.2.2-1
360.261	5.368	15.80	1.07	0.1331	6.10.3.2.1-1	15.80	1.07	0.1331	6.10.3.2.2-1
363.277	5.400	15.80	1.07	0.1458	6.10.3.2.1-1	15.80	1.07	0.1458	6.10.3.2.2-1
367.595	5.445	15.80	1.07	0.1580	6.10.3.2.1-1	15.80	1.07	0.1580	6.10.3.2.2-1
372.802	5.500	15.80	1.07	0.1634	6.10.3.2.1-1	15.80	1.07	0.1634	6.10.3.2.2-1
374.928	5.522	15.80	1.07	0.1627	6.10.3.2.1-1	15.80	1.07	0.1627	6.10.3.2.2-1
382.262	5.599	15.80	1.07	0.1469	6.10.3.2.1-1	15.80	1.07	0.1469	6.10.3.2.2-1
382.327	5.600	15.80	1.07	0.1467	6.10.3.2.1-1	15.80	1.07	0.1467	6.10.3.2.2-1
389.595	5.676	15.80	1.07	0.1109	6.10.3.2.1-1	15.80	1.07	0.1109	6.10.3.2.2-1
391.852	5.700	15.80	1.07	0.0957	6.10.3.2.1-1	15.80	1.07	0.0957	6.10.3.2.2-1
396.504	5.749	15.80	1.07	0.0583	6.10.3.2.1-1	15.80	1.07	0.0583	6.10.3.2.2-1
396.704	5.751	15.80	1.07	0.0565	6.10.3.2.1-1	15.80	1.07	0.0565	6.10.3.2.2-1
396.866	5.753	15.80	1.07	0.0551	6.10.3.2.1-1	15.80	1.07	0.0551	6.10.3.2.2-1
401.377	5.800	15.80	1.07	0.0104	6.10.3.2.1-1	15.80	1.07	0.0104	6.10.3.2.2-1
404.137	5.829	15.80	1.07	0.0207	6.10.3.2.2-1	15.80	1.07	0.0207	6.10.3.2.1-1
407.949	5.869	15.80	1.07	0.0685	6.10.3.2.2-1	15.80	1.07	0.0685	6.10.3.2.1-1
410.902	5.900	15.80	1.07	0.1094	6.10.3.2.2-1	15.80	1.07	0.1094	6.10.3.2.1-1
411.762	5.909	15.80	1.07	0.1219	6.10.3.2.2-1	15.80	1.07	0.1219	6.10.3.2.1-1
416.094	5.955	15.80	1.07	0.1893	6.10.3.2.2-1	15.80	1.07	0.1893	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
420.327	5.999	15.80	1.07	0.2620	6.10.3.2.2-1	15.80	1.07	0.2620	6.10.3.2.1-1
420.427	6.000	15.80	1.07	0.2638	6.10.3.2.2-1	15.80	1.07	0.2638	6.10.3.2.1-1
420.527	6.001	15.80	1.07	0.2621	6.10.3.2.2-1	15.80	1.07	0.2621	6.10.3.2.1-1
423.974	6.052	15.80	1.07	0.2067	6.10.3.2.2-1	15.80	1.07	0.2067	6.10.3.2.1-1
427.245	6.100	15.80	1.07	0.1582	6.10.3.2.2-1	15.80	1.07	0.1582	6.10.3.2.1-1
427.521	6.104	15.80	1.07	0.1543	6.10.3.2.2-1	15.80	1.07	0.1543	6.10.3.2.1-1
434.063	6.200	15.80	1.07	0.0702	6.10.3.2.2-1	15.80	1.07	0.0702	6.10.3.2.1-1
436.354	6.234	15.80	1.07	0.0446	6.10.3.2.2-1	15.80	1.07	0.0446	6.10.3.2.1-1
440.880	6.300	15.80	1.07	0.0002	6.10.3.2.1-1	15.80	1.07	0.0002	6.10.3.2.2-1
445.187	6.363	15.80	1.07	0.0357	6.10.3.2.1-1	15.80	1.07	0.0357	6.10.3.2.2-1
447.698	6.400	15.80	1.07	0.0531	6.10.3.2.1-1	15.80	1.07	0.0531	6.10.3.2.2-1
454.021	6.493	15.80	1.07	0.0864	6.10.3.2.1-1	15.80	1.07	0.0864	6.10.3.2.2-1
454.516	6.500	15.80	1.07	0.0884	6.10.3.2.1-1	15.80	1.07	0.0884	6.10.3.2.2-1
461.333	6.600	15.80	1.07	0.1062	6.10.3.2.1-1	15.80	1.07	0.1062	6.10.3.2.2-1
462.854	6.622	15.80	1.07	0.1078	6.10.3.2.1-1	15.80	1.07	0.1078	6.10.3.2.2-1
467.125	6.685	15.80	1.07	0.1074	6.10.3.2.1-1	15.80	1.07	0.1074	6.10.3.2.2-1
468.151	6.700	15.80	1.07	0.1062	6.10.3.2.1-1	15.80	1.07	0.1062	6.10.3.2.2-1
471.396	6.748	15.80	1.07	0.1001	6.10.3.2.1-1	15.80	1.07	0.1001	6.10.3.2.2-1
474.969	6.800	15.80	1.07	0.0885	6.10.3.2.1-1	15.80	1.07	0.0885	6.10.3.2.2-1
475.667	6.810	15.80	1.07	0.0857	6.10.3.2.1-1	15.80	1.07	0.0857	6.10.3.2.2-1
479.938	6.873	15.80	1.07	0.0645	6.10.3.2.1-1	15.80	1.07	0.0645	6.10.3.2.2-1
481.786	6.900	15.80	1.07	0.0531	6.10.3.2.1-1	15.80	1.07	0.0531	6.10.3.2.2-1
484.271	6.936	15.80	1.07	0.0358	6.10.3.2.1-1	15.80	1.07	0.0358	6.10.3.2.2-1
488.504	6.999	15.80	1.07	0.0009	6.10.3.2.1-1	15.80	1.07	0.0009	6.10.3.2.2-1
488.604	7.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
0.100	1.002	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
3.339	1.051	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
6.515	1.100	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
6.677	1.102	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
13.029	1.200	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
14.984	1.230	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
19.544	1.300	15.80	1.07	0.0066	6.10.8.1.3-1	15.80	1.07	0.1568	6.10.8.1.1-1
19.544	1.300	15.80	1.07	0.3546	6.10.7.1.1-1	15.80	1.07	0.3546	6.10.7.1.1-1
23.292	1.357	15.80	1.07	0.0240	6.10.8.1.3-1	15.80	1.07	0.1928	6.10.8.1.1-1
23.292	1.357	15.80	1.07	0.3732	6.10.7.1.1-1	15.80	1.07	0.3732	6.10.7.1.1-1
26.071	1.400	15.80	1.07	0.0402	6.10.8.1.3-1	15.80	1.07	0.1928	6.10.8.1.1-1
26.071	1.400	15.80	1.07	0.3808	6.10.7.1.1-1	15.80	1.07	0.3808	6.10.7.1.1-1
31.583	1.485	15.80	1.07	0.0808	6.10.8.1.3-1	15.80	1.07	0.1928	6.10.8.1.1-1
31.583	1.485	15.80	1.07	0.3657	6.10.7.1.1-1	15.80	1.07	0.3657	6.10.7.1.1-1
32.589	1.500	15.80	1.07	0.0894	6.10.8.1.3-1	15.80	1.07	0.1928	6.10.8.1.1-1
32.589	1.500	15.80	1.07	0.3596	6.10.7.1.1-1	15.80	1.07	0.3596	6.10.7.1.1-1
39.106	1.600	15.80	1.07	0.1543	6.10.8.1.3-1	15.80	1.07	0.1928	6.10.8.1.1-1
39.106	1.600	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
39.875	1.612	15.80	1.07	0.1629	6.10.8.1.3-1	15.80	1.07	0.3172	6.10.8.1.1-1
39.875	1.612	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
44.042	1.676	15.80	1.07	0.2139	6.10.8.1.3-1	15.80	1.07	0.3172	6.10.8.1.1-1
44.042	1.676	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
45.624	1.700	15.80	1.07	0.2351	6.10.8.1.3-1	15.80	1.07	0.3172	6.10.8.1.1-1
45.624	1.700	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
48.208	1.740	15.80	1.07	0.2804	6.10.8.1.3-1	15.80	1.07	0.5010	6.10.8.1.1-1
48.208	1.740	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
52.142	1.800	15.80	1.07	0.3575	6.10.8.1.3-1	15.80	1.07	0.5010	6.10.8.1.1-1
52.142	1.800	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
52.375	1.804	15.80	1.07	0.3622	6.10.8.1.3-1	15.80	1.07	0.5010	6.10.8.1.1-1
52.375	1.804	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
56.542	1.868	15.80	1.07	0.4560	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1
56.542	1.868	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
58.659	1.900	15.80	1.07	0.5215	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1
60.859	1.934	15.80	1.07	0.6098	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
65.077	1.998	15.80	1.07	0.7986	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1
65.177	2.000	15.80	1.07	0.8034	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1
65.277	2.001	15.80	1.07	0.7985	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1
67.802	2.029	15.80	1.07	0.6788	6.10.8.1.3-1	15.80	1.07	0.8761	6.10.8.1.1-1
70.427	2.057	15.80	1.07	0.5608	6.10.8.1.3-1	15.80	1.07	0.6139	6.10.8.1.1-1
74.377	2.100	15.80	1.07	0.4009	6.10.8.1.3-1	15.80	1.07	0.6139	6.10.8.1.1-1
74.377	2.100	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
75.719	2.115	15.80	1.07	0.3512	6.10.8.1.3-1	15.80	1.07	0.6139	6.10.8.1.1-1
75.719	2.115	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
81.010	2.172	15.80	1.07	0.1868	6.10.8.1.3-1	15.80	1.07	0.2144	6.10.8.1.1-1
81.010	2.172	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
83.577	2.200	15.80	1.07	0.1426	6.10.8.1.3-1	15.80	1.07	0.2144	6.10.8.1.1-1
83.577	2.200	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
87.899	2.247	15.80	1.07	0.0913	6.10.8.1.3-1	15.80	1.07	0.2144	6.10.8.1.1-1
87.899	2.247	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
88.099	2.249	15.80	1.07	0.0892	6.10.8.1.3-1	15.80	1.07	0.2144	6.10.8.1.1-1
88.099	2.249	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
89.510	2.264	15.80	1.07	0.0747	6.10.8.1.3-1	15.80	1.07	0.2144	6.10.8.1.1-1
89.510	2.264	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
92.777	2.300	15.80	1.07	0.0440	6.10.8.1.3-1	15.80	1.07	0.2144	6.10.8.1.1-1
92.777	2.300	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
98.010	2.357	15.80	1.07	0.4167	6.10.7.1.1-1	15.80	1.07	0.4167	6.10.7.1.1-1
101.977	2.400	15.80	1.07	0.4527	6.10.7.1.1-1	15.80	1.07	0.4527	6.10.7.1.1-1
106.510	2.449	15.80	1.07	0.4764	6.10.7.1.1-1	15.80	1.07	0.4764	6.10.7.1.1-1
111.177	2.500	15.80	1.07	0.4838	6.10.7.1.1-1	15.80	1.07	0.4838	6.10.7.1.1-1
115.010	2.542	15.80	1.07	0.4761	6.10.7.1.1-1	15.80	1.07	0.4761	6.10.7.1.1-1
120.377	2.600	15.80	1.07	0.4497	6.10.7.1.1-1	15.80	1.07	0.4497	6.10.7.1.1-1
123.510	2.634	15.80	1.07	0.4211	6.10.7.1.1-1	15.80	1.07	0.4211	6.10.7.1.1-1
129.577	2.700	15.80	1.07	0.0497	6.10.8.1.3-1	15.80	1.07	0.2558	6.10.8.1.1-1
129.577	2.700	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
132.010	2.726	15.80	1.07	0.0731	6.10.8.1.3-1	15.80	1.07	0.2030	6.10.8.1.1-1
132.010	2.726	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1

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Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
136.135	2.771	15.80	1.07	0.1178	6.10.8.1.3-1	15.80	1.07	0.2030	6.10.8.1.1-1
136.135	2.771	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
138.777	2.800	15.80	1.07	0.1523	6.10.8.1.3-1	15.80	1.07	0.2030	6.10.8.1.1-1
138.777	2.800	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
140.260	2.816	15.80	1.07	0.1790	6.10.8.1.3-1	15.80	1.07	0.4855	6.10.8.1.1-1
140.260	2.816	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
144.385	2.861	15.80	1.07	0.2926	6.10.8.1.3-1	15.80	1.07	0.4855	6.10.8.1.1-1
144.385	2.861	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
147.977	2.900	15.80	1.07	0.4214	6.10.8.1.3-1	15.80	1.07	0.4855	6.10.8.1.1-1
147.977	2.900	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
148.510	2.906	15.80	1.07	0.4425	6.10.8.1.3-1	15.80	1.07	0.9076	6.10.8.1.1-1
148.510	2.906	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
152.844	2.953	15.80	1.07	0.6266	6.10.8.1.3-1	15.80	1.07	0.9076	6.10.8.1.1-1
157.077	2.999	15.80	1.07	0.8280	6.10.8.1.3-1	15.80	1.07	0.9076	6.10.8.1.1-1
157.177	3.000	15.80	1.07	0.8330	6.10.8.1.3-1	15.80	1.07	0.9076	6.10.8.1.1-1
157.277	3.001	15.80	1.07	0.8283	6.10.8.1.3-1	15.80	1.07	0.9076	6.10.8.1.1-1
159.802	3.031	15.80	1.07	0.7116	6.10.8.1.3-1	15.80	1.07	0.9076	6.10.8.1.1-1
162.427	3.063	15.80	1.07	0.6004	6.10.8.1.3-1	15.80	1.07	0.6559	6.10.8.1.1-1
165.577	3.100	15.80	1.07	0.4798	6.10.8.1.3-1	15.80	1.07	0.6559	6.10.8.1.1-1
165.577	3.100	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
171.094	3.166	15.80	1.07	0.3449	6.10.8.1.3-1	15.80	1.07	0.6559	6.10.8.1.1-1
171.094	3.166	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
173.977	3.200	15.80	1.07	0.2851	6.10.8.1.3-1	15.80	1.07	0.6559	6.10.8.1.1-1
173.977	3.200	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
179.760	3.269	15.80	1.07	0.1860	6.10.8.1.3-1	15.80	1.07	0.2161	6.10.8.1.1-1
179.760	3.269	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
182.377	3.300	15.80	1.07	0.1510	6.10.8.1.3-1	15.80	1.07	0.2161	6.10.8.1.1-1
182.377	3.300	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
186.649	3.351	15.80	1.07	0.0992	6.10.8.1.3-1	15.80	1.07	0.2161	6.10.8.1.1-1
186.649	3.351	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
186.849	3.353	15.80	1.07	0.0969	6.10.8.1.3-1	15.80	1.07	0.2161	6.10.8.1.1-1
186.849	3.353	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
188.677	3.375	15.80	1.07	0.0770	6.10.8.1.3-1	15.80	1.07	0.2161	6.10.8.1.1-1
188.677	3.375	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
190.777	3.400	15.80	1.07	0.0555	6.10.8.1.3-1	15.80	1.07	0.2161	6.10.8.1.1-1
190.777	3.400	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
197.594	3.481	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
199.177	3.500	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
206.510	3.587	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
207.577	3.600	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
215.427	3.693	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
215.977	3.700	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
219.698	3.744	15.80	1.07	0.0110	6.10.8.1.3-1	15.80	1.07	0.1300	6.10.8.1.1-1
219.698	3.744	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
223.969	3.795	15.80	1.07	0.1131	6.10.8.1.3-1	15.80	1.07	0.4765	6.10.8.1.1-1
223.969	3.795	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
224.377	3.800	15.80	1.07	0.1252	6.10.8.1.3-1	15.80	1.07	0.4765	6.10.8.1.1-1
224.377	3.800	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
228.240	3.846	15.80	1.07	0.2583	6.10.8.1.3-1	15.80	1.07	0.4765	6.10.8.1.1-1
228.240	3.846	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
232.510	3.897	15.80	1.07	0.4297	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
232.510	3.897	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
232.777	3.900	15.80	1.07	0.4413	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
232.777	3.900	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
236.844	3.948	15.80	1.07	0.6270	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
236.844	3.948	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
241.077	3.999	15.80	1.07	0.8407	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
241.177	4.000	15.80	1.07	0.8459	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
241.277	4.001	15.80	1.07	0.8352	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
241.277	4.001	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
244.719	4.042	15.80	1.07	0.6610	6.10.8.1.3-1	15.80	1.07	0.9317	6.10.8.1.1-1
244.719	4.042	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
248.260	4.084	15.80	1.07	0.4965	6.10.8.1.3-1	15.80	1.07	0.5503	6.10.8.1.1-1
248.260	4.084	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
249.577	4.100	15.80	1.07	0.4379	6.10.8.1.3-1	15.80	1.07	0.5503	6.10.8.1.1-1
249.577	4.100	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
257.177	4.190	15.80	1.07	0.1492	6.10.8.1.3-1	15.80	1.07	0.5503	6.10.8.1.1-1
257.177	4.190	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
257.977	4.200	15.80	1.07	0.1238	6.10.8.1.3-1	15.80	1.07	0.5503	6.10.8.1.1-1
257.977	4.200	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
266.094	4.297	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
266.377	4.300	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
274.777	4.400	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
275.010	4.403	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
283.177	4.500	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
283.927	4.509	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
291.577	4.600	15.80	1.07	0.0687	6.10.8.1.3-1	15.80	1.07	0.1995	6.10.8.1.1-1
291.577	4.600	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
291.990	4.605	15.80	1.07	0.0730	6.10.8.1.3-1	15.80	1.07	0.1995	6.10.8.1.1-1
291.990	4.605	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
295.504	4.647	15.80	1.07	0.1123	6.10.8.1.3-1	15.80	1.07	0.1995	6.10.8.1.1-1
295.504	4.647	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
295.704	4.649	15.80	1.07	0.1147	6.10.8.1.3-1	15.80	1.07	0.1995	6.10.8.1.1-1
295.704	4.649	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
299.977	4.700	15.80	1.07	0.1689	6.10.8.1.3-1	15.80	1.07	0.1995	6.10.8.1.1-1
299.977	4.700	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
300.052	4.701	15.80	1.07	0.1699	6.10.8.1.3-1	15.80	1.07	0.3467	6.10.8.1.1-1
300.052	4.701	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
304.167	4.750	15.80	1.07	0.2288	6.10.8.1.3-1	15.80	1.07	0.3467	6.10.8.1.1-1
304.167	4.750	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
308.281	4.799	15.80	1.07	0.3086	6.10.8.1.3-1	15.80	1.07	0.5514	6.10.8.1.1-1
308.281	4.799	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
308.377	4.800	15.80	1.07	0.3110	6.10.8.1.3-1	15.80	1.07	0.5514	6.10.8.1.1-1
308.377	4.800	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
312.396	4.848	15.80	1.07	0.3987	6.10.8.1.3-1	15.80	1.07	0.5514	6.10.8.1.1-1
312.396	4.848	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
316.510	4.897	15.80	1.07	0.5030	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
316.510	4.897	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
316.777	4.900	15.80	1.07	0.5104	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
320.844	4.948	15.80	1.07	0.6686	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
325.077	4.999	15.80	1.07	0.8623	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
325.177	5.000	15.80	1.07	0.8673	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
325.277	5.001	15.80	1.07	0.8622	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
328.052	5.030	15.80	1.07	0.7246	6.10.8.1.3-1	15.80	1.07	0.9447	6.10.8.1.1-1
330.927	5.060	15.80	1.07	0.5907	6.10.8.1.3-1	15.80	1.07	0.6458	6.10.8.1.1-1
334.702	5.100	15.80	1.07	0.4309	6.10.8.1.3-1	15.80	1.07	0.6458	6.10.8.1.1-1
334.702	5.100	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
338.261	5.137	15.80	1.07	0.3003	6.10.8.1.3-1	15.80	1.07	0.6458	6.10.8.1.1-1
338.261	5.137	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
344.227	5.200	15.80	1.07	0.1451	6.10.8.1.3-1	15.80	1.07	0.6458	6.10.8.1.1-1
344.227	5.200	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
345.594	5.214	15.80	1.07	0.1264	6.10.8.1.3-1	15.80	1.07	0.2343	6.10.8.1.1-1
345.594	5.214	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
352.928	5.291	15.80	1.07	0.0461	6.10.8.1.3-1	15.80	1.07	0.2343	6.10.8.1.1-1
352.928	5.291	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
353.752	5.300	15.80	1.07	0.0385	6.10.8.1.3-1	15.80	1.07	0.2343	6.10.8.1.1-1
353.752	5.300	15.80	1.07	0.3591	6.10.7.1.1-1	15.80	1.07	0.3591	6.10.7.1.1-1
360.261	5.368	15.80	1.07	0.4467	6.10.7.1.1-1	15.80	1.07	0.4467	6.10.7.1.1-1
363.277	5.400	15.80	1.07	0.4731	6.10.7.1.1-1	15.80	1.07	0.4731	6.10.7.1.1-1
367.595	5.445	15.80	1.07	0.4989	6.10.7.1.1-1	15.80	1.07	0.4989	6.10.7.1.1-1
372.802	5.500	15.80	1.07	0.5114	6.10.7.1.1-1	15.80	1.07	0.5114	6.10.7.1.1-1
374.928	5.522	15.80	1.07	0.5104	6.10.7.1.1-1	15.80	1.07	0.5104	6.10.7.1.1-1
382.262	5.599	15.80	1.07	0.4777	6.10.7.1.1-1	15.80	1.07	0.4777	6.10.7.1.1-1
382.327	5.600	15.80	1.07	0.4768	6.10.7.1.1-1	15.80	1.07	0.4768	6.10.7.1.1-1
389.595	5.676	15.80	1.07	0.0265	6.10.8.1.3-1	15.80	1.07	0.2300	6.10.8.1.1-1
389.595	5.676	15.80	1.07	0.3977	6.10.7.1.1-1	15.80	1.07	0.3977	6.10.7.1.1-1
391.852	5.700	15.80	1.07	0.0465	6.10.8.1.3-1	15.80	1.07	0.2300	6.10.8.1.1-1
391.852	5.700	15.80	1.07	0.3661	6.10.7.1.1-1	15.80	1.07	0.3661	6.10.7.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
396.504	5.749	15.80	1.07	0.0937	6.10.8.1.3-1	15.80	1.07	0.2300	6.10.8.1.1-1
396.504	5.749	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
396.704	5.751	15.80	1.07	0.0959	6.10.8.1.3-1	15.80	1.07	0.2300	6.10.8.1.1-1
396.704	5.751	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
396.866	5.753	15.80	1.07	0.0977	6.10.8.1.3-1	15.80	1.07	0.2300	6.10.8.1.1-1
396.866	5.753	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
401.377	5.800	15.80	1.07	0.1536	6.10.8.1.3-1	15.80	1.07	0.2300	6.10.8.1.1-1
401.377	5.800	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
404.137	5.829	15.80	1.07	0.2038	6.10.8.1.3-1	15.80	1.07	0.5080	6.10.8.1.1-1
404.137	5.829	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
407.949	5.869	15.80	1.07	0.3201	6.10.8.1.3-1	15.80	1.07	0.5080	6.10.8.1.1-1
407.949	5.869	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
410.902	5.900	15.80	1.07	0.4286	6.10.8.1.3-1	15.80	1.07	0.5080	6.10.8.1.1-1
410.902	5.900	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
411.762	5.909	15.80	1.07	0.4628	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
411.762	5.909	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
416.094	5.955	15.80	1.07	0.6510	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
420.327	5.999	15.80	1.07	0.8565	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
420.427	6.000	15.80	1.07	0.8615	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
420.527	6.001	15.80	1.07	0.8566	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
423.974	6.052	15.80	1.07	0.6936	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
427.245	6.100	15.80	1.07	0.5550	6.10.8.1.3-1	15.80	1.07	0.9388	6.10.8.1.1-1
427.521	6.104	15.80	1.07	0.5439	6.10.8.1.3-1	15.80	1.07	0.5950	6.10.8.1.1-1
434.063	6.200	15.80	1.07	0.3755	6.10.8.1.3-1	15.80	1.07	0.5950	6.10.8.1.1-1
434.063	6.200	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
436.354	6.234	15.80	1.07	0.3276	6.10.8.1.3-1	15.80	1.07	0.5950	6.10.8.1.1-1
436.354	6.234	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
440.880	6.300	15.80	1.07	0.2439	6.10.8.1.3-1	15.80	1.07	0.5950	6.10.8.1.1-1
440.880	6.300	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
445.187	6.363	15.80	1.07	0.1873	6.10.8.1.3-1	15.80	1.07	0.2197	6.10.8.1.1-1
445.187	6.363	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
447.698	6.400	15.80	1.07	0.1575	6.10.8.1.3-1	15.80	1.07	0.2197	6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
447.698	6.400	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
454.021	6.493	15.80	1.07	0.0927	6.10.8.1.3-1	15.80	1.07	0.2197	6.10.8.1.1-1
454.021	6.493	15.80	1.07	0.3869	6.10.7.1.1-1	15.80	1.07	0.3869	6.10.7.1.1-1
454.516	6.500	15.80	1.07	0.0883	6.10.8.1.3-1	15.80	1.07	0.2197	6.10.8.1.1-1
454.516	6.500	15.80	1.07	0.3884	6.10.7.1.1-1	15.80	1.07	0.3884	6.10.7.1.1-1
461.333	6.600	15.80	1.07	0.0361	6.10.8.1.3-1	15.80	1.07	0.2197	6.10.8.1.1-1
461.333	6.600	15.80	1.07	0.4055	6.10.7.1.1-1	15.80	1.07	0.4055	6.10.7.1.1-1
462.854	6.622	15.80	1.07	0.0268	6.10.8.1.3-1	15.80	1.07	0.1944	6.10.8.1.1-1
462.854	6.622	15.80	1.07	0.4026	6.10.7.1.1-1	15.80	1.07	0.4026	6.10.7.1.1-1
467.125	6.685	15.80	1.07	0.3862	6.10.7.1.1-1	15.80	1.07	0.3862	6.10.7.1.1-1
468.151	6.700	15.80	1.07	0.3803	6.10.7.1.1-1	15.80	1.07	0.3803	6.10.7.1.1-1
471.396	6.748	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
474.969	6.800	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
475.667	6.810	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
479.938	6.873	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
481.786	6.900	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
484.271	6.936	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
488.504	6.999	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1
488.604	7.000	15.80	1.07	0.3539	6.10.7.3-1	15.80	1.07	0.3539	6.10.7.3-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2
0.100	1.002	15.80	1.07	0.0013	6.10.4.2.2-1	15.80	1.07	0.0031	6.10.4.2.2-2
3.339	1.051	15.80	1.07	0.0394	6.10.4.2.2-1	15.80	1.07	0.0981	6.10.4.2.2-2
6.515	1.100	15.80	1.07	0.0715	6.10.4.2.2-1	15.80	1.07	0.1790	6.10.4.2.2-2
6.677	1.102	15.80	1.07	0.0728	6.10.4.2.2-1	15.80	1.07	0.1817	6.10.4.2.2-2
13.029	1.200	15.80	1.07	0.1194	6.10.4.2.2-1	15.80	1.07	0.2996	6.10.4.2.2-2
14.984	1.230	15.80	1.07	0.1290	6.10.4.2.2-1	15.80	1.07	0.3234	6.10.4.2.2-2
19.544	1.300	15.80	1.07	0.1448	6.10.4.2.2-1	15.80	1.07	0.3683	6.10.4.2.2-2
23.292	1.357	15.80	1.07	0.1497	6.10.4.2.2-1	15.80	1.07	0.3867	6.10.4.2.2-2

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Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
26.071	1.400	15.80	1.07	0.1492	6.10.4.2.2-1	15.80	1.07	0.3934	6.10.4.2.2-2
31.583	1.485	15.80	1.07	0.0646	6.10.4.2.2-1	15.80	1.07	0.0233	6.10.4.2.2-2
31.583	1.485	15.80	1.07	0.1356	6.10.4.2.2-1	15.80	1.07	0.3752	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.0604	6.10.4.2.2-1	15.80	1.07	0.0310	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.1315	6.10.4.2.2-1	15.80	1.07	0.3684	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0232	6.10.4.2.2-1	15.80	1.07	0.0910	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0942	6.10.4.2.2-1	15.80	1.07	0.3079	6.10.4.2.2-2
39.875	1.612	15.80	1.07	0.0177	6.10.4.2.2-1	15.80	1.07	0.0993	6.10.4.2.2-2
39.875	1.612	15.80	1.07	0.0889	6.10.4.2.2-1	15.80	1.07	0.3001	6.10.4.2.2-2
44.042	1.676	15.80	1.07	0.0160	6.10.4.2.2-1	15.80	1.07	0.1486	6.10.4.2.2-2
44.042	1.676	15.80	1.07	0.0518	6.10.4.2.2-1	15.80	1.07	0.2322	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0306	6.10.4.2.2-1	15.80	1.07	0.1693	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0360	6.10.4.2.2-1	15.80	1.07	0.2046	6.10.4.2.2-2
48.208	1.740	15.80	1.07	0.2212	6.10.4.2.2-1	15.80	1.07	0.2500	6.10.4.2.2-2
48.208	1.740	15.80	1.07	0.0069	6.10.4.2.2-1	15.80	1.07	0.1503	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.2848	6.10.4.2.2-1	15.80	1.07	0.3165	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.0423	6.10.4.2.2-1	15.80	1.07	0.0633	6.10.4.2.2-2
52.375	1.804	15.80	1.07	0.2887	6.10.4.2.2-1	15.80	1.07	0.3206	6.10.4.2.2-2
52.375	1.804	15.80	1.07	0.0456	6.10.4.2.2-1	15.80	1.07	0.0571	6.10.4.2.2-2
56.542	1.868	15.80	1.07	0.3661	6.10.4.2.2-1	15.80	1.07	0.4014	6.10.4.2.2-2
58.659	1.900	15.80	1.07	0.4197	6.10.4.2.2-1	15.80	1.07	0.4584	6.10.4.2.2-2
60.859	1.934	15.80	1.07	0.4912	6.10.4.2.2-1	15.80	1.07	0.5356	6.10.4.2.2-2
65.077	1.998	15.80	1.07	0.6441	6.10.4.2.2-1	15.80	1.07	0.7008	6.10.4.2.2-2
65.177	2.000	15.80	1.07	0.6480	6.10.4.2.2-1	15.80	1.07	0.7050	6.10.4.2.2-2
65.277	2.001	15.80	1.07	0.6441	6.10.4.2.2-1	15.80	1.07	0.7008	6.10.4.2.2-2
67.802	2.029	15.80	1.07	0.5469	6.10.4.2.2-1	15.80	1.07	0.5960	6.10.4.2.2-2
70.427	2.057	15.80	1.07	0.4514	6.10.4.2.2-1	15.80	1.07	0.4929	6.10.4.2.2-2
74.377	2.100	15.80	1.07	0.3216	6.10.4.2.2-1	15.80	1.07	0.3532	6.10.4.2.2-2
75.719	2.115	15.80	1.07	0.2813	6.10.4.2.2-1	15.80	1.07	0.3098	6.10.4.2.2-2
75.719	2.115	15.80	1.07	0.0679	6.10.4.2.2-1	15.80	1.07	0.0032	6.10.4.2.2-2
81.010	2.172	15.80	1.07	0.0382	6.10.4.2.2-1	15.80	1.07	0.1368	6.10.4.2.2-2
81.010	2.172	15.80	1.07	0.0062	6.10.4.2.2-1	15.80	1.07	0.1127	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
83.577	2.200	15.80	1.07	0.0086	6.10.4.2.2-1	15.80	1.07	0.0981	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0389	6.10.4.2.2-1	15.80	1.07	0.1681	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0348	6.10.4.2.2-1	15.80	1.07	0.0441	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0902	6.10.4.2.2-1	15.80	1.07	0.2668	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0366	6.10.4.2.2-1	15.80	1.07	0.0419	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0923	6.10.4.2.2-1	15.80	1.07	0.2707	6.10.4.2.2-2
89.510	2.264	15.80	1.07	0.0490	6.10.4.2.2-1	15.80	1.07	0.0265	6.10.4.2.2-2
89.510	2.264	15.80	1.07	0.1067	6.10.4.2.2-1	15.80	1.07	0.2974	6.10.4.2.2-2
92.777	2.300	15.80	1.07	0.1373	6.10.4.2.2-1	15.80	1.07	0.3566	6.10.4.2.2-2
98.010	2.357	15.80	1.07	0.1764	6.10.4.2.2-1	15.80	1.07	0.4349	6.10.4.2.2-2
101.977	2.400	15.80	1.07	0.1968	6.10.4.2.2-1	15.80	1.07	0.4742	6.10.4.2.2-2
106.510	2.449	15.80	1.07	0.2107	6.10.4.2.2-1	15.80	1.07	0.5002	6.10.4.2.2-2
111.177	2.500	15.80	1.07	0.2150	6.10.4.2.2-1	15.80	1.07	0.5084	6.10.4.2.2-2
115.010	2.542	15.80	1.07	0.2108	6.10.4.2.2-1	15.80	1.07	0.5000	6.10.4.2.2-2
120.377	2.600	15.80	1.07	0.1941	6.10.4.2.2-1	15.80	1.07	0.4705	6.10.4.2.2-2
123.510	2.634	15.80	1.07	0.1777	6.10.4.2.2-1	15.80	1.07	0.4393	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.0697	6.10.4.2.2-1	15.80	1.07	0.0005	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.1322	6.10.4.2.2-1	15.80	1.07	0.3507	6.10.4.2.2-2
132.010	2.726	15.80	1.07	0.0502	6.10.4.2.2-1	15.80	1.07	0.0249	6.10.4.2.2-2
132.010	2.726	15.80	1.07	0.1092	6.10.4.2.2-1	15.80	1.07	0.3065	6.10.4.2.2-2
136.135	2.771	15.80	1.07	0.0118	6.10.4.2.2-1	15.80	1.07	0.0723	6.10.4.2.2-2
136.135	2.771	15.80	1.07	0.0638	6.10.4.2.2-1	15.80	1.07	0.2197	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0165	6.10.4.2.2-1	15.80	1.07	0.1082	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0305	6.10.4.2.2-1	15.80	1.07	0.1557	6.10.4.2.2-2
140.260	2.816	15.80	1.07	0.0338	6.10.4.2.2-1	15.80	1.07	0.1306	6.10.4.2.2-2
140.260	2.816	15.80	1.07	0.0116	6.10.4.2.2-1	15.80	1.07	0.1243	6.10.4.2.2-2
144.385	2.861	15.80	1.07	0.0903	6.10.4.2.2-1	15.80	1.07	0.2195	6.10.4.2.2-2
144.385	2.861	15.80	1.07	0.0449	6.10.4.2.2-1	15.80	1.07	0.0350	6.10.4.2.2-2
147.977	2.900	15.80	1.07	0.3385	6.10.4.2.2-1	15.80	1.07	0.3709	6.10.4.2.2-2
148.510	2.906	15.80	1.07	0.3556	6.10.4.2.2-1	15.80	1.07	0.3894	6.10.4.2.2-2
152.844	2.953	15.80	1.07	0.5049	6.10.4.2.2-1	15.80	1.07	0.5503	6.10.4.2.2-2
157.077	2.999	15.80	1.07	0.6682	6.10.4.2.2-1	15.80	1.07	0.7263	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
157.177	3.000	15.80	1.07	0.6723	6.10.4.2.2-1	15.80	1.07	0.7307	6.10.4.2.2-2
157.277	3.001	15.80	1.07	0.6684	6.10.4.2.2-1	15.80	1.07	0.7265	6.10.4.2.2-2
159.802	3.031	15.80	1.07	0.5739	6.10.4.2.2-1	15.80	1.07	0.6245	6.10.4.2.2-2
162.427	3.063	15.80	1.07	0.4837	6.10.4.2.2-1	15.80	1.07	0.5273	6.10.4.2.2-2
165.577	3.100	15.80	1.07	0.3859	6.10.4.2.2-1	15.80	1.07	0.4220	6.10.4.2.2-2
171.094	3.166	15.80	1.07	0.2748	6.10.4.2.2-1	15.80	1.07	0.3053	6.10.4.2.2-2
171.094	3.166	15.80	1.07	0.0407	6.10.4.2.2-1	15.80	1.07	0.0647	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0642	6.10.4.2.2-1	15.80	1.07	0.2098	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0045	6.10.4.2.2-1	15.80	1.07	0.1258	6.10.4.2.2-2
179.760	3.269	15.80	1.07	0.0061	6.10.4.2.2-1	15.80	1.07	0.1256	6.10.4.2.2-2
179.760	3.269	15.80	1.07	0.0581	6.10.4.2.2-1	15.80	1.07	0.2353	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0158	6.10.4.2.2-1	15.80	1.07	0.0923	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0815	6.10.4.2.2-1	15.80	1.07	0.2761	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0461	6.10.4.2.2-1	15.80	1.07	0.0441	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.1115	6.10.4.2.2-1	15.80	1.07	0.3231	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.0473	6.10.4.2.2-1	15.80	1.07	0.0420	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.1125	6.10.4.2.2-1	15.80	1.07	0.3243	6.10.4.2.2-2
188.677	3.375	15.80	1.07	0.0580	6.10.4.2.2-1	15.80	1.07	0.0239	6.10.4.2.2-2
188.677	3.375	15.80	1.07	0.1226	6.10.4.2.2-1	15.80	1.07	0.3391	6.10.4.2.2-2
190.777	3.400	15.80	1.07	0.0686	6.10.4.2.2-1	15.80	1.07	0.0048	6.10.4.2.2-2
190.777	3.400	15.80	1.07	0.1318	6.10.4.2.2-1	15.80	1.07	0.3500	6.10.4.2.2-2
197.594	3.481	15.80	1.07	0.1485	6.10.4.2.2-1	15.80	1.07	0.3652	6.10.4.2.2-2
199.177	3.500	15.80	1.07	0.1492	6.10.4.2.2-1	15.80	1.07	0.3624	6.10.4.2.2-2
206.510	3.587	15.80	1.07	0.1360	6.10.4.2.2-1	15.80	1.07	0.3149	6.10.4.2.2-2
207.577	3.600	15.80	1.07	0.1324	6.10.4.2.2-1	15.80	1.07	0.3062	6.10.4.2.2-2
215.427	3.693	15.80	1.07	0.0867	6.10.4.2.2-1	15.80	1.07	0.1962	6.10.4.2.2-2
215.977	3.700	15.80	1.07	0.0828	6.10.4.2.2-1	15.80	1.07	0.1886	6.10.4.2.2-2
219.698	3.744	15.80	1.07	0.0536	6.10.4.2.2-1	15.80	1.07	0.1358	6.10.4.2.2-2
223.969	3.795	15.80	1.07	0.0131	6.10.4.2.2-1	15.80	1.07	0.0807	6.10.4.2.2-2
223.969	3.795	15.80	1.07	0.0138	6.10.4.2.2-1	15.80	1.07	0.0701	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0178	6.10.4.2.2-1	15.80	1.07	0.0904	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0146	6.10.4.2.2-1	15.80	1.07	0.0913	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
228.240	3.846	15.80	1.07	0.0666	6.10.4.2.2-1	15.80	1.07	0.1916	6.10.4.2.2-2
228.240	3.846	15.80	1.07	0.0252	6.10.4.2.2-1	15.80	1.07	0.0411	6.10.4.2.2-2
232.510	3.897	15.80	1.07	0.3431	6.10.4.2.2-1	15.80	1.07	0.3798	6.10.4.2.2-2
232.510	3.897	15.80	1.07	0.0742	6.10.4.2.2-1	15.80	1.07	0.0124	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.3525	6.10.4.2.2-1	15.80	1.07	0.3901	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.0774	6.10.4.2.2-1	15.80	1.07	0.0149	6.10.4.2.2-2
236.844	3.948	15.80	1.07	0.5020	6.10.4.2.2-1	15.80	1.07	0.5532	6.10.4.2.2-2
241.077	3.999	15.80	1.07	0.6740	6.10.4.2.2-1	15.80	1.07	0.7409	6.10.4.2.2-2
241.177	4.000	15.80	1.07	0.6782	6.10.4.2.2-1	15.80	1.07	0.7455	6.10.4.2.2-2
241.277	4.001	15.80	1.07	0.6693	6.10.4.2.2-1	15.80	1.07	0.7364	6.10.4.2.2-2
244.719	4.042	15.80	1.07	0.5290	6.10.4.2.2-1	15.80	1.07	0.5833	6.10.4.2.2-2
248.260	4.084	15.80	1.07	0.3966	6.10.4.2.2-1	15.80	1.07	0.4388	6.10.4.2.2-2
248.260	4.084	15.80	1.07	0.0878	6.10.4.2.2-1	15.80	1.07	0.0170	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.3495	6.10.4.2.2-1	15.80	1.07	0.3873	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.0725	6.10.4.2.2-1	15.80	1.07	0.0050	6.10.4.2.2-2
257.177	4.190	15.80	1.07	0.0253	6.10.4.2.2-1	15.80	1.07	0.1084	6.10.4.2.2-2
257.177	4.190	15.80	1.07	0.0093	6.10.4.2.2-1	15.80	1.07	0.0858	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0160	6.10.4.2.2-1	15.80	1.07	0.0891	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0170	6.10.4.2.2-1	15.80	1.07	0.0960	6.10.4.2.2-2
266.094	4.297	15.80	1.07	0.0810	6.10.4.2.2-1	15.80	1.07	0.1849	6.10.4.2.2-2
266.377	4.300	15.80	1.07	0.0830	6.10.4.2.2-1	15.80	1.07	0.1887	6.10.4.2.2-2
274.777	4.400	15.80	1.07	0.1308	6.10.4.2.2-1	15.80	1.07	0.3031	6.10.4.2.2-2
275.010	4.403	15.80	1.07	0.1316	6.10.4.2.2-1	15.80	1.07	0.3048	6.10.4.2.2-2
283.177	4.500	15.80	1.07	0.1465	6.10.4.2.2-1	15.80	1.07	0.3595	6.10.4.2.2-2
283.927	4.509	15.80	1.07	0.1465	6.10.4.2.2-1	15.80	1.07	0.3627	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.0631	6.10.4.2.2-1	15.80	1.07	0.0160	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.1278	6.10.4.2.2-1	15.80	1.07	0.3470	6.10.4.2.2-2
291.990	4.605	15.80	1.07	0.0611	6.10.4.2.2-1	15.80	1.07	0.0198	6.10.4.2.2-2
291.990	4.605	15.80	1.07	0.1262	6.10.4.2.2-1	15.80	1.07	0.3459	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0410	6.10.4.2.2-1	15.80	1.07	0.0551	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.1081	6.10.4.2.2-1	15.80	1.07	0.3218	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0397	6.10.4.2.2-1	15.80	1.07	0.0573	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
295.704	4.649	15.80	1.07	0.1070	6.10.4.2.2-1	15.80	1.07	0.3206	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0085	6.10.4.2.2-1	15.80	1.07	0.1076	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0761	6.10.4.2.2-1	15.80	1.07	0.2721	6.10.4.2.2-2
300.052	4.701	15.80	1.07	0.0079	6.10.4.2.2-1	15.80	1.07	0.1085	6.10.4.2.2-2
300.052	4.701	15.80	1.07	0.0755	6.10.4.2.2-1	15.80	1.07	0.2712	6.10.4.2.2-2
304.167	4.750	15.80	1.07	0.0291	6.10.4.2.2-1	15.80	1.07	0.1645	6.10.4.2.2-2
304.167	4.750	15.80	1.07	0.0366	6.10.4.2.2-1	15.80	1.07	0.2043	6.10.4.2.2-2
308.281	4.799	15.80	1.07	0.2445	6.10.4.2.2-1	15.80	1.07	0.2743	6.10.4.2.2-2
308.281	4.799	15.80	1.07	0.0100	6.10.4.2.2-1	15.80	1.07	0.1241	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.2464	6.10.4.2.2-1	15.80	1.07	0.2764	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.0112	6.10.4.2.2-1	15.80	1.07	0.1220	6.10.4.2.2-2
312.396	4.848	15.80	1.07	0.3187	6.10.4.2.2-1	15.80	1.07	0.3522	6.10.4.2.2-2
312.396	4.848	15.80	1.07	0.0637	6.10.4.2.2-1	15.80	1.07	0.0338	6.10.4.2.2-2
316.510	4.897	15.80	1.07	0.4045	6.10.4.2.2-1	15.80	1.07	0.4424	6.10.4.2.2-2
316.777	4.900	15.80	1.07	0.4105	6.10.4.2.2-1	15.80	1.07	0.4488	6.10.4.2.2-2
320.844	4.948	15.80	1.07	0.5390	6.10.4.2.2-1	15.80	1.07	0.5870	6.10.4.2.2-2
325.077	4.999	15.80	1.07	0.6960	6.10.4.2.2-1	15.80	1.07	0.7564	6.10.4.2.2-2
325.177	5.000	15.80	1.07	0.7000	6.10.4.2.2-1	15.80	1.07	0.7607	6.10.4.2.2-2
325.277	5.001	15.80	1.07	0.6958	6.10.4.2.2-1	15.80	1.07	0.7562	6.10.4.2.2-2
328.052	5.030	15.80	1.07	0.5843	6.10.4.2.2-1	15.80	1.07	0.6360	6.10.4.2.2-2
330.927	5.060	15.80	1.07	0.4758	6.10.4.2.2-1	15.80	1.07	0.5189	6.10.4.2.2-2
334.702	5.100	15.80	1.07	0.3461	6.10.4.2.2-1	15.80	1.07	0.3793	6.10.4.2.2-2
338.261	5.137	15.80	1.07	0.0926	6.10.4.2.2-1	15.80	1.07	0.2253	6.10.4.2.2-2
338.261	5.137	15.80	1.07	0.0458	6.10.4.2.2-1	15.80	1.07	0.0377	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0116	6.10.4.2.2-1	15.80	1.07	0.1012	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0365	6.10.4.2.2-1	15.80	1.07	0.1693	6.10.4.2.2-2
345.594	5.214	15.80	1.07	0.0038	6.10.4.2.2-1	15.80	1.07	0.0817	6.10.4.2.2-2
345.594	5.214	15.80	1.07	0.0543	6.10.4.2.2-1	15.80	1.07	0.2018	6.10.4.2.2-2
352.928	5.291	15.80	1.07	0.1356	6.10.4.2.2-1	15.80	1.07	0.3553	6.10.4.2.2-2
353.752	5.300	15.80	1.07	0.1436	6.10.4.2.2-1	15.80	1.07	0.3719	6.10.4.2.2-2
360.261	5.368	15.80	1.07	0.1930	6.10.4.2.2-1	15.80	1.07	0.4675	6.10.4.2.2-2
363.277	5.400	15.80	1.07	0.2086	6.10.4.2.2-1	15.80	1.07	0.4965	6.10.4.2.2-2

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Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
367.595	5.445	15.80	1.07	0.2237	6.10.4.2.2-1	15.80	1.07	0.5249	6.10.4.2.2-2
372.802	5.500	15.80	1.07	0.2305	6.10.4.2.2-1	15.80	1.07	0.5384	6.10.4.2.2-2
374.928	5.522	15.80	1.07	0.2297	6.10.4.2.2-1	15.80	1.07	0.5372	6.10.4.2.2-2
382.262	5.599	15.80	1.07	0.2104	6.10.4.2.2-1	15.80	1.07	0.5013	6.10.4.2.2-2
382.327	5.600	15.80	1.07	0.2100	6.10.4.2.2-1	15.80	1.07	0.5004	6.10.4.2.2-2
389.595	5.676	15.80	1.07	0.1651	6.10.4.2.2-1	15.80	1.07	0.4140	6.10.4.2.2-2
391.852	5.700	15.80	1.07	0.1464	6.10.4.2.2-1	15.80	1.07	0.3792	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0404	6.10.4.2.2-1	15.80	1.07	0.0431	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0995	6.10.4.2.2-1	15.80	1.07	0.2891	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0385	6.10.4.2.2-1	15.80	1.07	0.0454	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0972	6.10.4.2.2-1	15.80	1.07	0.2841	6.10.4.2.2-2
396.866	5.753	15.80	1.07	0.0369	6.10.4.2.2-1	15.80	1.07	0.0473	6.10.4.2.2-2
396.866	5.753	15.80	1.07	0.0954	6.10.4.2.2-1	15.80	1.07	0.2810	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0103	6.10.4.2.2-1	15.80	1.07	0.1062	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0401	6.10.4.2.2-1	15.80	1.07	0.1769	6.10.4.2.2-2
404.137	5.829	15.80	1.07	0.0437	6.10.4.2.2-1	15.80	1.07	0.1497	6.10.4.2.2-2
404.137	5.829	15.80	1.07	0.0033	6.10.4.2.2-1	15.80	1.07	0.1141	6.10.4.2.2-2
407.949	5.869	15.80	1.07	0.0993	6.10.4.2.2-1	15.80	1.07	0.2403	6.10.4.2.2-2
407.949	5.869	15.80	1.07	0.0514	6.10.4.2.2-1	15.80	1.07	0.0285	6.10.4.2.2-2
410.902	5.900	15.80	1.07	0.3441	6.10.4.2.2-1	15.80	1.07	0.3774	6.10.4.2.2-2
411.762	5.909	15.80	1.07	0.3718	6.10.4.2.2-1	15.80	1.07	0.4072	6.10.4.2.2-2
416.094	5.955	15.80	1.07	0.5245	6.10.4.2.2-1	15.80	1.07	0.5718	6.10.4.2.2-2
420.327	5.999	15.80	1.07	0.6911	6.10.4.2.2-1	15.80	1.07	0.7514	6.10.4.2.2-2
420.427	6.000	15.80	1.07	0.6952	6.10.4.2.2-1	15.80	1.07	0.7558	6.10.4.2.2-2
420.527	6.001	15.80	1.07	0.6911	6.10.4.2.2-1	15.80	1.07	0.7514	6.10.4.2.2-2
423.974	6.052	15.80	1.07	0.5592	6.10.4.2.2-1	15.80	1.07	0.6088	6.10.4.2.2-2
427.245	6.100	15.80	1.07	0.4468	6.10.4.2.2-1	15.80	1.07	0.4876	6.10.4.2.2-2
427.521	6.104	15.80	1.07	0.4378	6.10.4.2.2-1	15.80	1.07	0.4779	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.2993	6.10.4.2.2-1	15.80	1.07	0.3323	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.0463	6.10.4.2.2-1	15.80	1.07	0.0649	6.10.4.2.2-2
436.354	6.234	15.80	1.07	0.2598	6.10.4.2.2-1	15.80	1.07	0.2910	6.10.4.2.2-2
436.354	6.234	15.80	1.07	0.0157	6.10.4.2.2-1	15.80	1.07	0.1183	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
440.880	6.300	15.80	1.07	0.0311	6.10.4.2.2-1	15.80	1.07	0.1754	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0385	6.10.4.2.2-1	15.80	1.07	0.2153	6.10.4.2.2-2
445.187	6.363	15.80	1.07	0.0080	6.10.4.2.2-1	15.80	1.07	0.1199	6.10.4.2.2-2
445.187	6.363	15.80	1.07	0.0814	6.10.4.2.2-1	15.80	1.07	0.2921	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0274	6.10.4.2.2-1	15.80	1.07	0.0912	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.1028	6.10.4.2.2-1	15.80	1.07	0.3318	6.10.4.2.2-2
454.021	6.493	15.80	1.07	0.0656	6.10.4.2.2-1	15.80	1.07	0.0307	6.10.4.2.2-2
454.021	6.493	15.80	1.07	0.1417	6.10.4.2.2-1	15.80	1.07	0.3964	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.0680	6.10.4.2.2-1	15.80	1.07	0.0267	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.1437	6.10.4.2.2-1	15.80	1.07	0.3984	6.10.4.2.2-2
461.333	6.600	15.80	1.07	0.1621	6.10.4.2.2-1	15.80	1.07	0.4200	6.10.4.2.2-2
462.854	6.622	15.80	1.07	0.1630	6.10.4.2.2-1	15.80	1.07	0.4177	6.10.4.2.2-2
467.125	6.685	15.80	1.07	0.1599	6.10.4.2.2-1	15.80	1.07	0.4018	6.10.4.2.2-2
468.151	6.700	15.80	1.07	0.1579	6.10.4.2.2-1	15.80	1.07	0.3958	6.10.4.2.2-2
471.396	6.748	15.80	1.07	0.1477	6.10.4.2.2-1	15.80	1.07	0.3671	6.10.4.2.2-2
474.969	6.800	15.80	1.07	0.1300	6.10.4.2.2-1	15.80	1.07	0.3210	6.10.4.2.2-2
475.667	6.810	15.80	1.07	0.1263	6.10.4.2.2-1	15.80	1.07	0.3135	6.10.4.2.2-2
479.938	6.873	15.80	1.07	0.0946	6.10.4.2.2-1	15.80	1.07	0.2334	6.10.4.2.2-2
481.786	6.900	15.80	1.07	0.0777	6.10.4.2.2-1	15.80	1.07	0.1915	6.10.4.2.2-2
484.271	6.936	15.80	1.07	0.0523	6.10.4.2.2-1	15.80	1.07	0.1289	6.10.4.2.2-2
488.504	6.999	15.80	1.07	0.0013	6.10.4.2.2-1	15.80	1.07	0.0033	6.10.4.2.2-2
488.604	7.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0942	6.10.5.3-1	15.80	1.07	0.0942	6.10.5.3-1
0.100	1.002	15.80	1.07	0.0899	6.10.5.3-1	15.80	1.07	0.0899	6.10.5.3-1
3.339	1.051	15.80	1.07	0.0821	6.10.5.3-1	15.80	1.07	0.0821	6.10.5.3-1
6.515	1.100	15.80	1.07	0.1467	6.6.1.2.2-1	15.80	1.07	0.1467	6.6.1.2.2-1
6.677	1.102	15.80	1.07	0.2070	6.6.1.2.2-1	15.80	1.07	0.2070	6.6.1.2.2-1
13.029	1.200	15.80	1.07	0.2438	6.6.1.2.2-1	15.80	1.07	0.2438	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
14.984	1.230	15.80	1.07	0.2657	6.6.1.2.2-1	15.80	1.07	0.2657	6.6.1.2.2-1
19.544	1.300	15.80	1.07	0.3196	6.6.1.2.2-1	15.80	1.07	0.3196	6.6.1.2.2-1
23.292	1.357	15.80	1.07	0.4759	6.6.1.2.2-1	15.80	1.07	0.4759	6.6.1.2.2-1
26.071	1.400	15.80	1.07	0.3561	6.6.1.2.2-1	15.80	1.07	0.3561	6.6.1.2.2-1
31.583	1.485	15.80	1.07	0.3551	6.6.1.2.2-1	15.80	1.07	0.3551	6.6.1.2.2-1
32.589	1.500	15.80	1.07	0.3580	6.6.1.2.2-1	15.80	1.07	0.3580	6.6.1.2.2-1
39.106	1.600	15.80	1.07	0.3723	6.6.1.2.2-1	15.80	1.07	0.3723	6.6.1.2.2-1
39.875	1.612	15.80	1.07	0.5260	6.6.1.2.2-1	15.80	1.07	0.5260	6.6.1.2.2-1
39.875	1.612	15.80	1.07	0.5260	6.6.1.2.2-1	15.80	1.07	0.5260	6.6.1.2.2-1
44.042	1.676	15.80	1.07	0.3654	6.6.1.2.2-1	15.80	1.07	0.3654	6.6.1.2.2-1
44.042	1.676	15.80	1.07	0.3654	6.6.1.2.2-1	15.80	1.07	0.3654	6.6.1.2.2-1
45.624	1.700	15.80	1.07	0.3560	6.6.1.2.2-1	15.80	1.07	0.3560	6.6.1.2.2-1
45.624	1.700	15.80	1.07	0.3560	6.6.1.2.2-1	15.80	1.07	0.3560	6.6.1.2.2-1
48.208	1.740	15.80	1.07	0.4758	6.6.1.2.2-1	15.80	1.07	0.4758	6.6.1.2.2-1
48.208	1.740	15.80	1.07	0.4758	6.6.1.2.2-1	15.80	1.07	0.4758	6.6.1.2.2-1
52.142	1.800	15.80	1.07	0.3071	6.6.1.2.2-1	15.80	1.07	0.3071	6.6.1.2.2-1
52.375	1.804	15.80	1.07	0.3046	6.6.1.2.2-1	15.80	1.07	0.3046	6.6.1.2.2-1
56.542	1.868	15.80	1.07	0.1126	6.10.5.3-1	15.80	1.07	0.1126	6.10.5.3-1
58.659	1.900	15.80	1.07	0.1188	6.10.5.3-1	15.80	1.07	0.1188	6.10.5.3-1
60.859	1.934	15.80	1.07	0.1248	6.10.5.3-1	15.80	1.07	0.1248	6.10.5.3-1
65.077	1.998	15.80	1.07	0.1368	6.10.5.3-1	15.80	1.07	0.1368	6.10.5.3-1
65.177	2.000	15.80	1.07	0.1432	6.10.5.3-1	15.80	1.07	0.1432	6.10.5.3-1
65.277	2.001	15.80	1.07	0.1457	6.10.5.3-1	15.80	1.07	0.1457	6.10.5.3-1
67.802	2.029	15.80	1.07	0.1410	6.10.5.3-1	15.80	1.07	0.1410	6.10.5.3-1
70.427	2.057	15.80	1.07	0.1329	6.10.5.3-1	15.80	1.07	0.1329	6.10.5.3-1
74.377	2.100	15.80	1.07	0.1219	6.10.5.3-1	15.80	1.07	0.1219	6.10.5.3-1
75.719	2.115	15.80	1.07	0.1192	6.10.5.3-1	15.80	1.07	0.1192	6.10.5.3-1
81.010	2.172	15.80	1.07	0.3078	6.6.1.2.2-1	15.80	1.07	0.3078	6.6.1.2.2-1
81.010	2.172	15.80	1.07	0.3078	6.6.1.2.2-1	15.80	1.07	0.3078	6.6.1.2.2-1
83.577	2.200	15.80	1.07	0.2526	6.6.1.2.2-1	15.80	1.07	0.2526	6.6.1.2.2-1
83.577	2.200	15.80	1.07	0.2526	6.6.1.2.2-1	15.80	1.07	0.2526	6.6.1.2.2-1
87.899	2.247	15.80	1.07	0.2997	6.6.1.2.2-1	15.80	1.07	0.2997	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
88.099	2.249	15.80	1.07	0.3008	6.6.1.2.2-1	15.80	1.07	0.3008	6.6.1.2.2-1
89.510	2.264	15.80	1.07	0.3103	6.6.1.2.2-1	15.80	1.07	0.3103	6.6.1.2.2-1
92.777	2.300	15.80	1.07	0.3335	6.6.1.2.2-1	15.80	1.07	0.3335	6.6.1.2.2-1
98.010	2.357	15.80	1.07	0.5093	6.6.1.2.2-1	15.80	1.07	0.5093	6.6.1.2.2-1
101.977	2.400	15.80	1.07	0.3752	6.6.1.2.2-1	15.80	1.07	0.3752	6.6.1.2.2-1
106.510	2.449	15.80	1.07	0.3740	6.6.1.2.2-1	15.80	1.07	0.3740	6.6.1.2.2-1
111.177	2.500	15.80	1.07	0.3628	6.6.1.2.2-1	15.80	1.07	0.3628	6.6.1.2.2-1
115.010	2.542	15.80	1.07	0.5176	6.6.1.2.2-1	15.80	1.07	0.5176	6.6.1.2.2-1
120.377	2.600	15.80	1.07	0.3754	6.6.1.2.2-1	15.80	1.07	0.3754	6.6.1.2.2-1
123.510	2.634	15.80	1.07	0.3673	6.6.1.2.2-1	15.80	1.07	0.3673	6.6.1.2.2-1
129.577	2.700	15.80	1.07	0.3371	6.6.1.2.2-1	15.80	1.07	0.3371	6.6.1.2.2-1
132.010	2.726	15.80	1.07	0.4481	6.6.1.2.2-1	15.80	1.07	0.4481	6.6.1.2.2-1
136.135	2.771	15.80	1.07	0.2834	6.6.1.2.2-1	15.80	1.07	0.2834	6.6.1.2.2-1
136.135	2.771	15.80	1.07	0.2834	6.6.1.2.2-1	15.80	1.07	0.2834	6.6.1.2.2-1
138.777	2.800	15.80	1.07	0.2516	6.6.1.2.2-1	15.80	1.07	0.2516	6.6.1.2.2-1
138.777	2.800	15.80	1.07	0.2516	6.6.1.2.2-1	15.80	1.07	0.2516	6.6.1.2.2-1
140.260	2.816	15.80	1.07	0.3339	6.6.1.2.2-1	15.80	1.07	0.3339	6.6.1.2.2-1
140.260	2.816	15.80	1.07	0.3339	6.6.1.2.2-1	15.80	1.07	0.3339	6.6.1.2.2-1
144.385	2.861	15.80	1.07	0.1862	6.6.1.2.2-1	15.80	1.07	0.1862	6.6.1.2.2-1
147.977	2.900	15.80	1.07	0.1238	6.10.5.3-1	15.80	1.07	0.1238	6.10.5.3-1
148.510	2.906	15.80	1.07	0.1265	6.10.5.3-1	15.80	1.07	0.1265	6.10.5.3-1
152.844	2.953	15.80	1.07	0.1382	6.10.5.3-1	15.80	1.07	0.1382	6.10.5.3-1
157.077	2.999	15.80	1.07	0.1494	6.10.5.3-1	15.80	1.07	0.1494	6.10.5.3-1
157.177	3.000	15.80	1.07	0.1498	6.10.5.3-1	15.80	1.07	0.1498	6.10.5.3-1
157.277	3.001	15.80	1.07	0.1377	6.10.5.3-1	15.80	1.07	0.1377	6.10.5.3-1
159.802	3.031	15.80	1.07	0.1312	6.10.5.3-1	15.80	1.07	0.1312	6.10.5.3-1
162.427	3.063	15.80	1.07	0.1225	6.10.5.3-1	15.80	1.07	0.1225	6.10.5.3-1
165.577	3.100	15.80	1.07	0.1142	6.10.5.3-1	15.80	1.07	0.1142	6.10.5.3-1
171.094	3.166	15.80	1.07	0.2952	6.6.1.2.2-1	15.80	1.07	0.2952	6.6.1.2.2-1
173.977	3.200	15.80	1.07	0.3205	6.6.1.2.2-1	15.80	1.07	0.3205	6.6.1.2.2-1
173.977	3.200	15.80	1.07	0.3205	6.6.1.2.2-1	15.80	1.07	0.3205	6.6.1.2.2-1
179.760	3.269	15.80	1.07	0.4847	6.6.1.2.2-1	15.80	1.07	0.4847	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
179.760	3.269	15.80	1.07	0.4847	6.6.1.2.2-1	15.80	1.07	0.4847	6.6.1.2.2-1
182.377	3.300	15.80	1.07	0.3521	6.6.1.2.2-1	15.80	1.07	0.3521	6.6.1.2.2-1
182.377	3.300	15.80	1.07	0.3521	6.6.1.2.2-1	15.80	1.07	0.3521	6.6.1.2.2-1
186.649	3.351	15.80	1.07	0.3464	6.6.1.2.2-1	15.80	1.07	0.3464	6.6.1.2.2-1
186.849	3.353	15.80	1.07	0.3447	6.6.1.2.2-1	15.80	1.07	0.3447	6.6.1.2.2-1
188.677	3.375	15.80	1.07	0.3413	6.6.1.2.2-1	15.80	1.07	0.3413	6.6.1.2.2-1
190.777	3.400	15.80	1.07	0.3331	6.6.1.2.2-1	15.80	1.07	0.3331	6.6.1.2.2-1
197.594	3.481	15.80	1.07	0.4191	6.6.1.2.2-1	15.80	1.07	0.4191	6.6.1.2.2-1
199.177	3.500	15.80	1.07	0.2895	6.6.1.2.2-1	15.80	1.07	0.2895	6.6.1.2.2-1
206.510	3.587	15.80	1.07	0.2275	6.6.1.2.2-1	15.80	1.07	0.2275	6.6.1.2.2-1
207.577	3.600	15.80	1.07	0.2179	6.6.1.2.2-1	15.80	1.07	0.2179	6.6.1.2.2-1
215.427	3.693	15.80	1.07	0.1690	6.6.1.2.2-1	15.80	1.07	0.1690	6.6.1.2.2-1
215.977	3.700	15.80	1.07	0.1202	6.6.1.2.2-1	15.80	1.07	0.1202	6.6.1.2.2-1
219.698	3.744	15.80	1.07	0.1119	6.6.1.2.2-1	15.80	1.07	0.1119	6.6.1.2.2-1
223.969	3.795	15.80	1.07	0.1827	6.6.1.2.2-1	15.80	1.07	0.1827	6.6.1.2.2-1
223.969	3.795	15.80	1.07	0.1827	6.6.1.2.2-1	15.80	1.07	0.1827	6.6.1.2.2-1
224.377	3.800	15.80	1.07	0.1339	6.6.1.2.2-1	15.80	1.07	0.1339	6.6.1.2.2-1
224.377	3.800	15.80	1.07	0.1339	6.6.1.2.2-1	15.80	1.07	0.1339	6.6.1.2.2-1
228.240	3.846	15.80	1.07	0.1981	6.6.1.2.2-1	15.80	1.07	0.1981	6.6.1.2.2-1
232.510	3.897	15.80	1.07	0.4104	6.6.1.2.2-1	15.80	1.07	0.4104	6.6.1.2.2-1
232.777	3.900	15.80	1.07	0.1193	6.10.5.3-1	15.80	1.07	0.1193	6.10.5.3-1
236.844	3.948	15.80	1.07	0.1300	6.10.5.3-1	15.80	1.07	0.1300	6.10.5.3-1
241.077	3.999	15.80	1.07	0.1499	6.6.1.2.2-1	15.80	1.07	0.1499	6.6.1.2.2-1
241.177	4.000	15.80	1.07	0.1507	6.6.1.2.2-1	15.80	1.07	0.1507	6.6.1.2.2-1
241.277	4.001	15.80	1.07	0.1523	6.6.1.2.2-1	15.80	1.07	0.1523	6.6.1.2.2-1
244.719	4.042	15.80	1.07	0.1295	6.10.5.3-1	15.80	1.07	0.1295	6.10.5.3-1
248.260	4.084	15.80	1.07	0.5395	6.6.1.2.2-1	15.80	1.07	0.5395	6.6.1.2.2-1
249.577	4.100	15.80	1.07	0.3499	6.6.1.2.2-1	15.80	1.07	0.3499	6.6.1.2.2-1
257.177	4.190	15.80	1.07	0.1414	6.6.1.2.2-1	15.80	1.07	0.1414	6.6.1.2.2-1
257.177	4.190	15.80	1.07	0.1414	6.6.1.2.2-1	15.80	1.07	0.1414	6.6.1.2.2-1
257.977	4.200	15.80	1.07	0.1353	6.6.1.2.2-1	15.80	1.07	0.1353	6.6.1.2.2-1
257.977	4.200	15.80	1.07	0.1353	6.6.1.2.2-1	15.80	1.07	0.1353	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
266.094	4.297	15.80	1.07	0.1645	6.6.1.2.2-1	15.80	1.07	0.1645	6.6.1.2.2-1
266.377	4.300	15.80	1.07	0.1195	6.6.1.2.2-1	15.80	1.07	0.1195	6.6.1.2.2-1
274.777	4.400	15.80	1.07	0.2147	6.6.1.2.2-1	15.80	1.07	0.2147	6.6.1.2.2-1
275.010	4.403	15.80	1.07	0.2157	6.6.1.2.2-1	15.80	1.07	0.2157	6.6.1.2.2-1
283.177	4.500	15.80	1.07	0.2925	6.6.1.2.2-1	15.80	1.07	0.2925	6.6.1.2.2-1
283.927	4.509	15.80	1.07	0.4221	6.6.1.2.2-1	15.80	1.07	0.4221	6.6.1.2.2-1
291.577	4.600	15.80	1.07	0.3405	6.6.1.2.2-1	15.80	1.07	0.3405	6.6.1.2.2-1
291.990	4.605	15.80	1.07	0.3449	6.6.1.2.2-1	15.80	1.07	0.3449	6.6.1.2.2-1
295.504	4.647	15.80	1.07	0.3558	6.6.1.2.2-1	15.80	1.07	0.3558	6.6.1.2.2-1
295.704	4.649	15.80	1.07	0.3576	6.6.1.2.2-1	15.80	1.07	0.3576	6.6.1.2.2-1
299.977	4.700	15.80	1.07	0.3626	6.6.1.2.2-1	15.80	1.07	0.3626	6.6.1.2.2-1
299.977	4.700	15.80	1.07	0.3626	6.6.1.2.2-1	15.80	1.07	0.3626	6.6.1.2.2-1
300.052	4.701	15.80	1.07	0.5070	6.6.1.2.2-1	15.80	1.07	0.5070	6.6.1.2.2-1
300.052	4.701	15.80	1.07	0.5070	6.6.1.2.2-1	15.80	1.07	0.5070	6.6.1.2.2-1
304.167	4.750	15.80	1.07	0.3535	6.6.1.2.2-1	15.80	1.07	0.3535	6.6.1.2.2-1
304.167	4.750	15.80	1.07	0.3535	6.6.1.2.2-1	15.80	1.07	0.3535	6.6.1.2.2-1
308.281	4.799	15.80	1.07	0.4653	6.6.1.2.2-1	15.80	1.07	0.4653	6.6.1.2.2-1
308.281	4.799	15.80	1.07	0.4653	6.6.1.2.2-1	15.80	1.07	0.4653	6.6.1.2.2-1
308.377	4.800	15.80	1.07	0.3328	6.6.1.2.2-1	15.80	1.07	0.3328	6.6.1.2.2-1
308.377	4.800	15.80	1.07	0.3328	6.6.1.2.2-1	15.80	1.07	0.3328	6.6.1.2.2-1
312.396	4.848	15.80	1.07	0.3055	6.6.1.2.2-1	15.80	1.07	0.3055	6.6.1.2.2-1
316.510	4.897	15.80	1.07	0.1120	6.10.5.3-1	15.80	1.07	0.1120	6.10.5.3-1
316.777	4.900	15.80	1.07	0.1150	6.10.5.3-1	15.80	1.07	0.1150	6.10.5.3-1
320.844	4.948	15.80	1.07	0.1268	6.10.5.3-1	15.80	1.07	0.1268	6.10.5.3-1
325.077	4.999	15.80	1.07	0.1389	6.10.5.3-1	15.80	1.07	0.1389	6.10.5.3-1
325.177	5.000	15.80	1.07	0.1461	6.10.5.3-1	15.80	1.07	0.1461	6.10.5.3-1
325.277	5.001	15.80	1.07	0.1526	6.10.5.3-1	15.80	1.07	0.1526	6.10.5.3-1
328.052	5.030	15.80	1.07	0.1456	6.10.5.3-1	15.80	1.07	0.1456	6.10.5.3-1
330.927	5.060	15.80	1.07	0.1372	6.10.5.3-1	15.80	1.07	0.1372	6.10.5.3-1
334.702	5.100	15.80	1.07	0.1270	6.10.5.3-1	15.80	1.07	0.1270	6.10.5.3-1
338.261	5.137	15.80	1.07	0.1846	6.6.1.2.2-1	15.80	1.07	0.1846	6.6.1.2.2-1
344.227	5.200	15.80	1.07	0.2591	6.6.1.2.2-1	15.80	1.07	0.2591	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
344.227	5.200	15.80	1.07	0.2591	6.6.1.2.2-1	15.80	1.07	0.2591	6.6.1.2.2-1
345.594	5.214	15.80	1.07	0.3845	6.6.1.2.2-1	15.80	1.07	0.3845	6.6.1.2.2-1
345.594	5.214	15.80	1.07	0.3845	6.6.1.2.2-1	15.80	1.07	0.3845	6.6.1.2.2-1
352.928	5.291	15.80	1.07	0.3347	6.6.1.2.2-1	15.80	1.07	0.3347	6.6.1.2.2-1
353.752	5.300	15.80	1.07	0.3455	6.6.1.2.2-1	15.80	1.07	0.3455	6.6.1.2.2-1
360.261	5.368	15.80	1.07	0.5322	6.6.1.2.2-1	15.80	1.07	0.5322	6.6.1.2.2-1
363.277	5.400	15.80	1.07	0.3832	6.6.1.2.2-1	15.80	1.07	0.3832	6.6.1.2.2-1
367.595	5.445	15.80	1.07	0.3908	6.6.1.2.2-1	15.80	1.07	0.3908	6.6.1.2.2-1
372.802	5.500	15.80	1.07	0.3828	6.6.1.2.2-1	15.80	1.07	0.3828	6.6.1.2.2-1
374.928	5.522	15.80	1.07	0.5399	6.6.1.2.2-1	15.80	1.07	0.5399	6.6.1.2.2-1
382.262	5.599	15.80	1.07	0.3951	6.6.1.2.2-1	15.80	1.07	0.3951	6.6.1.2.2-1
382.327	5.600	15.80	1.07	0.3945	6.6.1.2.2-1	15.80	1.07	0.3945	6.6.1.2.2-1
389.595	5.676	15.80	1.07	0.5157	6.6.1.2.2-1	15.80	1.07	0.5157	6.6.1.2.2-1
391.852	5.700	15.80	1.07	0.3577	6.6.1.2.2-1	15.80	1.07	0.3577	6.6.1.2.2-1
396.504	5.749	15.80	1.07	0.3206	6.6.1.2.2-1	15.80	1.07	0.3206	6.6.1.2.2-1
396.704	5.751	15.80	1.07	0.3175	6.6.1.2.2-1	15.80	1.07	0.3175	6.6.1.2.2-1
396.866	5.753	15.80	1.07	0.3149	6.6.1.2.2-1	15.80	1.07	0.3149	6.6.1.2.2-1
401.377	5.800	15.80	1.07	0.2701	6.6.1.2.2-1	15.80	1.07	0.2701	6.6.1.2.2-1
401.377	5.800	15.80	1.07	0.2701	6.6.1.2.2-1	15.80	1.07	0.2701	6.6.1.2.2-1
404.137	5.829	15.80	1.07	0.3365	6.6.1.2.2-1	15.80	1.07	0.3365	6.6.1.2.2-1
404.137	5.829	15.80	1.07	0.3365	6.6.1.2.2-1	15.80	1.07	0.3365	6.6.1.2.2-1
407.949	5.869	15.80	1.07	0.1906	6.6.1.2.2-1	15.80	1.07	0.1906	6.6.1.2.2-1
410.902	5.900	15.80	1.07	0.1268	6.10.5.3-1	15.80	1.07	0.1268	6.10.5.3-1
411.762	5.909	15.80	1.07	0.1288	6.10.5.3-1	15.80	1.07	0.1288	6.10.5.3-1
416.094	5.955	15.80	1.07	0.1398	6.10.5.3-1	15.80	1.07	0.1398	6.10.5.3-1
420.327	5.999	15.80	1.07	0.1524	6.10.5.3-1	15.80	1.07	0.1524	6.10.5.3-1
420.427	6.000	15.80	1.07	0.1528	6.10.5.3-1	15.80	1.07	0.1528	6.10.5.3-1
420.527	6.001	15.80	1.07	0.1402	6.10.5.3-1	15.80	1.07	0.1402	6.10.5.3-1
423.974	6.052	15.80	1.07	0.1324	6.10.5.3-1	15.80	1.07	0.1324	6.10.5.3-1
427.245	6.100	15.80	1.07	0.1224	6.10.5.3-1	15.80	1.07	0.1224	6.10.5.3-1
427.521	6.104	15.80	1.07	0.1218	6.10.5.3-1	15.80	1.07	0.1218	6.10.5.3-1
434.063	6.200	15.80	1.07	0.3216	6.6.1.2.2-1	15.80	1.07	0.3216	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
436.354	6.234	15.80	1.07	0.3423	6.6.1.2.2-1	15.80	1.07	0.3423	6.6.1.2.2-1
436.354	6.234	15.80	1.07	0.3423	6.6.1.2.2-1	15.80	1.07	0.3423	6.6.1.2.2-1
440.880	6.300	15.80	1.07	0.3718	6.6.1.2.2-1	15.80	1.07	0.3718	6.6.1.2.2-1
440.880	6.300	15.80	1.07	0.3718	6.6.1.2.2-1	15.80	1.07	0.3718	6.6.1.2.2-1
445.187	6.363	15.80	1.07	0.5478	6.6.1.2.2-1	15.80	1.07	0.5478	6.6.1.2.2-1
445.187	6.363	15.80	1.07	0.5478	6.6.1.2.2-1	15.80	1.07	0.5478	6.6.1.2.2-1
447.698	6.400	15.80	1.07	0.3984	6.6.1.2.2-1	15.80	1.07	0.3984	6.6.1.2.2-1
454.021	6.493	15.80	1.07	0.3863	6.6.1.2.2-1	15.80	1.07	0.3863	6.6.1.2.2-1
454.516	6.500	15.80	1.07	0.3818	6.6.1.2.2-1	15.80	1.07	0.3818	6.6.1.2.2-1
461.333	6.600	15.80	1.07	0.3767	6.6.1.2.2-1	15.80	1.07	0.3767	6.6.1.2.2-1
462.854	6.622	15.80	1.07	0.5155	6.6.1.2.2-1	15.80	1.07	0.5155	6.6.1.2.2-1
467.125	6.685	15.80	1.07	0.3425	6.6.1.2.2-1	15.80	1.07	0.3425	6.6.1.2.2-1
468.151	6.700	15.80	1.07	0.3386	6.6.1.2.2-1	15.80	1.07	0.3386	6.6.1.2.2-1
471.396	6.748	15.80	1.07	0.4198	6.6.1.2.2-1	15.80	1.07	0.4198	6.6.1.2.2-1
474.969	6.800	15.80	1.07	0.2588	6.6.1.2.2-1	15.80	1.07	0.2588	6.6.1.2.2-1
475.667	6.810	15.80	1.07	0.2553	6.6.1.2.2-1	15.80	1.07	0.2553	6.6.1.2.2-1
479.938	6.873	15.80	1.07	0.2642	6.6.1.2.2-1	15.80	1.07	0.2642	6.6.1.2.2-1
481.786	6.900	15.80	1.07	0.1558	6.6.1.2.2-1	15.80	1.07	0.1558	6.6.1.2.2-1
484.271	6.936	15.80	1.07	0.1051	6.6.1.2.2-1	15.80	1.07	0.1051	6.6.1.2.2-1
488.504	6.999	15.80	1.07	0.0967	6.10.5.3-1	15.80	1.07	0.0967	6.10.5.3-1
488.604	7.000	15.80	1.07	0.0971	6.10.5.3-1	15.80	1.07	0.0971	6.10.5.3-1

Load combination: Final Default Service I (Deflection)

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	---	---	15.80	1.07	---	---
0.100	1.002	15.80	1.07	---	---	15.80	1.07	---	---
3.339	1.051	15.80	1.07	---	---	15.80	1.07	---	---
6.515	1.100	15.80	1.07	---	---	15.80	1.07	---	---
6.677	1.102	15.80	1.07	---	---	15.80	1.07	---	---
13.029	1.200	15.80	1.07	---	---	15.80	1.07	---	---
14.984	1.230	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
19.544	1.300	15.80	1.07	---	---	15.80	1.07	---	---
23.292	1.357	15.80	1.07	---	---	15.80	1.07	---	---
26.071	1.400	15.80	1.07	---	---	15.80	1.07	---	---
31.583	1.485	15.80	1.07	---	---	15.80	1.07	---	---
32.589	1.500	15.80	1.07	---	---	15.80	1.07	---	---
39.106	1.600	15.80	1.07	---	---	15.80	1.07	---	---
39.875	1.612	15.80	1.07	---	---	15.80	1.07	---	---
44.042	1.676	15.80	1.07	---	---	15.80	1.07	---	---
45.624	1.700	15.80	1.07	---	---	15.80	1.07	---	---
48.208	1.740	15.80	1.07	---	---	15.80	1.07	---	---
52.142	1.800	15.80	1.07	---	---	15.80	1.07	---	---
52.375	1.804	15.80	1.07	---	---	15.80	1.07	---	---
56.542	1.868	15.80	1.07	---	---	15.80	1.07	---	---
58.659	1.900	15.80	1.07	---	---	15.80	1.07	---	---
60.859	1.934	15.80	1.07	---	---	15.80	1.07	---	---
65.077	1.998	15.80	1.07	---	---	15.80	1.07	---	---
65.177	2.000	15.80	1.07	---	---	15.80	1.07	---	---
65.277	2.001	15.80	1.07	---	---	15.80	1.07	---	---
67.802	2.029	15.80	1.07	---	---	15.80	1.07	---	---
70.427	2.057	15.80	1.07	---	---	15.80	1.07	---	---
74.377	2.100	15.80	1.07	---	---	15.80	1.07	---	---
75.719	2.115	15.80	1.07	---	---	15.80	1.07	---	---
81.010	2.172	15.80	1.07	---	---	15.80	1.07	---	---
83.577	2.200	15.80	1.07	---	---	15.80	1.07	---	---
87.899	2.247	15.80	1.07	---	---	15.80	1.07	---	---
88.099	2.249	15.80	1.07	---	---	15.80	1.07	---	---
89.510	2.264	15.80	1.07	---	---	15.80	1.07	---	---
92.777	2.300	15.80	1.07	---	---	15.80	1.07	---	---
98.010	2.357	15.80	1.07	---	---	15.80	1.07	---	---
101.977	2.400	15.80	1.07	---	---	15.80	1.07	---	---
106.510	2.449	15.80	1.07	---	---	15.80	1.07	---	---
111.177	2.500	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
115.010	2.542	15.80	1.07	---	---	15.80	1.07	---	---
120.377	2.600	15.80	1.07	---	---	15.80	1.07	---	---
123.510	2.634	15.80	1.07	---	---	15.80	1.07	---	---
129.577	2.700	15.80	1.07	---	---	15.80	1.07	---	---
132.010	2.726	15.80	1.07	---	---	15.80	1.07	---	---
136.135	2.771	15.80	1.07	---	---	15.80	1.07	---	---
138.777	2.800	15.80	1.07	---	---	15.80	1.07	---	---
140.260	2.816	15.80	1.07	---	---	15.80	1.07	---	---
144.385	2.861	15.80	1.07	---	---	15.80	1.07	---	---
147.977	2.900	15.80	1.07	---	---	15.80	1.07	---	---
148.510	2.906	15.80	1.07	---	---	15.80	1.07	---	---
152.844	2.953	15.80	1.07	---	---	15.80	1.07	---	---
157.077	2.999	15.80	1.07	---	---	15.80	1.07	---	---
157.177	3.000	15.80	1.07	---	---	15.80	1.07	---	---
157.277	3.001	15.80	1.07	---	---	15.80	1.07	---	---
159.802	3.031	15.80	1.07	---	---	15.80	1.07	---	---
162.427	3.063	15.80	1.07	---	---	15.80	1.07	---	---
165.577	3.100	15.80	1.07	---	---	15.80	1.07	---	---
171.094	3.166	15.80	1.07	---	---	15.80	1.07	---	---
173.977	3.200	15.80	1.07	---	---	15.80	1.07	---	---
179.760	3.269	15.80	1.07	---	---	15.80	1.07	---	---
182.377	3.300	15.80	1.07	---	---	15.80	1.07	---	---
186.649	3.351	15.80	1.07	---	---	15.80	1.07	---	---
186.849	3.353	15.80	1.07	---	---	15.80	1.07	---	---
188.677	3.375	15.80	1.07	---	---	15.80	1.07	---	---
190.777	3.400	15.80	1.07	---	---	15.80	1.07	---	---
197.594	3.481	15.80	1.07	---	---	15.80	1.07	---	---
199.177	3.500	15.80	1.07	---	---	15.80	1.07	---	---
206.510	3.587	15.80	1.07	---	---	15.80	1.07	---	---
207.577	3.600	15.80	1.07	---	---	15.80	1.07	---	---
215.427	3.693	15.80	1.07	---	---	15.80	1.07	---	---
215.977	3.700	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
219.698	3.744	15.80	1.07	---	---	15.80	1.07	---	---
223.969	3.795	15.80	1.07	---	---	15.80	1.07	---	---
224.377	3.800	15.80	1.07	---	---	15.80	1.07	---	---
228.240	3.846	15.80	1.07	---	---	15.80	1.07	---	---
232.510	3.897	15.80	1.07	---	---	15.80	1.07	---	---
232.777	3.900	15.80	1.07	---	---	15.80	1.07	---	---
236.844	3.948	15.80	1.07	---	---	15.80	1.07	---	---
241.077	3.999	15.80	1.07	---	---	15.80	1.07	---	---
241.177	4.000	15.80	1.07	---	---	15.80	1.07	---	---
241.277	4.001	15.80	1.07	---	---	15.80	1.07	---	---
244.719	4.042	15.80	1.07	---	---	15.80	1.07	---	---
248.260	4.084	15.80	1.07	---	---	15.80	1.07	---	---
249.577	4.100	15.80	1.07	---	---	15.80	1.07	---	---
257.177	4.190	15.80	1.07	---	---	15.80	1.07	---	---
257.977	4.200	15.80	1.07	---	---	15.80	1.07	---	---
266.094	4.297	15.80	1.07	---	---	15.80	1.07	---	---
266.377	4.300	15.80	1.07	---	---	15.80	1.07	---	---
274.777	4.400	15.80	1.07	---	---	15.80	1.07	---	---
275.010	4.403	15.80	1.07	---	---	15.80	1.07	---	---
283.177	4.500	15.80	1.07	---	---	15.80	1.07	---	---
283.927	4.509	15.80	1.07	---	---	15.80	1.07	---	---
291.577	4.600	15.80	1.07	---	---	15.80	1.07	---	---
291.990	4.605	15.80	1.07	---	---	15.80	1.07	---	---
295.504	4.647	15.80	1.07	---	---	15.80	1.07	---	---
295.704	4.649	15.80	1.07	---	---	15.80	1.07	---	---
299.977	4.700	15.80	1.07	---	---	15.80	1.07	---	---
300.052	4.701	15.80	1.07	---	---	15.80	1.07	---	---
304.167	4.750	15.80	1.07	---	---	15.80	1.07	---	---
308.281	4.799	15.80	1.07	---	---	15.80	1.07	---	---
308.377	4.800	15.80	1.07	---	---	15.80	1.07	---	---
312.396	4.848	15.80	1.07	---	---	15.80	1.07	---	---
316.510	4.897	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
316.777	4.900	15.80	1.07	---	---	15.80	1.07	---	---
320.844	4.948	15.80	1.07	---	---	15.80	1.07	---	---
325.077	4.999	15.80	1.07	---	---	15.80	1.07	---	---
325.177	5.000	15.80	1.07	---	---	15.80	1.07	---	---
325.277	5.001	15.80	1.07	---	---	15.80	1.07	---	---
328.052	5.030	15.80	1.07	---	---	15.80	1.07	---	---
330.927	5.060	15.80	1.07	---	---	15.80	1.07	---	---
334.702	5.100	15.80	1.07	---	---	15.80	1.07	---	---
338.261	5.137	15.80	1.07	---	---	15.80	1.07	---	---
344.227	5.200	15.80	1.07	---	---	15.80	1.07	---	---
345.594	5.214	15.80	1.07	---	---	15.80	1.07	---	---
352.928	5.291	15.80	1.07	---	---	15.80	1.07	---	---
353.752	5.300	15.80	1.07	---	---	15.80	1.07	---	---
360.261	5.368	15.80	1.07	---	---	15.80	1.07	---	---
363.277	5.400	15.80	1.07	---	---	15.80	1.07	---	---
367.595	5.445	15.80	1.07	---	---	15.80	1.07	---	---
372.802	5.500	15.80	1.07	---	---	15.80	1.07	---	---
374.928	5.522	15.80	1.07	---	---	15.80	1.07	---	---
382.262	5.599	15.80	1.07	---	---	15.80	1.07	---	---
382.327	5.600	15.80	1.07	---	---	15.80	1.07	---	---
389.595	5.676	15.80	1.07	---	---	15.80	1.07	---	---
391.852	5.700	15.80	1.07	---	---	15.80	1.07	---	---
396.504	5.749	15.80	1.07	---	---	15.80	1.07	---	---
396.704	5.751	15.80	1.07	---	---	15.80	1.07	---	---
396.866	5.753	15.80	1.07	---	---	15.80	1.07	---	---
401.377	5.800	15.80	1.07	---	---	15.80	1.07	---	---
404.137	5.829	15.80	1.07	---	---	15.80	1.07	---	---
407.949	5.869	15.80	1.07	---	---	15.80	1.07	---	---
410.902	5.900	15.80	1.07	---	---	15.80	1.07	---	---
411.762	5.909	15.80	1.07	---	---	15.80	1.07	---	---
416.094	5.955	15.80	1.07	---	---	15.80	1.07	---	---
420.327	5.999	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
420.427	6.000	15.80	1.07	---	---	15.80	1.07	---	---
420.527	6.001	15.80	1.07	---	---	15.80	1.07	---	---
423.974	6.052	15.80	1.07	---	---	15.80	1.07	---	---
427.245	6.100	15.80	1.07	---	---	15.80	1.07	---	---
427.521	6.104	15.80	1.07	---	---	15.80	1.07	---	---
434.063	6.200	15.80	1.07	---	---	15.80	1.07	---	---
436.354	6.234	15.80	1.07	---	---	15.80	1.07	---	---
440.880	6.300	15.80	1.07	---	---	15.80	1.07	---	---
445.187	6.363	15.80	1.07	---	---	15.80	1.07	---	---
447.698	6.400	15.80	1.07	---	---	15.80	1.07	---	---
454.021	6.493	15.80	1.07	---	---	15.80	1.07	---	---
454.516	6.500	15.80	1.07	---	---	15.80	1.07	---	---
461.333	6.600	15.80	1.07	---	---	15.80	1.07	---	---
462.854	6.622	15.80	1.07	---	---	15.80	1.07	---	---
467.125	6.685	15.80	1.07	---	---	15.80	1.07	---	---
468.151	6.700	15.80	1.07	---	---	15.80	1.07	---	---
471.396	6.748	15.80	1.07	---	---	15.80	1.07	---	---
474.969	6.800	15.80	1.07	---	---	15.80	1.07	---	---
475.667	6.810	15.80	1.07	---	---	15.80	1.07	---	---
479.938	6.873	15.80	1.07	---	---	15.80	1.07	---	---
481.786	6.900	15.80	1.07	---	---	15.80	1.07	---	---
484.271	6.936	15.80	1.07	---	---	15.80	1.07	---	---
488.504	6.999	15.80	1.07	---	---	15.80	1.07	---	---
488.604	7.000	15.80	1.07	---	---	15.80	1.07	---	---

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	6.6771	Unstiffened	---	---	0.0085	6.10.3.3-1
0.100	1.002	0.65	36.56	6.6771	Unstiffened	---	---	0.0083	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
3.339	1.051	0.65	36.56	6.6771	Unstiffened	---	---	0.0071	6.10.3.3-1
6.515	1.100	0.65	36.56	6.6771	Unstiffened	---	---	0.0060	6.10.3.3-1
6.677	1.102	0.65	36.56	16.6146	Unstiffened	---	---	0.0058	6.10.3.3-1
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	0.0036	6.10.3.3-1
14.984	1.230	0.65	36.56	16.6146	Unstiffened	---	---	0.0029	6.10.3.3-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.0012	6.10.3.3-1
23.292	1.357	0.65	36.56	16.6146	Unstiffened	---	---	0.0002	6.10.3.3-1
26.071	1.400	0.65	36.56	16.5834	Unstiffened	---	---	0.0012	6.10.3.3-1
31.583	1.485	0.65	36.56	16.5834	Unstiffened	---	---	0.0031	6.10.3.3-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.0035	6.10.3.3-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.0058	6.10.3.3-1
39.875	1.612	0.65	36.56	16.5834	Unstiffened	---	---	0.0063	6.10.3.3-1
44.042	1.676	0.65	36.56	8.3333	Stiffened	---	---	0.0078	6.10.3.3-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.0083	6.10.3.3-1
48.208	1.740	0.65	36.56	8.3333	Stiffened	---	---	0.0094	6.10.3.3-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.0108	6.10.3.3-1
52.375	1.804	0.65	36.56	8.3333	Stiffened	---	---	0.0109	6.10.3.3-1
56.542	1.868	0.65	36.56	8.6355	Stiffened	---	---	0.0126	6.10.3.3-1
58.659	1.900	0.65	36.56	8.6355	Stiffened	---	---	0.0134	6.10.3.3-1
60.859	1.934	0.65	36.56	8.6355	Stiffened	---	---	0.0141	6.10.3.3-1
65.077	1.998	0.65	36.56	8.6355	Stiffened	---	---	0.0156	6.10.3.3-1
65.177	2.000	0.65	36.56	8.6355	Stiffened	---	---	0.0170	6.10.3.3-1
65.277	2.001	0.65	36.56	5.2500	Stiffened	---	---	0.0166	6.10.3.3-1
67.802	2.029	0.65	36.56	5.2500	Stiffened	---	---	0.0157	6.10.3.3-1
70.427	2.057	0.65	36.56	10.5834	Unstiffened	---	---	0.0146	6.10.3.3-1
74.377	2.100	0.65	36.56	10.5834	Unstiffened	---	---	0.0132	6.10.3.3-1
75.719	2.115	0.65	36.56	10.5834	Unstiffened	---	---	0.0128	6.10.3.3-1
81.010	2.172	0.65	36.56	17.0000	Unstiffened	---	---	0.0108	6.10.3.3-1
83.577	2.200	0.65	36.56	17.0000	Unstiffened	---	---	0.0099	6.10.3.3-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.0083	6.10.3.3-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.0083	6.10.3.3-1
89.510	2.264	0.65	36.56	17.0000	Unstiffened	---	---	0.0078	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.0066	6.10.3.3-1
98.010	2.357	0.65	36.56	17.0000	Unstiffened	---	---	0.0046	6.10.3.3-1
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	0.0032	6.10.3.3-1
106.510	2.449	0.65	36.56	17.0000	Unstiffened	---	---	0.0016	6.10.3.3-1
111.177	2.500	0.65	36.56	17.0000	Unstiffened	---	---	0.0000	6.10.3.3-1
115.010	2.542	0.65	36.56	17.0000	Unstiffened	---	---	0.0015	6.10.3.3-1
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	0.0034	6.10.3.3-1
123.510	2.634	0.65	36.56	17.0000	Unstiffened	---	---	0.0045	6.10.3.3-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.0067	6.10.3.3-1
132.010	2.726	0.65	36.56	17.0000	Unstiffened	---	---	0.0077	6.10.3.3-1
136.135	2.771	0.65	36.56	8.2500	Stiffened	---	---	0.0092	6.10.3.3-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.0101	6.10.3.3-1
140.260	2.816	0.65	36.56	8.2500	Stiffened	---	---	0.0109	6.10.3.3-1
144.385	2.861	0.65	36.56	8.2500	Stiffened	---	---	0.0123	6.10.3.3-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.0136	6.10.3.3-1
148.510	2.906	0.65	36.56	8.6667	Stiffened	---	---	0.0140	6.10.3.3-1
152.844	2.953	0.65	36.56	8.6667	Stiffened	---	---	0.0155	6.10.3.3-1
157.077	2.999	0.65	36.56	8.6667	Stiffened	---	---	0.0170	6.10.3.3-1
157.177	3.000	0.65	36.56	8.6667	Stiffened	---	---	0.0173	6.10.3.3-1
157.277	3.001	0.65	36.56	5.2500	Stiffened	---	---	0.0158	6.10.3.3-1
159.802	3.031	0.65	36.56	5.2500	Stiffened	---	---	0.0149	6.10.3.3-1
162.427	3.063	0.65	36.56	17.3333	Unstiffened	---	---	0.0139	6.10.3.3-1
165.577	3.100	0.65	36.56	17.3333	Unstiffened	---	---	0.0127	6.10.3.3-1
171.094	3.166	0.65	36.56	17.3333	Unstiffened	---	---	0.0108	6.10.3.3-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.0098	6.10.3.3-1
179.760	3.269	0.65	36.56	17.8333	Unstiffened	---	---	0.0076	6.10.3.3-1
182.377	3.300	0.65	36.56	17.8333	Unstiffened	---	---	0.0067	6.10.3.3-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.0052	6.10.3.3-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.0051	6.10.3.3-1
188.677	3.375	0.65	36.56	17.8333	Unstiffened	---	---	0.0044	6.10.3.3-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0037	6.10.3.3-1
197.594	3.481	0.65	36.56	17.8333	Unstiffened	---	---	0.0012	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0006	6.10.3.3-1
206.510	3.587	0.65	36.56	17.8333	Unstiffened	---	---	0.0020	6.10.3.3-1
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	0.0024	6.10.3.3-1
215.427	3.693	0.65	36.56	17.8333	Unstiffened	---	---	0.0054	6.10.3.3-1
215.977	3.700	0.65	36.56	8.5416	Stiffened	---	---	0.0056	6.10.3.3-1
219.698	3.744	0.65	36.56	8.5416	Stiffened	---	---	0.0069	6.10.3.3-1
223.969	3.795	0.65	36.56	8.5417	Stiffened	---	---	0.0086	6.10.3.3-1
224.377	3.800	0.65	36.56	8.5417	Stiffened	---	---	0.0088	6.10.3.3-1
228.240	3.846	0.65	36.56	8.5417	Stiffened	---	---	0.0101	6.10.3.3-1
232.510	3.897	0.65	36.56	8.6667	Stiffened	---	---	0.0118	6.10.3.3-1
232.777	3.900	0.65	36.56	8.6667	Stiffened	---	---	0.0119	6.10.3.3-1
236.844	3.948	0.65	36.56	8.6667	Stiffened	---	---	0.0134	6.10.3.3-1
241.077	3.999	0.65	36.56	8.6667	Stiffened	---	---	0.0149	6.10.3.3-1
241.177	4.000	0.65	36.56	8.6667	Stiffened	---	---	0.0152	6.10.3.3-1
241.277	4.001	0.65	36.56	7.0833	Stiffened	---	---	0.0144	6.10.3.3-1
244.719	4.042	0.65	36.56	7.0833	Stiffened	---	---	0.0132	6.10.3.3-1
248.260	4.084	0.65	36.56	17.8334	Unstiffened	---	---	0.0119	6.10.3.3-1
249.577	4.100	0.65	36.56	17.8334	Unstiffened	---	---	0.0114	6.10.3.3-1
257.177	4.190	0.65	36.56	17.8334	Unstiffened	---	---	0.0087	6.10.3.3-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.0084	6.10.3.3-1
266.094	4.297	0.65	36.56	17.8334	Unstiffened	---	---	0.0054	6.10.3.3-1
266.377	4.300	0.65	36.56	17.8333	Unstiffened	---	---	0.0053	6.10.3.3-1
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0023	6.10.3.3-1
275.010	4.403	0.65	36.56	17.8333	Unstiffened	---	---	0.0023	6.10.3.3-1
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0006	6.10.3.3-1
283.927	4.509	0.65	36.56	17.8333	Unstiffened	---	---	0.0010	6.10.3.3-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.0037	6.10.3.3-1
291.990	4.605	0.65	36.56	16.1250	Unstiffened	---	---	0.0039	6.10.3.3-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.0051	6.10.3.3-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.0052	6.10.3.3-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.0067	6.10.3.3-1
300.052	4.701	0.65	36.56	16.1250	Unstiffened	---	---	0.0069	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
304.167	4.750	0.65	36.56	8.2292	Stiffened	---	---	0.0084	6.10.3.3-1
308.281	4.799	0.65	36.56	8.2292	Stiffened	---	---	0.0101	6.10.3.3-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.0101	6.10.3.3-1
312.396	4.848	0.65	36.56	8.2292	Stiffened	---	---	0.0115	6.10.3.3-1
316.510	4.897	0.65	36.56	8.6667	Stiffened	---	---	0.0132	6.10.3.3-1
316.777	4.900	0.65	36.56	8.6667	Stiffened	---	---	0.0133	6.10.3.3-1
320.844	4.948	0.65	36.56	8.6667	Stiffened	---	---	0.0147	6.10.3.3-1
325.077	4.999	0.65	36.56	8.6667	Stiffened	---	---	0.0162	6.10.3.3-1
325.177	5.000	0.65	36.56	8.6667	Stiffened	---	---	0.0178	6.10.3.3-1
325.277	5.001	0.65	36.56	5.7500	Stiffened	---	---	0.0173	6.10.3.3-1
328.052	5.030	0.65	36.56	5.7500	Stiffened	---	---	0.0163	6.10.3.3-1
330.927	5.060	0.65	36.56	14.6670	Unstiffened	---	---	0.0152	6.10.3.3-1
334.702	5.100	0.65	36.56	14.6670	Unstiffened	---	---	0.0138	6.10.3.3-1
338.261	5.137	0.65	36.56	14.6670	Unstiffened	---	---	0.0126	6.10.3.3-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.0105	6.10.3.3-1
345.594	5.214	0.65	36.56	14.6670	Unstiffened	---	---	0.0099	6.10.3.3-1
352.928	5.291	0.65	36.56	14.6670	Unstiffened	---	---	0.0073	6.10.3.3-1
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.0070	6.10.3.3-1
360.261	5.368	0.65	36.56	14.6670	Unstiffened	---	---	0.0046	6.10.3.3-1
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	0.0035	6.10.3.3-1
367.595	5.445	0.65	36.56	14.6670	Unstiffened	---	---	0.0020	6.10.3.3-1
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	0.0001	6.10.3.3-1
374.928	5.522	0.65	36.56	14.6670	Unstiffened	---	---	0.0007	6.10.3.3-1
382.262	5.599	0.65	36.56	14.6670	Unstiffened	---	---	0.0034	6.10.3.3-1
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	0.0034	6.10.3.3-1
389.595	5.676	0.65	36.56	14.6670	Unstiffened	---	---	0.0061	6.10.3.3-1
391.852	5.700	0.65	36.56	14.5417	Unstiffened	---	---	0.0069	6.10.3.3-1
396.504	5.749	0.65	36.56	14.5417	Unstiffened	---	---	0.0085	6.10.3.3-1
396.704	5.751	0.65	36.56	14.5417	Unstiffened	---	---	0.0086	6.10.3.3-1
396.866	5.753	0.65	36.56	14.5417	Unstiffened	---	---	0.0086	6.10.3.3-1
401.377	5.800	0.65	36.56	14.5417	Unstiffened	---	---	0.0102	6.10.3.3-1
404.137	5.829	0.65	36.56	14.5417	Unstiffened	---	---	0.0114	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
407.949	5.869	0.65	36.56	7.6250	Stiffened	---	---	0.0128	6.10.3.3-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.0138	6.10.3.3-1
411.762	5.909	0.65	36.56	8.6653	Stiffened	---	---	0.0143	6.10.3.3-1
416.094	5.955	0.65	36.56	8.6653	Stiffened	---	---	0.0159	6.10.3.3-1
420.327	5.999	0.65	36.56	8.6653	Stiffened	---	---	0.0174	6.10.3.3-1
420.427	6.000	0.65	36.56	8.6653	Stiffened	---	---	0.0177	6.10.3.3-1
420.527	6.001	0.65	36.56	7.0937	Stiffened	---	---	0.0161	6.10.3.3-1
423.974	6.052	0.65	36.56	7.0937	Stiffened	---	---	0.0149	6.10.3.3-1
427.245	6.100	0.65	36.56	7.0937	Stiffened	---	---	0.0137	6.10.3.3-1
427.521	6.104	0.65	36.56	17.6666	Unstiffened	---	---	0.0135	6.10.3.3-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.0112	6.10.3.3-1
436.354	6.234	0.65	36.56	17.6666	Unstiffened	---	---	0.0104	6.10.3.3-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.0088	6.10.3.3-1
445.187	6.363	0.65	36.56	17.6667	Unstiffened	---	---	0.0072	6.10.3.3-1
447.698	6.400	0.65	36.56	17.6667	Unstiffened	---	---	0.0063	6.10.3.3-1
454.021	6.493	0.65	36.56	17.6667	Unstiffened	---	---	0.0040	6.10.3.3-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.0038	6.10.3.3-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0014	6.10.3.3-1
462.854	6.622	0.65	36.56	17.6667	Unstiffened	---	---	0.0007	6.10.3.3-1
467.125	6.685	0.65	36.56	8.5417	Stiffened	---	---	0.0008	6.10.3.3-1
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	0.0012	6.10.3.3-1
471.396	6.748	0.65	36.56	8.5417	Stiffened	---	---	0.0026	6.10.3.3-1
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	0.0038	6.10.3.3-1
475.667	6.810	0.65	36.56	8.5417	Stiffened	---	---	0.0041	6.10.3.3-1
479.938	6.873	0.65	36.56	8.6666	Stiffened	---	---	0.0058	6.10.3.3-1
481.786	6.900	0.65	36.56	8.6666	Unstiffened	---	---	0.0065	6.10.3.3-1
484.271	6.936	0.65	36.56	8.6666	Unstiffened	---	---	0.0073	6.10.3.3-1
488.504	6.999	0.65	36.56	8.6666	Unstiffened	---	---	0.0088	6.10.3.3-1
488.604	7.000	0.65	36.56	8.6666	Unstiffened	---	---	0.0091	6.10.3.3-1

Load combination: Stage 01 Default

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	6.6771	Unstiffened	---	---	0.0396	6.10.3.3-1
0.100	1.002	0.65	36.56	6.6771	Unstiffened	---	---	0.0392	6.10.3.3-1
3.339	1.051	0.65	36.56	6.6771	Unstiffened	---	---	0.0336	6.10.3.3-1
6.515	1.100	0.65	36.56	6.6771	Unstiffened	---	---	0.0281	6.10.3.3-1
6.677	1.102	0.65	36.56	16.6146	Unstiffened	---	---	0.0278	6.10.3.3-1
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	0.0168	6.10.3.3-1
14.984	1.230	0.65	36.56	16.6146	Unstiffened	---	---	0.0135	6.10.3.3-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.0056	6.10.3.3-1
23.292	1.357	0.65	36.56	16.6146	Unstiffened	---	---	0.0009	6.10.3.3-1
26.071	1.400	0.65	36.56	16.5834	Unstiffened	---	---	0.0057	6.10.3.3-1
31.583	1.485	0.65	36.56	16.5834	Unstiffened	---	---	0.0152	6.10.3.3-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.0169	6.10.3.3-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.0281	6.10.3.3-1
39.875	1.612	0.65	36.56	16.5834	Unstiffened	---	---	0.0296	6.10.3.3-1
44.042	1.676	0.65	36.56	8.3333	Stiffened	---	---	0.0368	6.10.3.3-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.0395	6.10.3.3-1
48.208	1.740	0.65	36.56	8.3333	Stiffened	---	---	0.0442	6.10.3.3-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.0509	6.10.3.3-1
52.375	1.804	0.65	36.56	8.3333	Stiffened	---	---	0.0513	6.10.3.3-1
56.542	1.868	0.65	36.56	8.6355	Stiffened	---	---	0.0587	6.10.3.3-1
58.659	1.900	0.65	36.56	8.6355	Stiffened	---	---	0.0624	6.10.3.3-1
60.859	1.934	0.65	36.56	8.6355	Stiffened	---	---	0.0661	6.10.3.3-1
65.077	1.998	0.65	36.56	8.6355	Stiffened	---	---	0.0734	6.10.3.3-1
65.177	2.000	0.65	36.56	8.6355	Stiffened	---	---	0.0793	6.10.3.3-1
65.277	2.001	0.65	36.56	5.2500	Stiffened	---	---	0.0787	6.10.3.3-1
67.802	2.029	0.65	36.56	5.2500	Stiffened	---	---	0.0743	6.10.3.3-1
70.427	2.057	0.65	36.56	10.5834	Unstiffened	---	---	0.0697	6.10.3.3-1
74.377	2.100	0.65	36.56	10.5834	Unstiffened	---	---	0.0629	6.10.3.3-1
75.719	2.115	0.65	36.56	10.5834	Unstiffened	---	---	0.0606	6.10.3.3-1
81.010	2.172	0.65	36.56	17.0000	Unstiffened	---	---	0.0514	6.10.3.3-1
83.577	2.200	0.65	36.56	17.0000	Unstiffened	---	---	0.0470	6.10.3.3-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.0396	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.0392	6.10.3.3-1
89.510	2.264	0.65	36.56	17.0000	Unstiffened	---	---	0.0368	6.10.3.3-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.0312	6.10.3.3-1
98.010	2.357	0.65	36.56	17.0000	Unstiffened	---	---	0.0221	6.10.3.3-1
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	0.0153	6.10.3.3-1
106.510	2.449	0.65	36.56	17.0000	Unstiffened	---	---	0.0075	6.10.3.3-1
111.177	2.500	0.65	36.56	17.0000	Unstiffened	---	---	0.0006	6.10.3.3-1
115.010	2.542	0.65	36.56	17.0000	Unstiffened	---	---	0.0073	6.10.3.3-1
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	0.0165	6.10.3.3-1
123.510	2.634	0.65	36.56	17.0000	Unstiffened	---	---	0.0219	6.10.3.3-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.0323	6.10.3.3-1
132.010	2.726	0.65	36.56	17.0000	Unstiffened	---	---	0.0367	6.10.3.3-1
136.135	2.771	0.65	36.56	8.2500	Stiffened	---	---	0.0438	6.10.3.3-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.0484	6.10.3.3-1
140.260	2.816	0.65	36.56	8.2500	Stiffened	---	---	0.0511	6.10.3.3-1
144.385	2.861	0.65	36.56	8.2500	Stiffened	---	---	0.0582	6.10.3.3-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.0644	6.10.3.3-1
148.510	2.906	0.65	36.56	8.6667	Stiffened	---	---	0.0655	6.10.3.3-1
152.844	2.953	0.65	36.56	8.6667	Stiffened	---	---	0.0730	6.10.3.3-1
157.077	2.999	0.65	36.56	8.6667	Stiffened	---	---	0.0802	6.10.3.3-1
157.177	3.000	0.65	36.56	8.6667	Stiffened	---	---	0.0806	6.10.3.3-1
157.277	3.001	0.65	36.56	5.2500	Stiffened	---	---	0.0751	6.10.3.3-1
159.802	3.031	0.65	36.56	5.2500	Stiffened	---	---	0.0708	6.10.3.3-1
162.427	3.063	0.65	36.56	17.3333	Unstiffened	---	---	0.0662	6.10.3.3-1
165.577	3.100	0.65	36.56	17.3333	Unstiffened	---	---	0.0608	6.10.3.3-1
171.094	3.166	0.65	36.56	17.3333	Unstiffened	---	---	0.0513	6.10.3.3-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.0463	6.10.3.3-1
179.760	3.269	0.65	36.56	17.8333	Unstiffened	---	---	0.0363	6.10.3.3-1
182.377	3.300	0.65	36.56	17.8333	Unstiffened	---	---	0.0318	6.10.3.3-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.0244	6.10.3.3-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.0241	6.10.3.3-1
188.677	3.375	0.65	36.56	17.8333	Unstiffened	---	---	0.0209	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0173	6.10.3.3-1
197.594	3.481	0.65	36.56	17.8333	Unstiffened	---	---	0.0055	6.10.3.3-1
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0028	6.10.3.3-1
206.510	3.587	0.65	36.56	17.8333	Unstiffened	---	---	0.0099	6.10.3.3-1
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	0.0117	6.10.3.3-1
215.427	3.693	0.65	36.56	17.8333	Unstiffened	---	---	0.0254	6.10.3.3-1
215.977	3.700	0.65	36.56	8.5416	Stiffened	---	---	0.0263	6.10.3.3-1
219.698	3.744	0.65	36.56	8.5416	Stiffened	---	---	0.0327	6.10.3.3-1
223.969	3.795	0.65	36.56	8.5417	Stiffened	---	---	0.0403	6.10.3.3-1
224.377	3.800	0.65	36.56	8.5417	Stiffened	---	---	0.0410	6.10.3.3-1
228.240	3.846	0.65	36.56	8.5417	Stiffened	---	---	0.0476	6.10.3.3-1
232.510	3.897	0.65	36.56	8.6667	Stiffened	---	---	0.0552	6.10.3.3-1
232.777	3.900	0.65	36.56	8.6667	Stiffened	---	---	0.0557	6.10.3.3-1
236.844	3.948	0.65	36.56	8.6667	Stiffened	---	---	0.0626	6.10.3.3-1
241.077	3.999	0.65	36.56	8.6667	Stiffened	---	---	0.0699	6.10.3.3-1
241.177	4.000	0.65	36.56	8.6667	Stiffened	---	---	0.0703	6.10.3.3-1
241.277	4.001	0.65	36.56	7.0833	Stiffened	---	---	0.0688	6.10.3.3-1
244.719	4.042	0.65	36.56	7.0833	Stiffened	---	---	0.0628	6.10.3.3-1
248.260	4.084	0.65	36.56	17.8334	Unstiffened	---	---	0.0566	6.10.3.3-1
249.577	4.100	0.65	36.56	17.8334	Unstiffened	---	---	0.0544	6.10.3.3-1
257.177	4.190	0.65	36.56	17.8334	Unstiffened	---	---	0.0413	6.10.3.3-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.0399	6.10.3.3-1
266.094	4.297	0.65	36.56	17.8334	Unstiffened	---	---	0.0259	6.10.3.3-1
266.377	4.300	0.65	36.56	17.8333	Unstiffened	---	---	0.0254	6.10.3.3-1
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0109	6.10.3.3-1
275.010	4.403	0.65	36.56	17.8333	Unstiffened	---	---	0.0105	6.10.3.3-1
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0035	6.10.3.3-1
283.927	4.509	0.65	36.56	17.8333	Unstiffened	---	---	0.0049	6.10.3.3-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.0181	6.10.3.3-1
291.990	4.605	0.65	36.56	16.1250	Unstiffened	---	---	0.0188	6.10.3.3-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.0248	6.10.3.3-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.0252	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.0325	6.10.3.3-1
300.052	4.701	0.65	36.56	16.1250	Unstiffened	---	---	0.0329	6.10.3.3-1
304.167	4.750	0.65	36.56	8.2292	Stiffened	---	---	0.0399	6.10.3.3-1
308.281	4.799	0.65	36.56	8.2292	Stiffened	---	---	0.0472	6.10.3.3-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.0474	6.10.3.3-1
312.396	4.848	0.65	36.56	8.2292	Stiffened	---	---	0.0543	6.10.3.3-1
316.510	4.897	0.65	36.56	8.6667	Stiffened	---	---	0.0616	6.10.3.3-1
316.777	4.900	0.65	36.56	8.6667	Stiffened	---	---	0.0620	6.10.3.3-1
320.844	4.948	0.65	36.56	8.6667	Stiffened	---	---	0.0690	6.10.3.3-1
325.077	4.999	0.65	36.56	8.6667	Stiffened	---	---	0.0763	6.10.3.3-1
325.177	5.000	0.65	36.56	8.6667	Stiffened	---	---	0.0829	6.10.3.3-1
325.277	5.001	0.65	36.56	5.7500	Stiffened	---	---	0.0823	6.10.3.3-1
328.052	5.030	0.65	36.56	5.7500	Stiffened	---	---	0.0775	6.10.3.3-1
330.927	5.060	0.65	36.56	14.6670	Unstiffened	---	---	0.0725	6.10.3.3-1
334.702	5.100	0.65	36.56	14.6670	Unstiffened	---	---	0.0660	6.10.3.3-1
338.261	5.137	0.65	36.56	14.6670	Unstiffened	---	---	0.0599	6.10.3.3-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.0496	6.10.3.3-1
345.594	5.214	0.65	36.56	14.6670	Unstiffened	---	---	0.0472	6.10.3.3-1
352.928	5.291	0.65	36.56	14.6670	Unstiffened	---	---	0.0345	6.10.3.3-1
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.0331	6.10.3.3-1
360.261	5.368	0.65	36.56	14.6670	Unstiffened	---	---	0.0218	6.10.3.3-1
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	0.0166	6.10.3.3-1
367.595	5.445	0.65	36.56	14.6670	Unstiffened	---	---	0.0092	6.10.3.3-1
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	0.0003	6.10.3.3-1
374.928	5.522	0.65	36.56	14.6670	Unstiffened	---	---	0.0035	6.10.3.3-1
382.262	5.599	0.65	36.56	14.6670	Unstiffened	---	---	0.0161	6.10.3.3-1
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	0.0162	6.10.3.3-1
389.595	5.676	0.65	36.56	14.6670	Unstiffened	---	---	0.0288	6.10.3.3-1
391.852	5.700	0.65	36.56	14.5417	Unstiffened	---	---	0.0327	6.10.3.3-1
396.504	5.749	0.65	36.56	14.5417	Unstiffened	---	---	0.0407	6.10.3.3-1
396.704	5.751	0.65	36.56	14.5417	Unstiffened	---	---	0.0411	6.10.3.3-1
396.866	5.753	0.65	36.56	14.5417	Unstiffened	---	---	0.0413	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
401.377	5.800	0.65	36.56	14.5417	Unstiffened	---	---	0.0491	6.10.3.3-1
404.137	5.829	0.65	36.56	14.5417	Unstiffened	---	---	0.0541	6.10.3.3-1
407.949	5.869	0.65	36.56	7.6250	Stiffened	---	---	0.0606	6.10.3.3-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.0657	6.10.3.3-1
411.762	5.909	0.65	36.56	8.6653	Stiffened	---	---	0.0674	6.10.3.3-1
416.094	5.955	0.65	36.56	8.6653	Stiffened	---	---	0.0748	6.10.3.3-1
420.327	5.999	0.65	36.56	8.6653	Stiffened	---	---	0.0821	6.10.3.3-1
420.427	6.000	0.65	36.56	8.6653	Stiffened	---	---	0.0825	6.10.3.3-1
420.527	6.001	0.65	36.56	7.0937	Stiffened	---	---	0.0765	6.10.3.3-1
423.974	6.052	0.65	36.56	7.0937	Stiffened	---	---	0.0705	6.10.3.3-1
427.245	6.100	0.65	36.56	7.0937	Stiffened	---	---	0.0649	6.10.3.3-1
427.521	6.104	0.65	36.56	17.6666	Unstiffened	---	---	0.0643	6.10.3.3-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.0531	6.10.3.3-1
436.354	6.234	0.65	36.56	17.6666	Unstiffened	---	---	0.0491	6.10.3.3-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.0413	6.10.3.3-1
445.187	6.363	0.65	36.56	17.6667	Unstiffened	---	---	0.0338	6.10.3.3-1
447.698	6.400	0.65	36.56	17.6667	Unstiffened	---	---	0.0295	6.10.3.3-1
454.021	6.493	0.65	36.56	17.6667	Unstiffened	---	---	0.0186	6.10.3.3-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.0178	6.10.3.3-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0061	6.10.3.3-1
462.854	6.622	0.65	36.56	17.6667	Unstiffened	---	---	0.0032	6.10.3.3-1
467.125	6.685	0.65	36.56	8.5417	Stiffened	---	---	0.0041	6.10.3.3-1
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	0.0059	6.10.3.3-1
471.396	6.748	0.65	36.56	8.5417	Stiffened	---	---	0.0117	6.10.3.3-1
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	0.0178	6.10.3.3-1
475.667	6.810	0.65	36.56	8.5417	Stiffened	---	---	0.0190	6.10.3.3-1
479.938	6.873	0.65	36.56	8.6666	Stiffened	---	---	0.0266	6.10.3.3-1
481.786	6.900	0.65	36.56	8.6666	Unstiffened	---	---	0.0297	6.10.3.3-1
484.271	6.936	0.65	36.56	8.6666	Unstiffened	---	---	0.0340	6.10.3.3-1
488.504	6.999	0.65	36.56	8.6666	Unstiffened	---	---	0.0413	6.10.3.3-1
488.604	7.000	0.65	36.56	8.6666	Unstiffened	---	---	0.0417	6.10.3.3-1

Load combination: Final Default Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	6.6771	Unstiffened	---	---	0.2514	6.10.9.1-1
0.100	1.002	0.65	36.56	6.6771	Unstiffened	---	---	0.2404	6.10.9.1-1
3.339	1.051	0.65	36.56	6.6771	Unstiffened	---	---	0.2236	6.10.9.1-1
6.515	1.100	0.65	36.56	6.6771	Unstiffened	---	---	0.2038	6.10.9.1-1
6.677	1.102	0.65	36.56	16.6146	Unstiffened	---	---	0.1959	6.10.9.1-1
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	0.1559	6.10.9.1-1
14.984	1.230	0.65	36.56	16.6146	Unstiffened	---	---	0.1454	6.10.9.1-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.1159	6.10.9.1-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.1159	6.10.9.1-1
23.292	1.357	0.65	36.56	16.6146	Unstiffened	---	---	0.0909	6.10.9.1-1
23.292	1.357	0.65	36.56	16.6146	Unstiffened	---	---	0.0909	6.10.9.1-1
26.071	1.400	0.65	36.56	16.5834	Unstiffened	---	---	0.0863	6.10.9.1-1
26.071	1.400	0.65	36.56	16.5834	Unstiffened	---	---	0.0863	6.10.9.1-1
31.583	1.485	0.65	36.56	16.5834	Unstiffened	---	---	0.1141	6.10.9.1-1
31.583	1.485	0.65	36.56	16.5834	Unstiffened	---	---	0.1141	6.10.9.1-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.1257	6.10.9.1-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.1257	6.10.9.1-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.1651	6.10.9.1-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.1651	6.10.9.1-1
39.875	1.612	0.65	36.56	16.5834	Unstiffened	---	---	0.1713	6.10.9.1-1
39.875	1.612	0.65	36.56	16.5834	Unstiffened	---	---	0.1713	6.10.9.1-1
44.042	1.676	0.65	36.56	8.3333	Stiffened	---	---	0.1978	6.10.9.1-1
44.042	1.676	0.65	36.56	8.3333	Stiffened	---	---	0.1978	6.10.9.1-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.2104	6.10.9.1-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.2104	6.10.9.1-1
48.208	1.740	0.65	36.56	8.3333	Stiffened	---	---	0.2250	6.10.9.1-1
48.208	1.740	0.65	36.56	8.3333	Stiffened	---	---	0.2250	6.10.9.1-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.2451	6.10.9.1-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.2451	6.10.9.1-1
52.375	1.804	0.65	36.56	8.3333	Stiffened	---	---	0.2535	6.10.9.1-1
52.375	1.804	0.65	36.56	8.3333	Stiffened	---	---	0.2535	6.10.9.1-1
56.542	1.868	0.65	36.56	8.6355	Stiffened	---	---	0.2783	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
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POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
56.542	1.868	0.65	36.56	8.6355	Stiffened	---	---	0.2783	6.10.9.1-1
58.659	1.900	0.65	36.56	8.6355	Stiffened	---	---	0.2911	6.10.9.1-1
60.859	1.934	0.65	36.56	8.6355	Stiffened	---	---	0.3022	6.10.9.1-1
65.077	1.998	0.65	36.56	8.6355	Stiffened	---	---	0.3254	6.10.9.1-1
65.177	2.000	0.65	36.56	8.6355	Stiffened	---	---	0.3364	6.10.9.1-1
65.277	2.001	0.65	36.56	5.2500	Stiffened	---	---	0.3425	6.10.9.1-1
67.802	2.029	0.65	36.56	5.2500	Stiffened	---	---	0.3366	6.10.9.1-1
70.427	2.057	0.65	36.56	10.5834	Unstiffened	---	---	0.3195	6.10.9.1-1
74.377	2.100	0.65	36.56	10.5834	Unstiffened	---	---	0.2978	6.10.9.1-1
74.377	2.100	0.65	36.56	10.5834	Unstiffened	---	---	0.2978	6.10.9.1-1
75.719	2.115	0.65	36.56	10.5834	Unstiffened	---	---	0.2907	6.10.9.1-1
75.719	2.115	0.65	36.56	10.5834	Unstiffened	---	---	0.2907	6.10.9.1-1
81.010	2.172	0.65	36.56	17.0000	Unstiffened	---	---	0.2611	6.10.9.1-1
81.010	2.172	0.65	36.56	17.0000	Unstiffened	---	---	0.2611	6.10.9.1-1
83.577	2.200	0.65	36.56	17.0000	Unstiffened	---	---	0.2467	6.10.9.1-1
83.577	2.200	0.65	36.56	17.0000	Unstiffened	---	---	0.2467	6.10.9.1-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.2245	6.10.9.1-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.2245	6.10.9.1-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.2160	6.10.9.1-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.2160	6.10.9.1-1
89.510	2.264	0.65	36.56	17.0000	Unstiffened	---	---	0.2123	6.10.9.1-1
89.510	2.264	0.65	36.56	17.0000	Unstiffened	---	---	0.2123	6.10.9.1-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.1920	6.10.9.1-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.1920	6.10.9.1-1
98.010	2.357	0.65	36.56	17.0000	Unstiffened	---	---	0.1568	6.10.9.1-1
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	0.1395	6.10.9.1-1
106.510	2.449	0.65	36.56	17.0000	Unstiffened	---	---	0.1137	6.10.9.1-1
111.177	2.500	0.65	36.56	17.0000	Unstiffened	---	---	0.0917	6.10.9.1-1
115.010	2.542	0.65	36.56	17.0000	Unstiffened	---	---	0.1131	6.10.9.1-1
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	0.1439	6.10.9.1-1
123.510	2.634	0.65	36.56	17.0000	Unstiffened	---	---	0.1580	6.10.9.1-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.1935	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.1935	6.10.9.1-1
132.010	2.726	0.65	36.56	17.0000	Unstiffened	---	---	0.2116	6.10.9.1-1
132.010	2.726	0.65	36.56	17.0000	Unstiffened	---	---	0.2116	6.10.9.1-1
136.135	2.771	0.65	36.56	8.2500	Stiffened	---	---	0.2305	6.10.9.1-1
136.135	2.771	0.65	36.56	8.2500	Stiffened	---	---	0.2305	6.10.9.1-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.2496	6.10.9.1-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.2496	6.10.9.1-1
140.260	2.816	0.65	36.56	8.2500	Stiffened	---	---	0.2612	6.10.9.1-1
140.260	2.816	0.65	36.56	8.2500	Stiffened	---	---	0.2612	6.10.9.1-1
144.385	2.861	0.65	36.56	8.2500	Stiffened	---	---	0.2836	6.10.9.1-1
144.385	2.861	0.65	36.56	8.2500	Stiffened	---	---	0.2836	6.10.9.1-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.2998	6.10.9.1-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.2998	6.10.9.1-1
148.510	2.906	0.65	36.56	8.6667	Stiffened	---	---	0.3058	6.10.9.1-1
148.510	2.906	0.65	36.56	8.6667	Stiffened	---	---	0.3058	6.10.9.1-1
152.844	2.953	0.65	36.56	8.6667	Stiffened	---	---	0.3287	6.10.9.1-1
157.077	2.999	0.65	36.56	8.6667	Stiffened	---	---	0.3528	6.10.9.1-1
157.177	3.000	0.65	36.56	8.6667	Stiffened	---	---	0.3533	6.10.9.1-1
157.277	3.001	0.65	36.56	5.2500	Stiffened	---	---	0.3291	6.10.9.1-1
159.802	3.031	0.65	36.56	5.2500	Stiffened	---	---	0.3155	6.10.9.1-1
162.427	3.063	0.65	36.56	17.3333	Unstiffened	---	---	0.2989	6.10.9.1-1
165.577	3.100	0.65	36.56	17.3333	Unstiffened	---	---	0.2813	6.10.9.1-1
165.577	3.100	0.65	36.56	17.3333	Unstiffened	---	---	0.2813	6.10.9.1-1
171.094	3.166	0.65	36.56	17.3333	Unstiffened	---	---	0.2464	6.10.9.1-1
171.094	3.166	0.65	36.56	17.3333	Unstiffened	---	---	0.2464	6.10.9.1-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.2293	6.10.9.1-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.2293	6.10.9.1-1
179.760	3.269	0.65	36.56	17.8333	Unstiffened	---	---	0.1827	6.10.9.1-1
179.760	3.269	0.65	36.56	17.8333	Unstiffened	---	---	0.1827	6.10.9.1-1
182.377	3.300	0.65	36.56	17.8333	Unstiffened	---	---	0.1707	6.10.9.1-1
182.377	3.300	0.65	36.56	17.8333	Unstiffened	---	---	0.1707	6.10.9.1-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.1427	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.1427	6.10.9.1-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.1363	6.10.9.1-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.1363	6.10.9.1-1
188.677	3.375	0.65	36.56	17.8333	Unstiffened	---	---	0.1320	6.10.9.1-1
188.677	3.375	0.65	36.56	17.8333	Unstiffened	---	---	0.1320	6.10.9.1-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.1197	6.10.9.1-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.1197	6.10.9.1-1
197.594	3.481	0.65	36.56	17.8333	Unstiffened	---	---	0.0874	6.10.9.1-1
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0994	6.10.9.1-1
206.510	3.587	0.65	36.56	17.8333	Unstiffened	---	---	0.1464	6.10.9.1-1
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	0.1494	6.10.9.1-1
215.427	3.693	0.65	36.56	17.8333	Unstiffened	---	---	0.1995	6.10.9.1-1
215.977	3.700	0.65	36.56	8.5416	Stiffened	---	---	0.2065	6.10.9.1-1
219.698	3.744	0.65	36.56	8.5416	Stiffened	---	---	0.2254	6.10.9.1-1
219.698	3.744	0.65	36.56	8.5416	Stiffened	---	---	0.2254	6.10.9.1-1
223.969	3.795	0.65	36.56	8.5417	Stiffened	---	---	0.2487	6.10.9.1-1
223.969	3.795	0.65	36.56	8.5417	Stiffened	---	---	0.2487	6.10.9.1-1
224.377	3.800	0.65	36.56	8.5417	Stiffened	---	---	0.2545	6.10.9.1-1
224.377	3.800	0.65	36.56	8.5417	Stiffened	---	---	0.2545	6.10.9.1-1
228.240	3.846	0.65	36.56	8.5417	Stiffened	---	---	0.2802	6.10.9.1-1
228.240	3.846	0.65	36.56	8.5417	Stiffened	---	---	0.2802	6.10.9.1-1
232.510	3.897	0.65	36.56	8.6667	Stiffened	---	---	0.2976	6.10.9.1-1
232.510	3.897	0.65	36.56	8.6667	Stiffened	---	---	0.2976	6.10.9.1-1
232.777	3.900	0.65	36.56	8.6667	Stiffened	---	---	0.3029	6.10.9.1-1
232.777	3.900	0.65	36.56	8.6667	Stiffened	---	---	0.3029	6.10.9.1-1
236.844	3.948	0.65	36.56	8.6667	Stiffened	---	---	0.3228	6.10.9.1-1
236.844	3.948	0.65	36.56	8.6667	Stiffened	---	---	0.3228	6.10.9.1-1
241.077	3.999	0.65	36.56	8.6667	Stiffened	---	---	0.3443	6.10.9.1-1
241.177	4.000	0.65	36.56	8.6667	Stiffened	---	---	0.3448	6.10.9.1-1
241.277	4.001	0.65	36.56	7.0833	Stiffened	---	---	0.3397	6.10.9.1-1
241.277	4.001	0.65	36.56	7.0833	Stiffened	---	---	0.3397	6.10.9.1-1
244.719	4.042	0.65	36.56	7.0833	Stiffened	---	---	0.3220	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
244.719	4.042	0.65	36.56	7.0833	Stiffened	---	---	0.3220	6.10.9.1-1
248.260	4.084	0.65	36.56	17.8334	Unstiffened	---	---	0.3058	6.10.9.1-1
248.260	4.084	0.65	36.56	17.8334	Unstiffened	---	---	0.3058	6.10.9.1-1
249.577	4.100	0.65	36.56	17.8334	Unstiffened	---	---	0.3021	6.10.9.1-1
249.577	4.100	0.65	36.56	17.8334	Unstiffened	---	---	0.3021	6.10.9.1-1
257.177	4.190	0.65	36.56	17.8334	Unstiffened	---	---	0.2600	6.10.9.1-1
257.177	4.190	0.65	36.56	17.8334	Unstiffened	---	---	0.2600	6.10.9.1-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.2494	6.10.9.1-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.2494	6.10.9.1-1
266.094	4.297	0.65	36.56	17.8334	Unstiffened	---	---	0.2056	6.10.9.1-1
266.377	4.300	0.65	36.56	17.8333	Unstiffened	---	---	0.2015	6.10.9.1-1
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	0.1488	6.10.9.1-1
275.010	4.403	0.65	36.56	17.8333	Unstiffened	---	---	0.1479	6.10.9.1-1
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	0.1002	6.10.9.1-1
283.927	4.509	0.65	36.56	17.8333	Unstiffened	---	---	0.0886	6.10.9.1-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.1206	6.10.9.1-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.1206	6.10.9.1-1
291.990	4.605	0.65	36.56	16.1250	Unstiffened	---	---	0.1217	6.10.9.1-1
291.990	4.605	0.65	36.56	16.1250	Unstiffened	---	---	0.1217	6.10.9.1-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.1436	6.10.9.1-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.1436	6.10.9.1-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.1443	6.10.9.1-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.1443	6.10.9.1-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.1699	6.10.9.1-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.1699	6.10.9.1-1
300.052	4.701	0.65	36.56	16.1250	Unstiffened	---	---	0.1777	6.10.9.1-1
300.052	4.701	0.65	36.56	16.1250	Unstiffened	---	---	0.1777	6.10.9.1-1
304.167	4.750	0.65	36.56	8.2292	Stiffened	---	---	0.2118	6.10.9.1-1
304.167	4.750	0.65	36.56	8.2292	Stiffened	---	---	0.2118	6.10.9.1-1
308.281	4.799	0.65	36.56	8.2292	Stiffened	---	---	0.2301	6.10.9.1-1
308.281	4.799	0.65	36.56	8.2292	Stiffened	---	---	0.2301	6.10.9.1-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.2350	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.2350	6.10.9.1-1
312.396	4.848	0.65	36.56	8.2292	Stiffened	---	---	0.2572	6.10.9.1-1
312.396	4.848	0.65	36.56	8.2292	Stiffened	---	---	0.2572	6.10.9.1-1
316.510	4.897	0.65	36.56	8.6667	Stiffened	---	---	0.2760	6.10.9.1-1
316.510	4.897	0.65	36.56	8.6667	Stiffened	---	---	0.2760	6.10.9.1-1
316.777	4.900	0.65	36.56	8.6667	Stiffened	---	---	0.2823	6.10.9.1-1
320.844	4.948	0.65	36.56	8.6667	Stiffened	---	---	0.3066	6.10.9.1-1
325.077	4.999	0.65	36.56	8.6667	Stiffened	---	---	0.3310	6.10.9.1-1
325.177	5.000	0.65	36.56	8.6667	Stiffened	---	---	0.3400	6.10.9.1-1
325.277	5.001	0.65	36.56	5.7500	Stiffened	---	---	0.3591	6.10.9.1-1
328.052	5.030	0.65	36.56	5.7500	Stiffened	---	---	0.3458	6.10.9.1-1
330.927	5.060	0.65	36.56	14.6670	Unstiffened	---	---	0.3278	6.10.9.1-1
334.702	5.100	0.65	36.56	14.6670	Unstiffened	---	---	0.3073	6.10.9.1-1
334.702	5.100	0.65	36.56	14.6670	Unstiffened	---	---	0.3073	6.10.9.1-1
338.261	5.137	0.65	36.56	14.6670	Unstiffened	---	---	0.2875	6.10.9.1-1
338.261	5.137	0.65	36.56	14.6670	Unstiffened	---	---	0.2875	6.10.9.1-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.2521	6.10.9.1-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.2521	6.10.9.1-1
345.594	5.214	0.65	36.56	14.6670	Unstiffened	---	---	0.2453	6.10.9.1-1
345.594	5.214	0.65	36.56	14.6670	Unstiffened	---	---	0.2453	6.10.9.1-1
352.928	5.291	0.65	36.56	14.6670	Unstiffened	---	---	0.2029	6.10.9.1-1
352.928	5.291	0.65	36.56	14.6670	Unstiffened	---	---	0.2029	6.10.9.1-1
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.1970	6.10.9.1-1
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.1970	6.10.9.1-1
360.261	5.368	0.65	36.56	14.6670	Unstiffened	---	---	0.1606	6.10.9.1-1
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	0.1450	6.10.9.1-1
367.595	5.445	0.65	36.56	14.6670	Unstiffened	---	---	0.1227	6.10.9.1-1
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	0.0912	6.10.9.1-1
374.928	5.522	0.65	36.56	14.6670	Unstiffened	---	---	0.1028	6.10.9.1-1
382.262	5.599	0.65	36.56	14.6670	Unstiffened	---	---	0.1413	6.10.9.1-1
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	0.1444	6.10.9.1-1
389.595	5.676	0.65	36.56	14.6670	Unstiffened	---	---	0.1821	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
389.595	5.676	0.65	36.56	14.6670	Unstiffened	---	---	0.1821	6.10.9.1-1
391.852	5.700	0.65	36.56	14.5417	Unstiffened	---	---	0.1952	6.10.9.1-1
391.852	5.700	0.65	36.56	14.5417	Unstiffened	---	---	0.1952	6.10.9.1-1
396.504	5.749	0.65	36.56	14.5417	Unstiffened	---	---	0.2243	6.10.9.1-1
396.504	5.749	0.65	36.56	14.5417	Unstiffened	---	---	0.2243	6.10.9.1-1
396.704	5.751	0.65	36.56	14.5417	Unstiffened	---	---	0.2248	6.10.9.1-1
396.704	5.751	0.65	36.56	14.5417	Unstiffened	---	---	0.2248	6.10.9.1-1
396.866	5.753	0.65	36.56	14.5417	Unstiffened	---	---	0.2254	6.10.9.1-1
396.866	5.753	0.65	36.56	14.5417	Unstiffened	---	---	0.2254	6.10.9.1-1
401.377	5.800	0.65	36.56	14.5417	Unstiffened	---	---	0.2517	6.10.9.1-1
401.377	5.800	0.65	36.56	14.5417	Unstiffened	---	---	0.2517	6.10.9.1-1
404.137	5.829	0.65	36.56	14.5417	Unstiffened	---	---	0.2697	6.10.9.1-1
404.137	5.829	0.65	36.56	14.5417	Unstiffened	---	---	0.2697	6.10.9.1-1
407.949	5.869	0.65	36.56	7.6250	Stiffened	---	---	0.2905	6.10.9.1-1
407.949	5.869	0.65	36.56	7.6250	Stiffened	---	---	0.2905	6.10.9.1-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.3065	6.10.9.1-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.3065	6.10.9.1-1
411.762	5.909	0.65	36.56	8.6653	Stiffened	---	---	0.3098	6.10.9.1-1
411.762	5.909	0.65	36.56	8.6653	Stiffened	---	---	0.3098	6.10.9.1-1
416.094	5.955	0.65	36.56	8.6653	Stiffened	---	---	0.3320	6.10.9.1-1
420.327	5.999	0.65	36.56	8.6653	Stiffened	---	---	0.3595	6.10.9.1-1
420.427	6.000	0.65	36.56	8.6653	Stiffened	---	---	0.3600	6.10.9.1-1
420.527	6.001	0.65	36.56	7.0937	Stiffened	---	---	0.3317	6.10.9.1-1
423.974	6.052	0.65	36.56	7.0937	Stiffened	---	---	0.3163	6.10.9.1-1
427.245	6.100	0.65	36.56	7.0937	Stiffened	---	---	0.2965	6.10.9.1-1
427.521	6.104	0.65	36.56	17.6666	Unstiffened	---	---	0.2954	6.10.9.1-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.2531	6.10.9.1-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.2531	6.10.9.1-1
436.354	6.234	0.65	36.56	17.6666	Unstiffened	---	---	0.2434	6.10.9.1-1
436.354	6.234	0.65	36.56	17.6666	Unstiffened	---	---	0.2434	6.10.9.1-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.2108	6.10.9.1-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.2108	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
445.187	6.363	0.65	36.56	17.6667	Unstiffened	---	---	0.1866	6.10.9.1-1
445.187	6.363	0.65	36.56	17.6667	Unstiffened	---	---	0.1866	6.10.9.1-1
447.698	6.400	0.65	36.56	17.6667	Unstiffened	---	---	0.1715	6.10.9.1-1
447.698	6.400	0.65	36.56	17.6667	Unstiffened	---	---	0.1715	6.10.9.1-1
454.021	6.493	0.65	36.56	17.6667	Unstiffened	---	---	0.1310	6.10.9.1-1
454.021	6.493	0.65	36.56	17.6667	Unstiffened	---	---	0.1310	6.10.9.1-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.1252	6.10.9.1-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.1252	6.10.9.1-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0857	6.10.9.1-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0857	6.10.9.1-1
462.854	6.622	0.65	36.56	17.6667	Unstiffened	---	---	0.0867	6.10.9.1-1
462.854	6.622	0.65	36.56	17.6667	Unstiffened	---	---	0.0867	6.10.9.1-1
467.125	6.685	0.65	36.56	8.5417	Stiffened	---	---	0.1117	6.10.9.1-1
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	0.1168	6.10.9.1-1
471.396	6.748	0.65	36.56	8.5417	Stiffened	---	---	0.1368	6.10.9.1-1
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	0.1614	6.10.9.1-1
475.667	6.810	0.65	36.56	8.5417	Stiffened	---	---	0.1681	6.10.9.1-1
479.938	6.873	0.65	36.56	8.6666	Stiffened	---	---	0.1951	6.10.9.1-1
481.786	6.900	0.65	36.56	8.6666	Unstiffened	---	---	0.2040	6.10.9.1-1
484.271	6.936	0.65	36.56	8.6666	Unstiffened	---	---	0.2269	6.10.9.1-1
488.504	6.999	0.65	36.56	8.6666	Unstiffened	---	---	0.2565	6.10.9.1-1
488.604	7.000	0.65	36.56	8.6666	Unstiffened	---	---	0.2574	6.10.9.1-1

Load combination: Final Default Service I (Deflection)

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	6.6771	Unstiffened	---	---	---	---
0.100	1.002	0.65	36.56	6.6771	Unstiffened	---	---	---	---
3.339	1.051	0.65	36.56	6.6771	Unstiffened	---	---	---	---
6.515	1.100	0.65	36.56	6.6771	Unstiffened	---	---	---	---
6.677	1.102	0.65	36.56	16.6146	Unstiffened	---	---	---	---
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
14.984	1.230	0.65	36.56	16.6146	Unstiffened	---	---	---	---
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	---	---
23.292	1.357	0.65	36.56	16.6146	Unstiffened	---	---	---	---
26.071	1.400	0.65	36.56	16.5834	Unstiffened	---	---	---	---
31.583	1.485	0.65	36.56	16.5834	Unstiffened	---	---	---	---
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	---	---
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	---	---
39.875	1.612	0.65	36.56	16.5834	Unstiffened	---	---	---	---
44.042	1.676	0.65	36.56	8.3333	Stiffened	---	---	---	---
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	---	---
48.208	1.740	0.65	36.56	8.3333	Stiffened	---	---	---	---
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	---	---
52.375	1.804	0.65	36.56	8.3333	Stiffened	---	---	---	---
56.542	1.868	0.65	36.56	8.6355	Stiffened	---	---	---	---
58.659	1.900	0.65	36.56	8.6355	Stiffened	---	---	---	---
60.859	1.934	0.65	36.56	8.6355	Stiffened	---	---	---	---
65.077	1.998	0.65	36.56	8.6355	Stiffened	---	---	---	---
65.177	2.000	0.65	36.56	8.6355	Stiffened	---	---	---	---
65.277	2.001	0.65	36.56	5.2500	Stiffened	---	---	---	---
67.802	2.029	0.65	36.56	5.2500	Stiffened	---	---	---	---
70.427	2.057	0.65	36.56	10.5834	Unstiffened	---	---	---	---
74.377	2.100	0.65	36.56	10.5834	Unstiffened	---	---	---	---
75.719	2.115	0.65	36.56	10.5834	Unstiffened	---	---	---	---
81.010	2.172	0.65	36.56	17.0000	Unstiffened	---	---	---	---
83.577	2.200	0.65	36.56	17.0000	Unstiffened	---	---	---	---
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	---	---
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	---	---
89.510	2.264	0.65	36.56	17.0000	Unstiffened	---	---	---	---
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	---	---
98.010	2.357	0.65	36.56	17.0000	Unstiffened	---	---	---	---
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	---	---
106.510	2.449	0.65	36.56	17.0000	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
111.177	2.500	0.65	36.56	17.0000	Unstiffened	---	---	---	---
115.010	2.542	0.65	36.56	17.0000	Unstiffened	---	---	---	---
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	---	---
123.510	2.634	0.65	36.56	17.0000	Unstiffened	---	---	---	---
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	---	---
132.010	2.726	0.65	36.56	17.0000	Unstiffened	---	---	---	---
136.135	2.771	0.65	36.56	8.2500	Stiffened	---	---	---	---
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	---	---
140.260	2.816	0.65	36.56	8.2500	Stiffened	---	---	---	---
144.385	2.861	0.65	36.56	8.2500	Stiffened	---	---	---	---
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	---	---
148.510	2.906	0.65	36.56	8.6667	Stiffened	---	---	---	---
152.844	2.953	0.65	36.56	8.6667	Stiffened	---	---	---	---
157.077	2.999	0.65	36.56	8.6667	Stiffened	---	---	---	---
157.177	3.000	0.65	36.56	8.6667	Stiffened	---	---	---	---
157.277	3.001	0.65	36.56	5.2500	Stiffened	---	---	---	---
159.802	3.031	0.65	36.56	5.2500	Stiffened	---	---	---	---
162.427	3.063	0.65	36.56	17.3333	Unstiffened	---	---	---	---
165.577	3.100	0.65	36.56	17.3333	Unstiffened	---	---	---	---
171.094	3.166	0.65	36.56	17.3333	Unstiffened	---	---	---	---
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	---	---
179.760	3.269	0.65	36.56	17.8333	Unstiffened	---	---	---	---
182.377	3.300	0.65	36.56	17.8333	Unstiffened	---	---	---	---
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	---	---
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	---	---
188.677	3.375	0.65	36.56	17.8333	Unstiffened	---	---	---	---
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	---	---
197.594	3.481	0.65	36.56	17.8333	Unstiffened	---	---	---	---
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	---	---
206.510	3.587	0.65	36.56	17.8333	Unstiffened	---	---	---	---
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	---	---
215.427	3.693	0.65	36.56	17.8333	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
215.977	3.700	0.65	36.56	8.5416	Stiffened	---	---	---	---
219.698	3.744	0.65	36.56	8.5416	Stiffened	---	---	---	---
223.969	3.795	0.65	36.56	8.5417	Stiffened	---	---	---	---
224.377	3.800	0.65	36.56	8.5417	Stiffened	---	---	---	---
228.240	3.846	0.65	36.56	8.5417	Stiffened	---	---	---	---
232.510	3.897	0.65	36.56	8.6667	Stiffened	---	---	---	---
232.777	3.900	0.65	36.56	8.6667	Stiffened	---	---	---	---
236.844	3.948	0.65	36.56	8.6667	Stiffened	---	---	---	---
241.077	3.999	0.65	36.56	8.6667	Stiffened	---	---	---	---
241.177	4.000	0.65	36.56	8.6667	Stiffened	---	---	---	---
241.277	4.001	0.65	36.56	7.0833	Stiffened	---	---	---	---
244.719	4.042	0.65	36.56	7.0833	Stiffened	---	---	---	---
248.260	4.084	0.65	36.56	17.8334	Unstiffened	---	---	---	---
249.577	4.100	0.65	36.56	17.8334	Unstiffened	---	---	---	---
257.177	4.190	0.65	36.56	17.8334	Unstiffened	---	---	---	---
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	---	---
266.094	4.297	0.65	36.56	17.8334	Unstiffened	---	---	---	---
266.377	4.300	0.65	36.56	17.8333	Unstiffened	---	---	---	---
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	---	---
275.010	4.403	0.65	36.56	17.8333	Unstiffened	---	---	---	---
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	---	---
283.927	4.509	0.65	36.56	17.8333	Unstiffened	---	---	---	---
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	---	---
291.990	4.605	0.65	36.56	16.1250	Unstiffened	---	---	---	---
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	---	---
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	---	---
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	---	---
300.052	4.701	0.65	36.56	16.1250	Unstiffened	---	---	---	---
304.167	4.750	0.65	36.56	8.2292	Stiffened	---	---	---	---
308.281	4.799	0.65	36.56	8.2292	Stiffened	---	---	---	---
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	---	---
312.396	4.848	0.65	36.56	8.2292	Stiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
316.510	4.897	0.65	36.56	8.6667	Stiffened	---	---	---	---
316.777	4.900	0.65	36.56	8.6667	Stiffened	---	---	---	---
320.844	4.948	0.65	36.56	8.6667	Stiffened	---	---	---	---
325.077	4.999	0.65	36.56	8.6667	Stiffened	---	---	---	---
325.177	5.000	0.65	36.56	8.6667	Stiffened	---	---	---	---
325.277	5.001	0.65	36.56	5.7500	Stiffened	---	---	---	---
328.052	5.030	0.65	36.56	5.7500	Stiffened	---	---	---	---
330.927	5.060	0.65	36.56	14.6670	Unstiffened	---	---	---	---
334.702	5.100	0.65	36.56	14.6670	Unstiffened	---	---	---	---
338.261	5.137	0.65	36.56	14.6670	Unstiffened	---	---	---	---
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	---	---
345.594	5.214	0.65	36.56	14.6670	Unstiffened	---	---	---	---
352.928	5.291	0.65	36.56	14.6670	Unstiffened	---	---	---	---
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	---	---
360.261	5.368	0.65	36.56	14.6670	Unstiffened	---	---	---	---
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	---	---
367.595	5.445	0.65	36.56	14.6670	Unstiffened	---	---	---	---
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	---	---
374.928	5.522	0.65	36.56	14.6670	Unstiffened	---	---	---	---
382.262	5.599	0.65	36.56	14.6670	Unstiffened	---	---	---	---
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	---	---
389.595	5.676	0.65	36.56	14.6670	Unstiffened	---	---	---	---
391.852	5.700	0.65	36.56	14.5417	Unstiffened	---	---	---	---
396.504	5.749	0.65	36.56	14.5417	Unstiffened	---	---	---	---
396.704	5.751	0.65	36.56	14.5417	Unstiffened	---	---	---	---
396.866	5.753	0.65	36.56	14.5417	Unstiffened	---	---	---	---
401.377	5.800	0.65	36.56	14.5417	Unstiffened	---	---	---	---
404.137	5.829	0.65	36.56	14.5417	Unstiffened	---	---	---	---
407.949	5.869	0.65	36.56	7.6250	Stiffened	---	---	---	---
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	---	---
411.762	5.909	0.65	36.56	8.6653	Stiffened	---	---	---	---
416.094	5.955	0.65	36.56	8.6653	Stiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:49 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
420.327	5.999	0.65	36.56	8.6653	Stiffened	---	---	---	---
420.427	6.000	0.65	36.56	8.6653	Stiffened	---	---	---	---
420.527	6.001	0.65	36.56	7.0937	Stiffened	---	---	---	---
423.974	6.052	0.65	36.56	7.0937	Stiffened	---	---	---	---
427.245	6.100	0.65	36.56	7.0937	Stiffened	---	---	---	---
427.521	6.104	0.65	36.56	17.6666	Unstiffened	---	---	---	---
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	---	---
436.354	6.234	0.65	36.56	17.6666	Unstiffened	---	---	---	---
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	---	---
445.187	6.363	0.65	36.56	17.6667	Unstiffened	---	---	---	---
447.698	6.400	0.65	36.56	17.6667	Unstiffened	---	---	---	---
454.021	6.493	0.65	36.56	17.6667	Unstiffened	---	---	---	---
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	---	---
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	---	---
462.854	6.622	0.65	36.56	17.6667	Unstiffened	---	---	---	---
467.125	6.685	0.65	36.56	8.5417	Stiffened	---	---	---	---
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	---	---
471.396	6.748	0.65	36.56	8.5417	Stiffened	---	---	---	---
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	---	---
475.667	6.810	0.65	36.56	8.5417	Stiffened	---	---	---	---
479.938	6.873	0.65	36.56	8.6666	Stiffened	---	---	---	---
481.786	6.900	0.65	36.56	8.6666	Unstiffened	---	---	---	---
484.271	6.936	0.65	36.56	8.6666	Unstiffened	---	---	---	---
488.504	6.999	0.65	36.56	8.6666	Unstiffened	---	---	---	---
488.604	7.000	0.65	36.56	8.6666	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

Code Checker Results

Group01

Member 02

Overall Design Summary Report

POI Location (ft)	Span Fraction	Critical Load Combination
0.000	1.000	Final - Strength I 6.10.7.3-1 0.349
0.100	1.002	Final - Strength I 6.10.7.3-1 0.349
5.671	1.087	Final - Strength I 6.10.7.3-1 0.349
6.515	1.100	Final - Strength I 6.10.7.3-1 0.349
11.342	1.174	Final - Strength I 6.10.7.3-1 0.349
13.029	1.200	Final - Strength I 6.10.7.3-1 0.349
19.544	1.300	Final - Strength I 6.10.7.3-1 0.349
19.649	1.301	Final - Strength I 6.10.7.3-1 0.349
26.071	1.400	Final - Service II 6.10.4.2.2-2 0.361
27.957	1.429	Final - Service II 6.10.4.2.2-2 0.355
32.589	1.500	Final - Strength I 6.10.7.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.349
36.248	1.556	Final - Strength I 6.10.7.3-1 0.349
39.106	1.600	Final - Strength I 6.10.7.3-1 0.349
44.540	1.683	Final - Strength I 6.10.8.1.1-1 0.366
45.624	1.700	Final - Strength I 6.10.8.1.1-1 0.366
48.707	1.747	Final - Strength I 6.10.8.1.1-1 0.366
52.142	1.800	Final - Strength I 6.10.8.1.1-1 0.366
52.873	1.811	Final - Strength I 6.10.8.1.1-1 0.612
57.040	1.875	Final - Strength I 6.10.8.1.1-1 0.612
58.659	1.900	Final - Strength I 6.10.8.1.1-1 0.612
61.207	1.939	Final - Strength I 6.10.8.1.1-1 0.787
63.192	1.970	Final - Strength I 6.10.8.1.1-1 0.787
65.077	1.998	Final - Strength I 6.10.8.1.1-1 0.787

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
65.177	2.000	Final - Strength I 6.10.8.1.1-1 0.787
65.277	2.001	Final - Strength I 6.10.8.1.1-1 0.787
70.135	2.054	Final - Strength I 6.10.8.1.1-1 0.787
74.377	2.100	Final - Strength I 6.10.8.1.1-1 0.787
75.092	2.108	Final - Strength I 6.10.8.1.1-1 0.367
80.384	2.165	Final - Strength I 6.10.8.1.1-1 0.367
83.577	2.200	Final - Strength I 6.10.8.1.1-1 0.367
85.675	2.223	Final - Strength I 6.10.7.3-1 0.349
87.899	2.247	Final - Strength I 6.10.7.3-1 0.349
88.099	2.249	Final - Strength I 6.10.7.3-1 0.349
92.777	2.300	Final - Strength I 6.10.7.3-1 0.349
94.175	2.315	Final - Strength I 6.10.7.3-1 0.349
		Final - Service II

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
101.977	2.400	6.10.4.2.2-2 0.411
102.675	2.408	Final - Service II 6.10.4.2.2-2 0.414
111.175	2.500	Final - Service II 6.10.4.2.2-2 0.442
119.675	2.592	Final - Service II 6.10.4.2.2-2 0.413
120.377	2.600	Final - Service II 6.10.4.2.2-2 0.407
128.175	2.685	Final - Strength I 6.10.7.3-1 0.349
129.577	2.700	Final - Strength I 6.10.7.3-1 0.349
136.675	2.777	Final - Strength I 6.10.7.3-1 0.349
138.777	2.800	Final - Strength I 6.10.7.3-1 0.349
140.800	2.822	Final - Strength I 6.10.7.3-1 0.349
144.925	2.867	Final - Strength I 6.10.8.1.1-1 0.618
147.977	2.900	Final - Strength I 6.10.8.1.1-1 0.618
149.050	2.912	Final - Strength I 6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.618
153.175	2.957	Final - Strength I 6.10.8.1.1-1 0.802
155.176	2.978	Final - Strength I 6.10.8.1.1-1 0.802
157.077	2.999	Final - Strength I 6.10.8.1.1-1 0.802
157.177	3.000	Final - Strength I 6.10.8.1.1-1 0.802
157.277	3.001	Final - Strength I 6.10.8.1.1-1 0.802
162.135	3.059	Final - Strength I 6.10.8.1.1-1 0.802
165.577	3.100	Final - Strength I 6.10.8.1.1-1 0.802
167.092	3.118	Final - Strength I 6.10.8.1.1-1 0.423
173.977	3.200	Final - Strength I 6.10.8.1.1-1 0.423
175.759	3.221	Final - Strength I 6.10.8.1.1-1 0.423
182.377	3.300	Final - Strength I 6.10.8.1.1-1 0.423
184.425	3.324	Final - Strength I 6.10.7.3-1 0.349

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
186.649	3.351	Final - Strength I 6.10.7.3-1 0.349
186.849	3.353	Final - Strength I 6.10.7.3-1 0.349
190.777	3.400	Final - Strength I 6.10.7.3-1 0.349
193.342	3.431	Final - Strength I 6.10.7.3-1 0.349
199.177	3.500	Final - Strength I 6.10.7.3-1 0.349
202.259	3.537	Final - Strength I 6.10.7.3-1 0.349
207.577	3.600	Final - Strength I 6.10.7.3-1 0.349
211.175	3.643	Final - Strength I 6.10.7.3-1 0.349
215.977	3.700	Final - Strength I 6.10.7.3-1 0.349
220.092	3.749	Final - Strength I 6.10.7.3-1 0.349
224.363	3.800	Final - Strength I 6.10.7.3-1 0.349
224.377	3.800	Final - Strength I 6.10.7.3-1 0.349
		Final - Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
228.634	3.851	6.10.8.1.1-1 0.623
232.777	3.900	Final - Strength I 6.10.8.1.1-1 0.623
232.905	3.902	Final - Strength I 6.10.8.1.1-1 0.623
237.175	3.952	Final - Strength I 6.10.8.1.1-1 0.820
239.176	3.976	Final - Strength I 6.10.8.1.1-1 0.820
241.077	3.999	Final - Strength I 6.10.8.1.1-1 0.820
241.177	4.000	Final - Strength I 6.10.8.1.1-1 0.820
241.277	4.001	Final - Strength I 6.10.8.1.1-1 0.820
247.051	4.070	Final - Strength I 6.10.8.1.1-1 0.820
249.577	4.100	Final - Strength I 6.10.8.1.1-1 0.820
252.925	4.140	Final - Strength I 6.10.7.3-1 0.349
257.977	4.200	Final - Strength I 6.10.7.3-1 0.349
261.842	4.246	Final - Strength I 6.10.7.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.349
266.377	4.300	Final - Strength I 6.10.7.3-1 0.349
270.759	4.352	Final - Strength I 6.10.7.3-1 0.349
274.777	4.400	Final - Strength I 6.10.7.3-1 0.349
279.675	4.458	Final - Strength I 6.10.7.3-1 0.349
283.177	4.500	Final - Strength I 6.10.7.3-1 0.349
288.592	4.564	Final - Strength I 6.10.7.3-1 0.349
291.577	4.600	Final - Strength I 6.10.7.3-1 0.349
295.504	4.647	Final - Strength I 6.10.7.3-1 0.349
295.704	4.649	Final - Strength I 6.10.7.3-1 0.349
296.655	4.660	Final - Strength I 6.10.7.3-1 0.349
299.977	4.700	Final - Strength I 6.10.7.3-1 0.349
304.717	4.756	Final - Strength I 6.10.8.1.1-1 0.394

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
308.377	4.800	Final - Strength I 6.10.8.1.1-1 0.394
308.832	4.805	Final - Strength I 6.10.8.1.1-1 0.394
312.946	4.854	Final - Strength I 6.10.8.1.1-1 0.656
316.777	4.900	Final - Strength I 6.10.8.1.1-1 0.656
317.061	4.903	Final - Strength I 6.10.8.1.1-1 0.656
321.175	4.952	Final - Strength I 6.10.8.1.1-1 0.834
323.176	4.976	Final - Strength I 6.10.8.1.1-1 0.834
325.077	4.999	Final - Strength I 6.10.8.1.1-1 0.834
325.177	5.000	Final - Strength I 6.10.8.1.1-1 0.834
325.277	5.001	Final - Strength I 6.10.8.1.1-1 0.834
330.385	5.055	Final - Strength I 6.10.8.1.1-1 0.834
334.702	5.100	Final - Strength I 6.10.8.1.1-1 0.834
		Final - Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
335.592	5.109	6.10.8.1.1-1 0.380
342.926	5.186	Final - Strength I 6.10.8.1.1-1 0.380
344.227	5.200	Final - Strength I 6.10.8.1.1-1 0.380
350.259	5.263	Final - Strength I 6.10.7.3-1 0.349
353.752	5.300	Final - Strength I 6.10.7.3-1 0.349
357.593	5.340	Final - Service II 6.10.4.2.2-2 0.372
363.277	5.400	Final - Service II 6.10.4.2.2-2 0.429
364.926	5.417	Final - Service II 6.10.4.2.2-2 0.441
372.260	5.494	Final - Service II 6.10.4.2.2-2 0.466
372.802	5.500	Final - Service II 6.10.4.2.2-2 0.465
379.593	5.571	Final - Service II 6.10.4.2.2-2 0.450
382.327	5.600	Final - Service II 6.10.4.2.2-2 0.433
386.927	5.648	Final - Service II 6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.390
391.852	5.700	Final - Strength I 6.10.7.3-1 0.349
394.260	5.725	Final - Strength I 6.10.7.3-1 0.349
396.504	5.749	Final - Strength I 6.10.7.3-1 0.349
396.704	5.751	Final - Strength I 6.10.7.3-1 0.349
397.691	5.761	Final - Strength I 6.10.7.3-1 0.349
401.123	5.797	Final - Strength I 6.10.7.3-1 0.349
401.377	5.800	Final - Strength I 6.10.7.3-1 0.349
404.962	5.838	Final - Strength I 6.10.7.3-1 0.349
408.802	5.878	Final - Strength I 6.10.8.1.1-1 0.650
410.902	5.900	Final - Strength I 6.10.8.1.1-1 0.650
412.614	5.918	Final - Strength I 6.10.8.1.1-1 0.650
416.427	5.958	Final - Strength I 6.10.8.1.1-1 0.840

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
418.427	5.979	Final - Strength I 6.10.8.1.1-1 0.840
420.327	5.999	Final - Strength I 6.10.8.1.1-1 0.840
420.427	6.000	Final - Strength I 6.10.8.1.1-1 0.840
420.527	6.001	Final - Strength I 6.10.8.1.1-1 0.840
426.306	6.086	Final - Strength I 6.10.8.1.1-1 0.840
427.245	6.100	Final - Strength I 6.10.8.1.1-1 0.840
432.186	6.172	Final - Strength I 6.10.8.1.1-1 0.405
434.063	6.200	Final - Strength I 6.10.8.1.1-1 0.405
440.880	6.300	Final - Strength I 6.10.8.1.1-1 0.405
441.019	6.302	Final - Strength I 6.10.8.1.1-1 0.405
447.698	6.400	Final - Strength I 6.10.8.1.1-1 0.405
449.852	6.432	Final - Fatigue 6.6.1.2.2-1 0.381
		Final - Service II

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
454.516	6.500	6.10.4.2.2-2 0.363
458.686	6.561	Final - Service II 6.10.4.2.2-2 0.379
461.333	6.600	Final - Service II 6.10.4.2.2-2 0.382
467.519	6.691	Final - Service II 6.10.4.2.2-2 0.366
468.151	6.700	Final - Service II 6.10.4.2.2-2 0.362
471.790	6.753	Final - Strength I 6.10.7.3-1 0.349
474.969	6.800	Final - Strength I 6.10.7.3-1 0.349
476.061	6.816	Final - Strength I 6.10.7.3-1 0.349
480.332	6.879	Final - Strength I 6.10.7.3-1 0.349
481.786	6.900	Final - Strength I 6.10.7.3-1 0.349
484.603	6.941	Final - Strength I 6.10.7.3-1 0.349
486.603	6.971	Final - Strength I 6.10.7.3-1 0.349
488.504	6.999	Final - Strength I 6.10.7.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx	
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22

POI Location (ft)	Span Fraction	Critical Load Combination
		0.349
488.604	7.000	Final - Strength I 6.10.7.3-1 0.349

Summary Flexure Report

Load combination: Deck Design Stress Check Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2
0.100	1.002	15.80	1.07	0.0003	6.10.4.2.2-1	15.80	1.07	0.0003	6.10.4.2.2-2
0.100	1.002	15.80	1.07	0.0004	6.10.4.2.2-1	15.80	1.07	0.0020	6.10.4.2.2-2
5.671	1.087	15.80	1.07	0.0001	6.10.4.2.2-1	15.80	1.07	0.0116	6.10.4.2.2-2
5.671	1.087	15.80	1.07	0.0197	6.10.4.2.2-1	15.80	1.07	0.1065	6.10.4.2.2-2
6.515	1.100	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0135	6.10.4.2.2-2
6.515	1.100	15.80	1.07	0.0217	6.10.4.2.2-1	15.80	1.07	0.1171	6.10.4.2.2-2
11.342	1.174	15.80	1.07	0.0011	6.10.4.2.2-1	15.80	1.07	0.0253	6.10.4.2.2-2
11.342	1.174	15.80	1.07	0.0338	6.10.4.2.2-1	15.80	1.07	0.1830	6.10.4.2.2-2
13.029	1.200	15.80	1.07	0.0016	6.10.4.2.2-1	15.80	1.07	0.0297	6.10.4.2.2-2
13.029	1.200	15.80	1.07	0.0369	6.10.4.2.2-1	15.80	1.07	0.1997	6.10.4.2.2-2
19.544	1.300	15.80	1.07	0.0040	6.10.4.2.2-1	15.80	1.07	0.0486	6.10.4.2.2-2
19.544	1.300	15.80	1.07	0.0459	6.10.4.2.2-1	15.80	1.07	0.2495	6.10.4.2.2-2
19.649	1.301	15.80	1.07	0.0041	6.10.4.2.2-1	15.80	1.07	0.0490	6.10.4.2.2-2
19.649	1.301	15.80	1.07	0.0461	6.10.4.2.2-1	15.80	1.07	0.2503	6.10.4.2.2-2
26.071	1.400	15.80	1.07	0.0077	6.10.4.2.2-1	15.80	1.07	0.0703	6.10.4.2.2-2
26.071	1.400	15.80	1.07	0.0499	6.10.4.2.2-1	15.80	1.07	0.2732	6.10.4.2.2-2
27.957	1.429	15.80	1.07	0.0089	6.10.4.2.2-1	15.80	1.07	0.0771	6.10.4.2.2-2
27.957	1.429	15.80	1.07	0.0492	6.10.4.2.2-1	15.80	1.07	0.2702	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.0125	6.10.4.2.2-1	15.80	1.07	0.0947	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.0477	6.10.4.2.2-1	15.80	1.07	0.2646	6.10.4.2.2-2
36.248	1.556	15.80	1.07	0.0156	6.10.4.2.2-1	15.80	1.07	0.1096	6.10.4.2.2-2
36.248	1.556	15.80	1.07	0.0454	6.10.4.2.2-1	15.80	1.07	0.2549	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
39.106	1.600	15.80	1.07	0.0184	6.10.4.2.2-1	15.80	1.07	0.1218	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0419	6.10.4.2.2-1	15.80	1.07	0.2381	6.10.4.2.2-2
44.540	1.683	15.80	1.07	0.0242	6.10.4.2.2-1	15.80	1.07	0.1465	6.10.4.2.2-2
44.540	1.683	15.80	1.07	0.0326	6.10.4.2.2-1	15.80	1.07	0.1925	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0254	6.10.4.2.2-1	15.80	1.07	0.1516	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0309	6.10.4.2.2-1	15.80	1.07	0.1847	6.10.4.2.2-2
48.707	1.747	15.80	1.07	0.0292	6.10.4.2.2-1	15.80	1.07	0.1667	6.10.4.2.2-2
48.707	1.747	15.80	1.07	0.0236	6.10.4.2.2-1	15.80	1.07	0.1485	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.0324	6.10.4.2.2-1	15.80	1.07	0.1767	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.0157	6.10.4.2.2-1	15.80	1.07	0.1105	6.10.4.2.2-2
52.873	1.811	15.80	1.07	0.0334	6.10.4.2.2-1	15.80	1.07	0.1805	6.10.4.2.2-2
52.873	1.811	15.80	1.07	0.0135	6.10.4.2.2-1	15.80	1.07	0.0992	6.10.4.2.2-2
57.040	1.875	15.80	1.07	0.2229	6.10.4.2.2-1	15.80	1.07	0.2557	6.10.4.2.2-2
57.040	1.875	15.80	1.07	0.0027	6.10.4.2.2-1	15.80	1.07	0.0477	6.10.4.2.2-2
58.659	1.900	15.80	1.07	0.2425	6.10.4.2.2-1	15.80	1.07	0.2780	6.10.4.2.2-2
58.659	1.900	15.80	1.07	0.0008	6.10.4.2.2-1	15.80	1.07	0.0325	6.10.4.2.2-2
61.207	1.939	15.80	1.07	0.2852	6.10.4.2.2-1	15.80	1.07	0.3267	6.10.4.2.2-2
61.207	1.939	15.80	1.07	0.0056	6.10.4.2.2-1	15.80	1.07	0.0129	6.10.4.2.2-2
63.192	1.970	15.80	1.07	0.3212	6.10.4.2.2-1	15.80	1.07	0.3678	6.10.4.2.2-2
63.192	1.970	15.80	1.07	0.0084	6.10.4.2.2-1	15.80	1.07	0.0035	6.10.4.2.2-2
65.077	1.998	15.80	1.07	0.3585	6.10.4.2.2-1	15.80	1.07	0.4104	6.10.4.2.2-2
65.077	1.998	15.80	1.07	0.0106	6.10.4.2.2-1	15.80	1.07	0.0019	6.10.4.2.2-2
65.177	2.000	15.80	1.07	0.3605	6.10.4.2.2-1	15.80	1.07	0.4128	6.10.4.2.2-2
65.177	2.000	15.80	1.07	0.0107	6.10.4.2.2-1	15.80	1.07	0.0021	6.10.4.2.2-2
65.277	2.001	15.80	1.07	0.3585	6.10.4.2.2-1	15.80	1.07	0.4105	6.10.4.2.2-2
70.135	2.054	15.80	1.07	0.2656	6.10.4.2.2-1	15.80	1.07	0.3045	6.10.4.2.2-2
70.135	2.054	15.80	1.07	0.0044	6.10.4.2.2-1	15.80	1.07	0.0147	6.10.4.2.2-2
74.377	2.100	15.80	1.07	0.0345	6.10.4.2.2-1	15.80	1.07	0.1802	6.10.4.2.2-2
74.377	2.100	15.80	1.07	0.0039	6.10.4.2.2-1	15.80	1.07	0.0487	6.10.4.2.2-2
75.092	2.108	15.80	1.07	0.0323	6.10.4.2.2-1	15.80	1.07	0.1700	6.10.4.2.2-2
75.092	2.108	15.80	1.07	0.0052	6.10.4.2.2-1	15.80	1.07	0.0540	6.10.4.2.2-2
80.384	2.165	15.80	1.07	0.0193	6.10.4.2.2-1	15.80	1.07	0.1089	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
80.384	2.165	15.80	1.07	0.0157	6.10.4.2.2-1	15.80	1.07	0.1000	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0150	6.10.4.2.2-1	15.80	1.07	0.0924	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0222	6.10.4.2.2-1	15.80	1.07	0.1299	6.10.4.2.2-2
85.675	2.223	15.80	1.07	0.0123	6.10.4.2.2-1	15.80	1.07	0.0813	6.10.4.2.2-2
85.675	2.223	15.80	1.07	0.0271	6.10.4.2.2-1	15.80	1.07	0.1533	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0103	6.10.4.2.2-1	15.80	1.07	0.0749	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0324	6.10.4.2.2-1	15.80	1.07	0.1801	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0102	6.10.4.2.2-1	15.80	1.07	0.0744	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0328	6.10.4.2.2-1	15.80	1.07	0.1821	6.10.4.2.2-2
92.777	2.300	15.80	1.07	0.0066	6.10.4.2.2-1	15.80	1.07	0.0623	6.10.4.2.2-2
92.777	2.300	15.80	1.07	0.0417	6.10.4.2.2-1	15.80	1.07	0.2258	6.10.4.2.2-2
94.175	2.315	15.80	1.07	0.0057	6.10.4.2.2-1	15.80	1.07	0.0590	6.10.4.2.2-2
94.175	2.315	15.80	1.07	0.0444	6.10.4.2.2-1	15.80	1.07	0.2399	6.10.4.2.2-2
101.977	2.400	15.80	1.07	0.0013	6.10.4.2.2-1	15.80	1.07	0.0427	6.10.4.2.2-2
101.977	2.400	15.80	1.07	0.0538	6.10.4.2.2-1	15.80	1.07	0.2860	6.10.4.2.2-2
102.675	2.408	15.80	1.07	0.0010	6.10.4.2.2-1	15.80	1.07	0.0414	6.10.4.2.2-2
102.675	2.408	15.80	1.07	0.0541	6.10.4.2.2-1	15.80	1.07	0.2872	6.10.4.2.2-2
111.175	2.500	15.80	1.07	0.0017	6.10.4.2.2-1	15.80	1.07	0.0285	6.10.4.2.2-2
111.175	2.500	15.80	1.07	0.0574	6.10.4.2.2-1	15.80	1.07	0.3037	6.10.4.2.2-2
119.675	2.592	15.80	1.07	0.0012	6.10.4.2.2-1	15.80	1.07	0.0419	6.10.4.2.2-2
119.675	2.592	15.80	1.07	0.0540	6.10.4.2.2-1	15.80	1.07	0.2878	6.10.4.2.2-2
120.377	2.600	15.80	1.07	0.0015	6.10.4.2.2-1	15.80	1.07	0.0432	6.10.4.2.2-2
120.377	2.600	15.80	1.07	0.0534	6.10.4.2.2-1	15.80	1.07	0.2846	6.10.4.2.2-2
128.175	2.685	15.80	1.07	0.0061	6.10.4.2.2-1	15.80	1.07	0.0603	6.10.4.2.2-2
128.175	2.685	15.80	1.07	0.0436	6.10.4.2.2-1	15.80	1.07	0.2360	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.0071	6.10.4.2.2-1	15.80	1.07	0.0638	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.0413	6.10.4.2.2-1	15.80	1.07	0.2250	6.10.4.2.2-2
136.675	2.777	15.80	1.07	0.0130	6.10.4.2.2-1	15.80	1.07	0.0835	6.10.4.2.2-2
136.675	2.777	15.80	1.07	0.0263	6.10.4.2.2-1	15.80	1.07	0.1506	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0153	6.10.4.2.2-1	15.80	1.07	0.0923	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0211	6.10.4.2.2-1	15.80	1.07	0.1251	6.10.4.2.2-2
140.800	2.822	15.80	1.07	0.0178	6.10.4.2.2-1	15.80	1.07	0.1012	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
140.800	2.822	15.80	1.07	0.0170	6.10.4.2.2-1	15.80	1.07	0.1064	6.10.4.2.2-2
144.925	2.867	15.80	1.07	0.0266	6.10.4.2.2-1	15.80	1.07	0.1412	6.10.4.2.2-2
144.925	2.867	15.80	1.07	0.0088	6.10.4.2.2-1	15.80	1.07	0.0703	6.10.4.2.2-2
147.977	2.900	15.80	1.07	0.0351	6.10.4.2.2-1	15.80	1.07	0.1810	6.10.4.2.2-2
147.977	2.900	15.80	1.07	0.0029	6.10.4.2.2-1	15.80	1.07	0.0456	6.10.4.2.2-2
149.050	2.912	15.80	1.07	0.2133	6.10.4.2.2-1	15.80	1.07	0.2445	6.10.4.2.2-2
149.050	2.912	15.80	1.07	0.0009	6.10.4.2.2-1	15.80	1.07	0.0373	6.10.4.2.2-2
153.175	2.957	15.80	1.07	0.2842	6.10.4.2.2-1	15.80	1.07	0.3254	6.10.4.2.2-2
153.175	2.957	15.80	1.07	0.0071	6.10.4.2.2-1	15.80	1.07	0.0057	6.10.4.2.2-2
155.176	2.978	15.80	1.07	0.3218	6.10.4.2.2-1	15.80	1.07	0.3684	6.10.4.2.2-2
157.077	2.999	15.80	1.07	0.3591	6.10.4.2.2-1	15.80	1.07	0.4109	6.10.4.2.2-2
157.177	3.000	15.80	1.07	0.3611	6.10.4.2.2-1	15.80	1.07	0.4132	6.10.4.2.2-2
157.277	3.001	15.80	1.07	0.3592	6.10.4.2.2-1	15.80	1.07	0.4110	6.10.4.2.2-2
162.135	3.059	15.80	1.07	0.2720	6.10.4.2.2-1	15.80	1.07	0.3115	6.10.4.2.2-2
162.135	3.059	15.80	1.07	0.0040	6.10.4.2.2-1	15.80	1.07	0.0217	6.10.4.2.2-2
165.577	3.100	15.80	1.07	0.2196	6.10.4.2.2-1	15.80	1.07	0.2518	6.10.4.2.2-2
165.577	3.100	15.80	1.07	0.0024	6.10.4.2.2-1	15.80	1.07	0.0480	6.10.4.2.2-2
167.092	3.118	15.80	1.07	0.2068	6.10.4.2.2-1	15.80	1.07	0.2374	6.10.4.2.2-2
167.092	3.118	15.80	1.07	0.0058	6.10.4.2.2-1	15.80	1.07	0.0631	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0264	6.10.4.2.2-1	15.80	1.07	0.1493	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0205	6.10.4.2.2-1	15.80	1.07	0.1309	6.10.4.2.2-2
175.759	3.221	15.80	1.07	0.0243	6.10.4.2.2-1	15.80	1.07	0.1414	6.10.4.2.2-2
175.759	3.221	15.80	1.07	0.0242	6.10.4.2.2-1	15.80	1.07	0.1480	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0164	6.10.4.2.2-1	15.80	1.07	0.1077	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0355	6.10.4.2.2-1	15.80	1.07	0.2019	6.10.4.2.2-2
184.425	3.324	15.80	1.07	0.0141	6.10.4.2.2-1	15.80	1.07	0.0978	6.10.4.2.2-2
184.425	3.324	15.80	1.07	0.0376	6.10.4.2.2-1	15.80	1.07	0.2107	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0118	6.10.4.2.2-1	15.80	1.07	0.0874	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0399	6.10.4.2.2-1	15.80	1.07	0.2211	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.0116	6.10.4.2.2-1	15.80	1.07	0.0865	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.0399	6.10.4.2.2-1	15.80	1.07	0.2213	6.10.4.2.2-2
190.777	3.400	15.80	1.07	0.0079	6.10.4.2.2-1	15.80	1.07	0.0690	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
190.777	3.400	15.80	1.07	0.0420	6.10.4.2.2-1	15.80	1.07	0.2291	6.10.4.2.2-2
193.342	3.431	15.80	1.07	0.0058	6.10.4.2.2-1	15.80	1.07	0.0581	6.10.4.2.2-2
193.342	3.431	15.80	1.07	0.0426	6.10.4.2.2-1	15.80	1.07	0.2307	6.10.4.2.2-2
199.177	3.500	15.80	1.07	0.0014	6.10.4.2.2-1	15.80	1.07	0.0348	6.10.4.2.2-2
199.177	3.500	15.80	1.07	0.0421	6.10.4.2.2-1	15.80	1.07	0.2250	6.10.4.2.2-2
202.259	3.537	15.80	1.07	0.0005	6.10.4.2.2-1	15.80	1.07	0.0234	6.10.4.2.2-2
202.259	3.537	15.80	1.07	0.0403	6.10.4.2.2-1	15.80	1.07	0.2142	6.10.4.2.2-2
207.577	3.600	15.80	1.07	0.0032	6.10.4.2.2-1	15.80	1.07	0.0051	6.10.4.2.2-2
207.577	3.600	15.80	1.07	0.0348	6.10.4.2.2-1	15.80	1.07	0.1836	6.10.4.2.2-2
211.175	3.643	15.80	1.07	0.0295	6.10.4.2.2-1	15.80	1.07	0.1552	6.10.4.2.2-2
215.977	3.700	15.80	1.07	0.0214	6.10.4.2.2-1	15.80	1.07	0.1124	6.10.4.2.2-2
220.092	3.749	15.80	1.07	0.0029	6.10.4.2.2-1	15.80	1.07	0.0254	6.10.4.2.2-2
220.092	3.749	15.80	1.07	0.0155	6.10.4.2.2-1	15.80	1.07	0.0841	6.10.4.2.2-2
224.363	3.800	15.80	1.07	0.0125	6.10.4.2.2-1	15.80	1.07	0.0743	6.10.4.2.2-2
224.363	3.800	15.80	1.07	0.0131	6.10.4.2.2-1	15.80	1.07	0.0787	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0126	6.10.4.2.2-1	15.80	1.07	0.0744	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0131	6.10.4.2.2-1	15.80	1.07	0.0787	6.10.4.2.2-2
228.634	3.851	15.80	1.07	0.0248	6.10.4.2.2-1	15.80	1.07	0.1368	6.10.4.2.2-2
228.634	3.851	15.80	1.07	0.0086	6.10.4.2.2-1	15.80	1.07	0.0626	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.2250	6.10.4.2.2-1	15.80	1.07	0.2589	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.0057	6.10.4.2.2-1	15.80	1.07	0.0574	6.10.4.2.2-2
232.905	3.902	15.80	1.07	0.2276	6.10.4.2.2-1	15.80	1.07	0.2618	6.10.4.2.2-2
232.905	3.902	15.80	1.07	0.0057	6.10.4.2.2-1	15.80	1.07	0.0576	6.10.4.2.2-2
237.175	3.952	15.80	1.07	0.3168	6.10.4.2.2-1	15.80	1.07	0.3641	6.10.4.2.2-2
237.175	3.952	15.80	1.07	0.0043	6.10.4.2.2-1	15.80	1.07	0.0636	6.10.4.2.2-2
239.176	3.976	15.80	1.07	0.3620	6.10.4.2.2-1	15.80	1.07	0.4159	6.10.4.2.2-2
239.176	3.976	15.80	1.07	0.0035	6.10.4.2.2-1	15.80	1.07	0.0661	6.10.4.2.2-2
241.077	3.999	15.80	1.07	0.4059	6.10.4.2.2-1	15.80	1.07	0.4661	6.10.4.2.2-2
241.077	3.999	15.80	1.07	0.0027	6.10.4.2.2-1	15.80	1.07	0.0684	6.10.4.2.2-2
241.177	4.000	15.80	1.07	0.4082	6.10.4.2.2-1	15.80	1.07	0.4688	6.10.4.2.2-2
241.177	4.000	15.80	1.07	0.0027	6.10.4.2.2-1	15.80	1.07	0.0685	6.10.4.2.2-2
241.277	4.001	15.80	1.07	0.4065	6.10.4.2.2-1	15.80	1.07	0.4670	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
241.277	4.001	15.80	1.07	0.0042	6.10.4.2.2-1	15.80	1.07	0.0760	6.10.4.2.2-2
247.051	4.070	15.80	1.07	0.2776	6.10.4.2.2-1	15.80	1.07	0.3192	6.10.4.2.2-2
247.051	4.070	15.80	1.07	0.0062	6.10.4.2.2-1	15.80	1.07	0.0670	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.2252	6.10.4.2.2-1	15.80	1.07	0.2592	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.0068	6.10.4.2.2-1	15.80	1.07	0.0627	6.10.4.2.2-2
252.925	4.140	15.80	1.07	0.0272	6.10.4.2.2-1	15.80	1.07	0.1499	6.10.4.2.2-2
252.925	4.140	15.80	1.07	0.0088	6.10.4.2.2-1	15.80	1.07	0.0649	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0125	6.10.4.2.2-1	15.80	1.07	0.0747	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0135	6.10.4.2.2-1	15.80	1.07	0.0805	6.10.4.2.2-2
261.842	4.246	15.80	1.07	0.0036	6.10.4.2.2-1	15.80	1.07	0.0295	6.10.4.2.2-2
261.842	4.246	15.80	1.07	0.0150	6.10.4.2.2-1	15.80	1.07	0.0814	6.10.4.2.2-2
266.377	4.300	15.80	1.07	0.0215	6.10.4.2.2-1	15.80	1.07	0.1129	6.10.4.2.2-2
270.759	4.352	15.80	1.07	0.0289	6.10.4.2.2-1	15.80	1.07	0.1518	6.10.4.2.2-2
274.777	4.400	15.80	1.07	0.0029	6.10.4.2.2-1	15.80	1.07	0.0067	6.10.4.2.2-2
274.777	4.400	15.80	1.07	0.0344	6.10.4.2.2-1	15.80	1.07	0.1816	6.10.4.2.2-2
279.675	4.458	15.80	1.07	0.0001	6.10.4.2.2-1	15.80	1.07	0.0248	6.10.4.2.2-2
279.675	4.458	15.80	1.07	0.0399	6.10.4.2.2-1	15.80	1.07	0.2123	6.10.4.2.2-2
283.177	4.500	15.80	1.07	0.0022	6.10.4.2.2-1	15.80	1.07	0.0386	6.10.4.2.2-2
283.177	4.500	15.80	1.07	0.0419	6.10.4.2.2-1	15.80	1.07	0.2247	6.10.4.2.2-2
288.592	4.564	15.80	1.07	0.0065	6.10.4.2.2-1	15.80	1.07	0.0617	6.10.4.2.2-2
288.592	4.564	15.80	1.07	0.0426	6.10.4.2.2-1	15.80	1.07	0.2315	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.0092	6.10.4.2.2-1	15.80	1.07	0.0751	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.0421	6.10.4.2.2-1	15.80	1.07	0.2310	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0131	6.10.4.2.2-1	15.80	1.07	0.0938	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0399	6.10.4.2.2-1	15.80	1.07	0.2227	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0133	6.10.4.2.2-1	15.80	1.07	0.0947	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0399	6.10.4.2.2-1	15.80	1.07	0.2225	6.10.4.2.2-2
296.655	4.660	15.80	1.07	0.0143	6.10.4.2.2-1	15.80	1.07	0.0994	6.10.4.2.2-2
296.655	4.660	15.80	1.07	0.0386	6.10.4.2.2-1	15.80	1.07	0.2164	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0181	6.10.4.2.2-1	15.80	1.07	0.1162	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0354	6.10.4.2.2-1	15.80	1.07	0.2030	6.10.4.2.2-2
304.717	4.756	15.80	1.07	0.0239	6.10.4.2.2-1	15.80	1.07	0.1413	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
304.717	4.756	15.80	1.07	0.0273	6.10.4.2.2-1	15.80	1.07	0.1645	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.0284	6.10.4.2.2-1	15.80	1.07	0.1593	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.0206	6.10.4.2.2-1	15.80	1.07	0.1330	6.10.4.2.2-2
308.832	4.805	15.80	1.07	0.0291	6.10.4.2.2-1	15.80	1.07	0.1619	6.10.4.2.2-2
308.832	4.805	15.80	1.07	0.0197	6.10.4.2.2-1	15.80	1.07	0.1293	6.10.4.2.2-2
312.946	4.854	15.80	1.07	0.0352	6.10.4.2.2-1	15.80	1.07	0.1866	6.10.4.2.2-2
312.946	4.854	15.80	1.07	0.0106	6.10.4.2.2-1	15.80	1.07	0.0868	6.10.4.2.2-2
316.777	4.900	15.80	1.07	0.2318	6.10.4.2.2-1	15.80	1.07	0.2658	6.10.4.2.2-2
316.777	4.900	15.80	1.07	0.0015	6.10.4.2.2-1	15.80	1.07	0.0450	6.10.4.2.2-2
317.061	4.903	15.80	1.07	0.2343	6.10.4.2.2-1	15.80	1.07	0.2685	6.10.4.2.2-2
317.061	4.903	15.80	1.07	0.0008	6.10.4.2.2-1	15.80	1.07	0.0419	6.10.4.2.2-2
321.175	4.952	15.80	1.07	0.2993	6.10.4.2.2-1	15.80	1.07	0.3426	6.10.4.2.2-2
321.175	4.952	15.80	1.07	0.0072	6.10.4.2.2-1	15.80	1.07	0.0092	6.10.4.2.2-2
323.176	4.976	15.80	1.07	0.3354	6.10.4.2.2-1	15.80	1.07	0.3839	6.10.4.2.2-2
323.176	4.976	15.80	1.07	0.0100	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2
325.077	4.999	15.80	1.07	0.3722	6.10.4.2.2-1	15.80	1.07	0.4258	6.10.4.2.2-2
325.177	5.000	15.80	1.07	0.3742	6.10.4.2.2-1	15.80	1.07	0.4281	6.10.4.2.2-2
325.277	5.001	15.80	1.07	0.3722	6.10.4.2.2-1	15.80	1.07	0.4258	6.10.4.2.2-2
330.385	5.055	15.80	1.07	0.2728	6.10.4.2.2-1	15.80	1.07	0.3125	6.10.4.2.2-2
330.385	5.055	15.80	1.07	0.0054	6.10.4.2.2-1	15.80	1.07	0.0135	6.10.4.2.2-2
334.702	5.100	15.80	1.07	0.0357	6.10.4.2.2-1	15.80	1.07	0.1843	6.10.4.2.2-2
334.702	5.100	15.80	1.07	0.0032	6.10.4.2.2-1	15.80	1.07	0.0477	6.10.4.2.2-2
335.592	5.109	15.80	1.07	0.0331	6.10.4.2.2-1	15.80	1.07	0.1718	6.10.4.2.2-2
335.592	5.109	15.80	1.07	0.0049	6.10.4.2.2-1	15.80	1.07	0.0548	6.10.4.2.2-2
342.926	5.186	15.80	1.07	0.0162	6.10.4.2.2-1	15.80	1.07	0.0949	6.10.4.2.2-2
342.926	5.186	15.80	1.07	0.0194	6.10.4.2.2-1	15.80	1.07	0.1177	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0146	6.10.4.2.2-1	15.80	1.07	0.0893	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0224	6.10.4.2.2-1	15.80	1.07	0.1317	6.10.4.2.2-2
350.259	5.263	15.80	1.07	0.0087	6.10.4.2.2-1	15.80	1.07	0.0689	6.10.4.2.2-2
350.259	5.263	15.80	1.07	0.0363	6.10.4.2.2-1	15.80	1.07	0.1997	6.10.4.2.2-2
353.752	5.300	15.80	1.07	0.0060	6.10.4.2.2-1	15.80	1.07	0.0601	6.10.4.2.2-2
353.752	5.300	15.80	1.07	0.0429	6.10.4.2.2-1	15.80	1.07	0.2323	6.10.4.2.2-2

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Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
357.593	5.340	15.80	1.07	0.0035	6.10.4.2.2-1	15.80	1.07	0.0513	6.10.4.2.2-2
357.593	5.340	15.80	1.07	0.0491	6.10.4.2.2-1	15.80	1.07	0.2625	6.10.4.2.2-2
363.277	5.400	15.80	1.07	0.0005	6.10.4.2.2-1	15.80	1.07	0.0400	6.10.4.2.2-2
363.277	5.400	15.80	1.07	0.0557	6.10.4.2.2-1	15.80	1.07	0.2952	6.10.4.2.2-2
364.926	5.417	15.80	1.07	0.0003	6.10.4.2.2-1	15.80	1.07	0.0371	6.10.4.2.2-2
364.926	5.417	15.80	1.07	0.0571	6.10.4.2.2-1	15.80	1.07	0.3023	6.10.4.2.2-2
372.260	5.494	15.80	1.07	0.0024	6.10.4.2.2-1	15.80	1.07	0.0277	6.10.4.2.2-2
372.260	5.494	15.80	1.07	0.0600	6.10.4.2.2-1	15.80	1.07	0.3161	6.10.4.2.2-2
372.802	5.500	15.80	1.07	0.0022	6.10.4.2.2-1	15.80	1.07	0.0284	6.10.4.2.2-2
372.802	5.500	15.80	1.07	0.0598	6.10.4.2.2-1	15.80	1.07	0.3151	6.10.4.2.2-2
379.593	5.571	15.80	1.07	0.0001	6.10.4.2.2-1	15.80	1.07	0.0390	6.10.4.2.2-2
379.593	5.571	15.80	1.07	0.0581	6.10.4.2.2-1	15.80	1.07	0.3073	6.10.4.2.2-2
382.327	5.600	15.80	1.07	0.0011	6.10.4.2.2-1	15.80	1.07	0.0441	6.10.4.2.2-2
382.327	5.600	15.80	1.07	0.0563	6.10.4.2.2-1	15.80	1.07	0.2985	6.10.4.2.2-2
386.927	5.648	15.80	1.07	0.0036	6.10.4.2.2-1	15.80	1.07	0.0537	6.10.4.2.2-2
386.927	5.648	15.80	1.07	0.0513	6.10.4.2.2-1	15.80	1.07	0.2741	6.10.4.2.2-2
391.852	5.700	15.80	1.07	0.0069	6.10.4.2.2-1	15.80	1.07	0.0656	6.10.4.2.2-2
391.852	5.700	15.80	1.07	0.0439	6.10.4.2.2-1	15.80	1.07	0.2376	6.10.4.2.2-2
394.260	5.725	15.80	1.07	0.0087	6.10.4.2.2-1	15.80	1.07	0.0719	6.10.4.2.2-2
394.260	5.725	15.80	1.07	0.0394	6.10.4.2.2-1	15.80	1.07	0.2151	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0106	6.10.4.2.2-1	15.80	1.07	0.0782	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0344	6.10.4.2.2-1	15.80	1.07	0.1906	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0108	6.10.4.2.2-1	15.80	1.07	0.0788	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0341	6.10.4.2.2-1	15.80	1.07	0.1889	6.10.4.2.2-2
397.691	5.761	15.80	1.07	0.0116	6.10.4.2.2-1	15.80	1.07	0.0816	6.10.4.2.2-2
397.691	5.761	15.80	1.07	0.0322	6.10.4.2.2-1	15.80	1.07	0.1799	6.10.4.2.2-2
401.123	5.797	15.80	1.07	0.0151	6.10.4.2.2-1	15.80	1.07	0.0933	6.10.4.2.2-2
401.123	5.797	15.80	1.07	0.0237	6.10.4.2.2-1	15.80	1.07	0.1382	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0160	6.10.4.2.2-1	15.80	1.07	0.0979	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0232	6.10.4.2.2-1	15.80	1.07	0.1358	6.10.4.2.2-2
404.962	5.838	15.80	1.07	0.0210	6.10.4.2.2-1	15.80	1.07	0.1176	6.10.4.2.2-2
404.962	5.838	15.80	1.07	0.0152	6.10.4.2.2-1	15.80	1.07	0.0985	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
408.802	5.878	15.80	1.07	0.0303	6.10.4.2.2-1	15.80	1.07	0.1604	6.10.4.2.2-2
408.802	5.878	15.80	1.07	0.0075	6.10.4.2.2-1	15.80	1.07	0.0651	6.10.4.2.2-2
410.902	5.900	15.80	1.07	0.2048	6.10.4.2.2-1	15.80	1.07	0.2351	6.10.4.2.2-2
410.902	5.900	15.80	1.07	0.0033	6.10.4.2.2-1	15.80	1.07	0.0473	6.10.4.2.2-2
412.614	5.918	15.80	1.07	0.2327	6.10.4.2.2-1	15.80	1.07	0.2669	6.10.4.2.2-2
412.614	5.918	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0341	6.10.4.2.2-2
416.427	5.958	15.80	1.07	0.3012	6.10.4.2.2-1	15.80	1.07	0.3450	6.10.4.2.2-2
416.427	5.958	15.80	1.07	0.0073	6.10.4.2.2-1	15.80	1.07	0.0060	6.10.4.2.2-2
418.427	5.979	15.80	1.07	0.3402	6.10.4.2.2-1	15.80	1.07	0.3896	6.10.4.2.2-2
420.327	5.999	15.80	1.07	0.3789	6.10.4.2.2-1	15.80	1.07	0.4337	6.10.4.2.2-2
420.427	6.000	15.80	1.07	0.3810	6.10.4.2.2-1	15.80	1.07	0.4360	6.10.4.2.2-2
420.527	6.001	15.80	1.07	0.3789	6.10.4.2.2-1	15.80	1.07	0.4337	6.10.4.2.2-2
426.306	6.086	15.80	1.07	0.2693	6.10.4.2.2-1	15.80	1.07	0.3086	6.10.4.2.2-2
426.306	6.086	15.80	1.07	0.0025	6.10.4.2.2-1	15.80	1.07	0.0289	6.10.4.2.2-2
427.245	6.100	15.80	1.07	0.2536	6.10.4.2.2-1	15.80	1.07	0.2906	6.10.4.2.2-2
427.245	6.100	15.80	1.07	0.0009	6.10.4.2.2-1	15.80	1.07	0.0347	6.10.4.2.2-2
432.186	6.172	15.80	1.07	0.2081	6.10.4.2.2-1	15.80	1.07	0.2392	6.10.4.2.2-2
432.186	6.172	15.80	1.07	0.0115	6.10.4.2.2-1	15.80	1.07	0.0923	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.0336	6.10.4.2.2-1	15.80	1.07	0.1825	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.0163	6.10.4.2.2-1	15.80	1.07	0.1154	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0261	6.10.4.2.2-1	15.80	1.07	0.1557	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0319	6.10.4.2.2-1	15.80	1.07	0.1901	6.10.4.2.2-2
441.019	6.302	15.80	1.07	0.0259	6.10.4.2.2-1	15.80	1.07	0.1551	6.10.4.2.2-2
441.019	6.302	15.80	1.07	0.0321	6.10.4.2.2-1	15.80	1.07	0.1912	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0186	6.10.4.2.2-1	15.80	1.07	0.1246	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0442	6.10.4.2.2-1	15.80	1.07	0.2506	6.10.4.2.2-2
449.852	6.432	15.80	1.07	0.0165	6.10.4.2.2-1	15.80	1.07	0.1153	6.10.4.2.2-2
449.852	6.432	15.80	1.07	0.0471	6.10.4.2.2-1	15.80	1.07	0.2642	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.0124	6.10.4.2.2-1	15.80	1.07	0.0964	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.0510	6.10.4.2.2-1	15.80	1.07	0.2819	6.10.4.2.2-2
458.686	6.561	15.80	1.07	0.0092	6.10.4.2.2-1	15.80	1.07	0.0806	6.10.4.2.2-2
458.686	6.561	15.80	1.07	0.0523	6.10.4.2.2-1	15.80	1.07	0.2862	6.10.4.2.2-2

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
461.333	6.600	15.80	1.07	0.0074	6.10.4.2.2-1	15.80	1.07	0.0712	6.10.4.2.2-2
461.333	6.600	15.80	1.07	0.0523	6.10.4.2.2-1	15.80	1.07	0.2850	6.10.4.2.2-2
467.519	6.691	15.80	1.07	0.0040	6.10.4.2.2-1	15.80	1.07	0.0508	6.10.4.2.2-2
467.519	6.691	15.80	1.07	0.0495	6.10.4.2.2-1	15.80	1.07	0.2680	6.10.4.2.2-2
468.151	6.700	15.80	1.07	0.0037	6.10.4.2.2-1	15.80	1.07	0.0489	6.10.4.2.2-2
468.151	6.700	15.80	1.07	0.0488	6.10.4.2.2-1	15.80	1.07	0.2645	6.10.4.2.2-2
471.790	6.753	15.80	1.07	0.0022	6.10.4.2.2-1	15.80	1.07	0.0382	6.10.4.2.2-2
471.790	6.753	15.80	1.07	0.0448	6.10.4.2.2-1	15.80	1.07	0.2420	6.10.4.2.2-2
474.969	6.800	15.80	1.07	0.0012	6.10.4.2.2-1	15.80	1.07	0.0296	6.10.4.2.2-2
474.969	6.800	15.80	1.07	0.0391	6.10.4.2.2-1	15.80	1.07	0.2109	6.10.4.2.2-2
476.061	6.816	15.80	1.07	0.0009	6.10.4.2.2-1	15.80	1.07	0.0268	6.10.4.2.2-2
476.061	6.816	15.80	1.07	0.0375	6.10.4.2.2-1	15.80	1.07	0.2027	6.10.4.2.2-2
480.332	6.879	15.80	1.07	0.0001	6.10.4.2.2-1	15.80	1.07	0.0166	6.10.4.2.2-2
480.332	6.879	15.80	1.07	0.0274	6.10.4.2.2-1	15.80	1.07	0.1480	6.10.4.2.2-2
481.786	6.900	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0133	6.10.4.2.2-2
481.786	6.900	15.80	1.07	0.0234	6.10.4.2.2-1	15.80	1.07	0.1263	6.10.4.2.2-2
484.603	6.941	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0075	6.10.4.2.2-2
484.603	6.941	15.80	1.07	0.0146	6.10.4.2.2-1	15.80	1.07	0.0787	6.10.4.2.2-2
486.603	6.971	15.80	1.07	0.0001	6.10.4.2.2-1	15.80	1.07	0.0036	6.10.4.2.2-2
486.603	6.971	15.80	1.07	0.0076	6.10.4.2.2-1	15.80	1.07	0.0410	6.10.4.2.2-2
488.504	6.999	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0002	6.10.4.2.2-2
488.504	6.999	15.80	1.07	0.0004	6.10.4.2.2-1	15.80	1.07	0.0022	6.10.4.2.2-2
488.604	7.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2

Load combination: Initial Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1
0.100	1.002	15.80	1.07	0.0002	6.10.3.2.1-1	15.80	1.07	0.0002	6.10.3.2.2-1
5.671	1.087	15.80	1.07	0.0092	6.10.3.2.1-1	15.80	1.07	0.0092	6.10.3.2.2-1
6.515	1.100	15.80	1.07	0.0103	6.10.3.2.1-1	15.80	1.07	0.0103	6.10.3.2.2-1
11.342	1.174	15.80	1.07	0.0159	6.10.3.2.1-1	15.80	1.07	0.0159	6.10.3.2.2-1

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
13.029	1.200	15.80	1.07	0.0173	6.10.3.2.1-1	15.80	1.07	0.0173	6.10.3.2.2-1
19.544	1.300	15.80	1.07	0.0207	6.10.3.2.1-1	15.80	1.07	0.0207	6.10.3.2.2-1
19.649	1.301	15.80	1.07	0.0208	6.10.3.2.1-1	15.80	1.07	0.0208	6.10.3.2.2-1
26.071	1.400	15.80	1.07	0.0209	6.10.3.2.1-1	15.80	1.07	0.0209	6.10.3.2.2-1
27.957	1.429	15.80	1.07	0.0203	6.10.3.2.1-1	15.80	1.07	0.0203	6.10.3.2.2-1
32.589	1.500	15.80	1.07	0.0174	6.10.3.2.1-1	15.80	1.07	0.0174	6.10.3.2.2-1
36.248	1.556	15.80	1.07	0.0139	6.10.3.2.1-1	15.80	1.07	0.0139	6.10.3.2.2-1
39.106	1.600	15.80	1.07	0.0105	6.10.3.2.1-1	15.80	1.07	0.0105	6.10.3.2.2-1
44.540	1.683	15.80	1.07	0.0022	6.10.3.2.1-1	15.80	1.07	0.0022	6.10.3.2.2-1
45.624	1.700	15.80	1.07	0.0002	6.10.3.2.1-1	15.80	1.07	0.0002	6.10.3.2.2-1
48.707	1.747	15.80	1.07	0.0060	6.10.3.2.2-1	15.80	1.07	0.0060	6.10.3.2.1-1
52.142	1.800	15.80	1.07	0.0139	6.10.3.2.2-1	15.80	1.07	0.0139	6.10.3.2.1-1
52.873	1.811	15.80	1.07	0.0157	6.10.3.2.2-1	15.80	1.07	0.0157	6.10.3.2.1-1
57.040	1.875	15.80	1.07	0.0269	6.10.3.2.2-1	15.80	1.07	0.0269	6.10.3.2.1-1
58.659	1.900	15.80	1.07	0.0316	6.10.3.2.2-1	15.80	1.07	0.0316	6.10.3.2.1-1
61.207	1.939	15.80	1.07	0.0395	6.10.3.2.2-1	15.80	1.07	0.0395	6.10.3.2.1-1
63.192	1.970	15.80	1.07	0.0460	6.10.3.2.2-1	15.80	1.07	0.0460	6.10.3.2.1-1
65.077	1.998	15.80	1.07	0.0526	6.10.3.2.2-1	15.80	1.07	0.0526	6.10.3.2.1-1
65.177	2.000	15.80	1.07	0.0529	6.10.3.2.2-1	15.80	1.07	0.0529	6.10.3.2.1-1
65.277	2.001	15.80	1.07	0.0525	6.10.3.2.2-1	15.80	1.07	0.0525	6.10.3.2.1-1
70.135	2.054	15.80	1.07	0.0354	6.10.3.2.2-1	15.80	1.07	0.0354	6.10.3.2.1-1
74.377	2.100	15.80	1.07	0.0219	6.10.3.2.2-1	15.80	1.07	0.0219	6.10.3.2.1-1
75.092	2.108	15.80	1.07	0.0197	6.10.3.2.2-1	15.80	1.07	0.0197	6.10.3.2.1-1
80.384	2.165	15.80	1.07	0.0054	6.10.3.2.2-1	15.80	1.07	0.0054	6.10.3.2.1-1
83.577	2.200	15.80	1.07	0.0022	6.10.3.2.1-1	15.80	1.07	0.0022	6.10.3.2.2-1
85.675	2.223	15.80	1.07	0.0068	6.10.3.2.1-1	15.80	1.07	0.0068	6.10.3.2.2-1
87.899	2.247	15.80	1.07	0.0111	6.10.3.2.1-1	15.80	1.07	0.0111	6.10.3.2.2-1
88.099	2.249	15.80	1.07	0.0115	6.10.3.2.1-1	15.80	1.07	0.0115	6.10.3.2.2-1
92.777	2.300	15.80	1.07	0.0193	6.10.3.2.1-1	15.80	1.07	0.0193	6.10.3.2.2-1
94.175	2.315	15.80	1.07	0.0213	6.10.3.2.1-1	15.80	1.07	0.0213	6.10.3.2.2-1
101.977	2.400	15.80	1.07	0.0296	6.10.3.2.1-1	15.80	1.07	0.0296	6.10.3.2.2-1
102.675	2.408	15.80	1.07	0.0301	6.10.3.2.1-1	15.80	1.07	0.0301	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
111.175	2.500	15.80	1.07	0.0328	6.10.3.2.1-1	15.80	1.07	0.0328	6.10.3.2.2-1
119.675	2.592	15.80	1.07	0.0298	6.10.3.2.1-1	15.80	1.07	0.0298	6.10.3.2.2-1
120.377	2.600	15.80	1.07	0.0292	6.10.3.2.1-1	15.80	1.07	0.0292	6.10.3.2.2-1
128.175	2.685	15.80	1.07	0.0206	6.10.3.2.1-1	15.80	1.07	0.0206	6.10.3.2.2-1
129.577	2.700	15.80	1.07	0.0186	6.10.3.2.1-1	15.80	1.07	0.0186	6.10.3.2.2-1
136.675	2.777	15.80	1.07	0.0059	6.10.3.2.1-1	15.80	1.07	0.0059	6.10.3.2.2-1
138.777	2.800	15.80	1.07	0.0012	6.10.3.2.1-1	15.80	1.07	0.0012	6.10.3.2.2-1
140.800	2.822	15.80	1.07	0.0037	6.10.3.2.2-1	15.80	1.07	0.0037	6.10.3.2.1-1
144.925	2.867	15.80	1.07	0.0146	6.10.3.2.2-1	15.80	1.07	0.0146	6.10.3.2.1-1
147.977	2.900	15.80	1.07	0.0237	6.10.3.2.2-1	15.80	1.07	0.0237	6.10.3.2.1-1
149.050	2.912	15.80	1.07	0.0270	6.10.3.2.2-1	15.80	1.07	0.0270	6.10.3.2.1-1
153.175	2.957	15.80	1.07	0.0408	6.10.3.2.2-1	15.80	1.07	0.0408	6.10.3.2.1-1
155.176	2.978	15.80	1.07	0.0481	6.10.3.2.2-1	15.80	1.07	0.0481	6.10.3.2.1-1
157.077	2.999	15.80	1.07	0.0553	6.10.3.2.2-1	15.80	1.07	0.0553	6.10.3.2.1-1
157.177	3.000	15.80	1.07	0.0557	6.10.3.2.2-1	15.80	1.07	0.0557	6.10.3.2.1-1
157.277	3.001	15.80	1.07	0.0553	6.10.3.2.2-1	15.80	1.07	0.0553	6.10.3.2.1-1
162.135	3.059	15.80	1.07	0.0391	6.10.3.2.2-1	15.80	1.07	0.0391	6.10.3.2.1-1
165.577	3.100	15.80	1.07	0.0286	6.10.3.2.2-1	15.80	1.07	0.0286	6.10.3.2.1-1
167.092	3.118	15.80	1.07	0.0244	6.10.3.2.2-1	15.80	1.07	0.0244	6.10.3.2.1-1
173.977	3.200	15.80	1.07	0.0074	6.10.3.2.2-1	15.80	1.07	0.0074	6.10.3.2.1-1
175.759	3.221	15.80	1.07	0.0036	6.10.3.2.2-1	15.80	1.07	0.0036	6.10.3.2.1-1
182.377	3.300	15.80	1.07	0.0082	6.10.3.2.1-1	15.80	1.07	0.0082	6.10.3.2.2-1
184.425	3.324	15.80	1.07	0.0112	6.10.3.2.1-1	15.80	1.07	0.0112	6.10.3.2.2-1
186.649	3.351	15.80	1.07	0.0140	6.10.3.2.1-1	15.80	1.07	0.0140	6.10.3.2.2-1
186.849	3.353	15.80	1.07	0.0142	6.10.3.2.1-1	15.80	1.07	0.0142	6.10.3.2.2-1
190.777	3.400	15.80	1.07	0.0180	6.10.3.2.1-1	15.80	1.07	0.0180	6.10.3.2.2-1
193.342	3.431	15.80	1.07	0.0199	6.10.3.2.1-1	15.80	1.07	0.0199	6.10.3.2.2-1
199.177	3.500	15.80	1.07	0.0221	6.10.3.2.1-1	15.80	1.07	0.0221	6.10.3.2.2-1
202.259	3.537	15.80	1.07	0.0223	6.10.3.2.1-1	15.80	1.07	0.0223	6.10.3.2.2-1
207.577	3.600	15.80	1.07	0.0204	6.10.3.2.1-1	15.80	1.07	0.0204	6.10.3.2.2-1
211.175	3.643	15.80	1.07	0.0180	6.10.3.2.1-1	15.80	1.07	0.0180	6.10.3.2.2-1
215.977	3.700	15.80	1.07	0.0131	6.10.3.2.1-1	15.80	1.07	0.0131	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
220.092	3.749	15.80	1.07	0.0074	6.10.3.2.1-1	15.80	1.07	0.0074	6.10.3.2.2-1
224.363	3.800	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
224.377	3.800	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
228.634	3.851	15.80	1.07	0.0092	6.10.3.2.2-1	15.80	1.07	0.0092	6.10.3.2.1-1
232.777	3.900	15.80	1.07	0.0196	6.10.3.2.2-1	15.80	1.07	0.0196	6.10.3.2.1-1
232.905	3.902	15.80	1.07	0.0199	6.10.3.2.2-1	15.80	1.07	0.0199	6.10.3.2.1-1
237.175	3.952	15.80	1.07	0.0321	6.10.3.2.2-1	15.80	1.07	0.0321	6.10.3.2.1-1
239.176	3.976	15.80	1.07	0.0383	6.10.3.2.2-1	15.80	1.07	0.0383	6.10.3.2.1-1
241.077	3.999	15.80	1.07	0.0446	6.10.3.2.2-1	15.80	1.07	0.0446	6.10.3.2.1-1
241.177	4.000	15.80	1.07	0.0449	6.10.3.2.2-1	15.80	1.07	0.0449	6.10.3.2.1-1
241.277	4.001	15.80	1.07	0.0429	6.10.3.2.2-1	15.80	1.07	0.0429	6.10.3.2.1-1
247.051	4.070	15.80	1.07	0.0256	6.10.3.2.2-1	15.80	1.07	0.0256	6.10.3.2.1-1
249.577	4.100	15.80	1.07	0.0188	6.10.3.2.2-1	15.80	1.07	0.0188	6.10.3.2.1-1
252.925	4.140	15.80	1.07	0.0106	6.10.3.2.2-1	15.80	1.07	0.0106	6.10.3.2.1-1
257.977	4.200	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
261.842	4.246	15.80	1.07	0.0065	6.10.3.2.1-1	15.80	1.07	0.0065	6.10.3.2.2-1
266.377	4.300	15.80	1.07	0.0129	6.10.3.2.1-1	15.80	1.07	0.0129	6.10.3.2.2-1
270.759	4.352	15.80	1.07	0.0175	6.10.3.2.1-1	15.80	1.07	0.0175	6.10.3.2.2-1
274.777	4.400	15.80	1.07	0.0201	6.10.3.2.1-1	15.80	1.07	0.0201	6.10.3.2.2-1
279.675	4.458	15.80	1.07	0.0217	6.10.3.2.1-1	15.80	1.07	0.0217	6.10.3.2.2-1
283.177	4.500	15.80	1.07	0.0216	6.10.3.2.1-1	15.80	1.07	0.0216	6.10.3.2.2-1
288.592	4.564	15.80	1.07	0.0197	6.10.3.2.1-1	15.80	1.07	0.0197	6.10.3.2.2-1
291.577	4.600	15.80	1.07	0.0174	6.10.3.2.1-1	15.80	1.07	0.0174	6.10.3.2.2-1
295.504	4.647	15.80	1.07	0.0134	6.10.3.2.1-1	15.80	1.07	0.0134	6.10.3.2.2-1
295.704	4.649	15.80	1.07	0.0132	6.10.3.2.1-1	15.80	1.07	0.0132	6.10.3.2.2-1
296.655	4.660	15.80	1.07	0.0120	6.10.3.2.1-1	15.80	1.07	0.0120	6.10.3.2.2-1
299.977	4.700	15.80	1.07	0.0074	6.10.3.2.1-1	15.80	1.07	0.0074	6.10.3.2.2-1
304.717	4.756	15.80	1.07	0.0007	6.10.3.2.2-1	15.80	1.07	0.0007	6.10.3.2.1-1
308.377	4.800	15.80	1.07	0.0084	6.10.3.2.2-1	15.80	1.07	0.0084	6.10.3.2.1-1
308.832	4.805	15.80	1.07	0.0095	6.10.3.2.2-1	15.80	1.07	0.0095	6.10.3.2.1-1
312.946	4.854	15.80	1.07	0.0196	6.10.3.2.2-1	15.80	1.07	0.0196	6.10.3.2.1-1
316.777	4.900	15.80	1.07	0.0304	6.10.3.2.2-1	15.80	1.07	0.0304	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
317.061	4.903	15.80	1.07	0.0313	6.10.3.2.2-1	15.80	1.07	0.0313	6.10.3.2.1-1
321.175	4.952	15.80	1.07	0.0443	6.10.3.2.2-1	15.80	1.07	0.0443	6.10.3.2.1-1
323.176	4.976	15.80	1.07	0.0512	6.10.3.2.2-1	15.80	1.07	0.0512	6.10.3.2.1-1
325.077	4.999	15.80	1.07	0.0580	6.10.3.2.2-1	15.80	1.07	0.0580	6.10.3.2.1-1
325.177	5.000	15.80	1.07	0.0584	6.10.3.2.2-1	15.80	1.07	0.0584	6.10.3.2.1-1
325.277	5.001	15.80	1.07	0.0580	6.10.3.2.2-1	15.80	1.07	0.0580	6.10.3.2.1-1
330.385	5.055	15.80	1.07	0.0391	6.10.3.2.2-1	15.80	1.07	0.0391	6.10.3.2.1-1
334.702	5.100	15.80	1.07	0.0248	6.10.3.2.2-1	15.80	1.07	0.0248	6.10.3.2.1-1
335.592	5.109	15.80	1.07	0.0220	6.10.3.2.2-1	15.80	1.07	0.0220	6.10.3.2.1-1
342.926	5.186	15.80	1.07	0.0017	6.10.3.2.2-1	15.80	1.07	0.0017	6.10.3.2.1-1
344.227	5.200	15.80	1.07	0.0015	6.10.3.2.1-1	15.80	1.07	0.0015	6.10.3.2.2-1
350.259	5.263	15.80	1.07	0.0144	6.10.3.2.1-1	15.80	1.07	0.0144	6.10.3.2.2-1
353.752	5.300	15.80	1.07	0.0203	6.10.3.2.1-1	15.80	1.07	0.0203	6.10.3.2.2-1
357.593	5.340	15.80	1.07	0.0258	6.10.3.2.1-1	15.80	1.07	0.0258	6.10.3.2.2-1
363.277	5.400	15.80	1.07	0.0318	6.10.3.2.1-1	15.80	1.07	0.0318	6.10.3.2.2-1
364.926	5.417	15.80	1.07	0.0331	6.10.3.2.1-1	15.80	1.07	0.0331	6.10.3.2.2-1
372.260	5.494	15.80	1.07	0.0356	6.10.3.2.1-1	15.80	1.07	0.0356	6.10.3.2.2-1
372.802	5.500	15.80	1.07	0.0357	6.10.3.2.1-1	15.80	1.07	0.0357	6.10.3.2.2-1
379.593	5.571	15.80	1.07	0.0340	6.10.3.2.1-1	15.80	1.07	0.0340	6.10.3.2.2-1
382.327	5.600	15.80	1.07	0.0322	6.10.3.2.1-1	15.80	1.07	0.0322	6.10.3.2.2-1
386.927	5.648	15.80	1.07	0.0278	6.10.3.2.1-1	15.80	1.07	0.0278	6.10.3.2.2-1
391.852	5.700	15.80	1.07	0.0212	6.10.3.2.1-1	15.80	1.07	0.0212	6.10.3.2.2-1
394.260	5.725	15.80	1.07	0.0173	6.10.3.2.1-1	15.80	1.07	0.0173	6.10.3.2.2-1
396.504	5.749	15.80	1.07	0.0131	6.10.3.2.1-1	15.80	1.07	0.0131	6.10.3.2.2-1
396.704	5.751	15.80	1.07	0.0127	6.10.3.2.1-1	15.80	1.07	0.0127	6.10.3.2.2-1
397.691	5.761	15.80	1.07	0.0107	6.10.3.2.1-1	15.80	1.07	0.0107	6.10.3.2.2-1
401.123	5.797	15.80	1.07	0.0033	6.10.3.2.1-1	15.80	1.07	0.0033	6.10.3.2.2-1
401.377	5.800	15.80	1.07	0.0027	6.10.3.2.1-1	15.80	1.07	0.0027	6.10.3.2.2-1
404.962	5.838	15.80	1.07	0.0063	6.10.3.2.2-1	15.80	1.07	0.0063	6.10.3.2.1-1
408.802	5.878	15.80	1.07	0.0171	6.10.3.2.2-1	15.80	1.07	0.0171	6.10.3.2.1-1
410.902	5.900	15.80	1.07	0.0236	6.10.3.2.2-1	15.80	1.07	0.0236	6.10.3.2.1-1
412.614	5.918	15.80	1.07	0.0292	6.10.3.2.2-1	15.80	1.07	0.0292	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
416.427	5.958	15.80	1.07	0.0424	6.10.3.2.2-1	15.80	1.07	0.0424	6.10.3.2.1-1
418.427	5.979	15.80	1.07	0.0498	6.10.3.2.2-1	15.80	1.07	0.0498	6.10.3.2.1-1
420.327	5.999	15.80	1.07	0.0572	6.10.3.2.2-1	15.80	1.07	0.0572	6.10.3.2.1-1
420.427	6.000	15.80	1.07	0.0576	6.10.3.2.2-1	15.80	1.07	0.0576	6.10.3.2.1-1
420.527	6.001	15.80	1.07	0.0572	6.10.3.2.2-1	15.80	1.07	0.0572	6.10.3.2.1-1
426.306	6.086	15.80	1.07	0.0377	6.10.3.2.2-1	15.80	1.07	0.0377	6.10.3.2.1-1
427.245	6.100	15.80	1.07	0.0348	6.10.3.2.2-1	15.80	1.07	0.0348	6.10.3.2.1-1
432.186	6.172	15.80	1.07	0.0205	6.10.3.2.2-1	15.80	1.07	0.0205	6.10.3.2.1-1
434.063	6.200	15.80	1.07	0.0157	6.10.3.2.2-1	15.80	1.07	0.0157	6.10.3.2.1-1
440.880	6.300	15.80	1.07	0.0004	6.10.3.2.2-1	15.80	1.07	0.0004	6.10.3.2.1-1
441.019	6.302	15.80	1.07	0.0001	6.10.3.2.2-1	15.80	1.07	0.0001	6.10.3.2.1-1
447.698	6.400	15.80	1.07	0.0113	6.10.3.2.1-1	15.80	1.07	0.0113	6.10.3.2.2-1
449.852	6.432	15.80	1.07	0.0142	6.10.3.2.1-1	15.80	1.07	0.0142	6.10.3.2.2-1
454.516	6.500	15.80	1.07	0.0190	6.10.3.2.1-1	15.80	1.07	0.0190	6.10.3.2.2-1
458.686	6.561	15.80	1.07	0.0219	6.10.3.2.1-1	15.80	1.07	0.0219	6.10.3.2.2-1
461.333	6.600	15.80	1.07	0.0230	6.10.3.2.1-1	15.80	1.07	0.0230	6.10.3.2.2-1
467.519	6.691	15.80	1.07	0.0235	6.10.3.2.1-1	15.80	1.07	0.0235	6.10.3.2.2-1
468.151	6.700	15.80	1.07	0.0234	6.10.3.2.1-1	15.80	1.07	0.0234	6.10.3.2.2-1
471.790	6.753	15.80	1.07	0.0218	6.10.3.2.1-1	15.80	1.07	0.0218	6.10.3.2.2-1
474.969	6.800	15.80	1.07	0.0195	6.10.3.2.1-1	15.80	1.07	0.0195	6.10.3.2.2-1
476.061	6.816	15.80	1.07	0.0186	6.10.3.2.1-1	15.80	1.07	0.0186	6.10.3.2.2-1
480.332	6.879	15.80	1.07	0.0137	6.10.3.2.1-1	15.80	1.07	0.0137	6.10.3.2.2-1
481.786	6.900	15.80	1.07	0.0117	6.10.3.2.1-1	15.80	1.07	0.0117	6.10.3.2.2-1
484.603	6.941	15.80	1.07	0.0074	6.10.3.2.1-1	15.80	1.07	0.0074	6.10.3.2.2-1
486.603	6.971	15.80	1.07	0.0038	6.10.3.2.1-1	15.80	1.07	0.0038	6.10.3.2.2-1
488.504	6.999	15.80	1.07	0.0002	6.10.3.2.1-1	15.80	1.07	0.0002	6.10.3.2.2-1
488.604	7.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1

Load combination: Stage 01 Default

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.100	1.002	15.80	1.07	0.0009	6.10.3.2.1-1	15.80	1.07	0.0009	6.10.3.2.2-1
5.671	1.087	15.80	1.07	0.0449	6.10.3.2.1-1	15.80	1.07	0.0449	6.10.3.2.2-1
6.515	1.100	15.80	1.07	0.0505	6.10.3.2.1-1	15.80	1.07	0.0505	6.10.3.2.2-1
11.342	1.174	15.80	1.07	0.0772	6.10.3.2.1-1	15.80	1.07	0.0772	6.10.3.2.2-1
13.029	1.200	15.80	1.07	0.0843	6.10.3.2.1-1	15.80	1.07	0.0843	6.10.3.2.2-1
19.544	1.300	15.80	1.07	0.1010	6.10.3.2.1-1	15.80	1.07	0.1010	6.10.3.2.2-1
19.649	1.301	15.80	1.07	0.1012	6.10.3.2.1-1	15.80	1.07	0.1012	6.10.3.2.2-1
26.071	1.400	15.80	1.07	0.1011	6.10.3.2.1-1	15.80	1.07	0.1011	6.10.3.2.2-1
27.957	1.429	15.80	1.07	0.0980	6.10.3.2.1-1	15.80	1.07	0.0980	6.10.3.2.2-1
32.589	1.500	15.80	1.07	0.0841	6.10.3.2.1-1	15.80	1.07	0.0841	6.10.3.2.2-1
36.248	1.556	15.80	1.07	0.0671	6.10.3.2.1-1	15.80	1.07	0.0671	6.10.3.2.2-1
39.106	1.600	15.80	1.07	0.0502	6.10.3.2.1-1	15.80	1.07	0.0502	6.10.3.2.2-1
44.540	1.683	15.80	1.07	0.0091	6.10.3.2.1-1	15.80	1.07	0.0091	6.10.3.2.2-1
45.624	1.700	15.80	1.07	0.0005	6.10.3.2.2-1	15.80	1.07	0.0005	6.10.3.2.1-1
48.707	1.747	15.80	1.07	0.0306	6.10.3.2.2-1	15.80	1.07	0.0306	6.10.3.2.1-1
52.142	1.800	15.80	1.07	0.0685	6.10.3.2.2-1	15.80	1.07	0.0685	6.10.3.2.1-1
52.873	1.811	15.80	1.07	0.0772	6.10.3.2.2-1	15.80	1.07	0.0772	6.10.3.2.1-1
57.040	1.875	15.80	1.07	0.1309	6.10.3.2.2-1	15.80	1.07	0.1309	6.10.3.2.1-1
58.659	1.900	15.80	1.07	0.1536	6.10.3.2.2-1	15.80	1.07	0.1536	6.10.3.2.1-1
61.207	1.939	15.80	1.07	0.1914	6.10.3.2.2-1	15.80	1.07	0.1914	6.10.3.2.1-1
63.192	1.970	15.80	1.07	0.2227	6.10.3.2.2-1	15.80	1.07	0.2227	6.10.3.2.1-1
65.077	1.998	15.80	1.07	0.2539	6.10.3.2.2-1	15.80	1.07	0.2539	6.10.3.2.1-1
65.177	2.000	15.80	1.07	0.2556	6.10.3.2.2-1	15.80	1.07	0.2556	6.10.3.2.1-1
65.277	2.001	15.80	1.07	0.2538	6.10.3.2.2-1	15.80	1.07	0.2538	6.10.3.2.1-1
70.135	2.054	15.80	1.07	0.1704	6.10.3.2.2-1	15.80	1.07	0.1704	6.10.3.2.1-1
74.377	2.100	15.80	1.07	0.1052	6.10.3.2.2-1	15.80	1.07	0.1052	6.10.3.2.1-1
75.092	2.108	15.80	1.07	0.0949	6.10.3.2.2-1	15.80	1.07	0.0949	6.10.3.2.1-1
80.384	2.165	15.80	1.07	0.0252	6.10.3.2.2-1	15.80	1.07	0.0252	6.10.3.2.1-1
83.577	2.200	15.80	1.07	0.0115	6.10.3.2.1-1	15.80	1.07	0.0115	6.10.3.2.2-1
85.675	2.223	15.80	1.07	0.0334	6.10.3.2.1-1	15.80	1.07	0.0334	6.10.3.2.2-1
87.899	2.247	15.80	1.07	0.0547	6.10.3.2.1-1	15.80	1.07	0.0547	6.10.3.2.2-1
88.099	2.249	15.80	1.07	0.0565	6.10.3.2.1-1	15.80	1.07	0.0565	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
92.777	2.300	15.80	1.07	0.0944	6.10.3.2.1-1	15.80	1.07	0.0944	6.10.3.2.2-1
94.175	2.315	15.80	1.07	0.1040	6.10.3.2.1-1	15.80	1.07	0.1040	6.10.3.2.2-1
101.977	2.400	15.80	1.07	0.1437	6.10.3.2.1-1	15.80	1.07	0.1437	6.10.3.2.2-1
102.675	2.408	15.80	1.07	0.1461	6.10.3.2.1-1	15.80	1.07	0.1461	6.10.3.2.2-1
111.175	2.500	15.80	1.07	0.1591	6.10.3.2.1-1	15.80	1.07	0.1591	6.10.3.2.2-1
119.675	2.592	15.80	1.07	0.1437	6.10.3.2.1-1	15.80	1.07	0.1437	6.10.3.2.2-1
120.377	2.600	15.80	1.07	0.1411	6.10.3.2.1-1	15.80	1.07	0.1411	6.10.3.2.2-1
128.175	2.685	15.80	1.07	0.0992	6.10.3.2.1-1	15.80	1.07	0.0992	6.10.3.2.2-1
129.577	2.700	15.80	1.07	0.0891	6.10.3.2.1-1	15.80	1.07	0.0891	6.10.3.2.2-1
136.675	2.777	15.80	1.07	0.0262	6.10.3.2.1-1	15.80	1.07	0.0262	6.10.3.2.2-1
138.777	2.800	15.80	1.07	0.0036	6.10.3.2.1-1	15.80	1.07	0.0036	6.10.3.2.2-1
140.800	2.822	15.80	1.07	0.0198	6.10.3.2.2-1	15.80	1.07	0.0198	6.10.3.2.1-1
144.925	2.867	15.80	1.07	0.0726	6.10.3.2.2-1	15.80	1.07	0.0726	6.10.3.2.1-1
147.977	2.900	15.80	1.07	0.1161	6.10.3.2.2-1	15.80	1.07	0.1161	6.10.3.2.1-1
149.050	2.912	15.80	1.07	0.1323	6.10.3.2.2-1	15.80	1.07	0.1323	6.10.3.2.1-1
153.175	2.957	15.80	1.07	0.1987	6.10.3.2.2-1	15.80	1.07	0.1987	6.10.3.2.1-1
155.176	2.978	15.80	1.07	0.2334	6.10.3.2.2-1	15.80	1.07	0.2334	6.10.3.2.1-1
157.077	2.999	15.80	1.07	0.2679	6.10.3.2.2-1	15.80	1.07	0.2679	6.10.3.2.1-1
157.177	3.000	15.80	1.07	0.2697	6.10.3.2.2-1	15.80	1.07	0.2697	6.10.3.2.1-1
157.277	3.001	15.80	1.07	0.2680	6.10.3.2.2-1	15.80	1.07	0.2680	6.10.3.2.1-1
162.135	3.059	15.80	1.07	0.1887	6.10.3.2.2-1	15.80	1.07	0.1887	6.10.3.2.1-1
165.577	3.100	15.80	1.07	0.1381	6.10.3.2.2-1	15.80	1.07	0.1381	6.10.3.2.1-1
167.092	3.118	15.80	1.07	0.1173	6.10.3.2.2-1	15.80	1.07	0.1173	6.10.3.2.1-1
173.977	3.200	15.80	1.07	0.0345	6.10.3.2.2-1	15.80	1.07	0.0345	6.10.3.2.1-1
175.759	3.221	15.80	1.07	0.0161	6.10.3.2.2-1	15.80	1.07	0.0161	6.10.3.2.1-1
182.377	3.300	15.80	1.07	0.0412	6.10.3.2.1-1	15.80	1.07	0.0412	6.10.3.2.2-1
184.425	3.324	15.80	1.07	0.0554	6.10.3.2.1-1	15.80	1.07	0.0554	6.10.3.2.2-1
186.649	3.351	15.80	1.07	0.0688	6.10.3.2.1-1	15.80	1.07	0.0688	6.10.3.2.2-1
186.849	3.353	15.80	1.07	0.0700	6.10.3.2.1-1	15.80	1.07	0.0700	6.10.3.2.2-1
190.777	3.400	15.80	1.07	0.0886	6.10.3.2.1-1	15.80	1.07	0.0886	6.10.3.2.2-1
193.342	3.431	15.80	1.07	0.0975	6.10.3.2.1-1	15.80	1.07	0.0975	6.10.3.2.2-1
199.177	3.500	15.80	1.07	0.1081	6.10.3.2.1-1	15.80	1.07	0.1081	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		
		v21.01.00.22		

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
202.259	3.537	15.80	1.07	0.1083	6.10.3.2.1-1	15.80	1.07	0.1083	6.10.3.2.2-1
207.577	3.600	15.80	1.07	0.0995	6.10.3.2.1-1	15.80	1.07	0.0995	6.10.3.2.2-1
211.175	3.643	15.80	1.07	0.0872	6.10.3.2.1-1	15.80	1.07	0.0872	6.10.3.2.2-1
215.977	3.700	15.80	1.07	0.0628	6.10.3.2.1-1	15.80	1.07	0.0628	6.10.3.2.2-1
220.092	3.749	15.80	1.07	0.0347	6.10.3.2.1-1	15.80	1.07	0.0347	6.10.3.2.2-1
224.363	3.800	15.80	1.07	0.0020	6.10.3.2.2-1	15.80	1.07	0.0020	6.10.3.2.1-1
224.377	3.800	15.80	1.07	0.0021	6.10.3.2.2-1	15.80	1.07	0.0021	6.10.3.2.1-1
228.634	3.851	15.80	1.07	0.0458	6.10.3.2.2-1	15.80	1.07	0.0458	6.10.3.2.1-1
232.777	3.900	15.80	1.07	0.0954	6.10.3.2.2-1	15.80	1.07	0.0954	6.10.3.2.1-1
232.905	3.902	15.80	1.07	0.0970	6.10.3.2.2-1	15.80	1.07	0.0970	6.10.3.2.1-1
237.175	3.952	15.80	1.07	0.1555	6.10.3.2.2-1	15.80	1.07	0.1555	6.10.3.2.1-1
239.176	3.976	15.80	1.07	0.1855	6.10.3.2.2-1	15.80	1.07	0.1855	6.10.3.2.1-1
241.077	3.999	15.80	1.07	0.2154	6.10.3.2.2-1	15.80	1.07	0.2154	6.10.3.2.1-1
241.177	4.000	15.80	1.07	0.2170	6.10.3.2.2-1	15.80	1.07	0.2170	6.10.3.2.1-1
241.277	4.001	15.80	1.07	0.2090	6.10.3.2.2-1	15.80	1.07	0.2090	6.10.3.2.1-1
247.051	4.070	15.80	1.07	0.1243	6.10.3.2.2-1	15.80	1.07	0.1243	6.10.3.2.1-1
249.577	4.100	15.80	1.07	0.0913	6.10.3.2.2-1	15.80	1.07	0.0913	6.10.3.2.1-1
252.925	4.140	15.80	1.07	0.0516	6.10.3.2.2-1	15.80	1.07	0.0516	6.10.3.2.1-1
257.977	4.200	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
261.842	4.246	15.80	1.07	0.0324	6.10.3.2.1-1	15.80	1.07	0.0324	6.10.3.2.2-1
266.377	4.300	15.80	1.07	0.0630	6.10.3.2.1-1	15.80	1.07	0.0630	6.10.3.2.2-1
270.759	4.352	15.80	1.07	0.0850	6.10.3.2.1-1	15.80	1.07	0.0850	6.10.3.2.2-1
274.777	4.400	15.80	1.07	0.0982	6.10.3.2.1-1	15.80	1.07	0.0982	6.10.3.2.2-1
279.675	4.458	15.80	1.07	0.1057	6.10.3.2.1-1	15.80	1.07	0.1057	6.10.3.2.2-1
283.177	4.500	15.80	1.07	0.1052	6.10.3.2.1-1	15.80	1.07	0.1052	6.10.3.2.2-1
288.592	4.564	15.80	1.07	0.0950	6.10.3.2.1-1	15.80	1.07	0.0950	6.10.3.2.2-1
291.577	4.600	15.80	1.07	0.0842	6.10.3.2.1-1	15.80	1.07	0.0842	6.10.3.2.2-1
295.504	4.647	15.80	1.07	0.0647	6.10.3.2.1-1	15.80	1.07	0.0647	6.10.3.2.2-1
295.704	4.649	15.80	1.07	0.0636	6.10.3.2.1-1	15.80	1.07	0.0636	6.10.3.2.2-1
296.655	4.660	15.80	1.07	0.0578	6.10.3.2.1-1	15.80	1.07	0.0578	6.10.3.2.2-1
299.977	4.700	15.80	1.07	0.0351	6.10.3.2.1-1	15.80	1.07	0.0351	6.10.3.2.2-1
304.717	4.756	15.80	1.07	0.0049	6.10.3.2.2-1	15.80	1.07	0.0049	6.10.3.2.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
308.377	4.800	15.80	1.07	0.0422	6.10.3.2.2-1	15.80	1.07	0.0422	6.10.3.2.1-1
308.832	4.805	15.80	1.07	0.0472	6.10.3.2.2-1	15.80	1.07	0.0472	6.10.3.2.1-1
312.946	4.854	15.80	1.07	0.0961	6.10.3.2.2-1	15.80	1.07	0.0961	6.10.3.2.1-1
316.777	4.900	15.80	1.07	0.1480	6.10.3.2.2-1	15.80	1.07	0.1480	6.10.3.2.1-1
317.061	4.903	15.80	1.07	0.1520	6.10.3.2.2-1	15.80	1.07	0.1520	6.10.3.2.1-1
321.175	4.952	15.80	1.07	0.2146	6.10.3.2.2-1	15.80	1.07	0.2146	6.10.3.2.1-1
323.176	4.976	15.80	1.07	0.2475	6.10.3.2.2-1	15.80	1.07	0.2475	6.10.3.2.1-1
325.077	4.999	15.80	1.07	0.2803	6.10.3.2.2-1	15.80	1.07	0.2803	6.10.3.2.1-1
325.177	5.000	15.80	1.07	0.2820	6.10.3.2.2-1	15.80	1.07	0.2820	6.10.3.2.1-1
325.277	5.001	15.80	1.07	0.2801	6.10.3.2.2-1	15.80	1.07	0.2801	6.10.3.2.1-1
330.385	5.055	15.80	1.07	0.1884	6.10.3.2.2-1	15.80	1.07	0.1884	6.10.3.2.1-1
334.702	5.100	15.80	1.07	0.1189	6.10.3.2.2-1	15.80	1.07	0.1189	6.10.3.2.1-1
335.592	5.109	15.80	1.07	0.1055	6.10.3.2.2-1	15.80	1.07	0.1055	6.10.3.2.1-1
342.926	5.186	15.80	1.07	0.0071	6.10.3.2.2-1	15.80	1.07	0.0071	6.10.3.2.1-1
344.227	5.200	15.80	1.07	0.0081	6.10.3.2.1-1	15.80	1.07	0.0081	6.10.3.2.2-1
350.259	5.263	15.80	1.07	0.0700	6.10.3.2.1-1	15.80	1.07	0.0700	6.10.3.2.2-1
353.752	5.300	15.80	1.07	0.0991	6.10.3.2.1-1	15.80	1.07	0.0991	6.10.3.2.2-1
357.593	5.340	15.80	1.07	0.1255	6.10.3.2.1-1	15.80	1.07	0.1255	6.10.3.2.2-1
363.277	5.400	15.80	1.07	0.1539	6.10.3.2.1-1	15.80	1.07	0.1539	6.10.3.2.2-1
364.926	5.417	15.80	1.07	0.1598	6.10.3.2.1-1	15.80	1.07	0.1598	6.10.3.2.2-1
372.260	5.494	15.80	1.07	0.1724	6.10.3.2.1-1	15.80	1.07	0.1724	6.10.3.2.2-1
372.802	5.500	15.80	1.07	0.1725	6.10.3.2.1-1	15.80	1.07	0.1725	6.10.3.2.2-1
379.593	5.571	15.80	1.07	0.1638	6.10.3.2.1-1	15.80	1.07	0.1638	6.10.3.2.2-1
382.327	5.600	15.80	1.07	0.1550	6.10.3.2.1-1	15.80	1.07	0.1550	6.10.3.2.2-1
386.927	5.648	15.80	1.07	0.1335	6.10.3.2.1-1	15.80	1.07	0.1335	6.10.3.2.2-1
391.852	5.700	15.80	1.07	0.1012	6.10.3.2.1-1	15.80	1.07	0.1012	6.10.3.2.2-1
394.260	5.725	15.80	1.07	0.0820	6.10.3.2.1-1	15.80	1.07	0.0820	6.10.3.2.2-1
396.504	5.749	15.80	1.07	0.0619	6.10.3.2.1-1	15.80	1.07	0.0619	6.10.3.2.2-1
396.704	5.751	15.80	1.07	0.0600	6.10.3.2.1-1	15.80	1.07	0.0600	6.10.3.2.2-1
397.691	5.761	15.80	1.07	0.0504	6.10.3.2.1-1	15.80	1.07	0.0504	6.10.3.2.2-1
401.123	5.797	15.80	1.07	0.0142	6.10.3.2.1-1	15.80	1.07	0.0142	6.10.3.2.2-1
401.377	5.800	15.80	1.07	0.0113	6.10.3.2.1-1	15.80	1.07	0.0113	6.10.3.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
404.962	5.838	15.80	1.07	0.0321	6.10.3.2.2-1	15.80	1.07	0.0321	6.10.3.2.1-1
408.802	5.878	15.80	1.07	0.0841	6.10.3.2.2-1	15.80	1.07	0.0841	6.10.3.2.1-1
410.902	5.900	15.80	1.07	0.1151	6.10.3.2.2-1	15.80	1.07	0.1151	6.10.3.2.1-1
412.614	5.918	15.80	1.07	0.1417	6.10.3.2.2-1	15.80	1.07	0.1417	6.10.3.2.1-1
416.427	5.958	15.80	1.07	0.2051	6.10.3.2.2-1	15.80	1.07	0.2051	6.10.3.2.1-1
418.427	5.979	15.80	1.07	0.2408	6.10.3.2.2-1	15.80	1.07	0.2408	6.10.3.2.1-1
420.327	5.999	15.80	1.07	0.2761	6.10.3.2.2-1	15.80	1.07	0.2761	6.10.3.2.1-1
420.427	6.000	15.80	1.07	0.2780	6.10.3.2.2-1	15.80	1.07	0.2780	6.10.3.2.1-1
420.527	6.001	15.80	1.07	0.2762	6.10.3.2.2-1	15.80	1.07	0.2762	6.10.3.2.1-1
426.306	6.086	15.80	1.07	0.1812	6.10.3.2.2-1	15.80	1.07	0.1812	6.10.3.2.1-1
427.245	6.100	15.80	1.07	0.1670	6.10.3.2.2-1	15.80	1.07	0.1670	6.10.3.2.1-1
432.186	6.172	15.80	1.07	0.0979	6.10.3.2.2-1	15.80	1.07	0.0979	6.10.3.2.1-1
434.063	6.200	15.80	1.07	0.0743	6.10.3.2.2-1	15.80	1.07	0.0743	6.10.3.2.1-1
440.880	6.300	15.80	1.07	0.0002	6.10.3.2.2-1	15.80	1.07	0.0002	6.10.3.2.1-1
441.019	6.302	15.80	1.07	0.0011	6.10.3.2.1-1	15.80	1.07	0.0011	6.10.3.2.2-1
447.698	6.400	15.80	1.07	0.0555	6.10.3.2.1-1	15.80	1.07	0.0555	6.10.3.2.2-1
449.852	6.432	15.80	1.07	0.0694	6.10.3.2.1-1	15.80	1.07	0.0694	6.10.3.2.2-1
454.516	6.500	15.80	1.07	0.0927	6.10.3.2.1-1	15.80	1.07	0.0927	6.10.3.2.2-1
458.686	6.561	15.80	1.07	0.1063	6.10.3.2.1-1	15.80	1.07	0.1063	6.10.3.2.2-1
461.333	6.600	15.80	1.07	0.1114	6.10.3.2.1-1	15.80	1.07	0.1114	6.10.3.2.2-1
467.519	6.691	15.80	1.07	0.1125	6.10.3.2.1-1	15.80	1.07	0.1125	6.10.3.2.2-1
468.151	6.700	15.80	1.07	0.1117	6.10.3.2.1-1	15.80	1.07	0.1117	6.10.3.2.2-1
471.790	6.753	15.80	1.07	0.1040	6.10.3.2.1-1	15.80	1.07	0.1040	6.10.3.2.2-1
474.969	6.800	15.80	1.07	0.0931	6.10.3.2.1-1	15.80	1.07	0.0931	6.10.3.2.2-1
476.061	6.816	15.80	1.07	0.0884	6.10.3.2.1-1	15.80	1.07	0.0884	6.10.3.2.2-1
480.332	6.879	15.80	1.07	0.0653	6.10.3.2.1-1	15.80	1.07	0.0653	6.10.3.2.2-1
481.786	6.900	15.80	1.07	0.0558	6.10.3.2.1-1	15.80	1.07	0.0558	6.10.3.2.2-1
484.603	6.941	15.80	1.07	0.0351	6.10.3.2.1-1	15.80	1.07	0.0351	6.10.3.2.2-1
486.603	6.971	15.80	1.07	0.0183	6.10.3.2.1-1	15.80	1.07	0.0183	6.10.3.2.2-1
488.504	6.999	15.80	1.07	0.0010	6.10.3.2.1-1	15.80	1.07	0.0010	6.10.3.2.2-1
488.604	7.000	15.80	1.07	0.0000	6.10.3.2.1-1	15.80	1.07	0.0000	6.10.3.2.2-1

Load combination: Final Default Strength I

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
0.100	1.002	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
5.671	1.087	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
6.515	1.100	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
11.342	1.174	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
13.029	1.200	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
19.544	1.300	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
19.649	1.301	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
26.071	1.400	15.80	1.07	0.0285	6.10.8.1.3-1	15.80	1.07	0.1628	6.10.8.1.1-1
26.071	1.400	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
27.957	1.429	15.80	1.07	0.0399	6.10.8.1.3-1	15.80	1.07	0.2279	6.10.8.1.1-1
27.957	1.429	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
32.589	1.500	15.80	1.07	0.0736	6.10.8.1.3-1	15.80	1.07	0.2279	6.10.8.1.1-1
32.589	1.500	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
36.248	1.556	15.80	1.07	0.1056	6.10.8.1.3-1	15.80	1.07	0.2279	6.10.8.1.1-1
36.248	1.556	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
39.106	1.600	15.80	1.07	0.1339	6.10.8.1.3-1	15.80	1.07	0.2279	6.10.8.1.1-1
39.106	1.600	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
44.540	1.683	15.80	1.07	0.1957	6.10.8.1.3-1	15.80	1.07	0.3655	6.10.8.1.1-1
44.540	1.683	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
45.624	1.700	15.80	1.07	0.2096	6.10.8.1.3-1	15.80	1.07	0.3655	6.10.8.1.1-1
45.624	1.700	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
48.707	1.747	15.80	1.07	0.2611	6.10.8.1.3-1	15.80	1.07	0.3655	6.10.8.1.1-1
48.707	1.747	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
52.142	1.800	15.80	1.07	0.3139	6.10.8.1.3-1	15.80	1.07	0.3655	6.10.8.1.1-1
52.142	1.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
52.873	1.811	15.80	1.07	0.3279	6.10.8.1.3-1	15.80	1.07	0.6122	6.10.8.1.1-1
52.873	1.811	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
57.040	1.875	15.80	1.07	0.4180	6.10.8.1.3-1	15.80	1.07	0.6122	6.10.8.1.1-1
58.659	1.900	15.80	1.07	0.4662	6.10.8.1.3-1	15.80	1.07	0.6122	6.10.8.1.1-1
61.207	1.939	15.80	1.07	0.5592	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1
63.192	1.970	15.80	1.07	0.6371	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1

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Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
65.077	1.998	15.80	1.07	0.7165	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1
65.177	2.000	15.80	1.07	0.7208	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1
65.277	2.001	15.80	1.07	0.7164	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1
70.135	2.054	15.80	1.07	0.5129	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1
74.377	2.100	15.80	1.07	0.3564	6.10.8.1.3-1	15.80	1.07	0.7874	6.10.8.1.1-1
74.377	2.100	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
75.092	2.108	15.80	1.07	0.3317	6.10.8.1.3-1	15.80	1.07	0.3666	6.10.8.1.1-1
75.092	2.108	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
80.384	2.165	15.80	1.07	0.1760	6.10.8.1.3-1	15.80	1.07	0.3666	6.10.8.1.1-1
80.384	2.165	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
83.577	2.200	15.80	1.07	0.1195	6.10.8.1.3-1	15.80	1.07	0.3666	6.10.8.1.1-1
83.577	2.200	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
85.675	2.223	15.80	1.07	0.0894	6.10.8.1.3-1	15.80	1.07	0.2191	6.10.8.1.1-1
85.675	2.223	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
87.899	2.247	15.80	1.07	0.0663	6.10.8.1.3-1	15.80	1.07	0.2191	6.10.8.1.1-1
87.899	2.247	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
88.099	2.249	15.80	1.07	0.0643	6.10.8.1.3-1	15.80	1.07	0.2191	6.10.8.1.1-1
88.099	2.249	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
92.777	2.300	15.80	1.07	0.0221	6.10.8.1.3-1	15.80	1.07	0.2191	6.10.8.1.1-1
92.777	2.300	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
94.175	2.315	15.80	1.07	0.0109	6.10.8.1.3-1	15.80	1.07	0.2191	6.10.8.1.1-1
94.175	2.315	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
101.977	2.400	15.80	1.07	0.3860	6.10.7.1.1-1	15.80	1.07	0.3860	6.10.7.1.1-1
102.675	2.408	15.80	1.07	0.3887	6.10.7.1.1-1	15.80	1.07	0.3887	6.10.7.1.1-1
111.175	2.500	15.80	1.07	0.4139	6.10.7.1.1-1	15.80	1.07	0.4139	6.10.7.1.1-1
119.675	2.592	15.80	1.07	0.3878	6.10.7.1.1-1	15.80	1.07	0.3878	6.10.7.1.1-1
120.377	2.600	15.80	1.07	0.3829	6.10.7.1.1-1	15.80	1.07	0.3829	6.10.7.1.1-1
128.175	2.685	15.80	1.07	0.0159	6.10.8.1.3-1	15.80	1.07	0.2166	6.10.8.1.1-1
128.175	2.685	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
129.577	2.700	15.80	1.07	0.0276	6.10.8.1.3-1	15.80	1.07	0.2166	6.10.8.1.1-1
129.577	2.700	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
136.675	2.777	15.80	1.07	0.0973	6.10.8.1.3-1	15.80	1.07	0.2983	6.10.8.1.1-1

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Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
136.675	2.777	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
138.777	2.800	15.80	1.07	0.1248	6.10.8.1.3-1	15.80	1.07	0.2983	6.10.8.1.1-1
138.777	2.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
140.800	2.822	15.80	1.07	0.1598	6.10.8.1.3-1	15.80	1.07	0.2983	6.10.8.1.1-1
140.800	2.822	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
144.925	2.867	15.80	1.07	0.2691	6.10.8.1.3-1	15.80	1.07	0.6180	6.10.8.1.1-1
144.925	2.867	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
147.977	2.900	15.80	1.07	0.3686	6.10.8.1.3-1	15.80	1.07	0.6180	6.10.8.1.1-1
149.050	2.912	15.80	1.07	0.4071	6.10.8.1.3-1	15.80	1.07	0.6180	6.10.8.1.1-1
153.175	2.957	15.80	1.07	0.5654	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
155.176	2.978	15.80	1.07	0.6488	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
157.077	2.999	15.80	1.07	0.7315	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
157.177	3.000	15.80	1.07	0.7360	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
157.277	3.001	15.80	1.07	0.7317	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
162.135	3.059	15.80	1.07	0.5396	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
165.577	3.100	15.80	1.07	0.4212	6.10.8.1.3-1	15.80	1.07	0.8023	6.10.8.1.1-1
167.092	3.118	15.80	1.07	0.3837	6.10.8.1.3-1	15.80	1.07	0.4226	6.10.8.1.1-1
167.092	3.118	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
173.977	3.200	15.80	1.07	0.2412	6.10.8.1.3-1	15.80	1.07	0.4226	6.10.8.1.1-1
173.977	3.200	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
175.759	3.221	15.80	1.07	0.2114	6.10.8.1.3-1	15.80	1.07	0.4226	6.10.8.1.1-1
175.759	3.221	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
182.377	3.300	15.80	1.07	0.1206	6.10.8.1.3-1	15.80	1.07	0.4226	6.10.8.1.1-1
182.377	3.300	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
184.425	3.324	15.80	1.07	0.0974	6.10.8.1.3-1	15.80	1.07	0.1627	6.10.8.1.1-1
184.425	3.324	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
186.649	3.351	15.80	1.07	0.0739	6.10.8.1.3-1	15.80	1.07	0.1627	6.10.8.1.1-1
186.649	3.351	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
186.849	3.353	15.80	1.07	0.0719	6.10.8.1.3-1	15.80	1.07	0.1627	6.10.8.1.1-1
186.849	3.353	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
190.777	3.400	15.80	1.07	0.0351	6.10.8.1.3-1	15.80	1.07	0.1627	6.10.8.1.1-1
190.777	3.400	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
193.342	3.431	15.80	1.07	0.0140	6.10.8.1.3-1	15.80	1.07	0.1627	6.10.8.1.1-1
193.342	3.431	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
199.177	3.500	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
202.259	3.537	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
207.577	3.600	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
211.175	3.643	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
215.977	3.700	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
220.092	3.749	15.80	1.07	0.0115	6.10.8.1.3-1	15.80	1.07	0.2643	6.10.8.1.1-1
220.092	3.749	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
224.363	3.800	15.80	1.07	0.1044	6.10.8.1.3-1	15.80	1.07	0.2643	6.10.8.1.1-1
224.363	3.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
224.377	3.800	15.80	1.07	0.1048	6.10.8.1.3-1	15.80	1.07	0.2643	6.10.8.1.1-1
224.377	3.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
228.634	3.851	15.80	1.07	0.2355	6.10.8.1.3-1	15.80	1.07	0.6235	6.10.8.1.1-1
228.634	3.851	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
232.777	3.900	15.80	1.07	0.3847	6.10.8.1.3-1	15.80	1.07	0.6235	6.10.8.1.1-1
232.777	3.900	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
232.905	3.902	15.80	1.07	0.3897	6.10.8.1.3-1	15.80	1.07	0.6235	6.10.8.1.1-1
232.905	3.902	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
237.175	3.952	15.80	1.07	0.5632	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
237.175	3.952	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
239.176	3.976	15.80	1.07	0.6515	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
241.077	3.999	15.80	1.07	0.7379	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
241.177	4.000	15.80	1.07	0.7426	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
241.277	4.001	15.80	1.07	0.7323	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
247.051	4.070	15.80	1.07	0.4813	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
247.051	4.070	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
249.577	4.100	15.80	1.07	0.3808	6.10.8.1.3-1	15.80	1.07	0.8198	6.10.8.1.1-1
249.577	4.100	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
252.925	4.140	15.80	1.07	0.2596	6.10.8.1.3-1	15.80	1.07	0.2911	6.10.8.1.1-1
252.925	4.140	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
257.977	4.200	15.80	1.07	0.1031	6.10.8.1.3-1	15.80	1.07	0.2911	6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
257.977	4.200	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
261.842	4.246	15.80	1.07	0.0188	6.10.8.1.3-1	15.80	1.07	0.2911	6.10.8.1.1-1
261.842	4.246	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
266.377	4.300	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
270.759	4.352	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
274.777	4.400	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
279.675	4.458	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
283.177	4.500	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
288.592	4.564	15.80	1.07	0.0207	6.10.8.1.3-1	15.80	1.07	0.2306	6.10.8.1.1-1
288.592	4.564	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
291.577	4.600	15.80	1.07	0.0466	6.10.8.1.3-1	15.80	1.07	0.2306	6.10.8.1.1-1
291.577	4.600	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
295.504	4.647	15.80	1.07	0.0854	6.10.8.1.3-1	15.80	1.07	0.2306	6.10.8.1.1-1
295.504	4.647	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
295.704	4.649	15.80	1.07	0.0876	6.10.8.1.3-1	15.80	1.07	0.2306	6.10.8.1.1-1
295.704	4.649	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
296.655	4.660	15.80	1.07	0.0979	6.10.8.1.3-1	15.80	1.07	0.2306	6.10.8.1.1-1
296.655	4.660	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
299.977	4.700	15.80	1.07	0.1364	6.10.8.1.3-1	15.80	1.07	0.2306	6.10.8.1.1-1
299.977	4.700	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
304.717	4.756	15.80	1.07	0.1998	6.10.8.1.3-1	15.80	1.07	0.3944	6.10.8.1.1-1
304.717	4.756	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
308.377	4.800	15.80	1.07	0.2630	6.10.8.1.3-1	15.80	1.07	0.3944	6.10.8.1.1-1
308.377	4.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
308.832	4.805	15.80	1.07	0.2716	6.10.8.1.3-1	15.80	1.07	0.3944	6.10.8.1.1-1
308.832	4.805	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
312.946	4.854	15.80	1.07	0.3559	6.10.8.1.3-1	15.80	1.07	0.6561	6.10.8.1.1-1
312.946	4.854	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
316.777	4.900	15.80	1.07	0.4469	6.10.8.1.3-1	15.80	1.07	0.6561	6.10.8.1.1-1
317.061	4.903	15.80	1.07	0.4542	6.10.8.1.3-1	15.80	1.07	0.6561	6.10.8.1.1-1
321.175	4.952	15.80	1.07	0.6009	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1
323.176	4.976	15.80	1.07	0.6805	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
325.077	4.999	15.80	1.07	0.7608	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1
325.177	5.000	15.80	1.07	0.7652	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1
325.277	5.001	15.80	1.07	0.7606	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1
330.385	5.055	15.80	1.07	0.5404	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1
334.702	5.100	15.80	1.07	0.3761	6.10.8.1.3-1	15.80	1.07	0.8339	6.10.8.1.1-1
335.592	5.109	15.80	1.07	0.3451	6.10.8.1.3-1	15.80	1.07	0.3801	6.10.8.1.1-1
335.592	5.109	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
342.926	5.186	15.80	1.07	0.1381	6.10.8.1.3-1	15.80	1.07	0.3801	6.10.8.1.1-1
342.926	5.186	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
344.227	5.200	15.80	1.07	0.1176	6.10.8.1.3-1	15.80	1.07	0.3801	6.10.8.1.1-1
344.227	5.200	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
350.259	5.263	15.80	1.07	0.0476	6.10.8.1.3-1	15.80	1.07	0.2371	6.10.8.1.1-1
350.259	5.263	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
353.752	5.300	15.80	1.07	0.0157	6.10.8.1.3-1	15.80	1.07	0.2371	6.10.8.1.1-1
353.752	5.300	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
357.593	5.340	15.80	1.07	0.3503	6.10.7.1.1-1	15.80	1.07	0.3503	6.10.7.1.1-1
363.277	5.400	15.80	1.07	0.4019	6.10.7.1.1-1	15.80	1.07	0.4019	6.10.7.1.1-1
364.926	5.417	15.80	1.07	0.4129	6.10.7.1.1-1	15.80	1.07	0.4129	6.10.7.1.1-1
372.260	5.494	15.80	1.07	0.4350	6.10.7.1.1-1	15.80	1.07	0.4350	6.10.7.1.1-1
372.802	5.500	15.80	1.07	0.4341	6.10.7.1.1-1	15.80	1.07	0.4341	6.10.7.1.1-1
379.593	5.571	15.80	1.07	0.4206	6.10.7.1.1-1	15.80	1.07	0.4206	6.10.7.1.1-1
382.327	5.600	15.80	1.07	0.4060	6.10.7.1.1-1	15.80	1.07	0.4060	6.10.7.1.1-1
386.927	5.648	15.80	1.07	0.3673	6.10.7.1.1-1	15.80	1.07	0.3673	6.10.7.1.1-1
391.852	5.700	15.80	1.07	0.0218	6.10.8.1.3-1	15.80	1.07	0.2425	6.10.8.1.1-1
391.852	5.700	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
394.260	5.725	15.80	1.07	0.0436	6.10.8.1.3-1	15.80	1.07	0.1398	6.10.8.1.1-1
394.260	5.725	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
396.504	5.749	15.80	1.07	0.0659	6.10.8.1.3-1	15.80	1.07	0.1398	6.10.8.1.1-1
396.504	5.749	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
396.704	5.751	15.80	1.07	0.0679	6.10.8.1.3-1	15.80	1.07	0.1398	6.10.8.1.1-1
396.704	5.751	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
397.691	5.761	15.80	1.07	0.0784	6.10.8.1.3-1	15.80	1.07	0.1398	6.10.8.1.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
397.691	5.761	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
401.123	5.797	15.80	1.07	0.1190	6.10.8.1.3-1	15.80	1.07	0.3405	6.10.8.1.1-1
401.123	5.797	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
401.377	5.800	15.80	1.07	0.1273	6.10.8.1.3-1	15.80	1.07	0.3405	6.10.8.1.1-1
401.377	5.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
404.962	5.838	15.80	1.07	0.1950	6.10.8.1.3-1	15.80	1.07	0.3405	6.10.8.1.1-1
404.962	5.838	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
408.802	5.878	15.80	1.07	0.3074	6.10.8.1.3-1	15.80	1.07	0.6495	6.10.8.1.1-1
408.802	5.878	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
410.902	5.900	15.80	1.07	0.3789	6.10.8.1.3-1	15.80	1.07	0.6495	6.10.8.1.1-1
410.902	5.900	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
412.614	5.918	15.80	1.07	0.4416	6.10.8.1.3-1	15.80	1.07	0.6495	6.10.8.1.1-1
416.427	5.958	15.80	1.07	0.5937	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
418.427	5.979	15.80	1.07	0.6798	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
420.327	5.999	15.80	1.07	0.7651	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
420.427	6.000	15.80	1.07	0.7697	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
420.527	6.001	15.80	1.07	0.7653	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
426.306	6.086	15.80	1.07	0.5285	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
427.245	6.100	15.80	1.07	0.4940	6.10.8.1.3-1	15.80	1.07	0.8399	6.10.8.1.1-1
432.186	6.172	15.80	1.07	0.3656	6.10.8.1.3-1	15.80	1.07	0.4053	6.10.8.1.1-1
432.186	6.172	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
434.063	6.200	15.80	1.07	0.3278	6.10.8.1.3-1	15.80	1.07	0.4053	6.10.8.1.1-1
434.063	6.200	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
440.880	6.300	15.80	1.07	0.2149	6.10.8.1.3-1	15.80	1.07	0.4053	6.10.8.1.1-1
440.880	6.300	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
441.019	6.302	15.80	1.07	0.2130	6.10.8.1.3-1	15.80	1.07	0.4053	6.10.8.1.1-1
441.019	6.302	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
447.698	6.400	15.80	1.07	0.1341	6.10.8.1.3-1	15.80	1.07	0.4053	6.10.8.1.1-1
447.698	6.400	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
449.852	6.432	15.80	1.07	0.1120	6.10.8.1.3-1	15.80	1.07	0.1787	6.10.8.1.1-1
449.852	6.432	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
454.516	6.500	15.80	1.07	0.0701	6.10.8.1.3-1	15.80	1.07	0.1787	6.10.8.1.1-1

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		v21.01.00.22		

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
454.516	6.500	15.80	1.07	0.3501	6.10.7.1.1-1	15.80	1.07	0.3501	6.10.7.1.1-1
458.686	6.561	15.80	1.07	0.0392	6.10.8.1.3-1	15.80	1.07	0.1787	6.10.8.1.1-1
458.686	6.561	15.80	1.07	0.3630	6.10.7.1.1-1	15.80	1.07	0.3630	6.10.7.1.1-1
461.333	6.600	15.80	1.07	0.0227	6.10.8.1.3-1	15.80	1.07	0.1787	6.10.8.1.1-1
461.333	6.600	15.80	1.07	0.3648	6.10.7.1.1-1	15.80	1.07	0.3648	6.10.7.1.1-1
467.519	6.691	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
468.151	6.700	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
471.790	6.753	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
474.969	6.800	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
476.061	6.816	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
480.332	6.879	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
481.786	6.900	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
484.603	6.941	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
486.603	6.971	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
488.504	6.999	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1
488.604	7.000	15.80	1.07	0.3491	6.10.7.3-1	15.80	1.07	0.3491	6.10.7.3-1

Load combination: Final Default Service II

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2
0.100	1.002	15.80	1.07	0.0012	6.10.4.2.2-1	15.80	1.07	0.0028	6.10.4.2.2-2
5.671	1.087	15.80	1.07	0.0588	6.10.4.2.2-1	15.80	1.07	0.1456	6.10.4.2.2-2
6.515	1.100	15.80	1.07	0.0656	6.10.4.2.2-1	15.80	1.07	0.1611	6.10.4.2.2-2
11.342	1.174	15.80	1.07	0.1009	6.10.4.2.2-1	15.80	1.07	0.2502	6.10.4.2.2-2
13.029	1.200	15.80	1.07	0.1102	6.10.4.2.2-1	15.80	1.07	0.2730	6.10.4.2.2-2
19.544	1.300	15.80	1.07	0.1338	6.10.4.2.2-1	15.80	1.07	0.3374	6.10.4.2.2-2
19.649	1.301	15.80	1.07	0.1341	6.10.4.2.2-1	15.80	1.07	0.3383	6.10.4.2.2-2
26.071	1.400	15.80	1.07	0.1378	6.10.4.2.2-1	15.80	1.07	0.3611	6.10.4.2.2-2
27.957	1.429	15.80	1.07	0.1345	6.10.4.2.2-1	15.80	1.07	0.3554	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.0607	6.10.4.2.2-1	15.80	1.07	0.0216	6.10.4.2.2-2
32.589	1.500	15.80	1.07	0.1209	6.10.4.2.2-1	15.80	1.07	0.3377	6.10.4.2.2-2

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
36.248	1.556	15.80	1.07	0.0427	6.10.4.2.2-1	15.80	1.07	0.0512	6.10.4.2.2-2
36.248	1.556	15.80	1.07	0.1038	6.10.4.2.2-1	15.80	1.07	0.3132	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0253	6.10.4.2.2-1	15.80	1.07	0.0782	6.10.4.2.2-2
39.106	1.600	15.80	1.07	0.0856	6.10.4.2.2-1	15.80	1.07	0.2818	6.10.4.2.2-2
44.540	1.683	15.80	1.07	0.0163	6.10.4.2.2-1	15.80	1.07	0.1385	6.10.4.2.2-2
44.540	1.683	15.80	1.07	0.0405	6.10.4.2.2-1	15.80	1.07	0.2004	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0259	6.10.4.2.2-1	15.80	1.07	0.1521	6.10.4.2.2-2
45.624	1.700	15.80	1.07	0.0304	6.10.4.2.2-1	15.80	1.07	0.1842	6.10.4.2.2-2
48.707	1.747	15.80	1.07	0.0558	6.10.4.2.2-1	15.80	1.07	0.1933	6.10.4.2.2-2
48.707	1.747	15.80	1.07	0.0030	6.10.4.2.2-1	15.80	1.07	0.1219	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.0920	6.10.4.2.2-1	15.80	1.07	0.2363	6.10.4.2.2-2
52.142	1.800	15.80	1.07	0.0439	6.10.4.2.2-1	15.80	1.07	0.0510	6.10.4.2.2-2
52.873	1.811	15.80	1.07	0.1005	6.10.4.2.2-1	15.80	1.07	0.2476	6.10.4.2.2-2
52.873	1.811	15.80	1.07	0.0536	6.10.4.2.2-1	15.80	1.07	0.0321	6.10.4.2.2-2
57.040	1.875	15.80	1.07	0.3367	6.10.4.2.2-1	15.80	1.07	0.3695	6.10.4.2.2-2
58.659	1.900	15.80	1.07	0.3761	6.10.4.2.2-1	15.80	1.07	0.4116	6.10.4.2.2-2
61.207	1.939	15.80	1.07	0.4517	6.10.4.2.2-1	15.80	1.07	0.4932	6.10.4.2.2-2
63.192	1.970	15.80	1.07	0.5149	6.10.4.2.2-1	15.80	1.07	0.5616	6.10.4.2.2-2
65.077	1.998	15.80	1.07	0.5793	6.10.4.2.2-1	15.80	1.07	0.6313	6.10.4.2.2-2
65.177	2.000	15.80	1.07	0.5828	6.10.4.2.2-1	15.80	1.07	0.6351	6.10.4.2.2-2
65.277	2.001	15.80	1.07	0.5792	6.10.4.2.2-1	15.80	1.07	0.6312	6.10.4.2.2-2
70.135	2.054	15.80	1.07	0.4138	6.10.4.2.2-1	15.80	1.07	0.4527	6.10.4.2.2-2
74.377	2.100	15.80	1.07	0.1259	6.10.4.2.2-1	15.80	1.07	0.2717	6.10.4.2.2-2
75.092	2.108	15.80	1.07	0.1149	6.10.4.2.2-1	15.80	1.07	0.2525	6.10.4.2.2-2
80.384	2.165	15.80	1.07	0.0412	6.10.4.2.2-1	15.80	1.07	0.1308	6.10.4.2.2-2
80.384	2.165	15.80	1.07	0.0062	6.10.4.2.2-1	15.80	1.07	0.0781	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0050	6.10.4.2.2-1	15.80	1.07	0.0823	6.10.4.2.2-2
83.577	2.200	15.80	1.07	0.0323	6.10.4.2.2-1	15.80	1.07	0.1399	6.10.4.2.2-2
85.675	2.223	15.80	1.07	0.0168	6.10.4.2.2-1	15.80	1.07	0.0522	6.10.4.2.2-2
85.675	2.223	15.80	1.07	0.0561	6.10.4.2.2-1	15.80	1.07	0.1824	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0372	6.10.4.2.2-1	15.80	1.07	0.0274	6.10.4.2.2-2
87.899	2.247	15.80	1.07	0.0800	6.10.4.2.2-1	15.80	1.07	0.2277	6.10.4.2.2-2

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
88.099	2.249	15.80	1.07	0.0390	6.10.4.2.2-1	15.80	1.07	0.0253	6.10.4.2.2-2
88.099	2.249	15.80	1.07	0.0819	6.10.4.2.2-1	15.80	1.07	0.2312	6.10.4.2.2-2
92.777	2.300	15.80	1.07	0.1237	6.10.4.2.2-1	15.80	1.07	0.3078	6.10.4.2.2-2
94.175	2.315	15.80	1.07	0.1349	6.10.4.2.2-1	15.80	1.07	0.3304	6.10.4.2.2-2
101.977	2.400	15.80	1.07	0.1787	6.10.4.2.2-1	15.80	1.07	0.4109	6.10.4.2.2-2
102.675	2.408	15.80	1.07	0.1811	6.10.4.2.2-1	15.80	1.07	0.4142	6.10.4.2.2-2
111.175	2.500	15.80	1.07	0.1957	6.10.4.2.2-1	15.80	1.07	0.4421	6.10.4.2.2-2
119.675	2.592	15.80	1.07	0.1790	6.10.4.2.2-1	15.80	1.07	0.4127	6.10.4.2.2-2
120.377	2.600	15.80	1.07	0.1761	6.10.4.2.2-1	15.80	1.07	0.4073	6.10.4.2.2-2
128.175	2.685	15.80	1.07	0.1298	6.10.4.2.2-1	15.80	1.07	0.3223	6.10.4.2.2-2
129.577	2.700	15.80	1.07	0.1188	6.10.4.2.2-1	15.80	1.07	0.3025	6.10.4.2.2-2
136.675	2.777	15.80	1.07	0.0098	6.10.4.2.2-1	15.80	1.07	0.0607	6.10.4.2.2-2
136.675	2.777	15.80	1.07	0.0491	6.10.4.2.2-1	15.80	1.07	0.1734	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0122	6.10.4.2.2-1	15.80	1.07	0.0892	6.10.4.2.2-2
138.777	2.800	15.80	1.07	0.0242	6.10.4.2.2-1	15.80	1.07	0.1282	6.10.4.2.2-2
140.800	2.822	15.80	1.07	0.0350	6.10.4.2.2-1	15.80	1.07	0.1184	6.10.4.2.2-2
140.800	2.822	15.80	1.07	0.0002	6.10.4.2.2-1	15.80	1.07	0.0892	6.10.4.2.2-2
144.925	2.867	15.80	1.07	0.0897	6.10.4.2.2-1	15.80	1.07	0.2043	6.10.4.2.2-2
144.925	2.867	15.80	1.07	0.0543	6.10.4.2.2-1	15.80	1.07	0.0072	6.10.4.2.2-2
147.977	2.900	15.80	1.07	0.1360	6.10.4.2.2-1	15.80	1.07	0.2819	6.10.4.2.2-2
149.050	2.912	15.80	1.07	0.3283	6.10.4.2.2-1	15.80	1.07	0.3596	6.10.4.2.2-2
153.175	2.957	15.80	1.07	0.4570	6.10.4.2.2-1	15.80	1.07	0.4983	6.10.4.2.2-2
155.176	2.978	15.80	1.07	0.5248	6.10.4.2.2-1	15.80	1.07	0.5714	6.10.4.2.2-2
157.077	2.999	15.80	1.07	0.5921	6.10.4.2.2-1	15.80	1.07	0.6439	6.10.4.2.2-2
157.177	3.000	15.80	1.07	0.5957	6.10.4.2.2-1	15.80	1.07	0.6478	6.10.4.2.2-2
157.277	3.001	15.80	1.07	0.5923	6.10.4.2.2-1	15.80	1.07	0.6441	6.10.4.2.2-2
162.135	3.059	15.80	1.07	0.4361	6.10.4.2.2-1	15.80	1.07	0.4756	6.10.4.2.2-2
165.577	3.100	15.80	1.07	0.3397	6.10.4.2.2-1	15.80	1.07	0.3719	6.10.4.2.2-2
167.092	3.118	15.80	1.07	0.3088	6.10.4.2.2-1	15.80	1.07	0.3394	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0564	6.10.4.2.2-1	15.80	1.07	0.1793	6.10.4.2.2-2
173.977	3.200	15.80	1.07	0.0095	6.10.4.2.2-1	15.80	1.07	0.1009	6.10.4.2.2-2
175.759	3.221	15.80	1.07	0.0383	6.10.4.2.2-1	15.80	1.07	0.1554	6.10.4.2.2-2

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POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
175.759	3.221	15.80	1.07	0.0101	6.10.4.2.2-1	15.80	1.07	0.1340	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0195	6.10.4.2.2-1	15.80	1.07	0.0719	6.10.4.2.2-2
182.377	3.300	15.80	1.07	0.0713	6.10.4.2.2-1	15.80	1.07	0.2377	6.10.4.2.2-2
184.425	3.324	15.80	1.07	0.0341	6.10.4.2.2-1	15.80	1.07	0.0496	6.10.4.2.2-2
184.425	3.324	15.80	1.07	0.0858	6.10.4.2.2-1	15.80	1.07	0.2589	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0480	6.10.4.2.2-1	15.80	1.07	0.0276	6.10.4.2.2-2
186.649	3.351	15.80	1.07	0.0997	6.10.4.2.2-1	15.80	1.07	0.2810	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.0492	6.10.4.2.2-1	15.80	1.07	0.0257	6.10.4.2.2-2
186.849	3.353	15.80	1.07	0.1008	6.10.4.2.2-1	15.80	1.07	0.2821	6.10.4.2.2-2
190.777	3.400	15.80	1.07	0.1191	6.10.4.2.2-1	15.80	1.07	0.3062	6.10.4.2.2-2
193.342	3.431	15.80	1.07	0.1275	6.10.4.2.2-1	15.80	1.07	0.3155	6.10.4.2.2-2
199.177	3.500	15.80	1.07	0.1361	6.10.4.2.2-1	15.80	1.07	0.3191	6.10.4.2.2-2
202.259	3.537	15.80	1.07	0.1345	6.10.4.2.2-1	15.80	1.07	0.3084	6.10.4.2.2-2
207.577	3.600	15.80	1.07	0.1213	6.10.4.2.2-1	15.80	1.07	0.2701	6.10.4.2.2-2
211.175	3.643	15.80	1.07	0.1053	6.10.4.2.2-1	15.80	1.07	0.2310	6.10.4.2.2-2
215.977	3.700	15.80	1.07	0.0760	6.10.4.2.2-1	15.80	1.07	0.1670	6.10.4.2.2-2
220.092	3.749	15.80	1.07	0.0456	6.10.4.2.2-1	15.80	1.07	0.1143	6.10.4.2.2-2
224.363	3.800	15.80	1.07	0.0142	6.10.4.2.2-1	15.80	1.07	0.0760	6.10.4.2.2-2
224.363	3.800	15.80	1.07	0.0114	6.10.4.2.2-1	15.80	1.07	0.0770	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0144	6.10.4.2.2-1	15.80	1.07	0.0763	6.10.4.2.2-2
224.377	3.800	15.80	1.07	0.0113	6.10.4.2.2-1	15.80	1.07	0.0769	6.10.4.2.2-2
228.634	3.851	15.80	1.07	0.0646	6.10.4.2.2-1	15.80	1.07	0.1766	6.10.4.2.2-2
228.634	3.851	15.80	1.07	0.0312	6.10.4.2.2-1	15.80	1.07	0.0228	6.10.4.2.2-2
232.777	3.900	15.80	1.07	0.3080	6.10.4.2.2-1	15.80	1.07	0.3418	6.10.4.2.2-2
232.905	3.902	15.80	1.07	0.3120	6.10.4.2.2-1	15.80	1.07	0.3462	6.10.4.2.2-2
237.175	3.952	15.80	1.07	0.4521	6.10.4.2.2-1	15.80	1.07	0.4993	6.10.4.2.2-2
239.176	3.976	15.80	1.07	0.5233	6.10.4.2.2-1	15.80	1.07	0.5772	6.10.4.2.2-2
241.077	3.999	15.80	1.07	0.5932	6.10.4.2.2-1	15.80	1.07	0.6534	6.10.4.2.2-2
241.177	4.000	15.80	1.07	0.5969	6.10.4.2.2-1	15.80	1.07	0.6575	6.10.4.2.2-2
241.277	4.001	15.80	1.07	0.5883	6.10.4.2.2-1	15.80	1.07	0.6487	6.10.4.2.2-2
247.051	4.070	15.80	1.07	0.3857	6.10.4.2.2-1	15.80	1.07	0.4273	6.10.4.2.2-2
249.577	4.100	15.80	1.07	0.3047	6.10.4.2.2-1	15.80	1.07	0.3386	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
249.577	4.100	15.80	1.07	0.0726	6.10.4.2.2-1	15.80	1.07	0.0167	6.10.4.2.2-2
252.925	4.140	15.80	1.07	0.0721	6.10.4.2.2-1	15.80	1.07	0.1948	6.10.4.2.2-2
252.925	4.140	15.80	1.07	0.0361	6.10.4.2.2-1	15.80	1.07	0.0200	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0127	6.10.4.2.2-1	15.80	1.07	0.0748	6.10.4.2.2-2
257.977	4.200	15.80	1.07	0.0133	6.10.4.2.2-1	15.80	1.07	0.0803	6.10.4.2.2-2
261.842	4.246	15.80	1.07	0.0245	6.10.4.2.2-1	15.80	1.07	0.0013	6.10.4.2.2-2
261.842	4.246	15.80	1.07	0.0431	6.10.4.2.2-1	15.80	1.07	0.1096	6.10.4.2.2-2
266.377	4.300	15.80	1.07	0.0763	6.10.4.2.2-1	15.80	1.07	0.1677	6.10.4.2.2-2
270.759	4.352	15.80	1.07	0.1028	6.10.4.2.2-1	15.80	1.07	0.2257	6.10.4.2.2-2
274.777	4.400	15.80	1.07	0.1198	6.10.4.2.2-1	15.80	1.07	0.2670	6.10.4.2.2-2
279.675	4.458	15.80	1.07	0.1318	6.10.4.2.2-1	15.80	1.07	0.3042	6.10.4.2.2-2
283.177	4.500	15.80	1.07	0.1334	6.10.4.2.2-1	15.80	1.07	0.3162	6.10.4.2.2-2
288.592	4.564	15.80	1.07	0.1253	6.10.4.2.2-1	15.80	1.07	0.3141	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.0641	6.10.4.2.2-1	15.80	1.07	0.0019	6.10.4.2.2-2
291.577	4.600	15.80	1.07	0.1154	6.10.4.2.2-1	15.80	1.07	0.3042	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0432	6.10.4.2.2-1	15.80	1.07	0.0375	6.10.4.2.2-2
295.504	4.647	15.80	1.07	0.0962	6.10.4.2.2-1	15.80	1.07	0.2790	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0420	6.10.4.2.2-1	15.80	1.07	0.0395	6.10.4.2.2-2
295.704	4.649	15.80	1.07	0.0951	6.10.4.2.2-1	15.80	1.07	0.2778	6.10.4.2.2-2
296.655	4.660	15.80	1.07	0.0360	6.10.4.2.2-1	15.80	1.07	0.0491	6.10.4.2.2-2
296.655	4.660	15.80	1.07	0.0889	6.10.4.2.2-1	15.80	1.07	0.2667	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0125	6.10.4.2.2-1	15.80	1.07	0.0857	6.10.4.2.2-2
299.977	4.700	15.80	1.07	0.0659	6.10.4.2.2-1	15.80	1.07	0.2335	6.10.4.2.2-2
304.717	4.756	15.80	1.07	0.0282	6.10.4.2.2-1	15.80	1.07	0.1456	6.10.4.2.2-2
304.717	4.756	15.80	1.07	0.0230	6.10.4.2.2-1	15.80	1.07	0.1602	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.0651	6.10.4.2.2-1	15.80	1.07	0.1961	6.10.4.2.2-2
308.377	4.800	15.80	1.07	0.0162	6.10.4.2.2-1	15.80	1.07	0.0963	6.10.4.2.2-2
308.832	4.805	15.80	1.07	0.0701	6.10.4.2.2-1	15.80	1.07	0.2030	6.10.4.2.2-2
308.832	4.805	15.80	1.07	0.0213	6.10.4.2.2-1	15.80	1.07	0.0882	6.10.4.2.2-2
312.946	4.854	15.80	1.07	0.1188	6.10.4.2.2-1	15.80	1.07	0.2702	6.10.4.2.2-2
312.946	4.854	15.80	1.07	0.0730	6.10.4.2.2-1	15.80	1.07	0.0032	6.10.4.2.2-2
316.777	4.900	15.80	1.07	0.3605	6.10.4.2.2-1	15.80	1.07	0.3945	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
317.061	4.903	15.80	1.07	0.3665	6.10.4.2.2-1	15.80	1.07	0.4008	6.10.4.2.2-2
321.175	4.952	15.80	1.07	0.4859	6.10.4.2.2-1	15.80	1.07	0.5293	6.10.4.2.2-2
323.176	4.976	15.80	1.07	0.5507	6.10.4.2.2-1	15.80	1.07	0.5991	6.10.4.2.2-2
325.077	4.999	15.80	1.07	0.6159	6.10.4.2.2-1	15.80	1.07	0.6696	6.10.4.2.2-2
325.177	5.000	15.80	1.07	0.6195	6.10.4.2.2-1	15.80	1.07	0.6734	6.10.4.2.2-2
325.277	5.001	15.80	1.07	0.6158	6.10.4.2.2-1	15.80	1.07	0.6694	6.10.4.2.2-2
330.385	5.055	15.80	1.07	0.4367	6.10.4.2.2-1	15.80	1.07	0.4763	6.10.4.2.2-2
334.702	5.100	15.80	1.07	0.1391	6.10.4.2.2-1	15.80	1.07	0.2877	6.10.4.2.2-2
335.592	5.109	15.80	1.07	0.1248	6.10.4.2.2-1	15.80	1.07	0.2635	6.10.4.2.2-2
342.926	5.186	15.80	1.07	0.0224	6.10.4.2.2-1	15.80	1.07	0.1011	6.10.4.2.2-2
342.926	5.186	15.80	1.07	0.0133	6.10.4.2.2-1	15.80	1.07	0.1115	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0075	6.10.4.2.2-1	15.80	1.07	0.0822	6.10.4.2.2-2
344.227	5.200	15.80	1.07	0.0295	6.10.4.2.2-1	15.80	1.07	0.1388	6.10.4.2.2-2
350.259	5.263	15.80	1.07	0.0522	6.10.4.2.2-1	15.80	1.07	0.0080	6.10.4.2.2-2
350.259	5.263	15.80	1.07	0.0972	6.10.4.2.2-1	15.80	1.07	0.2606	6.10.4.2.2-2
353.752	5.300	15.80	1.07	0.1291	6.10.4.2.2-1	15.80	1.07	0.3185	6.10.4.2.2-2
357.593	5.340	15.80	1.07	0.1582	6.10.4.2.2-1	15.80	1.07	0.3717	6.10.4.2.2-2
363.277	5.400	15.80	1.07	0.1896	6.10.4.2.2-1	15.80	1.07	0.4291	6.10.4.2.2-2
364.926	5.417	15.80	1.07	0.1961	6.10.4.2.2-1	15.80	1.07	0.4412	6.10.4.2.2-2
372.260	5.494	15.80	1.07	0.2099	6.10.4.2.2-1	15.80	1.07	0.4660	6.10.4.2.2-2
372.802	5.500	15.80	1.07	0.2098	6.10.4.2.2-1	15.80	1.07	0.4651	6.10.4.2.2-2
379.593	5.571	15.80	1.07	0.2006	6.10.4.2.2-1	15.80	1.07	0.4497	6.10.4.2.2-2
382.327	5.600	15.80	1.07	0.1911	6.10.4.2.2-1	15.80	1.07	0.4333	6.10.4.2.2-2
386.927	5.648	15.80	1.07	0.1674	6.10.4.2.2-1	15.80	1.07	0.3902	6.10.4.2.2-2
391.852	5.700	15.80	1.07	0.1320	6.10.4.2.2-1	15.80	1.07	0.3257	6.10.4.2.2-2
394.260	5.725	15.80	1.07	0.0626	6.10.4.2.2-1	15.80	1.07	0.0006	6.10.4.2.2-2
394.260	5.725	15.80	1.07	0.1107	6.10.4.2.2-1	15.80	1.07	0.2864	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0432	6.10.4.2.2-1	15.80	1.07	0.0244	6.10.4.2.2-2
396.504	5.749	15.80	1.07	0.0882	6.10.4.2.2-1	15.80	1.07	0.2444	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0414	6.10.4.2.2-1	15.80	1.07	0.0266	6.10.4.2.2-2
396.704	5.751	15.80	1.07	0.0862	6.10.4.2.2-1	15.80	1.07	0.2410	6.10.4.2.2-2
397.691	5.761	15.80	1.07	0.0322	6.10.4.2.2-1	15.80	1.07	0.0378	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
397.691	5.761	15.80	1.07	0.0760	6.10.4.2.2-1	15.80	1.07	0.2237	6.10.4.2.2-2
401.123	5.797	15.80	1.07	0.0028	6.10.4.2.2-1	15.80	1.07	0.0810	6.10.4.2.2-2
401.123	5.797	15.80	1.07	0.0360	6.10.4.2.2-1	15.80	1.07	0.1506	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0062	6.10.4.2.2-1	15.80	1.07	0.0881	6.10.4.2.2-2
401.377	5.800	15.80	1.07	0.0330	6.10.4.2.2-1	15.80	1.07	0.1456	6.10.4.2.2-2
404.962	5.838	15.80	1.07	0.0489	6.10.4.2.2-1	15.80	1.07	0.1455	6.10.4.2.2-2
404.962	5.838	15.80	1.07	0.0127	6.10.4.2.2-1	15.80	1.07	0.0706	6.10.4.2.2-2
408.802	5.878	15.80	1.07	0.1034	6.10.4.2.2-1	15.80	1.07	0.2336	6.10.4.2.2-2
410.902	5.900	15.80	1.07	0.3050	6.10.4.2.2-1	15.80	1.07	0.3352	6.10.4.2.2-2
412.614	5.918	15.80	1.07	0.3560	6.10.4.2.2-1	15.80	1.07	0.3901	6.10.4.2.2-2
416.427	5.958	15.80	1.07	0.4796	6.10.4.2.2-1	15.80	1.07	0.5234	6.10.4.2.2-2
418.427	5.979	15.80	1.07	0.5496	6.10.4.2.2-1	15.80	1.07	0.5990	6.10.4.2.2-2
420.327	5.999	15.80	1.07	0.6190	6.10.4.2.2-1	15.80	1.07	0.6738	6.10.4.2.2-2
420.427	6.000	15.80	1.07	0.6227	6.10.4.2.2-1	15.80	1.07	0.6778	6.10.4.2.2-2
420.527	6.001	15.80	1.07	0.6191	6.10.4.2.2-1	15.80	1.07	0.6739	6.10.4.2.2-2
426.306	6.086	15.80	1.07	0.4269	6.10.4.2.2-1	15.80	1.07	0.4661	6.10.4.2.2-2
427.245	6.100	15.80	1.07	0.3988	6.10.4.2.2-1	15.80	1.07	0.4358	6.10.4.2.2-2
432.186	6.172	15.80	1.07	0.2933	6.10.4.2.2-1	15.80	1.07	0.3244	6.10.4.2.2-2
432.186	6.172	15.80	1.07	0.0737	6.10.4.2.2-1	15.80	1.07	0.0072	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.0982	6.10.4.2.2-1	15.80	1.07	0.2471	6.10.4.2.2-2
434.063	6.200	15.80	1.07	0.0483	6.10.4.2.2-1	15.80	1.07	0.0507	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0263	6.10.4.2.2-1	15.80	1.07	0.1559	6.10.4.2.2-2
440.880	6.300	15.80	1.07	0.0317	6.10.4.2.2-1	15.80	1.07	0.1899	6.10.4.2.2-2
441.019	6.302	15.80	1.07	0.0250	6.10.4.2.2-1	15.80	1.07	0.1541	6.10.4.2.2-2
441.019	6.302	15.80	1.07	0.0330	6.10.4.2.2-1	15.80	1.07	0.1921	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0297	6.10.4.2.2-1	15.80	1.07	0.0763	6.10.4.2.2-2
447.698	6.400	15.80	1.07	0.0925	6.10.4.2.2-1	15.80	1.07	0.2989	6.10.4.2.2-2
449.852	6.432	15.80	1.07	0.0438	6.10.4.2.2-1	15.80	1.07	0.0550	6.10.4.2.2-2
449.852	6.432	15.80	1.07	0.1074	6.10.4.2.2-1	15.80	1.07	0.3245	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.0682	6.10.4.2.2-1	15.80	1.07	0.0158	6.10.4.2.2-2
454.516	6.500	15.80	1.07	0.1316	6.10.4.2.2-1	15.80	1.07	0.3625	6.10.4.2.2-2
458.686	6.561	15.80	1.07	0.1447	6.10.4.2.2-1	15.80	1.07	0.3786	6.10.4.2.2-2

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
461.333	6.600	15.80	1.07	0.1491	6.10.4.2.2-1	15.80	1.07	0.3818	6.10.4.2.2-2
467.519	6.691	15.80	1.07	0.1472	6.10.4.2.2-1	15.80	1.07	0.3658	6.10.4.2.2-2
468.151	6.700	15.80	1.07	0.1459	6.10.4.2.2-1	15.80	1.07	0.3616	6.10.4.2.2-2
471.790	6.753	15.80	1.07	0.1352	6.10.4.2.2-1	15.80	1.07	0.3324	6.10.4.2.2-2
474.969	6.800	15.80	1.07	0.1200	6.10.4.2.2-1	15.80	1.07	0.2918	6.10.4.2.2-2
476.061	6.816	15.80	1.07	0.1144	6.10.4.2.2-1	15.80	1.07	0.2796	6.10.4.2.2-2
480.332	6.879	15.80	1.07	0.0842	6.10.4.2.2-1	15.80	1.07	0.2048	6.10.4.2.2-2
481.786	6.900	15.80	1.07	0.0719	6.10.4.2.2-1	15.80	1.07	0.1748	6.10.4.2.2-2
484.603	6.941	15.80	1.07	0.0451	6.10.4.2.2-1	15.80	1.07	0.1091	6.10.4.2.2-2
486.603	6.971	15.80	1.07	0.0235	6.10.4.2.2-1	15.80	1.07	0.0569	6.10.4.2.2-2
488.504	6.999	15.80	1.07	0.0012	6.10.4.2.2-1	15.80	1.07	0.0030	6.10.4.2.2-2
488.604	7.000	15.80	1.07	0.0000	6.10.4.2.2-1	15.80	1.07	0.0000	6.10.4.2.2-2

Load combination: Final Default Fatigue

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	0.0926	6.10.5.3-1	15.80	1.07	0.0926	6.10.5.3-1
0.100	1.002	15.80	1.07	0.0880	6.10.5.3-1	15.80	1.07	0.0880	6.10.5.3-1
5.671	1.087	15.80	1.07	0.0899	6.6.1.2.2-1	15.80	1.07	0.0899	6.6.1.2.2-1
6.515	1.100	15.80	1.07	0.0980	6.6.1.2.2-1	15.80	1.07	0.0980	6.6.1.2.2-1
11.342	1.174	15.80	1.07	0.2144	6.6.1.2.2-1	15.80	1.07	0.2144	6.6.1.2.2-1
13.029	1.200	15.80	1.07	0.1676	6.6.1.2.2-1	15.80	1.07	0.1676	6.6.1.2.2-1
19.544	1.300	15.80	1.07	0.2205	6.6.1.2.2-1	15.80	1.07	0.2205	6.6.1.2.2-1
19.649	1.301	15.80	1.07	0.2213	6.6.1.2.2-1	15.80	1.07	0.2213	6.6.1.2.2-1
26.071	1.400	15.80	1.07	0.2462	6.6.1.2.2-1	15.80	1.07	0.2462	6.6.1.2.2-1
27.957	1.429	15.80	1.07	0.3464	6.6.1.2.2-1	15.80	1.07	0.3464	6.6.1.2.2-1
32.589	1.500	15.80	1.07	0.2487	6.6.1.2.2-1	15.80	1.07	0.2487	6.6.1.2.2-1
36.248	1.556	15.80	1.07	0.2587	6.6.1.2.2-1	15.80	1.07	0.2587	6.6.1.2.2-1
39.106	1.600	15.80	1.07	0.2605	6.6.1.2.2-1	15.80	1.07	0.2605	6.6.1.2.2-1
44.540	1.683	15.80	1.07	0.3490	6.6.1.2.2-1	15.80	1.07	0.3490	6.6.1.2.2-1
44.540	1.683	15.80	1.07	0.3490	6.6.1.2.2-1	15.80	1.07	0.3490	6.6.1.2.2-1
45.624	1.700	15.80	1.07	0.2474	6.6.1.2.2-1	15.80	1.07	0.2474	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
45.624	1.700	15.80	1.07	0.2474	6.6.1.2.2-1	15.80	1.07	0.2474	6.6.1.2.2-1
48.707	1.747	15.80	1.07	0.2323	6.6.1.2.2-1	15.80	1.07	0.2323	6.6.1.2.2-1
48.707	1.747	15.80	1.07	0.2323	6.6.1.2.2-1	15.80	1.07	0.2323	6.6.1.2.2-1
52.142	1.800	15.80	1.07	0.2042	6.6.1.2.2-1	15.80	1.07	0.2042	6.6.1.2.2-1
52.873	1.811	15.80	1.07	0.2759	6.6.1.2.2-1	15.80	1.07	0.2759	6.6.1.2.2-1
57.040	1.875	15.80	1.07	0.1110	6.10.5.3-1	15.80	1.07	0.1110	6.10.5.3-1
58.659	1.900	15.80	1.07	0.1161	6.10.5.3-1	15.80	1.07	0.1161	6.10.5.3-1
61.207	1.939	15.80	1.07	0.1228	6.10.5.3-1	15.80	1.07	0.1228	6.10.5.3-1
63.192	1.970	15.80	1.07	0.1288	6.10.5.3-1	15.80	1.07	0.1288	6.10.5.3-1
65.077	1.998	15.80	1.07	0.1339	6.10.5.3-1	15.80	1.07	0.1339	6.10.5.3-1
65.177	2.000	15.80	1.07	0.1402	6.10.5.3-1	15.80	1.07	0.1402	6.10.5.3-1
65.277	2.001	15.80	1.07	0.1436	6.10.5.3-1	15.80	1.07	0.1436	6.10.5.3-1
70.135	2.054	15.80	1.07	0.1308	6.10.5.3-1	15.80	1.07	0.1308	6.10.5.3-1
74.377	2.100	15.80	1.07	0.1197	6.10.5.3-1	15.80	1.07	0.1197	6.10.5.3-1
75.092	2.108	15.80	1.07	0.1174	6.10.5.3-1	15.80	1.07	0.1174	6.10.5.3-1
80.384	2.165	15.80	1.07	0.1358	6.6.1.2.2-1	15.80	1.07	0.1358	6.6.1.2.2-1
83.577	2.200	15.80	1.07	0.1591	6.6.1.2.2-1	15.80	1.07	0.1591	6.6.1.2.2-1
83.577	2.200	15.80	1.07	0.1591	6.6.1.2.2-1	15.80	1.07	0.1591	6.6.1.2.2-1
85.675	2.223	15.80	1.07	0.2372	6.6.1.2.2-1	15.80	1.07	0.2372	6.6.1.2.2-1
87.899	2.247	15.80	1.07	0.1846	6.6.1.2.2-1	15.80	1.07	0.1846	6.6.1.2.2-1
88.099	2.249	15.80	1.07	0.1852	6.6.1.2.2-1	15.80	1.07	0.1852	6.6.1.2.2-1
92.777	2.300	15.80	1.07	0.2055	6.6.1.2.2-1	15.80	1.07	0.2055	6.6.1.2.2-1
94.175	2.315	15.80	1.07	0.2132	6.6.1.2.2-1	15.80	1.07	0.2132	6.6.1.2.2-1
101.977	2.400	15.80	1.07	0.2306	6.6.1.2.2-1	15.80	1.07	0.2306	6.6.1.2.2-1
102.675	2.408	15.80	1.07	0.3195	6.6.1.2.2-1	15.80	1.07	0.3195	6.6.1.2.2-1
111.175	2.500	15.80	1.07	0.2231	6.6.1.2.2-1	15.80	1.07	0.2231	6.6.1.2.2-1
119.675	2.592	15.80	1.07	0.3236	6.6.1.2.2-1	15.80	1.07	0.3236	6.6.1.2.2-1
120.377	2.600	15.80	1.07	0.2314	6.6.1.2.2-1	15.80	1.07	0.2314	6.6.1.2.2-1
128.175	2.685	15.80	1.07	0.2128	6.6.1.2.2-1	15.80	1.07	0.2128	6.6.1.2.2-1
129.577	2.700	15.80	1.07	0.2078	6.6.1.2.2-1	15.80	1.07	0.2078	6.6.1.2.2-1
136.675	2.777	15.80	1.07	0.2385	6.6.1.2.2-1	15.80	1.07	0.2385	6.6.1.2.2-1
138.777	2.800	15.80	1.07	0.1560	6.6.1.2.2-1	15.80	1.07	0.1560	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
138.777	2.800	15.80	1.07	0.1560	6.6.1.2.2-1	15.80	1.07	0.1560	6.6.1.2.2-1
140.800	2.822	15.80	1.07	0.1419	6.6.1.2.2-1	15.80	1.07	0.1419	6.6.1.2.2-1
140.800	2.822	15.80	1.07	0.1419	6.6.1.2.2-1	15.80	1.07	0.1419	6.6.1.2.2-1
144.925	2.867	15.80	1.07	0.1141	6.10.5.3-1	15.80	1.07	0.1141	6.10.5.3-1
147.977	2.900	15.80	1.07	0.1215	6.10.5.3-1	15.80	1.07	0.1215	6.10.5.3-1
149.050	2.912	15.80	1.07	0.1249	6.10.5.3-1	15.80	1.07	0.1249	6.10.5.3-1
153.175	2.957	15.80	1.07	0.1359	6.10.5.3-1	15.80	1.07	0.1359	6.10.5.3-1
155.176	2.978	15.80	1.07	0.1411	6.10.5.3-1	15.80	1.07	0.1411	6.10.5.3-1
157.077	2.999	15.80	1.07	0.1463	6.10.5.3-1	15.80	1.07	0.1463	6.10.5.3-1
157.177	3.000	15.80	1.07	0.1469	6.10.5.3-1	15.80	1.07	0.1469	6.10.5.3-1
157.277	3.001	15.80	1.07	0.1347	6.10.5.3-1	15.80	1.07	0.1347	6.10.5.3-1
162.135	3.059	15.80	1.07	0.1216	6.10.5.3-1	15.80	1.07	0.1216	6.10.5.3-1
165.577	3.100	15.80	1.07	0.1118	6.10.5.3-1	15.80	1.07	0.1118	6.10.5.3-1
167.092	3.118	15.80	1.07	0.1059	6.10.5.3-1	15.80	1.07	0.1059	6.10.5.3-1
173.977	3.200	15.80	1.07	0.2018	6.6.1.2.2-1	15.80	1.07	0.2018	6.6.1.2.2-1
175.759	3.221	15.80	1.07	0.2104	6.6.1.2.2-1	15.80	1.07	0.2104	6.6.1.2.2-1
175.759	3.221	15.80	1.07	0.2104	6.6.1.2.2-1	15.80	1.07	0.2104	6.6.1.2.2-1
182.377	3.300	15.80	1.07	0.2233	6.6.1.2.2-1	15.80	1.07	0.2233	6.6.1.2.2-1
184.425	3.324	15.80	1.07	0.3103	6.6.1.2.2-1	15.80	1.07	0.3103	6.6.1.2.2-1
186.649	3.351	15.80	1.07	0.2202	6.6.1.2.2-1	15.80	1.07	0.2202	6.6.1.2.2-1
186.849	3.353	15.80	1.07	0.2191	6.6.1.2.2-1	15.80	1.07	0.2191	6.6.1.2.2-1
190.777	3.400	15.80	1.07	0.2108	6.6.1.2.2-1	15.80	1.07	0.2108	6.6.1.2.2-1
193.342	3.431	15.80	1.07	0.2018	6.6.1.2.2-1	15.80	1.07	0.2018	6.6.1.2.2-1
199.177	3.500	15.80	1.07	0.1830	6.6.1.2.2-1	15.80	1.07	0.1830	6.6.1.2.2-1
202.259	3.537	15.80	1.07	0.2398	6.6.1.2.2-1	15.80	1.07	0.2398	6.6.1.2.2-1
207.577	3.600	15.80	1.07	0.1383	6.6.1.2.2-1	15.80	1.07	0.1383	6.6.1.2.2-1
211.175	3.643	15.80	1.07	0.1081	6.6.1.2.2-1	15.80	1.07	0.1081	6.6.1.2.2-1
215.977	3.700	15.80	1.07	0.0762	6.6.1.2.2-1	15.80	1.07	0.0762	6.6.1.2.2-1
220.092	3.749	15.80	1.07	0.0998	6.6.1.2.2-1	15.80	1.07	0.0998	6.6.1.2.2-1
224.363	3.800	15.80	1.07	0.0922	6.10.5.3-1	15.80	1.07	0.0922	6.10.5.3-1
224.363	3.800	15.80	1.07	0.0922	6.10.5.3-1	15.80	1.07	0.0922	6.10.5.3-1
224.377	3.800	15.80	1.07	0.0940	6.10.5.3-1	15.80	1.07	0.0940	6.10.5.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
224.377	3.800	15.80	1.07	0.0940	6.10.5.3-1	15.80	1.07	0.0940	6.10.5.3-1
228.634	3.851	15.80	1.07	0.1831	6.6.1.2.2-1	15.80	1.07	0.1831	6.6.1.2.2-1
232.777	3.900	15.80	1.07	0.1168	6.10.5.3-1	15.80	1.07	0.1168	6.10.5.3-1
232.905	3.902	15.80	1.07	0.1171	6.10.5.3-1	15.80	1.07	0.1171	6.10.5.3-1
237.175	3.952	15.80	1.07	0.1280	6.10.5.3-1	15.80	1.07	0.1280	6.10.5.3-1
239.176	3.976	15.80	1.07	0.1330	6.10.5.3-1	15.80	1.07	0.1330	6.10.5.3-1
241.077	3.999	15.80	1.07	0.1378	6.10.5.3-1	15.80	1.07	0.1378	6.10.5.3-1
241.177	4.000	15.80	1.07	0.1384	6.10.5.3-1	15.80	1.07	0.1384	6.10.5.3-1
241.277	4.001	15.80	1.07	0.1360	6.10.5.3-1	15.80	1.07	0.1360	6.10.5.3-1
247.051	4.070	15.80	1.07	0.1222	6.10.5.3-1	15.80	1.07	0.1222	6.10.5.3-1
249.577	4.100	15.80	1.07	0.1159	6.10.5.3-1	15.80	1.07	0.1159	6.10.5.3-1
252.925	4.140	15.80	1.07	0.2032	6.6.1.2.2-1	15.80	1.07	0.2032	6.6.1.2.2-1
257.977	4.200	15.80	1.07	0.0911	6.10.5.3-1	15.80	1.07	0.0911	6.10.5.3-1
257.977	4.200	15.80	1.07	0.0911	6.10.5.3-1	15.80	1.07	0.0911	6.10.5.3-1
261.842	4.246	15.80	1.07	0.0826	6.10.5.3-1	15.80	1.07	0.0826	6.10.5.3-1
266.377	4.300	15.80	1.07	0.0761	6.6.1.2.2-1	15.80	1.07	0.0761	6.6.1.2.2-1
270.759	4.352	15.80	1.07	0.1471	6.6.1.2.2-1	15.80	1.07	0.1471	6.6.1.2.2-1
274.777	4.400	15.80	1.07	0.1362	6.6.1.2.2-1	15.80	1.07	0.1362	6.6.1.2.2-1
279.675	4.458	15.80	1.07	0.1712	6.6.1.2.2-1	15.80	1.07	0.1712	6.6.1.2.2-1
283.177	4.500	15.80	1.07	0.1865	6.6.1.2.2-1	15.80	1.07	0.1865	6.6.1.2.2-1
288.592	4.564	15.80	1.07	0.2862	6.6.1.2.2-1	15.80	1.07	0.2862	6.6.1.2.2-1
291.577	4.600	15.80	1.07	0.2172	6.6.1.2.2-1	15.80	1.07	0.2172	6.6.1.2.2-1
295.504	4.647	15.80	1.07	0.2258	6.6.1.2.2-1	15.80	1.07	0.2258	6.6.1.2.2-1
295.704	4.649	15.80	1.07	0.2269	6.6.1.2.2-1	15.80	1.07	0.2269	6.6.1.2.2-1
296.655	4.660	15.80	1.07	0.2263	6.6.1.2.2-1	15.80	1.07	0.2263	6.6.1.2.2-1
299.977	4.700	15.80	1.07	0.2303	6.6.1.2.2-1	15.80	1.07	0.2303	6.6.1.2.2-1
304.717	4.756	15.80	1.07	0.3090	6.6.1.2.2-1	15.80	1.07	0.3090	6.6.1.2.2-1
304.717	4.756	15.80	1.07	0.3090	6.6.1.2.2-1	15.80	1.07	0.3090	6.6.1.2.2-1
308.377	4.800	15.80	1.07	0.2087	6.6.1.2.2-1	15.80	1.07	0.2087	6.6.1.2.2-1
308.832	4.805	15.80	1.07	0.2054	6.6.1.2.2-1	15.80	1.07	0.2054	6.6.1.2.2-1
312.946	4.854	15.80	1.07	0.1013	6.10.5.3-1	15.80	1.07	0.1013	6.10.5.3-1
316.777	4.900	15.80	1.07	0.1126	6.10.5.3-1	15.80	1.07	0.1126	6.10.5.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
317.061	4.903	15.80	1.07	0.1131	6.10.5.3-1	15.80	1.07	0.1131	6.10.5.3-1
321.175	4.952	15.80	1.07	0.1248	6.10.5.3-1	15.80	1.07	0.1248	6.10.5.3-1
323.176	4.976	15.80	1.07	0.1304	6.10.5.3-1	15.80	1.07	0.1304	6.10.5.3-1
325.077	4.999	15.80	1.07	0.1339	6.10.5.3-1	15.80	1.07	0.1339	6.10.5.3-1
325.177	5.000	15.80	1.07	0.1410	6.10.5.3-1	15.80	1.07	0.1410	6.10.5.3-1
325.277	5.001	15.80	1.07	0.1493	6.10.5.3-1	15.80	1.07	0.1493	6.10.5.3-1
330.385	5.055	15.80	1.07	0.1353	6.10.5.3-1	15.80	1.07	0.1353	6.10.5.3-1
334.702	5.100	15.80	1.07	0.1246	6.10.5.3-1	15.80	1.07	0.1246	6.10.5.3-1
335.592	5.109	15.80	1.07	0.1203	6.10.5.3-1	15.80	1.07	0.1203	6.10.5.3-1
342.926	5.186	15.80	1.07	0.1461	6.6.1.2.2-1	15.80	1.07	0.1461	6.6.1.2.2-1
342.926	5.186	15.80	1.07	0.1461	6.6.1.2.2-1	15.80	1.07	0.1461	6.6.1.2.2-1
344.227	5.200	15.80	1.07	0.1581	6.6.1.2.2-1	15.80	1.07	0.1581	6.6.1.2.2-1
344.227	5.200	15.80	1.07	0.1581	6.6.1.2.2-1	15.80	1.07	0.1581	6.6.1.2.2-1
350.259	5.263	15.80	1.07	0.2711	6.6.1.2.2-1	15.80	1.07	0.2711	6.6.1.2.2-1
353.752	5.300	15.80	1.07	0.2100	6.6.1.2.2-1	15.80	1.07	0.2100	6.6.1.2.2-1
357.593	5.340	15.80	1.07	0.2240	6.6.1.2.2-1	15.80	1.07	0.2240	6.6.1.2.2-1
363.277	5.400	15.80	1.07	0.2330	6.6.1.2.2-1	15.80	1.07	0.2330	6.6.1.2.2-1
364.926	5.417	15.80	1.07	0.3281	6.6.1.2.2-1	15.80	1.07	0.3281	6.6.1.2.2-1
372.260	5.494	15.80	1.07	0.2332	6.6.1.2.2-1	15.80	1.07	0.2332	6.6.1.2.2-1
372.802	5.500	15.80	1.07	0.2319	6.6.1.2.2-1	15.80	1.07	0.2319	6.6.1.2.2-1
379.593	5.571	15.80	1.07	0.3363	6.6.1.2.2-1	15.80	1.07	0.3363	6.6.1.2.2-1
382.327	5.600	15.80	1.07	0.2397	6.6.1.2.2-1	15.80	1.07	0.2397	6.6.1.2.2-1
386.927	5.648	15.80	1.07	0.2314	6.6.1.2.2-1	15.80	1.07	0.2314	6.6.1.2.2-1
391.852	5.700	15.80	1.07	0.2177	6.6.1.2.2-1	15.80	1.07	0.2177	6.6.1.2.2-1
394.260	5.725	15.80	1.07	0.2893	6.6.1.2.2-1	15.80	1.07	0.2893	6.6.1.2.2-1
396.504	5.749	15.80	1.07	0.1933	6.6.1.2.2-1	15.80	1.07	0.1933	6.6.1.2.2-1
396.704	5.751	15.80	1.07	0.1929	6.6.1.2.2-1	15.80	1.07	0.1929	6.6.1.2.2-1
397.691	5.761	15.80	1.07	0.1889	6.6.1.2.2-1	15.80	1.07	0.1889	6.6.1.2.2-1
401.123	5.797	15.80	1.07	0.2320	6.6.1.2.2-1	15.80	1.07	0.2320	6.6.1.2.2-1
401.123	5.797	15.80	1.07	0.2320	6.6.1.2.2-1	15.80	1.07	0.2320	6.6.1.2.2-1
401.377	5.800	15.80	1.07	0.1676	6.6.1.2.2-1	15.80	1.07	0.1676	6.6.1.2.2-1
401.377	5.800	15.80	1.07	0.1676	6.6.1.2.2-1	15.80	1.07	0.1676	6.6.1.2.2-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
404.962	5.838	15.80	1.07	0.1411	6.6.1.2.2-1	15.80	1.07	0.1411	6.6.1.2.2-1
408.802	5.878	15.80	1.07	0.1187	6.10.5.3-1	15.80	1.07	0.1187	6.10.5.3-1
410.902	5.900	15.80	1.07	0.1242	6.10.5.3-1	15.80	1.07	0.1242	6.10.5.3-1
412.614	5.918	15.80	1.07	0.1291	6.10.5.3-1	15.80	1.07	0.1291	6.10.5.3-1
416.427	5.958	15.80	1.07	0.1383	6.10.5.3-1	15.80	1.07	0.1383	6.10.5.3-1
418.427	5.979	15.80	1.07	0.1443	6.10.5.3-1	15.80	1.07	0.1443	6.10.5.3-1
420.327	5.999	15.80	1.07	0.1494	6.10.5.3-1	15.80	1.07	0.1494	6.10.5.3-1
420.427	6.000	15.80	1.07	0.1500	6.10.5.3-1	15.80	1.07	0.1500	6.10.5.3-1
420.527	6.001	15.80	1.07	0.1371	6.10.5.3-1	15.80	1.07	0.1371	6.10.5.3-1
426.306	6.086	15.80	1.07	0.1225	6.10.5.3-1	15.80	1.07	0.1225	6.10.5.3-1
427.245	6.100	15.80	1.07	0.1196	6.10.5.3-1	15.80	1.07	0.1196	6.10.5.3-1
432.186	6.172	15.80	1.07	0.1051	6.10.5.3-1	15.80	1.07	0.1051	6.10.5.3-1
434.063	6.200	15.80	1.07	0.2112	6.6.1.2.2-1	15.80	1.07	0.2112	6.6.1.2.2-1
440.880	6.300	15.80	1.07	0.2536	6.6.1.2.2-1	15.80	1.07	0.2536	6.6.1.2.2-1
440.880	6.300	15.80	1.07	0.2536	6.6.1.2.2-1	15.80	1.07	0.2536	6.6.1.2.2-1
441.019	6.302	15.80	1.07	0.2534	6.6.1.2.2-1	15.80	1.07	0.2534	6.6.1.2.2-1
441.019	6.302	15.80	1.07	0.2534	6.6.1.2.2-1	15.80	1.07	0.2534	6.6.1.2.2-1
447.698	6.400	15.80	1.07	0.2718	6.6.1.2.2-1	15.80	1.07	0.2718	6.6.1.2.2-1
449.852	6.432	15.80	1.07	0.3806	6.6.1.2.2-1	15.80	1.07	0.3806	6.6.1.2.2-1
454.516	6.500	15.80	1.07	0.2613	6.6.1.2.2-1	15.80	1.07	0.2613	6.6.1.2.2-1
458.686	6.561	15.80	1.07	0.2581	6.6.1.2.2-1	15.80	1.07	0.2581	6.6.1.2.2-1
461.333	6.600	15.80	1.07	0.2559	6.6.1.2.2-1	15.80	1.07	0.2559	6.6.1.2.2-1
467.519	6.691	15.80	1.07	0.3262	6.6.1.2.2-1	15.80	1.07	0.3262	6.6.1.2.2-1
468.151	6.700	15.80	1.07	0.2308	6.6.1.2.2-1	15.80	1.07	0.2308	6.6.1.2.2-1
471.790	6.753	15.80	1.07	0.2038	6.6.1.2.2-1	15.80	1.07	0.2038	6.6.1.2.2-1
474.969	6.800	15.80	1.07	0.1757	6.6.1.2.2-1	15.80	1.07	0.1757	6.6.1.2.2-1
476.061	6.816	15.80	1.07	0.2379	6.6.1.2.2-1	15.80	1.07	0.2379	6.6.1.2.2-1
480.332	6.879	15.80	1.07	0.1241	6.6.1.2.2-1	15.80	1.07	0.1241	6.6.1.2.2-1
481.786	6.900	15.80	1.07	0.1063	6.6.1.2.2-1	15.80	1.07	0.1063	6.6.1.2.2-1
484.603	6.941	15.80	1.07	0.0928	6.6.1.2.2-1	15.80	1.07	0.0928	6.6.1.2.2-1
486.603	6.971	15.80	1.07	0.0885	6.10.5.3-1	15.80	1.07	0.0885	6.10.5.3-1
488.504	6.999	15.80	1.07	0.0949	6.10.5.3-1	15.80	1.07	0.0949	6.10.5.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
488.604	7.000	15.80	1.07	0.0955	6.10.5.3-1	15.80	1.07	0.0955	6.10.5.3-1

Load combination: Final Default Service I (Deflection)

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
0.000	1.000	15.80	1.07	---	---	15.80	1.07	---	---
0.100	1.002	15.80	1.07	---	---	15.80	1.07	---	---
5.671	1.087	15.80	1.07	---	---	15.80	1.07	---	---
6.515	1.100	15.80	1.07	---	---	15.80	1.07	---	---
11.342	1.174	15.80	1.07	---	---	15.80	1.07	---	---
13.029	1.200	15.80	1.07	---	---	15.80	1.07	---	---
19.544	1.300	15.80	1.07	---	---	15.80	1.07	---	---
19.649	1.301	15.80	1.07	---	---	15.80	1.07	---	---
26.071	1.400	15.80	1.07	---	---	15.80	1.07	---	---
27.957	1.429	15.80	1.07	---	---	15.80	1.07	---	---
32.589	1.500	15.80	1.07	---	---	15.80	1.07	---	---
36.248	1.556	15.80	1.07	---	---	15.80	1.07	---	---
39.106	1.600	15.80	1.07	---	---	15.80	1.07	---	---
44.540	1.683	15.80	1.07	---	---	15.80	1.07	---	---
45.624	1.700	15.80	1.07	---	---	15.80	1.07	---	---
48.707	1.747	15.80	1.07	---	---	15.80	1.07	---	---
52.142	1.800	15.80	1.07	---	---	15.80	1.07	---	---
52.873	1.811	15.80	1.07	---	---	15.80	1.07	---	---
57.040	1.875	15.80	1.07	---	---	15.80	1.07	---	---
58.659	1.900	15.80	1.07	---	---	15.80	1.07	---	---
61.207	1.939	15.80	1.07	---	---	15.80	1.07	---	---
63.192	1.970	15.80	1.07	---	---	15.80	1.07	---	---
65.077	1.998	15.80	1.07	---	---	15.80	1.07	---	---
65.177	2.000	15.80	1.07	---	---	15.80	1.07	---	---
65.277	2.001	15.80	1.07	---	---	15.80	1.07	---	---
70.135	2.054	15.80	1.07	---	---	15.80	1.07	---	---
74.377	2.100	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
75.092	2.108	15.80	1.07	---	---	15.80	1.07	---	---
80.384	2.165	15.80	1.07	---	---	15.80	1.07	---	---
83.577	2.200	15.80	1.07	---	---	15.80	1.07	---	---
85.675	2.223	15.80	1.07	---	---	15.80	1.07	---	---
87.899	2.247	15.80	1.07	---	---	15.80	1.07	---	---
88.099	2.249	15.80	1.07	---	---	15.80	1.07	---	---
92.777	2.300	15.80	1.07	---	---	15.80	1.07	---	---
94.175	2.315	15.80	1.07	---	---	15.80	1.07	---	---
101.977	2.400	15.80	1.07	---	---	15.80	1.07	---	---
102.675	2.408	15.80	1.07	---	---	15.80	1.07	---	---
111.175	2.500	15.80	1.07	---	---	15.80	1.07	---	---
119.675	2.592	15.80	1.07	---	---	15.80	1.07	---	---
120.377	2.600	15.80	1.07	---	---	15.80	1.07	---	---
128.175	2.685	15.80	1.07	---	---	15.80	1.07	---	---
129.577	2.700	15.80	1.07	---	---	15.80	1.07	---	---
136.675	2.777	15.80	1.07	---	---	15.80	1.07	---	---
138.777	2.800	15.80	1.07	---	---	15.80	1.07	---	---
140.800	2.822	15.80	1.07	---	---	15.80	1.07	---	---
144.925	2.867	15.80	1.07	---	---	15.80	1.07	---	---
147.977	2.900	15.80	1.07	---	---	15.80	1.07	---	---
149.050	2.912	15.80	1.07	---	---	15.80	1.07	---	---
153.175	2.957	15.80	1.07	---	---	15.80	1.07	---	---
155.176	2.978	15.80	1.07	---	---	15.80	1.07	---	---
157.077	2.999	15.80	1.07	---	---	15.80	1.07	---	---
157.177	3.000	15.80	1.07	---	---	15.80	1.07	---	---
157.277	3.001	15.80	1.07	---	---	15.80	1.07	---	---
162.135	3.059	15.80	1.07	---	---	15.80	1.07	---	---
165.577	3.100	15.80	1.07	---	---	15.80	1.07	---	---
167.092	3.118	15.80	1.07	---	---	15.80	1.07	---	---
173.977	3.200	15.80	1.07	---	---	15.80	1.07	---	---
175.759	3.221	15.80	1.07	---	---	15.80	1.07	---	---
182.377	3.300	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
184.425	3.324	15.80	1.07	---	---	15.80	1.07	---	---
186.649	3.351	15.80	1.07	---	---	15.80	1.07	---	---
186.849	3.353	15.80	1.07	---	---	15.80	1.07	---	---
190.777	3.400	15.80	1.07	---	---	15.80	1.07	---	---
193.342	3.431	15.80	1.07	---	---	15.80	1.07	---	---
199.177	3.500	15.80	1.07	---	---	15.80	1.07	---	---
202.259	3.537	15.80	1.07	---	---	15.80	1.07	---	---
207.577	3.600	15.80	1.07	---	---	15.80	1.07	---	---
211.175	3.643	15.80	1.07	---	---	15.80	1.07	---	---
215.977	3.700	15.80	1.07	---	---	15.80	1.07	---	---
220.092	3.749	15.80	1.07	---	---	15.80	1.07	---	---
224.363	3.800	15.80	1.07	---	---	15.80	1.07	---	---
224.377	3.800	15.80	1.07	---	---	15.80	1.07	---	---
228.634	3.851	15.80	1.07	---	---	15.80	1.07	---	---
232.777	3.900	15.80	1.07	---	---	15.80	1.07	---	---
232.905	3.902	15.80	1.07	---	---	15.80	1.07	---	---
237.175	3.952	15.80	1.07	---	---	15.80	1.07	---	---
239.176	3.976	15.80	1.07	---	---	15.80	1.07	---	---
241.077	3.999	15.80	1.07	---	---	15.80	1.07	---	---
241.177	4.000	15.80	1.07	---	---	15.80	1.07	---	---
241.277	4.001	15.80	1.07	---	---	15.80	1.07	---	---
247.051	4.070	15.80	1.07	---	---	15.80	1.07	---	---
249.577	4.100	15.80	1.07	---	---	15.80	1.07	---	---
252.925	4.140	15.80	1.07	---	---	15.80	1.07	---	---
257.977	4.200	15.80	1.07	---	---	15.80	1.07	---	---
261.842	4.246	15.80	1.07	---	---	15.80	1.07	---	---
266.377	4.300	15.80	1.07	---	---	15.80	1.07	---	---
270.759	4.352	15.80	1.07	---	---	15.80	1.07	---	---
274.777	4.400	15.80	1.07	---	---	15.80	1.07	---	---
279.675	4.458	15.80	1.07	---	---	15.80	1.07	---	---
283.177	4.500	15.80	1.07	---	---	15.80	1.07	---	---
288.592	4.564	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
291.577	4.600	15.80	1.07	---	---	15.80	1.07	---	---
295.504	4.647	15.80	1.07	---	---	15.80	1.07	---	---
295.704	4.649	15.80	1.07	---	---	15.80	1.07	---	---
296.655	4.660	15.80	1.07	---	---	15.80	1.07	---	---
299.977	4.700	15.80	1.07	---	---	15.80	1.07	---	---
304.717	4.756	15.80	1.07	---	---	15.80	1.07	---	---
308.377	4.800	15.80	1.07	---	---	15.80	1.07	---	---
308.832	4.805	15.80	1.07	---	---	15.80	1.07	---	---
312.946	4.854	15.80	1.07	---	---	15.80	1.07	---	---
316.777	4.900	15.80	1.07	---	---	15.80	1.07	---	---
317.061	4.903	15.80	1.07	---	---	15.80	1.07	---	---
321.175	4.952	15.80	1.07	---	---	15.80	1.07	---	---
323.176	4.976	15.80	1.07	---	---	15.80	1.07	---	---
325.077	4.999	15.80	1.07	---	---	15.80	1.07	---	---
325.177	5.000	15.80	1.07	---	---	15.80	1.07	---	---
325.277	5.001	15.80	1.07	---	---	15.80	1.07	---	---
330.385	5.055	15.80	1.07	---	---	15.80	1.07	---	---
334.702	5.100	15.80	1.07	---	---	15.80	1.07	---	---
335.592	5.109	15.80	1.07	---	---	15.80	1.07	---	---
342.926	5.186	15.80	1.07	---	---	15.80	1.07	---	---
344.227	5.200	15.80	1.07	---	---	15.80	1.07	---	---
350.259	5.263	15.80	1.07	---	---	15.80	1.07	---	---
353.752	5.300	15.80	1.07	---	---	15.80	1.07	---	---
357.593	5.340	15.80	1.07	---	---	15.80	1.07	---	---
363.277	5.400	15.80	1.07	---	---	15.80	1.07	---	---
364.926	5.417	15.80	1.07	---	---	15.80	1.07	---	---
372.260	5.494	15.80	1.07	---	---	15.80	1.07	---	---
372.802	5.500	15.80	1.07	---	---	15.80	1.07	---	---
379.593	5.571	15.80	1.07	---	---	15.80	1.07	---	---
382.327	5.600	15.80	1.07	---	---	15.80	1.07	---	---
386.927	5.648	15.80	1.07	---	---	15.80	1.07	---	---
391.852	5.700	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
394.260	5.725	15.80	1.07	---	---	15.80	1.07	---	---
396.504	5.749	15.80	1.07	---	---	15.80	1.07	---	---
396.704	5.751	15.80	1.07	---	---	15.80	1.07	---	---
397.691	5.761	15.80	1.07	---	---	15.80	1.07	---	---
401.123	5.797	15.80	1.07	---	---	15.80	1.07	---	---
401.377	5.800	15.80	1.07	---	---	15.80	1.07	---	---
404.962	5.838	15.80	1.07	---	---	15.80	1.07	---	---
408.802	5.878	15.80	1.07	---	---	15.80	1.07	---	---
410.902	5.900	15.80	1.07	---	---	15.80	1.07	---	---
412.614	5.918	15.80	1.07	---	---	15.80	1.07	---	---
416.427	5.958	15.80	1.07	---	---	15.80	1.07	---	---
418.427	5.979	15.80	1.07	---	---	15.80	1.07	---	---
420.327	5.999	15.80	1.07	---	---	15.80	1.07	---	---
420.427	6.000	15.80	1.07	---	---	15.80	1.07	---	---
420.527	6.001	15.80	1.07	---	---	15.80	1.07	---	---
426.306	6.086	15.80	1.07	---	---	15.80	1.07	---	---
427.245	6.100	15.80	1.07	---	---	15.80	1.07	---	---
432.186	6.172	15.80	1.07	---	---	15.80	1.07	---	---
434.063	6.200	15.80	1.07	---	---	15.80	1.07	---	---
440.880	6.300	15.80	1.07	---	---	15.80	1.07	---	---
441.019	6.302	15.80	1.07	---	---	15.80	1.07	---	---
447.698	6.400	15.80	1.07	---	---	15.80	1.07	---	---
449.852	6.432	15.80	1.07	---	---	15.80	1.07	---	---
454.516	6.500	15.80	1.07	---	---	15.80	1.07	---	---
458.686	6.561	15.80	1.07	---	---	15.80	1.07	---	---
461.333	6.600	15.80	1.07	---	---	15.80	1.07	---	---
467.519	6.691	15.80	1.07	---	---	15.80	1.07	---	---
468.151	6.700	15.80	1.07	---	---	15.80	1.07	---	---
471.790	6.753	15.80	1.07	---	---	15.80	1.07	---	---
474.969	6.800	15.80	1.07	---	---	15.80	1.07	---	---
476.061	6.816	15.80	1.07	---	---	15.80	1.07	---	---
480.332	6.879	15.80	1.07	---	---	15.80	1.07	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Top Flange				Bottom Flange			
		Width (in)	Thickness (in)	Perf. Ratio	Control Equation	Width (in)	Thickness (in)	Perf. Ratio	Control Equation
481.786	6.900	15.80	1.07	---	---	15.80	1.07	---	---
484.603	6.941	15.80	1.07	---	---	15.80	1.07	---	---
486.603	6.971	15.80	1.07	---	---	15.80	1.07	---	---
488.504	6.999	15.80	1.07	---	---	15.80	1.07	---	---
488.604	7.000	15.80	1.07	---	---	15.80	1.07	---	---

Summary Shear Report

Load combination: Initial Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	11.3421	Unstiffened	---	---	0.0089	6.10.3.3-1
0.100	1.002	0.65	36.56	11.3421	Unstiffened	---	---	0.0084	6.10.3.3-1
5.671	1.087	0.65	36.56	11.3421	Unstiffened	---	---	0.0064	6.10.3.3-1
6.515	1.100	0.65	36.56	11.3421	Unstiffened	---	---	0.0061	6.10.3.3-1
11.342	1.174	0.65	36.56	16.6146	Unstiffened	---	---	0.0042	6.10.3.3-1
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	0.0036	6.10.3.3-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.0013	6.10.3.3-1
19.649	1.301	0.65	36.56	16.6146	Unstiffened	---	---	0.0012	6.10.3.3-1
26.071	1.400	0.65	36.56	16.6146	Unstiffened	---	---	0.0011	6.10.3.3-1
27.957	1.429	0.65	36.56	16.6146	Unstiffened	---	---	0.0020	6.10.3.3-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.0037	6.10.3.3-1
36.248	1.556	0.65	36.56	16.5834	Unstiffened	---	---	0.0050	6.10.3.3-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.0060	6.10.3.3-1
44.540	1.683	0.65	36.56	16.5834	Unstiffened	---	---	0.0083	6.10.3.3-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.0087	6.10.3.3-1
48.707	1.747	0.65	36.56	8.3333	Stiffened	---	---	0.0098	6.10.3.3-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.0110	6.10.3.3-1
52.873	1.811	0.65	36.56	8.3333	Stiffened	---	---	0.0116	6.10.3.3-1
57.040	1.875	0.65	36.56	8.3333	Stiffened	---	---	0.0131	6.10.3.3-1
58.659	1.900	0.65	36.56	8.3333	Stiffened	---	---	0.0136	6.10.3.3-1
61.207	1.939	0.65	36.56	8.3333	Stiffened	---	---	0.0147	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
63.192	1.970	0.65	36.56	3.9705	Stiffened	---	---	0.0155	6.10.3.3-1
65.077	1.998	0.65	36.56	3.9705	Stiffened	---	---	0.0161	6.10.3.3-1
65.177	2.000	0.65	36.56	9.9150	Unstiffened	---	---	0.0178	6.10.3.3-1
65.277	2.001	0.65	36.56	9.9150	Unstiffened	---	---	0.0170	6.10.3.3-1
70.135	2.054	0.65	36.56	9.9150	Unstiffened	---	---	0.0153	6.10.3.3-1
74.377	2.100	0.65	36.56	9.9150	Unstiffened	---	---	0.0138	6.10.3.3-1
75.092	2.108	0.65	36.56	10.5833	Unstiffened	---	---	0.0133	6.10.3.3-1
80.384	2.165	0.65	36.56	10.5833	Unstiffened	---	---	0.0115	6.10.3.3-1
83.577	2.200	0.65	36.56	10.5833	Unstiffened	---	---	0.0103	6.10.3.3-1
85.675	2.223	0.65	36.56	17.0000	Unstiffened	---	---	0.0093	6.10.3.3-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.0085	6.10.3.3-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.0084	6.10.3.3-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.0068	6.10.3.3-1
94.175	2.315	0.65	36.56	17.0000	Unstiffened	---	---	0.0063	6.10.3.3-1
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	0.0035	6.10.3.3-1
102.675	2.408	0.65	36.56	17.0000	Unstiffened	---	---	0.0029	6.10.3.3-1
111.175	2.500	0.65	36.56	17.0000	Unstiffened	---	---	0.0001	6.10.3.3-1
119.675	2.592	0.65	36.56	17.0000	Unstiffened	---	---	0.0034	6.10.3.3-1
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	0.0037	6.10.3.3-1
128.175	2.685	0.65	36.56	17.0000	Unstiffened	---	---	0.0064	6.10.3.3-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.0069	6.10.3.3-1
136.675	2.777	0.65	36.56	17.0000	Unstiffened	---	---	0.0098	6.10.3.3-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.0106	6.10.3.3-1
140.800	2.822	0.65	36.56	8.2500	Stiffened	---	---	0.0113	6.10.3.3-1
144.925	2.867	0.65	36.56	8.2500	Stiffened	---	---	0.0131	6.10.3.3-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.0142	6.10.3.3-1
149.050	2.912	0.65	36.56	8.2500	Stiffened	---	---	0.0145	6.10.3.3-1
153.175	2.957	0.65	36.56	8.2500	Stiffened	---	---	0.0162	6.10.3.3-1
155.176	2.978	0.65	36.56	4.0017	Stiffened	---	---	0.0169	6.10.3.3-1
157.077	2.999	0.65	36.56	4.0017	Stiffened	---	---	0.0176	6.10.3.3-1
157.177	3.000	0.65	36.56	9.9150	Unstiffened	---	---	0.0181	6.10.3.3-1
157.277	3.001	0.65	36.56	9.9150	Unstiffened	---	---	0.0161	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
162.135	3.059	0.65	36.56	9.9150	Unstiffened	---	---	0.0144	6.10.3.3-1
165.577	3.100	0.65	36.56	9.9150	Unstiffened	---	---	0.0132	6.10.3.3-1
167.092	3.118	0.65	36.56	17.3333	Unstiffened	---	---	0.0125	6.10.3.3-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.0100	6.10.3.3-1
175.759	3.221	0.65	36.56	17.3333	Unstiffened	---	---	0.0094	6.10.3.3-1
182.377	3.300	0.65	36.56	17.3333	Unstiffened	---	---	0.0070	6.10.3.3-1
184.425	3.324	0.65	36.56	17.8333	Unstiffened	---	---	0.0060	6.10.3.3-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.0052	6.10.3.3-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.0051	6.10.3.3-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0037	6.10.3.3-1
193.342	3.431	0.65	36.56	17.8333	Unstiffened	---	---	0.0028	6.10.3.3-1
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0008	6.10.3.3-1
202.259	3.537	0.65	36.56	17.8333	Unstiffened	---	---	0.0006	6.10.3.3-1
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	0.0025	6.10.3.3-1
211.175	3.643	0.65	36.56	17.8333	Unstiffened	---	---	0.0038	6.10.3.3-1
215.977	3.700	0.65	36.56	17.8333	Unstiffened	---	---	0.0055	6.10.3.3-1
220.092	3.749	0.65	36.56	17.8333	Unstiffened	---	---	0.0074	6.10.3.3-1
224.363	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.0089	6.10.3.3-1
224.377	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.0089	6.10.3.3-1
228.634	3.851	0.65	36.56	8.5417	Stiffened	---	---	0.0107	6.10.3.3-1
232.777	3.900	0.65	36.56	8.5417	Stiffened	---	---	0.0122	6.10.3.3-1
232.905	3.902	0.65	36.56	8.5417	Stiffened	---	---	0.0122	6.10.3.3-1
237.175	3.952	0.65	36.56	8.5417	Stiffened	---	---	0.0139	6.10.3.3-1
239.176	3.976	0.65	36.56	4.0017	Stiffened	---	---	0.0147	6.10.3.3-1
241.077	3.999	0.65	36.56	4.0017	Stiffened	---	---	0.0153	6.10.3.3-1
241.177	4.000	0.65	36.56	11.7483	Unstiffened	---	---	0.0158	6.10.3.3-1
241.277	4.001	0.65	36.56	11.7483	Unstiffened	---	---	0.0147	6.10.3.3-1
247.051	4.070	0.65	36.56	11.7483	Unstiffened	---	---	0.0127	6.10.3.3-1
249.577	4.100	0.65	36.56	11.7483	Unstiffened	---	---	0.0118	6.10.3.3-1
252.925	4.140	0.65	36.56	17.8334	Unstiffened	---	---	0.0104	6.10.3.3-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.0086	6.10.3.3-1
261.842	4.246	0.65	36.56	17.8334	Unstiffened	---	---	0.0072	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
266.377	4.300	0.65	36.56	17.8334	Unstiffened	---	---	0.0056	6.10.3.3-1
270.759	4.352	0.65	36.56	17.8334	Unstiffened	---	---	0.0037	6.10.3.3-1
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0023	6.10.3.3-1
279.675	4.458	0.65	36.56	17.8333	Unstiffened	---	---	0.0006	6.10.3.3-1
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0007	6.10.3.3-1
288.592	4.564	0.65	36.56	17.8333	Unstiffened	---	---	0.0029	6.10.3.3-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.0040	6.10.3.3-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.0054	6.10.3.3-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.0054	6.10.3.3-1
296.655	4.660	0.65	36.56	16.1250	Unstiffened	---	---	0.0058	6.10.3.3-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.0069	6.10.3.3-1
304.717	4.756	0.65	36.56	16.1250	Unstiffened	---	---	0.0090	6.10.3.3-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.0103	6.10.3.3-1
308.832	4.805	0.65	36.56	8.2292	Stiffened	---	---	0.0105	6.10.3.3-1
312.946	4.854	0.65	36.56	8.2292	Stiffened	---	---	0.0123	6.10.3.3-1
316.777	4.900	0.65	36.56	8.2292	Stiffened	---	---	0.0136	6.10.3.3-1
317.061	4.903	0.65	36.56	8.2292	Stiffened	---	---	0.0137	6.10.3.3-1
321.175	4.952	0.65	36.56	8.2292	Stiffened	---	---	0.0154	6.10.3.3-1
323.176	4.976	0.65	36.56	4.0017	Stiffened	---	---	0.0161	6.10.3.3-1
325.077	4.999	0.65	36.56	4.0017	Stiffened	---	---	0.0168	6.10.3.3-1
325.177	5.000	0.65	36.56	10.4150	Unstiffened	---	---	0.0186	6.10.3.3-1
325.277	5.001	0.65	36.56	10.4150	Unstiffened	---	---	0.0178	6.10.3.3-1
330.385	5.055	0.65	36.56	10.4150	Unstiffened	---	---	0.0160	6.10.3.3-1
334.702	5.100	0.65	36.56	10.4150	Unstiffened	---	---	0.0144	6.10.3.3-1
335.592	5.109	0.65	36.56	14.6670	Unstiffened	---	---	0.0139	6.10.3.3-1
342.926	5.186	0.65	36.56	14.6670	Unstiffened	---	---	0.0113	6.10.3.3-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.0109	6.10.3.3-1
350.259	5.263	0.65	36.56	14.6670	Unstiffened	---	---	0.0084	6.10.3.3-1
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.0072	6.10.3.3-1
357.593	5.340	0.65	36.56	14.6670	Unstiffened	---	---	0.0058	6.10.3.3-1
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	0.0038	6.10.3.3-1
364.926	5.417	0.65	36.56	14.6670	Unstiffened	---	---	0.0029	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
372.260	5.494	0.65	36.56	14.6670	Unstiffened	---	---	0.0003	6.10.3.3-1
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	0.0001	6.10.3.3-1
379.593	5.571	0.65	36.56	14.6670	Unstiffened	---	---	0.0026	6.10.3.3-1
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	0.0036	6.10.3.3-1
386.927	5.648	0.65	36.56	14.6670	Unstiffened	---	---	0.0052	6.10.3.3-1
391.852	5.700	0.65	36.56	14.6670	Unstiffened	---	---	0.0070	6.10.3.3-1
394.260	5.725	0.65	36.56	14.6670	Unstiffened	---	---	0.0081	6.10.3.3-1
396.504	5.749	0.65	36.56	6.8627	Stiffened	---	---	0.0089	6.10.3.3-1
396.704	5.751	0.65	36.56	6.8627	Stiffened	---	---	0.0090	6.10.3.3-1
397.691	5.761	0.65	36.56	6.8627	Stiffened	---	---	0.0093	6.10.3.3-1
401.123	5.797	0.65	36.56	7.6790	Stiffened	---	---	0.0108	6.10.3.3-1
401.377	5.800	0.65	36.56	7.6790	Stiffened	---	---	0.0108	6.10.3.3-1
404.962	5.838	0.65	36.56	7.6790	Stiffened	---	---	0.0121	6.10.3.3-1
408.802	5.878	0.65	36.56	7.6790	Stiffened	---	---	0.0138	6.10.3.3-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.0145	6.10.3.3-1
412.614	5.918	0.65	36.56	7.6250	Stiffened	---	---	0.0151	6.10.3.3-1
416.427	5.958	0.65	36.56	7.6250	Stiffened	---	---	0.0167	6.10.3.3-1
418.427	5.979	0.65	36.56	4.0003	Stiffened	---	---	0.0174	6.10.3.3-1
420.327	5.999	0.65	36.56	4.0003	Stiffened	---	---	0.0181	6.10.3.3-1
420.427	6.000	0.65	36.56	11.7587	Unstiffened	---	---	0.0186	6.10.3.3-1
420.527	6.001	0.65	36.56	11.7587	Unstiffened	---	---	0.0165	6.10.3.3-1
426.306	6.086	0.65	36.56	11.7587	Unstiffened	---	---	0.0144	6.10.3.3-1
427.245	6.100	0.65	36.56	11.7587	Unstiffened	---	---	0.0141	6.10.3.3-1
432.186	6.172	0.65	36.56	17.6666	Unstiffened	---	---	0.0121	6.10.3.3-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.0115	6.10.3.3-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.0090	6.10.3.3-1
441.019	6.302	0.65	36.56	17.6666	Unstiffened	---	---	0.0090	6.10.3.3-1
447.698	6.400	0.65	36.56	17.6666	Unstiffened	---	---	0.0066	6.10.3.3-1
449.852	6.432	0.65	36.56	17.6667	Unstiffened	---	---	0.0055	6.10.3.3-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.0039	6.10.3.3-1
458.686	6.561	0.65	36.56	17.6667	Unstiffened	---	---	0.0024	6.10.3.3-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0015	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
467.519	6.691	0.65	36.56	17.6667	Unstiffened	---	---	0.0011	6.10.3.3-1
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	0.0014	6.10.3.3-1
471.790	6.753	0.65	36.56	8.5417	Stiffened	---	---	0.0027	6.10.3.3-1
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	0.0038	6.10.3.3-1
476.061	6.816	0.65	36.56	8.5417	Stiffened	---	---	0.0045	6.10.3.3-1
480.332	6.879	0.65	36.56	8.5417	Stiffened	---	---	0.0060	6.10.3.3-1
481.786	6.900	0.65	36.56	8.5417	Stiffened	---	---	0.0065	6.10.3.3-1
484.603	6.941	0.65	36.56	8.5417	Stiffened	---	---	0.0077	6.10.3.3-1
486.603	6.971	0.65	36.56	4.0016	Stiffened	---	---	0.0084	6.10.3.3-1
488.504	6.999	0.65	36.56	4.0016	Stiffened	---	---	0.0091	6.10.3.3-1
488.604	7.000	0.65	36.56	4.0016	Stiffened	---	---	0.0096	6.10.3.3-1

Load combination: Stage 01 Default

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	11.3421	Unstiffened	---	---	0.0418	6.10.3.3-1
0.100	1.002	0.65	36.56	11.3421	Unstiffened	---	---	0.0411	6.10.3.3-1
5.671	1.087	0.65	36.56	11.3421	Unstiffened	---	---	0.0311	6.10.3.3-1
6.515	1.100	0.65	36.56	11.3421	Unstiffened	---	---	0.0296	6.10.3.3-1
11.342	1.174	0.65	36.56	16.6146	Unstiffened	---	---	0.0207	6.10.3.3-1
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	0.0176	6.10.3.3-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.0059	6.10.3.3-1
19.649	1.301	0.65	36.56	16.6146	Unstiffened	---	---	0.0057	6.10.3.3-1
26.071	1.400	0.65	36.56	16.6146	Unstiffened	---	---	0.0058	6.10.3.3-1
27.957	1.429	0.65	36.56	16.6146	Unstiffened	---	---	0.0095	6.10.3.3-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.0179	6.10.3.3-1
36.248	1.556	0.65	36.56	16.5834	Unstiffened	---	---	0.0245	6.10.3.3-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.0296	6.10.3.3-1
44.540	1.683	0.65	36.56	16.5834	Unstiffened	---	---	0.0398	6.10.3.3-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.0418	6.10.3.3-1
48.707	1.747	0.65	36.56	8.3333	Stiffened	---	---	0.0473	6.10.3.3-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.0535	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
52.873	1.811	0.65	36.56	8.3333	Stiffened	---	---	0.0551	6.10.3.3-1
57.040	1.875	0.65	36.56	8.3333	Stiffened	---	---	0.0626	6.10.3.3-1
58.659	1.900	0.65	36.56	8.3333	Stiffened	---	---	0.0655	6.10.3.3-1
61.207	1.939	0.65	36.56	8.3333	Stiffened	---	---	0.0703	6.10.3.3-1
63.192	1.970	0.65	36.56	3.9705	Stiffened	---	---	0.0739	6.10.3.3-1
65.077	1.998	0.65	36.56	3.9705	Stiffened	---	---	0.0773	6.10.3.3-1
65.177	2.000	0.65	36.56	9.9150	Unstiffened	---	---	0.0837	6.10.3.3-1
65.277	2.001	0.65	36.56	9.9150	Unstiffened	---	---	0.0828	6.10.3.3-1
70.135	2.054	0.65	36.56	9.9150	Unstiffened	---	---	0.0741	6.10.3.3-1
74.377	2.100	0.65	36.56	9.9150	Unstiffened	---	---	0.0664	6.10.3.3-1
75.092	2.108	0.65	36.56	10.5833	Unstiffened	---	---	0.0649	6.10.3.3-1
80.384	2.165	0.65	36.56	10.5833	Unstiffened	---	---	0.0554	6.10.3.3-1
83.577	2.200	0.65	36.56	10.5833	Unstiffened	---	---	0.0496	6.10.3.3-1
85.675	2.223	0.65	36.56	17.0000	Unstiffened	---	---	0.0456	6.10.3.3-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.0416	6.10.3.3-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.0412	6.10.3.3-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.0328	6.10.3.3-1
94.175	2.315	0.65	36.56	17.0000	Unstiffened	---	---	0.0303	6.10.3.3-1
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	0.0162	6.10.3.3-1
102.675	2.408	0.65	36.56	17.0000	Unstiffened	---	---	0.0147	6.10.3.3-1
111.175	2.500	0.65	36.56	17.0000	Unstiffened	---	---	0.0006	6.10.3.3-1
119.675	2.592	0.65	36.56	17.0000	Unstiffened	---	---	0.0163	6.10.3.3-1
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	0.0175	6.10.3.3-1
128.175	2.685	0.65	36.56	17.0000	Unstiffened	---	---	0.0316	6.10.3.3-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.0341	6.10.3.3-1
136.675	2.777	0.65	36.56	17.0000	Unstiffened	---	---	0.0473	6.10.3.3-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.0511	6.10.3.3-1
140.800	2.822	0.65	36.56	8.2500	Stiffened	---	---	0.0547	6.10.3.3-1
144.925	2.867	0.65	36.56	8.2500	Stiffened	---	---	0.0624	6.10.3.3-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.0679	6.10.3.3-1
149.050	2.912	0.65	36.56	8.2500	Stiffened	---	---	0.0699	6.10.3.3-1
153.175	2.957	0.65	36.56	8.2500	Stiffened	---	---	0.0775	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
155.176	2.978	0.65	36.56	4.0017	Stiffened	---	---	0.0811	6.10.3.3-1
157.077	2.999	0.65	36.56	4.0017	Stiffened	---	---	0.0845	6.10.3.3-1
157.177	3.000	0.65	36.56	9.9150	Unstiffened	---	---	0.0852	6.10.3.3-1
157.277	3.001	0.65	36.56	9.9150	Unstiffened	---	---	0.0790	6.10.3.3-1
162.135	3.059	0.65	36.56	9.9150	Unstiffened	---	---	0.0702	6.10.3.3-1
165.577	3.100	0.65	36.56	9.9150	Unstiffened	---	---	0.0640	6.10.3.3-1
167.092	3.118	0.65	36.56	17.3333	Unstiffened	---	---	0.0611	6.10.3.3-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.0487	6.10.3.3-1
175.759	3.221	0.65	36.56	17.3333	Unstiffened	---	---	0.0455	6.10.3.3-1
182.377	3.300	0.65	36.56	17.3333	Unstiffened	---	---	0.0336	6.10.3.3-1
184.425	3.324	0.65	36.56	17.8333	Unstiffened	---	---	0.0296	6.10.3.3-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.0256	6.10.3.3-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.0252	6.10.3.3-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0182	6.10.3.3-1
193.342	3.431	0.65	36.56	17.8333	Unstiffened	---	---	0.0135	6.10.3.3-1
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0030	6.10.3.3-1
202.259	3.537	0.65	36.56	17.8333	Unstiffened	---	---	0.0028	6.10.3.3-1
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	0.0124	6.10.3.3-1
211.175	3.643	0.65	36.56	17.8333	Unstiffened	---	---	0.0189	6.10.3.3-1
215.977	3.700	0.65	36.56	17.8333	Unstiffened	---	---	0.0275	6.10.3.3-1
220.092	3.749	0.65	36.56	17.8333	Unstiffened	---	---	0.0353	6.10.3.3-1
224.363	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.0430	6.10.3.3-1
224.377	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.0430	6.10.3.3-1
228.634	3.851	0.65	36.56	8.5417	Stiffened	---	---	0.0510	6.10.3.3-1
232.777	3.900	0.65	36.56	8.5417	Stiffened	---	---	0.0585	6.10.3.3-1
232.905	3.902	0.65	36.56	8.5417	Stiffened	---	---	0.0587	6.10.3.3-1
237.175	3.952	0.65	36.56	8.5417	Stiffened	---	---	0.0666	6.10.3.3-1
239.176	3.976	0.65	36.56	4.0017	Stiffened	---	---	0.0702	6.10.3.3-1
241.077	3.999	0.65	36.56	4.0017	Stiffened	---	---	0.0736	6.10.3.3-1
241.177	4.000	0.65	36.56	11.7483	Unstiffened	---	---	0.0743	6.10.3.3-1
241.277	4.001	0.65	36.56	11.7483	Unstiffened	---	---	0.0722	6.10.3.3-1
247.051	4.070	0.65	36.56	11.7483	Unstiffened	---	---	0.0618	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
249.577	4.100	0.65	36.56	11.7483	Unstiffened	---	---	0.0573	6.10.3.3-1
252.925	4.140	0.65	36.56	17.8334	Unstiffened	---	---	0.0510	6.10.3.3-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.0419	6.10.3.3-1
261.842	4.246	0.65	36.56	17.8334	Unstiffened	---	---	0.0350	6.10.3.3-1
266.377	4.300	0.65	36.56	17.8334	Unstiffened	---	---	0.0268	6.10.3.3-1
270.759	4.352	0.65	36.56	17.8334	Unstiffened	---	---	0.0186	6.10.3.3-1
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	0.0114	6.10.3.3-1
279.675	4.458	0.65	36.56	17.8333	Unstiffened	---	---	0.0026	6.10.3.3-1
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	0.0037	6.10.3.3-1
288.592	4.564	0.65	36.56	17.8333	Unstiffened	---	---	0.0138	6.10.3.3-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.0192	6.10.3.3-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.0262	6.10.3.3-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.0266	6.10.3.3-1
296.655	4.660	0.65	36.56	16.1250	Unstiffened	---	---	0.0283	6.10.3.3-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.0343	6.10.3.3-1
304.717	4.756	0.65	36.56	16.1250	Unstiffened	---	---	0.0432	6.10.3.3-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.0498	6.10.3.3-1
308.832	4.805	0.65	36.56	8.2292	Stiffened	---	---	0.0506	6.10.3.3-1
312.946	4.854	0.65	36.56	8.2292	Stiffened	---	---	0.0583	6.10.3.3-1
316.777	4.900	0.65	36.56	8.2292	Stiffened	---	---	0.0652	6.10.3.3-1
317.061	4.903	0.65	36.56	8.2292	Stiffened	---	---	0.0658	6.10.3.3-1
321.175	4.952	0.65	36.56	8.2292	Stiffened	---	---	0.0734	6.10.3.3-1
323.176	4.976	0.65	36.56	4.0017	Stiffened	---	---	0.0770	6.10.3.3-1
325.077	4.999	0.65	36.56	4.0017	Stiffened	---	---	0.0804	6.10.3.3-1
325.177	5.000	0.65	36.56	10.4150	Unstiffened	---	---	0.0876	6.10.3.3-1
325.277	5.001	0.65	36.56	10.4150	Unstiffened	---	---	0.0866	6.10.3.3-1
330.385	5.055	0.65	36.56	10.4150	Unstiffened	---	---	0.0774	6.10.3.3-1
334.702	5.100	0.65	36.56	10.4150	Unstiffened	---	---	0.0697	6.10.3.3-1
335.592	5.109	0.65	36.56	14.6670	Unstiffened	---	---	0.0679	6.10.3.3-1
342.926	5.186	0.65	36.56	14.6670	Unstiffened	---	---	0.0547	6.10.3.3-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.0523	6.10.3.3-1
350.259	5.263	0.65	36.56	14.6670	Unstiffened	---	---	0.0412	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.0349	6.10.3.3-1
357.593	5.340	0.65	36.56	14.6670	Unstiffened	---	---	0.0280	6.10.3.3-1
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	0.0177	6.10.3.3-1
364.926	5.417	0.65	36.56	14.6670	Unstiffened	---	---	0.0144	6.10.3.3-1
372.260	5.494	0.65	36.56	14.6670	Unstiffened	---	---	0.0012	6.10.3.3-1
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	0.0003	6.10.3.3-1
379.593	5.571	0.65	36.56	14.6670	Unstiffened	---	---	0.0123	6.10.3.3-1
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	0.0172	6.10.3.3-1
386.927	5.648	0.65	36.56	14.6670	Unstiffened	---	---	0.0255	6.10.3.3-1
391.852	5.700	0.65	36.56	14.6670	Unstiffened	---	---	0.0343	6.10.3.3-1
394.260	5.725	0.65	36.56	14.6670	Unstiffened	---	---	0.0390	6.10.3.3-1
396.504	5.749	0.65	36.56	6.8627	Stiffened	---	---	0.0430	6.10.3.3-1
396.704	5.751	0.65	36.56	6.8627	Stiffened	---	---	0.0434	6.10.3.3-1
397.691	5.761	0.65	36.56	6.8627	Stiffened	---	---	0.0452	6.10.3.3-1
401.123	5.797	0.65	36.56	7.6790	Stiffened	---	---	0.0515	6.10.3.3-1
401.377	5.800	0.65	36.56	7.6790	Stiffened	---	---	0.0520	6.10.3.3-1
404.962	5.838	0.65	36.56	7.6790	Stiffened	---	---	0.0584	6.10.3.3-1
408.802	5.878	0.65	36.56	7.6790	Stiffened	---	---	0.0657	6.10.3.3-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.0694	6.10.3.3-1
412.614	5.918	0.65	36.56	7.6250	Stiffened	---	---	0.0725	6.10.3.3-1
416.427	5.958	0.65	36.56	7.6250	Stiffened	---	---	0.0796	6.10.3.3-1
418.427	5.979	0.65	36.56	4.0003	Stiffened	---	---	0.0832	6.10.3.3-1
420.327	5.999	0.65	36.56	4.0003	Stiffened	---	---	0.0866	6.10.3.3-1
420.427	6.000	0.65	36.56	11.7587	Unstiffened	---	---	0.0873	6.10.3.3-1
420.527	6.001	0.65	36.56	11.7587	Unstiffened	---	---	0.0804	6.10.3.3-1
426.306	6.086	0.65	36.56	11.7587	Unstiffened	---	---	0.0699	6.10.3.3-1
427.245	6.100	0.65	36.56	11.7587	Unstiffened	---	---	0.0683	6.10.3.3-1
432.186	6.172	0.65	36.56	17.6666	Unstiffened	---	---	0.0592	6.10.3.3-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.0558	6.10.3.3-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.0435	6.10.3.3-1
441.019	6.302	0.65	36.56	17.6666	Unstiffened	---	---	0.0433	6.10.3.3-1
447.698	6.400	0.65	36.56	17.6666	Unstiffened	---	---	0.0312	6.10.3.3-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
449.852	6.432	0.65	36.56	17.6667	Unstiffened	---	---	0.0271	6.10.3.3-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.0187	6.10.3.3-1
458.686	6.561	0.65	36.56	17.6667	Unstiffened	---	---	0.0111	6.10.3.3-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0064	6.10.3.3-1
467.519	6.691	0.65	36.56	17.6667	Unstiffened	---	---	0.0052	6.10.3.3-1
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	0.0063	6.10.3.3-1
471.790	6.753	0.65	36.56	8.5417	Stiffened	---	---	0.0129	6.10.3.3-1
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	0.0186	6.10.3.3-1
476.061	6.816	0.65	36.56	8.5417	Stiffened	---	---	0.0208	6.10.3.3-1
480.332	6.879	0.65	36.56	8.5417	Stiffened	---	---	0.0285	6.10.3.3-1
481.786	6.900	0.65	36.56	8.5417	Stiffened	---	---	0.0312	6.10.3.3-1
484.603	6.941	0.65	36.56	8.5417	Stiffened	---	---	0.0364	6.10.3.3-1
486.603	6.971	0.65	36.56	4.0016	Stiffened	---	---	0.0400	6.10.3.3-1
488.504	6.999	0.65	36.56	4.0016	Stiffened	---	---	0.0435	6.10.3.3-1
488.604	7.000	0.65	36.56	4.0016	Stiffened	---	---	0.0441	6.10.3.3-1

Load combination: Final Default Strength I

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	11.3421	Unstiffened	---	---	0.2723	6.10.9.1-1
0.100	1.002	0.65	36.56	11.3421	Unstiffened	---	---	0.2589	6.10.9.1-1
5.671	1.087	0.65	36.56	11.3421	Unstiffened	---	---	0.2296	6.10.9.1-1
6.515	1.100	0.65	36.56	11.3421	Unstiffened	---	---	0.2120	6.10.9.1-1
11.342	1.174	0.65	36.56	16.6146	Unstiffened	---	---	0.1848	6.10.9.1-1
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	0.1686	6.10.9.1-1
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	0.1277	6.10.9.1-1
19.649	1.301	0.65	36.56	16.6146	Unstiffened	---	---	0.1184	6.10.9.1-1
26.071	1.400	0.65	36.56	16.6146	Unstiffened	---	---	0.0927	6.10.9.1-1
26.071	1.400	0.65	36.56	16.6146	Unstiffened	---	---	0.0927	6.10.9.1-1
27.957	1.429	0.65	36.56	16.6146	Unstiffened	---	---	0.0999	6.10.9.1-1
27.957	1.429	0.65	36.56	16.6146	Unstiffened	---	---	0.0999	6.10.9.1-1
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.1367	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	0.1367	6.10.9.1-1
36.248	1.556	0.65	36.56	16.5834	Unstiffened	---	---	0.1626	6.10.9.1-1
36.248	1.556	0.65	36.56	16.5834	Unstiffened	---	---	0.1626	6.10.9.1-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.1788	6.10.9.1-1
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	0.1788	6.10.9.1-1
44.540	1.683	0.65	36.56	16.5834	Unstiffened	---	---	0.2161	6.10.9.1-1
44.540	1.683	0.65	36.56	16.5834	Unstiffened	---	---	0.2161	6.10.9.1-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.2275	6.10.9.1-1
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	0.2275	6.10.9.1-1
48.707	1.747	0.65	36.56	8.3333	Stiffened	---	---	0.2437	6.10.9.1-1
48.707	1.747	0.65	36.56	8.3333	Stiffened	---	---	0.2437	6.10.9.1-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.2628	6.10.9.1-1
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	0.2628	6.10.9.1-1
52.873	1.811	0.65	36.56	8.3333	Stiffened	---	---	0.2730	6.10.9.1-1
52.873	1.811	0.65	36.56	8.3333	Stiffened	---	---	0.2730	6.10.9.1-1
57.040	1.875	0.65	36.56	8.3333	Stiffened	---	---	0.2988	6.10.9.1-1
58.659	1.900	0.65	36.56	8.3333	Stiffened	---	---	0.3113	6.10.9.1-1
61.207	1.939	0.65	36.56	8.3333	Stiffened	---	---	0.3236	6.10.9.1-1
63.192	1.970	0.65	36.56	3.9705	Stiffened	---	---	0.3379	6.10.9.1-1
65.077	1.998	0.65	36.56	3.9705	Stiffened	---	---	0.3469	6.10.9.1-1
65.177	2.000	0.65	36.56	9.9150	Unstiffened	---	---	0.3572	6.10.9.1-1
65.277	2.001	0.65	36.56	9.9150	Unstiffened	---	---	0.3686	6.10.9.1-1
70.135	2.054	0.65	36.56	9.9150	Unstiffened	---	---	0.3422	6.10.9.1-1
74.377	2.100	0.65	36.56	9.9150	Unstiffened	---	---	0.3183	6.10.9.1-1
74.377	2.100	0.65	36.56	9.9150	Unstiffened	---	---	0.3183	6.10.9.1-1
75.092	2.108	0.65	36.56	10.5833	Unstiffened	---	---	0.3107	6.10.9.1-1
75.092	2.108	0.65	36.56	10.5833	Unstiffened	---	---	0.3107	6.10.9.1-1
80.384	2.165	0.65	36.56	10.5833	Unstiffened	---	---	0.2817	6.10.9.1-1
80.384	2.165	0.65	36.56	10.5833	Unstiffened	---	---	0.2817	6.10.9.1-1
83.577	2.200	0.65	36.56	10.5833	Unstiffened	---	---	0.2651	6.10.9.1-1
83.577	2.200	0.65	36.56	10.5833	Unstiffened	---	---	0.2651	6.10.9.1-1
85.675	2.223	0.65	36.56	17.0000	Unstiffened	---	---	0.2509	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
85.675	2.223	0.65	36.56	17.0000	Unstiffened	---	---	0.2509	6.10.9.1-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.2410	6.10.9.1-1
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	0.2410	6.10.9.1-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.2294	6.10.9.1-1
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	0.2294	6.10.9.1-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.2074	6.10.9.1-1
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	0.2074	6.10.9.1-1
94.175	2.315	0.65	36.56	17.0000	Unstiffened	---	---	0.1974	6.10.9.1-1
94.175	2.315	0.65	36.56	17.0000	Unstiffened	---	---	0.1974	6.10.9.1-1
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	0.1517	6.10.9.1-1
102.675	2.408	0.65	36.56	17.0000	Unstiffened	---	---	0.1468	6.10.9.1-1
111.175	2.500	0.65	36.56	17.0000	Unstiffened	---	---	0.1017	6.10.9.1-1
119.675	2.592	0.65	36.56	17.0000	Unstiffened	---	---	0.1485	6.10.9.1-1
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	0.1562	6.10.9.1-1
128.175	2.685	0.65	36.56	17.0000	Unstiffened	---	---	0.2038	6.10.9.1-1
128.175	2.685	0.65	36.56	17.0000	Unstiffened	---	---	0.2038	6.10.9.1-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.2086	6.10.9.1-1
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	0.2086	6.10.9.1-1
136.675	2.777	0.65	36.56	17.0000	Unstiffened	---	---	0.2544	6.10.9.1-1
136.675	2.777	0.65	36.56	17.0000	Unstiffened	---	---	0.2544	6.10.9.1-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.2678	6.10.9.1-1
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	0.2678	6.10.9.1-1
140.800	2.822	0.65	36.56	8.2500	Stiffened	---	---	0.2815	6.10.9.1-1
140.800	2.822	0.65	36.56	8.2500	Stiffened	---	---	0.2815	6.10.9.1-1
144.925	2.867	0.65	36.56	8.2500	Stiffened	---	---	0.3051	6.10.9.1-1
144.925	2.867	0.65	36.56	8.2500	Stiffened	---	---	0.3051	6.10.9.1-1
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	0.3208	6.10.9.1-1
149.050	2.912	0.65	36.56	8.2500	Stiffened	---	---	0.3284	6.10.9.1-1
153.175	2.957	0.65	36.56	8.2500	Stiffened	---	---	0.3549	6.10.9.1-1
155.176	2.978	0.65	36.56	4.0017	Stiffened	---	---	0.3645	6.10.9.1-1
157.077	2.999	0.65	36.56	4.0017	Stiffened	---	---	0.3760	6.10.9.1-1
157.177	3.000	0.65	36.56	9.9150	Unstiffened	---	---	0.3767	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
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POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
157.277	3.001	0.65	36.56	9.9150	Unstiffened	---	---	0.3503	6.10.9.1-1
162.135	3.059	0.65	36.56	9.9150	Unstiffened	---	---	0.3233	6.10.9.1-1
165.577	3.100	0.65	36.56	9.9150	Unstiffened	---	---	0.3008	6.10.9.1-1
167.092	3.118	0.65	36.56	17.3333	Unstiffened	---	---	0.2851	6.10.9.1-1
167.092	3.118	0.65	36.56	17.3333	Unstiffened	---	---	0.2851	6.10.9.1-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.2457	6.10.9.1-1
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	0.2457	6.10.9.1-1
175.759	3.221	0.65	36.56	17.3333	Unstiffened	---	---	0.2386	6.10.9.1-1
175.759	3.221	0.65	36.56	17.3333	Unstiffened	---	---	0.2386	6.10.9.1-1
182.377	3.300	0.65	36.56	17.3333	Unstiffened	---	---	0.1860	6.10.9.1-1
182.377	3.300	0.65	36.56	17.3333	Unstiffened	---	---	0.1860	6.10.9.1-1
184.425	3.324	0.65	36.56	17.8333	Unstiffened	---	---	0.1692	6.10.9.1-1
184.425	3.324	0.65	36.56	17.8333	Unstiffened	---	---	0.1692	6.10.9.1-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.1534	6.10.9.1-1
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	0.1534	6.10.9.1-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.1530	6.10.9.1-1
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	0.1530	6.10.9.1-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.1296	6.10.9.1-1
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	0.1296	6.10.9.1-1
193.342	3.431	0.65	36.56	17.8333	Unstiffened	---	---	0.1145	6.10.9.1-1
193.342	3.431	0.65	36.56	17.8333	Unstiffened	---	---	0.1145	6.10.9.1-1
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	0.1115	6.10.9.1-1
202.259	3.537	0.65	36.56	17.8333	Unstiffened	---	---	0.1340	6.10.9.1-1
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	0.1634	6.10.9.1-1
211.175	3.643	0.65	36.56	17.8333	Unstiffened	---	---	0.1878	6.10.9.1-1
215.977	3.700	0.65	36.56	17.8333	Unstiffened	---	---	0.2239	6.10.9.1-1
220.092	3.749	0.65	36.56	17.8333	Unstiffened	---	---	0.2450	6.10.9.1-1
220.092	3.749	0.65	36.56	17.8333	Unstiffened	---	---	0.2450	6.10.9.1-1
224.363	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.2690	6.10.9.1-1
224.363	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.2690	6.10.9.1-1
224.377	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.2749	6.10.9.1-1
224.377	3.800	0.65	36.56	8.5416	Stiffened	---	---	0.2749	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
228.634	3.851	0.65	36.56	8.5417	Stiffened	---	---	0.3029	6.10.9.1-1
228.634	3.851	0.65	36.56	8.5417	Stiffened	---	---	0.3029	6.10.9.1-1
232.777	3.900	0.65	36.56	8.5417	Stiffened	---	---	0.3249	6.10.9.1-1
232.777	3.900	0.65	36.56	8.5417	Stiffened	---	---	0.3249	6.10.9.1-1
232.905	3.902	0.65	36.56	8.5417	Stiffened	---	---	0.3257	6.10.9.1-1
232.905	3.902	0.65	36.56	8.5417	Stiffened	---	---	0.3257	6.10.9.1-1
237.175	3.952	0.65	36.56	8.5417	Stiffened	---	---	0.3471	6.10.9.1-1
237.175	3.952	0.65	36.56	8.5417	Stiffened	---	---	0.3471	6.10.9.1-1
239.176	3.976	0.65	36.56	4.0017	Stiffened	---	---	0.3593	6.10.9.1-1
241.077	3.999	0.65	36.56	4.0017	Stiffened	---	---	0.3688	6.10.9.1-1
241.177	4.000	0.65	36.56	11.7483	Unstiffened	---	---	0.3695	6.10.9.1-1
241.277	4.001	0.65	36.56	11.7483	Unstiffened	---	---	0.3637	6.10.9.1-1
247.051	4.070	0.65	36.56	11.7483	Unstiffened	---	---	0.3389	6.10.9.1-1
247.051	4.070	0.65	36.56	11.7483	Unstiffened	---	---	0.3389	6.10.9.1-1
249.577	4.100	0.65	36.56	11.7483	Unstiffened	---	---	0.3251	6.10.9.1-1
249.577	4.100	0.65	36.56	11.7483	Unstiffened	---	---	0.3251	6.10.9.1-1
252.925	4.140	0.65	36.56	17.8334	Unstiffened	---	---	0.3047	6.10.9.1-1
252.925	4.140	0.65	36.56	17.8334	Unstiffened	---	---	0.3047	6.10.9.1-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.2689	6.10.9.1-1
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	0.2689	6.10.9.1-1
261.842	4.246	0.65	36.56	17.8334	Unstiffened	---	---	0.2511	6.10.9.1-1
261.842	4.246	0.65	36.56	17.8334	Unstiffened	---	---	0.2511	6.10.9.1-1
266.377	4.300	0.65	36.56	17.8334	Unstiffened	---	---	0.2195	6.10.9.1-1
270.759	4.352	0.65	36.56	17.8334	Unstiffened	---	---	0.1867	6.10.9.1-1
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	0.1627	6.10.9.1-1
279.675	4.458	0.65	36.56	17.8333	Unstiffened	---	---	0.1361	6.10.9.1-1
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	0.1122	6.10.9.1-1
288.592	4.564	0.65	36.56	17.8333	Unstiffened	---	---	0.1153	6.10.9.1-1
288.592	4.564	0.65	36.56	17.8333	Unstiffened	---	---	0.1153	6.10.9.1-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.1307	6.10.9.1-1
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	0.1307	6.10.9.1-1
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.1546	6.10.9.1-1

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Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	0.1546	6.10.9.1-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.1552	6.10.9.1-1
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	0.1552	6.10.9.1-1
296.655	4.660	0.65	36.56	16.1250	Unstiffened	---	---	0.1668	6.10.9.1-1
296.655	4.660	0.65	36.56	16.1250	Unstiffened	---	---	0.1668	6.10.9.1-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.1902	6.10.9.1-1
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	0.1902	6.10.9.1-1
304.717	4.756	0.65	36.56	16.1250	Unstiffened	---	---	0.2300	6.10.9.1-1
304.717	4.756	0.65	36.56	16.1250	Unstiffened	---	---	0.2300	6.10.9.1-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.2494	6.10.9.1-1
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	0.2494	6.10.9.1-1
308.832	4.805	0.65	36.56	8.2292	Stiffened	---	---	0.2531	6.10.9.1-1
308.832	4.805	0.65	36.56	8.2292	Stiffened	---	---	0.2531	6.10.9.1-1
312.946	4.854	0.65	36.56	8.2292	Stiffened	---	---	0.2793	6.10.9.1-1
312.946	4.854	0.65	36.56	8.2292	Stiffened	---	---	0.2793	6.10.9.1-1
316.777	4.900	0.65	36.56	8.2292	Stiffened	---	---	0.3010	6.10.9.1-1
317.061	4.903	0.65	36.56	8.2292	Stiffened	---	---	0.3024	6.10.9.1-1
321.175	4.952	0.65	36.56	8.2292	Stiffened	---	---	0.3279	6.10.9.1-1
323.176	4.976	0.65	36.56	4.0017	Stiffened	---	---	0.3427	6.10.9.1-1
325.077	4.999	0.65	36.56	4.0017	Stiffened	---	---	0.3471	6.10.9.1-1
325.177	5.000	0.65	36.56	10.4150	Unstiffened	---	---	0.3560	6.10.9.1-1
325.277	5.001	0.65	36.56	10.4150	Unstiffened	---	---	0.3836	6.10.9.1-1
330.385	5.055	0.65	36.56	10.4150	Unstiffened	---	---	0.3515	6.10.9.1-1
334.702	5.100	0.65	36.56	10.4150	Unstiffened	---	---	0.3284	6.10.9.1-1
335.592	5.109	0.65	36.56	14.6670	Unstiffened	---	---	0.3161	6.10.9.1-1
335.592	5.109	0.65	36.56	14.6670	Unstiffened	---	---	0.3161	6.10.9.1-1
342.926	5.186	0.65	36.56	14.6670	Unstiffened	---	---	0.2779	6.10.9.1-1
342.926	5.186	0.65	36.56	14.6670	Unstiffened	---	---	0.2779	6.10.9.1-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.2703	6.10.9.1-1
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	0.2703	6.10.9.1-1
350.259	5.263	0.65	36.56	14.6670	Unstiffened	---	---	0.2342	6.10.9.1-1
350.259	5.263	0.65	36.56	14.6670	Unstiffened	---	---	0.2342	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.2156	6.10.9.1-1
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	0.2156	6.10.9.1-1
357.593	5.340	0.65	36.56	14.6670	Unstiffened	---	---	0.1935	6.10.9.1-1
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	0.1578	6.10.9.1-1
364.926	5.417	0.65	36.56	14.6670	Unstiffened	---	---	0.1436	6.10.9.1-1
372.260	5.494	0.65	36.56	14.6670	Unstiffened	---	---	0.1026	6.10.9.1-1
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	0.1012	6.10.9.1-1
379.593	5.571	0.65	36.56	14.6670	Unstiffened	---	---	0.1376	6.10.9.1-1
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	0.1575	6.10.9.1-1
386.927	5.648	0.65	36.56	14.6670	Unstiffened	---	---	0.1822	6.10.9.1-1
391.852	5.700	0.65	36.56	14.6670	Unstiffened	---	---	0.2105	6.10.9.1-1
391.852	5.700	0.65	36.56	14.6670	Unstiffened	---	---	0.2105	6.10.9.1-1
394.260	5.725	0.65	36.56	14.6670	Unstiffened	---	---	0.2297	6.10.9.1-1
394.260	5.725	0.65	36.56	14.6670	Unstiffened	---	---	0.2297	6.10.9.1-1
396.504	5.749	0.65	36.56	6.8627	Stiffened	---	---	0.2348	6.10.9.1-1
396.504	5.749	0.65	36.56	6.8627	Stiffened	---	---	0.2348	6.10.9.1-1
396.704	5.751	0.65	36.56	6.8627	Stiffened	---	---	0.2420	6.10.9.1-1
396.704	5.751	0.65	36.56	6.8627	Stiffened	---	---	0.2420	6.10.9.1-1
397.691	5.761	0.65	36.56	6.8627	Stiffened	---	---	0.2475	6.10.9.1-1
397.691	5.761	0.65	36.56	6.8627	Stiffened	---	---	0.2475	6.10.9.1-1
401.123	5.797	0.65	36.56	7.6790	Stiffened	---	---	0.2686	6.10.9.1-1
401.123	5.797	0.65	36.56	7.6790	Stiffened	---	---	0.2686	6.10.9.1-1
401.377	5.800	0.65	36.56	7.6790	Stiffened	---	---	0.2704	6.10.9.1-1
401.377	5.800	0.65	36.56	7.6790	Stiffened	---	---	0.2704	6.10.9.1-1
404.962	5.838	0.65	36.56	7.6790	Stiffened	---	---	0.2925	6.10.9.1-1
404.962	5.838	0.65	36.56	7.6790	Stiffened	---	---	0.2925	6.10.9.1-1
408.802	5.878	0.65	36.56	7.6790	Stiffened	---	---	0.3152	6.10.9.1-1
408.802	5.878	0.65	36.56	7.6790	Stiffened	---	---	0.3152	6.10.9.1-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.3283	6.10.9.1-1
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	0.3283	6.10.9.1-1
412.614	5.918	0.65	36.56	7.6250	Stiffened	---	---	0.3371	6.10.9.1-1
416.427	5.958	0.65	36.56	7.6250	Stiffened	---	---	0.3561	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
418.427	5.979	0.65	36.56	4.0003	Stiffened	---	---	0.3721	6.10.9.1-1
420.327	5.999	0.65	36.56	4.0003	Stiffened	---	---	0.3832	6.10.9.1-1
420.427	6.000	0.65	36.56	11.7587	Unstiffened	---	---	0.3839	6.10.9.1-1
420.527	6.001	0.65	36.56	11.7587	Unstiffened	---	---	0.3533	6.10.9.1-1
426.306	6.086	0.65	36.56	11.7587	Unstiffened	---	---	0.3238	6.10.9.1-1
427.245	6.100	0.65	36.56	11.7587	Unstiffened	---	---	0.3160	6.10.9.1-1
432.186	6.172	0.65	36.56	17.6666	Unstiffened	---	---	0.2850	6.10.9.1-1
432.186	6.172	0.65	36.56	17.6666	Unstiffened	---	---	0.2850	6.10.9.1-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.2702	6.10.9.1-1
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	0.2702	6.10.9.1-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.2263	6.10.9.1-1
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	0.2263	6.10.9.1-1
441.019	6.302	0.65	36.56	17.6666	Unstiffened	---	---	0.2256	6.10.9.1-1
441.019	6.302	0.65	36.56	17.6666	Unstiffened	---	---	0.2256	6.10.9.1-1
447.698	6.400	0.65	36.56	17.6666	Unstiffened	---	---	0.1848	6.10.9.1-1
447.698	6.400	0.65	36.56	17.6666	Unstiffened	---	---	0.1848	6.10.9.1-1
449.852	6.432	0.65	36.56	17.6667	Unstiffened	---	---	0.1616	6.10.9.1-1
449.852	6.432	0.65	36.56	17.6667	Unstiffened	---	---	0.1616	6.10.9.1-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.1358	6.10.9.1-1
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	0.1358	6.10.9.1-1
458.686	6.561	0.65	36.56	17.6667	Unstiffened	---	---	0.1087	6.10.9.1-1
458.686	6.561	0.65	36.56	17.6667	Unstiffened	---	---	0.1087	6.10.9.1-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0937	6.10.9.1-1
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	0.0937	6.10.9.1-1
467.519	6.691	0.65	36.56	17.6667	Unstiffened	---	---	0.1242	6.10.9.1-1
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	0.1289	6.10.9.1-1
471.790	6.753	0.65	36.56	8.5417	Stiffened	---	---	0.1502	6.10.9.1-1
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	0.1756	6.10.9.1-1
476.061	6.816	0.65	36.56	8.5417	Stiffened	---	---	0.1869	6.10.9.1-1
480.332	6.879	0.65	36.56	8.5417	Stiffened	---	---	0.2167	6.10.9.1-1
481.786	6.900	0.65	36.56	8.5417	Stiffened	---	---	0.2207	6.10.9.1-1
484.603	6.941	0.65	36.56	8.5417	Stiffened	---	---	0.2464	6.10.9.1-1

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
486.603	6.971	0.65	36.56	4.0016	Stiffened	---	---	0.2626	6.10.9.1-1
488.504	6.999	0.65	36.56	4.0016	Stiffened	---	---	0.2771	6.10.9.1-1
488.604	7.000	0.65	36.56	4.0016	Stiffened	---	---	0.2783	6.10.9.1-1

Load combination: Final Default Service I (Deflection)

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
0.000	1.000	0.65	36.56	11.3421	Unstiffened	---	---	---	---
0.100	1.002	0.65	36.56	11.3421	Unstiffened	---	---	---	---
5.671	1.087	0.65	36.56	11.3421	Unstiffened	---	---	---	---
6.515	1.100	0.65	36.56	11.3421	Unstiffened	---	---	---	---
11.342	1.174	0.65	36.56	16.6146	Unstiffened	---	---	---	---
13.029	1.200	0.65	36.56	16.6146	Unstiffened	---	---	---	---
19.544	1.300	0.65	36.56	16.6146	Unstiffened	---	---	---	---
19.649	1.301	0.65	36.56	16.6146	Unstiffened	---	---	---	---
26.071	1.400	0.65	36.56	16.6146	Unstiffened	---	---	---	---
27.957	1.429	0.65	36.56	16.6146	Unstiffened	---	---	---	---
32.589	1.500	0.65	36.56	16.5834	Unstiffened	---	---	---	---
36.248	1.556	0.65	36.56	16.5834	Unstiffened	---	---	---	---
39.106	1.600	0.65	36.56	16.5834	Unstiffened	---	---	---	---
44.540	1.683	0.65	36.56	16.5834	Unstiffened	---	---	---	---
45.624	1.700	0.65	36.56	8.3333	Stiffened	---	---	---	---
48.707	1.747	0.65	36.56	8.3333	Stiffened	---	---	---	---
52.142	1.800	0.65	36.56	8.3333	Stiffened	---	---	---	---
52.873	1.811	0.65	36.56	8.3333	Stiffened	---	---	---	---
57.040	1.875	0.65	36.56	8.3333	Stiffened	---	---	---	---
58.659	1.900	0.65	36.56	8.3333	Stiffened	---	---	---	---
61.207	1.939	0.65	36.56	8.3333	Stiffened	---	---	---	---
63.192	1.970	0.65	36.56	3.9705	Stiffened	---	---	---	---
65.077	1.998	0.65	36.56	3.9705	Stiffened	---	---	---	---
65.177	2.000	0.65	36.56	9.9150	Unstiffened	---	---	---	---
65.277	2.001	0.65	36.56	9.9150	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
70.135	2.054	0.65	36.56	9.9150	Unstiffened	---	---	---	---
74.377	2.100	0.65	36.56	9.9150	Unstiffened	---	---	---	---
75.092	2.108	0.65	36.56	10.5833	Unstiffened	---	---	---	---
80.384	2.165	0.65	36.56	10.5833	Unstiffened	---	---	---	---
83.577	2.200	0.65	36.56	10.5833	Unstiffened	---	---	---	---
85.675	2.223	0.65	36.56	17.0000	Unstiffened	---	---	---	---
87.899	2.247	0.65	36.56	17.0000	Unstiffened	---	---	---	---
88.099	2.249	0.65	36.56	17.0000	Unstiffened	---	---	---	---
92.777	2.300	0.65	36.56	17.0000	Unstiffened	---	---	---	---
94.175	2.315	0.65	36.56	17.0000	Unstiffened	---	---	---	---
101.977	2.400	0.65	36.56	17.0000	Unstiffened	---	---	---	---
102.675	2.408	0.65	36.56	17.0000	Unstiffened	---	---	---	---
111.175	2.500	0.65	36.56	17.0000	Unstiffened	---	---	---	---
119.675	2.592	0.65	36.56	17.0000	Unstiffened	---	---	---	---
120.377	2.600	0.65	36.56	17.0000	Unstiffened	---	---	---	---
128.175	2.685	0.65	36.56	17.0000	Unstiffened	---	---	---	---
129.577	2.700	0.65	36.56	17.0000	Unstiffened	---	---	---	---
136.675	2.777	0.65	36.56	17.0000	Unstiffened	---	---	---	---
138.777	2.800	0.65	36.56	8.2500	Stiffened	---	---	---	---
140.800	2.822	0.65	36.56	8.2500	Stiffened	---	---	---	---
144.925	2.867	0.65	36.56	8.2500	Stiffened	---	---	---	---
147.977	2.900	0.65	36.56	8.2500	Stiffened	---	---	---	---
149.050	2.912	0.65	36.56	8.2500	Stiffened	---	---	---	---
153.175	2.957	0.65	36.56	8.2500	Stiffened	---	---	---	---
155.176	2.978	0.65	36.56	4.0017	Stiffened	---	---	---	---
157.077	2.999	0.65	36.56	4.0017	Stiffened	---	---	---	---
157.177	3.000	0.65	36.56	9.9150	Unstiffened	---	---	---	---
157.277	3.001	0.65	36.56	9.9150	Unstiffened	---	---	---	---
162.135	3.059	0.65	36.56	9.9150	Unstiffened	---	---	---	---
165.577	3.100	0.65	36.56	9.9150	Unstiffened	---	---	---	---
167.092	3.118	0.65	36.56	17.3333	Unstiffened	---	---	---	---
173.977	3.200	0.65	36.56	17.3333	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
175.759	3.221	0.65	36.56	17.3333	Unstiffened	---	---	---	---
182.377	3.300	0.65	36.56	17.3333	Unstiffened	---	---	---	---
184.425	3.324	0.65	36.56	17.8333	Unstiffened	---	---	---	---
186.649	3.351	0.65	36.56	17.8333	Unstiffened	---	---	---	---
186.849	3.353	0.65	36.56	17.8333	Unstiffened	---	---	---	---
190.777	3.400	0.65	36.56	17.8333	Unstiffened	---	---	---	---
193.342	3.431	0.65	36.56	17.8333	Unstiffened	---	---	---	---
199.177	3.500	0.65	36.56	17.8333	Unstiffened	---	---	---	---
202.259	3.537	0.65	36.56	17.8333	Unstiffened	---	---	---	---
207.577	3.600	0.65	36.56	17.8333	Unstiffened	---	---	---	---
211.175	3.643	0.65	36.56	17.8333	Unstiffened	---	---	---	---
215.977	3.700	0.65	36.56	17.8333	Unstiffened	---	---	---	---
220.092	3.749	0.65	36.56	17.8333	Unstiffened	---	---	---	---
224.363	3.800	0.65	36.56	8.5416	Stiffened	---	---	---	---
224.377	3.800	0.65	36.56	8.5416	Stiffened	---	---	---	---
228.634	3.851	0.65	36.56	8.5417	Stiffened	---	---	---	---
232.777	3.900	0.65	36.56	8.5417	Stiffened	---	---	---	---
232.905	3.902	0.65	36.56	8.5417	Stiffened	---	---	---	---
237.175	3.952	0.65	36.56	8.5417	Stiffened	---	---	---	---
239.176	3.976	0.65	36.56	4.0017	Stiffened	---	---	---	---
241.077	3.999	0.65	36.56	4.0017	Stiffened	---	---	---	---
241.177	4.000	0.65	36.56	11.7483	Unstiffened	---	---	---	---
241.277	4.001	0.65	36.56	11.7483	Unstiffened	---	---	---	---
247.051	4.070	0.65	36.56	11.7483	Unstiffened	---	---	---	---
249.577	4.100	0.65	36.56	11.7483	Unstiffened	---	---	---	---
252.925	4.140	0.65	36.56	17.8334	Unstiffened	---	---	---	---
257.977	4.200	0.65	36.56	17.8334	Unstiffened	---	---	---	---
261.842	4.246	0.65	36.56	17.8334	Unstiffened	---	---	---	---
266.377	4.300	0.65	36.56	17.8334	Unstiffened	---	---	---	---
270.759	4.352	0.65	36.56	17.8334	Unstiffened	---	---	---	---
274.777	4.400	0.65	36.56	17.8333	Unstiffened	---	---	---	---
279.675	4.458	0.65	36.56	17.8333	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
283.177	4.500	0.65	36.56	17.8333	Unstiffened	---	---	---	---
288.592	4.564	0.65	36.56	17.8333	Unstiffened	---	---	---	---
291.577	4.600	0.65	36.56	16.1250	Unstiffened	---	---	---	---
295.504	4.647	0.65	36.56	16.1250	Unstiffened	---	---	---	---
295.704	4.649	0.65	36.56	16.1250	Unstiffened	---	---	---	---
296.655	4.660	0.65	36.56	16.1250	Unstiffened	---	---	---	---
299.977	4.700	0.65	36.56	16.1250	Unstiffened	---	---	---	---
304.717	4.756	0.65	36.56	16.1250	Unstiffened	---	---	---	---
308.377	4.800	0.65	36.56	8.2292	Stiffened	---	---	---	---
308.832	4.805	0.65	36.56	8.2292	Stiffened	---	---	---	---
312.946	4.854	0.65	36.56	8.2292	Stiffened	---	---	---	---
316.777	4.900	0.65	36.56	8.2292	Stiffened	---	---	---	---
317.061	4.903	0.65	36.56	8.2292	Stiffened	---	---	---	---
321.175	4.952	0.65	36.56	8.2292	Stiffened	---	---	---	---
323.176	4.976	0.65	36.56	4.0017	Stiffened	---	---	---	---
325.077	4.999	0.65	36.56	4.0017	Stiffened	---	---	---	---
325.177	5.000	0.65	36.56	10.4150	Unstiffened	---	---	---	---
325.277	5.001	0.65	36.56	10.4150	Unstiffened	---	---	---	---
330.385	5.055	0.65	36.56	10.4150	Unstiffened	---	---	---	---
334.702	5.100	0.65	36.56	10.4150	Unstiffened	---	---	---	---
335.592	5.109	0.65	36.56	14.6670	Unstiffened	---	---	---	---
342.926	5.186	0.65	36.56	14.6670	Unstiffened	---	---	---	---
344.227	5.200	0.65	36.56	14.6670	Unstiffened	---	---	---	---
350.259	5.263	0.65	36.56	14.6670	Unstiffened	---	---	---	---
353.752	5.300	0.65	36.56	14.6670	Unstiffened	---	---	---	---
357.593	5.340	0.65	36.56	14.6670	Unstiffened	---	---	---	---
363.277	5.400	0.65	36.56	14.6670	Unstiffened	---	---	---	---
364.926	5.417	0.65	36.56	14.6670	Unstiffened	---	---	---	---
372.260	5.494	0.65	36.56	14.6670	Unstiffened	---	---	---	---
372.802	5.500	0.65	36.56	14.6670	Unstiffened	---	---	---	---
379.593	5.571	0.65	36.56	14.6670	Unstiffened	---	---	---	---
382.327	5.600	0.65	36.56	14.6670	Unstiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]		v21.01.00.22

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
386.927	5.648	0.65	36.56	14.6670	Unstiffened	---	---	---	---
391.852	5.700	0.65	36.56	14.6670	Unstiffened	---	---	---	---
394.260	5.725	0.65	36.56	14.6670	Unstiffened	---	---	---	---
396.504	5.749	0.65	36.56	6.8627	Stiffened	---	---	---	---
396.704	5.751	0.65	36.56	6.8627	Stiffened	---	---	---	---
397.691	5.761	0.65	36.56	6.8627	Stiffened	---	---	---	---
401.123	5.797	0.65	36.56	7.6790	Stiffened	---	---	---	---
401.377	5.800	0.65	36.56	7.6790	Stiffened	---	---	---	---
404.962	5.838	0.65	36.56	7.6790	Stiffened	---	---	---	---
408.802	5.878	0.65	36.56	7.6790	Stiffened	---	---	---	---
410.902	5.900	0.65	36.56	7.6250	Stiffened	---	---	---	---
412.614	5.918	0.65	36.56	7.6250	Stiffened	---	---	---	---
416.427	5.958	0.65	36.56	7.6250	Stiffened	---	---	---	---
418.427	5.979	0.65	36.56	4.0003	Stiffened	---	---	---	---
420.327	5.999	0.65	36.56	4.0003	Stiffened	---	---	---	---
420.427	6.000	0.65	36.56	11.7587	Unstiffened	---	---	---	---
420.527	6.001	0.65	36.56	11.7587	Unstiffened	---	---	---	---
426.306	6.086	0.65	36.56	11.7587	Unstiffened	---	---	---	---
427.245	6.100	0.65	36.56	11.7587	Unstiffened	---	---	---	---
432.186	6.172	0.65	36.56	17.6666	Unstiffened	---	---	---	---
434.063	6.200	0.65	36.56	17.6666	Unstiffened	---	---	---	---
440.880	6.300	0.65	36.56	17.6666	Unstiffened	---	---	---	---
441.019	6.302	0.65	36.56	17.6666	Unstiffened	---	---	---	---
447.698	6.400	0.65	36.56	17.6666	Unstiffened	---	---	---	---
449.852	6.432	0.65	36.56	17.6667	Unstiffened	---	---	---	---
454.516	6.500	0.65	36.56	17.6667	Unstiffened	---	---	---	---
458.686	6.561	0.65	36.56	17.6667	Unstiffened	---	---	---	---
461.333	6.600	0.65	36.56	17.6667	Unstiffened	---	---	---	---
467.519	6.691	0.65	36.56	17.6667	Unstiffened	---	---	---	---
468.151	6.700	0.65	36.56	8.5417	Stiffened	---	---	---	---
471.790	6.753	0.65	36.56	8.5417	Stiffened	---	---	---	---
474.969	6.800	0.65	36.56	8.5417	Stiffened	---	---	---	---

Date:	1/22/2025	Final_Rolled Section W40x199 Fixed Lean-on.lbsx		
Time:	3:52 PM	Bentley LEAP Bridge Steel [AASHTO LRFD 9th Ed. with 2020 Interims]	v21.01.00.22	

POI Location (ft)	Span Fraction	Web				Top Long. Stiff. ds (in)	Bottom Long. Stiff. ds (in)	Perf. Ratio	Control Equation
		Thickness (in)	Height (in)	d0 (ft)	Stiffened/Unstiffened				
476.061	6.816	0.65	36.56	8.5417	Stiffened	---	---	---	---
480.332	6.879	0.65	36.56	8.5417	Stiffened	---	---	---	---
481.786	6.900	0.65	36.56	8.5417	Stiffened	---	---	---	---
484.603	6.941	0.65	36.56	8.5417	Stiffened	---	---	---	---
486.603	6.971	0.65	36.56	4.0016	Stiffened	---	---	---	---
488.504	6.999	0.65	36.56	4.0016	Stiffened	---	---	---	---
488.604	7.000	0.65	36.56	4.0016	Stiffened	---	---	---	---

Completed By: CAE Date: 05/03/2024
Checked By: DOR Date: 05/14/2024

Completed By: CAE Date: 05/03/2024
Checked By: DOR Date: 05/14/2024

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Checked By: DOR Date: 05/14/2024

Check for Ultimate Strength Using Eq. (10-155) AASHTO : $0.264 < 1$!

1.2 Crossframe Design



Department of
Transportation



Project LAK-006-06.05 - SR 6 over I-271
Phase Final Design
Subject Intermediate Cross-Frames
Summary Independent Check

Proj. #: PROJECT #
By: MAR Date: 24-Jan-25
Chk'd: CAE Date: 27-Jan-25

(Input values are shown underlined and in italics.)
References

Independent Check

Determine the Capacity of a Single L 3 1/2 x 3 1/2 x 3/8 Angle in Tension and Compression

AISC - LRFD Specification with AASHTO Φ Factors

Material and Other General Properties

A709, Gr. 50 / A572, Gr. 50

F_y	<u>50</u> ksi	Yield	<u>AASHTO Φ Factors</u>		
F_u	<u>65</u> ksi	Strength	Φ_t	0.95	Yield (AASHTO 6.5.4.2)
E	<u>29,000</u> ksi	Modulus of Elasticity		0.80	Fracture
d_b	<u>7/8</u> in	Bolt Diameter	Φ_c	0.90	Compression
Fixity	<u>Case 2</u>	Restrained bracing member.	Φ_f	1.00	Flexure
K	<u>0.65</u>	Effective Length Factor			

Member Properties

Given Properties L3.5x3.5x0.375 L 3 1/2 x 3 1/2 x 3/8

b	<u>3 1/2</u> in	Leg width.
t	<u>3/8</u> in	Leg thickness.
A_g	<u>2.48</u> in ²	Gross area.
S_x	<u>1.150</u> in ³	Section modulus to the toe of the leg.
r	<u>1.070</u> in	Radius of gyration.
y	<u>1.010</u> in	Location of the neutral axis.
L	<u>3.96</u> ft	Unbraced length.

OK for all members.

Limiting Lengths

Primary and Secondary Tension Members

$$L_{Max} = 41.1 \text{ ft for } KL/r \leq 300$$

Primary Compression Members

$$L_{Max} = 16.4 \text{ ft for } KL/r \leq 120$$

Secondary Compression Members

$$L_{Max} = 27.4 \text{ ft for } KL/r \leq 200$$

Computed Properties

b/t	<u>9.33</u>	<	$0.71(E/F_y)^{1/2} =$	<u>17.10</u>	Flexural-torsional effects neglected. (AISC, Chap. E5.)
		<	$0.45(E/F_y)^{1/2} =$	<u>10.84</u>	Section is nonslender. (AISC, Table B4.1a, Case 3)
			$0.54(E/F_y)^{1/2} =$	<u>13.00</u>	Table B4.1b, Case 12)
		<	$0.91(E/F_y)^{1/2} =$	<u>21.92</u>	Section is compact. Table B4.1b, Case 12)
$M_y = F_y S_x$	<u>4.79</u> kip-ft		Yield flexure.		(AISC, F10.1)

Connection Details

t_c	<u>5/8</u> in	Connection plate thickness.
e	$= y + t_c/2$	Load eccentricity.
	<u>1.323</u> in	
l	<u>3</u> in	Total length of the connection.

Direct Tension Capacity Welded

U	$= (1 - y/l) \geq 0.6$	Shear lag factor	(AISC, Table D3.1, Cases 2 & 8)
	<u>0.663</u>		
A_n	<u>2.48</u> in ²	Net area: Welded	
A_e	$= A_n U$	Effective area	(AISC, (D3-1))
	<u>1.65</u> in ²		
$\Phi_t P_n$	$\leq \Phi_t F_y A_g$	Yield	(AISC, (D2-1))
	<u>117.8</u> kip		
	$\leq \Phi_t F_u A_e$	Fracture	(AISC, (D2-2))
	<u>85.5</u> kip	Controls	

Project LAK-006-06.05 - SR 6 over I-271
Phase Final Design
Subject Intermediate Cross-Frames
Summary Independent Check

Proj. #: PROJECT #
By: MAR Date: 24-Jan-25
Chk'd: CAE Date: 27-Jan-25

(Input values are shown underlined and in italics.)

Direct Compression Capacity

$$KL / r = 28.9 < 4.71 (E / QF_y)^{1/2} = 113.4$$

$$F_e = \pi^2 E / (KL / r)^2 = 343.5 \text{ ksi} \quad (\text{AISC, (E3-4)})$$

$$\lambda = b / t = 9.33$$

$$\lambda_r = 0.45 (E / F_y)^{1/2} = 10.84 \quad (\text{AISC, Table B4.1a, Case 3})$$

$$c_2 = 1.49 \quad (\text{AISC, Table E7.1})$$

$$F_{el} = (c_2 \lambda_r / \lambda)^2 F_y = 149.7 \text{ ksi} \quad \text{Elastic local buckling stress. (AISC, (E7-5))}$$

Controls

$$F_{cr} = (0.658^{(F_y / F_e)}) F_y = 43.5 \text{ ksi} \quad \text{for } KL / r \leq 4.71 (E / F_y)^{1/2} \quad (\text{AISC, (E3-2)})$$

Applies

$$= 0.877 F_e = 301.5 \text{ ksi} \quad \text{for } KL / r > 4.71 (E / F_y)^{1/2} \quad (\text{AISC, (E3-3)})$$

NA

$$\Phi_c P_n = \Phi_c F_{cr} A_g = 97.0 \text{ kip} \quad (\text{AISC, E1, (E3-1) \& (E7-1)})$$

Direct Flexural Capacity

Yielding Limit State

$$M_n = 1.5 M_y = 1.5 F_y S_x = 7.19 \text{ kip-ft} \quad (\text{F10-1})$$

Lateral Torsional Buckling Limit State

(AISC, F10.2)

$$M_y = F_y S_x \quad \text{Yield moment}$$

$$"M_y" = 0.8 M_y = 3.83 \text{ kip-ft} \quad \text{Limit on yield moment}$$

$$M_{cr} = (0.58 E b^4 t C_b / L^2) \{ [1 + 0.88 (L t / b^2)^2]^{1/2} - 1 \} = 24.16 \text{ kip-ft} \quad \text{for compression on the toe. (AISC, (F10-5a))}$$

$$= (0.58 E b^4 t C_b / L^2) \{ [1 + 0.88 (L t / b^2)^2]^{1/2} + 1 \} = 94.02 \text{ kip-ft} \quad \text{for tension on the toe. (AISC, (F10-5b))}$$

$$M_n = (1.92 - 1.17 (M_y / M_{cr})^{1/2}) M_y \leq 1.5 M_y = 5.57 \text{ kip-ft} \quad \text{Applies for } M_y / M_{cr} \leq 1.0 (0.80 M_y) \quad (\text{AISC, (F10-2)})$$

$$= 6.45 \text{ kip-ft} \quad \text{Applies for compression on the toe.}$$

$$= (0.92 - 0.17 M_y / M_{cr}) M_{cr} = 94.02 \text{ kip-ft} \quad \text{Applies for } M_y / M_{cr} > 1.0 (0.80 M_y) \quad (\text{AISC, (F10-3)})$$

kip-ft NA for compression on the toe.

kip-ft NA for tension on the toe.

Leg Local Buckling Limit State

$$M_n = 1.5 F_y S_x = 7.19 \text{ kip-ft} \quad \text{Applies for } b / t \leq 0.54 (E / F_y)^{1/2} \quad (\text{AISC, F10.3a})$$

$$= F_y S_x [2.43 - 1.72 (b / t) (F_y / E)] = 6.45 \text{ kip-ft} \quad \text{for } 0.54 (E / F_y)^{1/2} < b / t \leq 0.91 (E / F_y)^{1/2} \quad (\text{AISC, (F10-6)})$$

$$= F_y 0.8 S_x [2.43 - 1.72 (b / t) (F_y / E)] = 3.83 \text{ kip-ft} \quad \text{NA}$$

$$= F_{cr} S_x = 301.5 \text{ kip-ft} \quad \text{for } b / t > 0.91 (E / F_y)^{1/2} \quad (\text{AISC, (F10-7) \& (F10-8)})$$

$$= [0.71 E / (b / t)^2] 0.8 S_x = 301.5 \text{ kip-ft} \quad \text{NA}$$

Flexural Capacity

$$\Phi_t M_n = 5.57 \text{ kip-ft} \quad \text{For compression on the toe.}$$

$$= 6.45 \text{ kip-ft} \quad \text{For tension on the toe.}$$

(Input values are shown underlined and in italics.)

Axial Capacity



Tension Capacity *Welded*

$$f_{toe} = \Phi_t P_n (-1/A_g + y/S_x) \quad \text{Net stress on toe at nominal tensile capacity.}$$

Where $(-1/A_g + y/S_x) = +0.48 \text{ in}^{-2} \rightarrow \text{Net stress on the toe is compression.}$

$$P_U^T \leq 1.0 / [(1/\Phi_c P_n) + (e/\Phi_b M_n)] \quad \text{solved for } P_U, \text{ where } M_U = P_U e \quad (\text{AISC, (H2-1)})$$

31.8 kip Unbraced length OK

Compression Capacity

$$f_{toe} = \Phi_c P_n (+1/A_g - y/S_x) \quad \text{Net stress on toe at nominal compressive capacity.}$$

Where $(+1/A_g - y/S_x) = -0.48 \text{ in}^{-2} \rightarrow \text{Net stress on the toe is tension.}$

$$P_U^C \leq 1.0 / [(1/\Phi_c P_n) + (e/\Phi_b M_n)] \quad \text{solved for } P_U, \text{ where } M_U = P_U e \quad (\text{AISC, (H2-1)})$$

36.5 kip Unbraced length OK for primary and secondary members.

Determine the Effective Area of the Member as a Brace

Note:

Bracing stiffness equations often simply use the area of the brace as an input value. These equations are presuming that the bracing member is concentrically axially loaded. Such would not be the case here.

$$A_e^T = P_U^T / \Phi_t F_y \quad \text{Effective area of the member as a tension brace accounting for member eccentricity.}$$

0.669 in²

$$A_e^C = P_U^C / \Phi_c F_y \quad \text{Effective area of the member as a compression brace accounting for member eccentricity.}$$

0.812 in²

Member Areas at Connections

$$A_n = 1.40 \text{ in}^2 \quad \text{Net area of the member at bolted connection.}$$

$$A_e = 1.65 \text{ in}^2 \quad \text{Effective area of the member at welded connection.}$$



Completed By:	CAE	Date Completed:	3/26/2024
Checked By:	MAR	Date Checked:	1/24/2025
Project Name:	US 6 over I-271		
Project Number:	075926.001		

Skewed Crossframe Design

Summary:

This spreadsheet is made based on the NSBA Steel Bridge Design Handbook Chapter 13: Bracing System Theory and Design for I-Girders and Tub Girders, AASHTO LRFD BDS 9th Edition, 2020, and ODOT BDM 2024. For bridges with no skew, set theta to 0 degrees. This spreadsheet is for the design of X-Crossframes and Bearing Stiffeners/Connection Plates. A basemap of the crossframes is useful to have open while editing values in-order to see what works geometrically.

Comments:

- Fill out all inputs. If the strength check formula assumptions are not correct and if anything besides angle shapes are used for cross-frames or struts, find the appropriate formulas and factors in the AASHTO LRFD BDS 9th Edition, 2020.
- The same section properties and number of struts is assumed for both the positive and negative moment regions.

Order of Analysis:

1. Find forces acting on the system, both vertical and horizontal. For horizontal forces, TAEG 2.1 is used.
2. Design crossframe diagonals and struts. Conservatively, the forces in the struts are assumed to be the same as in the diagonals.
3. Design weld connection between bent plate and angles from crossframes.
4. Design the bolts to connect between the bent plate and bearing stiffener.
5. Design the connection plate between the diagonals, struts, and the bearing stiffeners.
6. Design the bearing stiffener.

Legend:

Input Required

Important Value



471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	U.S. 6 over I-271		
1/24/2025			
Project No:	075926.001		
Calc By:	CAE	Date:	03/26/24
Check By:	xxx	Date:	xxx

Horizontal Loadings on Crossframes

Purpose:

Calculate the horizontal loadings on the extreme skewed crossframe at Pier 4 exterior bay.

Construction Loading Calculation

Wind Loadings:

Length of Area Effected by Wind Loading	=	89.625	ft	(Half of Span 4 and Half of Span 5)
Height of Area Effected by Wind Loading	=	4.1	ft	(Deck Thick + Haunch + Beam Height)
Area of Wind Load on Structure, WL	=	367.46	sf	(Length * Height)
Strength III Design 3-sec Gust Wind Speed, V	=	115	mph	(Table/Figure 3.8.1.1.2-1)
Wind Exposure Category	=	C		(Article 3.8.1.1.5)
Structure Height, Z	=	18	ft	
Pressure Exposure & Elevation Coefficient, Kz	=	1		(Table C3.8.1.2.1-1)
Gust Effect Factor, G	=	1		(Table 3.8.1.2.1-1)
Drag Coefficient, Cd	=	1.3		(Table 3.8.1.2.1-2)
Wind Pressure, P	=	0.04	ksf	(Eq 3.8.1.2.1-1)
Wind Point Load on Exterior Bay Crossframes	=	16.17	kip	(Area * Wind Pressure)
Half Height to Top Flange	=	2.05	ft	
Half Height to Bottom Flange	=	2.05	ft	Factored:
		8.09	kip	12.13 kip
		8.09	kip	12.13 kip

Construction Loading: (Included factors by increasing each input by its factor in TAEG 2.1)

Formwork Load From TAEG 2.1	=	10	psf	(TAEG 2.1 Inputs)
D.L. Concrete From TAEG 2.1	=	144.9	psf	(TAEG 2.1 Inputs)
Maximum Negative Moment:				
Self-Weight Steel	=	-138.47	kip-ft	(LEAP Steel Output at Pier 4)
Self-Weight X-Frames	=	-2.60	kip-ft	(LEAP Steel Output at Pier 4)
Self-Weight Slab	=	-531.92	kip-ft	(LEAP Steel Output at Pier 4)
Formwork	=	-36.71	kip-ft	(Ratio from TAEG 2.1 Formwork vs Concrete)
Centroid of Beam for Half of Depth	=	19.35	in	Increased the inputs in TAEG 2.1 by Factor:
Moment of Inertia for X-X Axis	=	14900	in^4	DL Factor = 1.25 (3.4.2.1)
				LL Factor = 1.5 (3.4.2.1)
Stresses Due to Non-Composite Dead Load:				Factored:
From Max Negative Moment	=	11.06	ksi	(stress = (M*y)/I) 13.82 ksi
Take these values and input into a setup TAEG 2.1 file to calculated the Lateral Reactions				

Outputs from TAEG 2.1 Construction Loading:

Lateral Support Reaction	=	17.43	kip	(Construction Loading is based on 3 ft
Resulting Moment	=	54.66	kip-ft	overhang bracket spacing)

Strength III Loading Calculation

Wind Loadings:

Length of Area Effected by Wind Loading	=	89.625	ft	(Half of Span 4 and Half of Span 5)
Height of Area Effected by Wind Loading	=	7.1	ft	(Deck Thick + Haunch + Beam Height + Parapet)
Height of Fence for Wing Loading	=	6	ft	(VPF Std. Dwg.)
Area of Wind Load on Structure, WL	=	636.34	sf	(Length * Height)
Area of Wind Load on Fence, WLf	=	537.75	sf	(Length * Height)
Strength III Design 3-sec Gust Wind Speed, V	=	115	mph	(Table/Figure 3.8.1.1.2-1)
Wind Exposure Category	=	B		(Article 3.8.1.1.5)
Structure Height, Z	=	18	ft	
Pressure Exposure & Elevation Coefficient, Kz	=	0.71		(Table C3.8.1.2.1-1)
Gust Effect Factor, G	=	1		(Table 3.8.1.2.1-1)
Drag Coefficient, Cd	=	1.3		(Table 3.8.1.2.1-2)
Wind Pressure, P	=	0.03	ksf	(Eq 3.8.1.2.1-1)
Wind Point Load on Fence, Pf	=	8.07	kip	(13.8.2)
Wind Point Load on Exterior Bay Crossframes	=	19.88	kip	(Area * Wind Pressure)
Half Height to Top Flange Centroid	=	3.55	ft	
Half Height to Bottom Flange Centroid	=	3.55	ft	Factored:
		18.01	kip	18.01 kip (Fence goes to Top)
		9.94	kip	9.94 kip

Loading Comparison for Fbr

Construction Lateral Load	=	29.56	kip	Use Construction Loading
Strength III Factored Lateral Load	=	18.01	kip	

Skewed Crossframe Inputs for Angle Design

Negative Moment Region

Complete?	MAR	Input Data #####	
		Extreme Span Length, L	89.625 ft
		Number of Girders in Cross-Section, ng	5
		Girder Spacing, S	8.832 ft
		Skew, θ	31.8806 deg
		Number of Brace Points in Span, n	6
		Unbraced Length of the Segment, Lb	8.667 ft
	Cross-Frame Properties		
		Section Used	L4x4x1/2
		Width of connection plate, bs	7.75 in
		Distance from top of cross-frame to bottom of top flange, hi	2 in
		Height of cross-frame, hb	32.56 in
		Length of Diagonal, Ld	96.16793 in
		Length of Strut, Ls	90.48822 in
		Distance of centroid in x direction, x	1.18 in
		Shear lag reduction factor, U	0.831429
		Thickness of Brace Leg, tleg	0.5 in
		Yield Strength, Fy	50 ksi
		Ultimate Strength, Fu	70 ksi
		Radius of Gyration (X-Direction), rx	1.21 in
		Area of Brace, Ab (or Ag)	3.75 in ²
	Cross-Section Properties		
		Section Used	W40x199
		Web Depth, D	36.56 in
		Moment of Inertia (Strong Axis), Ix	14900 in ⁴
		Distance between centroid of compression and tension flange, ho	37.6 in
		Distance from centroid of girder to centroid of compression flange, c	18.8 in
		Distance from centroid of girder to centroid of tension flange, t	18.8 in
		Top Flange Width	15.8 in
		Top Flange Thickness	1.07 in
		Bottom Flange Width	15.8 in
		Bottom Flange Thickness	1.07 in
		Moment of Inertia of tension flange about vertical axis (Iy top flange), lyc	351.701 in ⁴
		Moment of Inertia of tension flange about vertical axis (Iy bottom flange), lyt	351.701 in ⁴
		Effective Moment of Inertia of girder about vertical axis, Ieff	703.4023 in ⁴
		Steel modulus of elasticity, E	29000 ksi
	Construction Loading Factors		
		Construction DL Factor, γ_{DL}	1.25
		Construction LL Factor, γ_{LL}	1.5
		Moment gradient Modifier, Cb	1
(From Horizontal Loading)	Negative Moment Loading		
		Unfactored DL Construction Moment, MDL	8516.393 kip-in
		Unfactored LL Construction Moment, MLL	2748.997 kip-in
		Factored Negative Moment	14768.99 kip-in

Skewed Crossframe Inputs for Angle Design			
Negative Moment Region Continued...			
Complete?	Weld Properties		
	Leg of Weld	0.3125	in
	Yield Strength of Weld	70	ksi
	Length of Weld	7	in
	Factors		
	Reduction factor for holes, Rp	1	
	Resistance factor for stability bracing, ϕ_{sb}	0.8	
	Single Angle Reduction Factor	0.65	
	Resistance factor for yielding, ϕ_y	0.95	
	Resistance factor for fracture, ϕ_u	0.8	
	Compressive Resistance of a Single Angle, ϕ_c	0.95	
	Resistance factor for shear in throat of weld metal, ϕ_e2	0.8	

Skewed Crossframe Inputs for Angle Design

Torsional Brace Stiffness Requirements

MAR

#####

Goal:

Find (BT)_{act} >= (BT)_{req}

$$(\beta_T)_{act} = \frac{1}{\frac{1}{\beta_{br}} + \frac{1}{\beta_{sec}} + \frac{1}{\beta_g}}$$

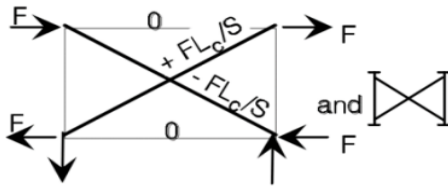
Where:

β_{br} = brace stiffness of the diaphragm or cross-frame

β_{sec} = cross-sectional distortion stiffness

β_g = effective in-plane girder stiffness

COMPRESSION SYSTEM



$$\beta_b = \frac{A_c E S^2 h_p^2}{L_c^3}$$

Tension - Compression System
horizontals not required

Negative Moment Region

B_{br} = 1236538 kip-in/rad

$$\beta_{bSkew} = \frac{\beta_b}{\cos^2 \theta}$$

B_{br, skew} = 1714895 kip-in/rad

Height of cross-frame vs 0.8*web depth

32.56 in

vs

29.248 in

B_{sec} = 1E+100 kip-in/rad

$$\beta_g = \frac{24(n_g - 1)^2}{n_g} \frac{S^2 E I_x}{L^3}$$

B_g = 299660 kip-in/rad

BT_{act} = 255087 kip-in/rad

Torsional Brace Stiffness Requirements Continued...

Negative Moment Region

$$\beta_T = \frac{\overline{\beta}_T L}{n} = \frac{2.4LM_r^2}{\phi nEI_{yeff}C_b^2}$$

BTreq = 5750 kip-in/rad

$$(\beta_T)_{act} \geq (\beta_T)_{req}$$

BTact vs BTreq

255087 vs 5750

PASS

Strength Requirements of Bracing in the Negative Moment Region

Tensile Capacity

MAR

1/24/2025

$$M_{br} = F_{br} h_b = \frac{0.005 L_b L M_r^2}{n E I_{y_{eff}} C_b^2 h_o}$$

Additional Moment from Horizontal Loading	=	655.92 kip-in
Mbr	=	26.508 kip-in
Mbr Total	=	682.428 kip-in

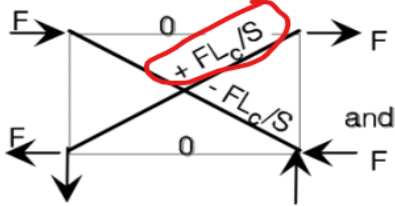
$$M_{br,skew} = \frac{M_{br}}{\cos \theta}$$

Mbr, skew	=	803.659 kip-in

$$F_{br} = \frac{M_{br,skew}}{h_b}$$

Additional Forces from Horizontal Loading	=	29.56 kip
Fbr	=	24.682 kip
Fbr Total	=	54.24 kip

COMPRESSION SYSTEM



Fd	=	49.216 kip
Fs	=	49.216 kip

(Assumed to be equal to Fd to be conservative)

$$A_n = A_g - 1 \times \left(d_b + \frac{1}{8} \right) \times t_{leg}$$

An	=	3.531 in^2

Gross section yielding capacity $\phi_y P_{ny} = \phi_y F_y A_g$

$\phi_y P_{ny}$	=	178.125 kip

Check Factored Tensile Capacity

Pr	=	178.125 kip
vs		
Fd	=	49.216 kip

PASS

Capacity to Demand	3.62

Strength Requirements of Bracing in the Negative Moment Region Continued...

Compressive Capacity

$$L_s/r_x = 74.784 \quad \text{AASHTO LRFD Article 6.9.4.4}$$

$$\left(\frac{Kl}{r_x} \right)_{eff} = 72 + 0.75 \frac{l}{r_x} \quad \text{AASHTO LRFD Article 6.9.4.4-1}$$
$$= 128.088$$

$$P_e = \frac{\pi^2 E}{\left(\frac{Kl}{r_x} \right)_{eff}^2} A_g \quad \text{AASHTO LRFD 6.9.4.1.2-1}$$
$$= 65.421 \text{ kip}$$

$$P_o = F_y A_g \quad \text{AASHTO LRFD 6.9.4.1}$$
$$= 187.500 \text{ kip}$$

$$P_o/P_e = 2.866 > 2.25? \quad \text{Use AASHTO LRFD 6.9.4.1.1-2}$$

$$P_n = \left[0.658 \left(\frac{P_o}{P_e} \right) \right] P_o \quad (6.9.4.1.1-1)$$
$$= 56.497 \text{ kip}$$

$$P_n = 0.877 P_e \quad (6.9.4.1.1-2)$$
$$= 57.374 \text{ kip}$$

Factored compressive resistance of a single angle

$$\phi_c P_n = 54.505 \text{ kip}$$

$$\phi_c P_n > F_d?$$

PASS

Capacity to Demand
1.11

Strength Requirements of Bracing in the Negative Moment Region Continued...

Limiting Slenderness Ratio Check

$$K = 1 \quad (\text{for single angles})$$

$$\frac{Kl}{r} < 140$$

$$(K*L_s)/r_x = 74.784$$

$$(K*L_s)/r_x < 140? \quad \boxed{\text{PASS}}$$

Fillet-Welded Connection to Bent Plate

$$\text{Throat Size} = 0.22 \text{ in}$$

$$F_{exx} = 15.47 \text{ kip/in} \quad (\text{Effective Area of Weld} * \text{Yield Strength of Weld Material})$$

$$R_r = 0.6\phi_{e2} F_{exx} \quad (6.13.3.2.4-1)$$

$$R_r = 51.97 \text{ kip}$$

Capacity to Demand

PASS

1.06

$$\text{Shear Force} = 49.22 \text{ kip}$$



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Calc By:	CAE	Date:	03/28/24
Check By:	xxx	Date:	xxx

Bent Plate Design

Purpose:

Design the a bent plate with bolt holes to allow for the framing of the crossframes. Using the maximum loading for the maximum design.

Inputs

Bolt Diameter, db	=	1 in	
Bolt Hole, dh	=	1.125 in	
Bolt Area	=	0.785 in ²	
Bolt Ultimate Strength, Fub	=	120 ksi	
Number of Shear Planes, Ns	=	1	
Number of Bolts per Line, Nb	=	2	
Number of Bolt Lines, Nbl	=	1	
Minimum Bolt Edge Distance, Be	=	1.5 in	(Table 6.13.2.6.6-1 + 1/4")
Used Bolt Edge Distance, Beu	=	3 in	(Designed)
Minimum Bolt Spacing	=	3 in	(Article 6.13.2.6.1)
Bolt Spacing, B Spa.	=	5 in	(Figure 4, Based on Angle fit on Bent Plate)
Minimum Distance from Stiffener to Bend	=	0.5 in	(Engineering Judgement)
Ultimate Strength of Bent Plate	=	65 ksi	
Length of Leg of Angle	=	0 in	
Minimum Weld Length	=	7 in	
		0.5 in	(Engineering Judgement)
Thickness of Bearing Stiffener	=	0.875 in	(Bearing Stiffener Sheet)
Resistance factor for bolts in shear, ϕ_s	=	0.8	
Resistance factor for bolts in tension, ϕ_t	=	0.8	
Resistance factor for bolt bearing, ϕ_b	=	0.8	

Free Body Diagram and Loads Acting on Bent Plate

Figure 1: Plan View of Bent Plate Connection

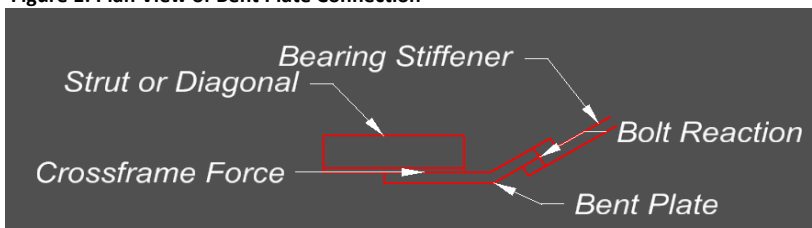
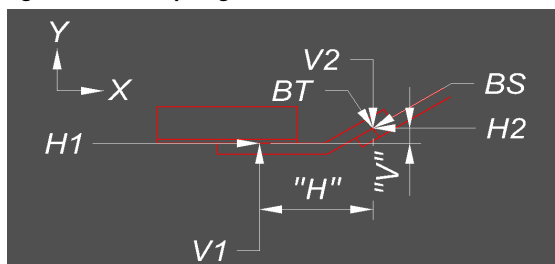
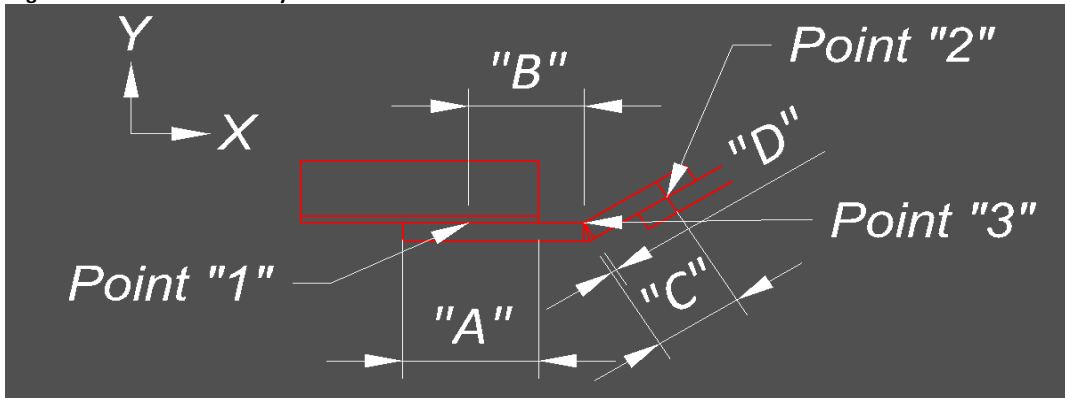


Figure 2: Free Body Diagram



Free Body Diagram and Loads Acting on Bent Plate Continued...

Figure 3: Bent Plate Geometry



Bent Plate Dimensions:

Thickness of Bent Plate	=	0.875 in	(Assumed to be same as Thick of Stiffener)
Angle of Bend	=	142.461 deg	(Measured from Detail)
Length of Weld on Strut Horizontal, "A"	=	3.5 in	
Distance from Bend to Center of Weld, "B"	=	2.25 in	
Distance from Bend to Bolt, "C"	=	3.5 in	
Difference in Length from In to Out, "D"	=	0.297 in	
X-Distance between Weld to Bolt, "H"	=	4.790 in	
Y-Distance between Weld to Bolt, "V"	=	1.951 in	

Forces Acting on Bent Plate and Bolts:

X- Direction Crossframe Forces, H1	=	43.01 kip	
Y- Direction Crossframe Forces, V1	=	33.05 kip	
X-Reaction at Bolt, H2	=	-43.01 kip	(Horizontal Component of BS)
Y-Reaction at Bolt, V2	=	-33.05 kip	(Vertical Component of BS)

Tension in Bolt, BT	=	23.22 kip	
Shear in Bolt, BS	=	54.24 kip	(Neg Moment Forces, Fbr)

Eq. 1: Sum M^{"3"} = 0; $(H2 * "V") - (BT * ("C" - "D")) - (V1 * "B") - (V2 * ("H" - "B")) = 0$

Solve for...

Eq. 1; BT = 23.22 kip (Magnitude, not in coord system)

Bolt Sizing and Number Calculations

Bolt Shear Resistance:

Article 6.13.2.7

Nominal shear resistance of bolts $R_n = 0.45 A_b F_{ub} N_s$ (threads included in shear plane)

$R_n = 84.823 \text{ kip}$ (Eq. 6.13.2.7-2)

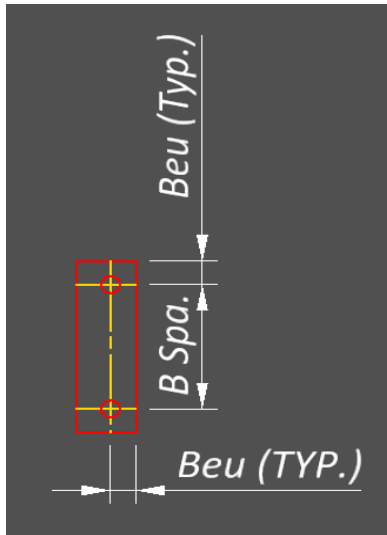
$\phi_s R_n = 67.858 \text{ kip}$

vs
BS = 54.24 kip

PASS

Bolt Sizing and Number Calculations Continued...

Figure 4: Bolt Holes in Bent Plate



Prying Action:

Article 6.13.2.10

$$Q_u = \left[\frac{3b}{8a} - \frac{t^3}{20} \right] P_u \quad (6.13.2.10.4-1)$$

Direct Tension per Bolt, P_u	=	11.61 kip	(BT / number of bolts)
Center of Bolt to Edge, a	=	3 in	(Same as B_{eu})
Center of Bolt to Toe of Fillet, b	=	3 in	(Only one row of bolts, $a = b$)
Thickness of Thinnest Part, t	=	0.875 in	(Min of Bent Plate and Bearing Stiffener)
Q_u	=	3.96 kip	(Add to BT per bolt)

Combined Tensile and Shear Resistance:

Article 6.13.2.11

$$\frac{P_u}{R_n} \leq 0.33, \quad P_u / R_n = 0.14$$

Equation to Use = AASHTO 6.13.2.11-1

$$T_n = 0.76 A_b F_{ub} \quad (6.13.2.11-1)$$

$$T_n = 143.26 \text{ kip}$$

$$T_n = 0.76 A_b F_{ub} \sqrt{1 - \left(\frac{P_u}{\phi_s R_n} \right)^2} \quad (6.13.2.11-2)$$

$$T_n = 141.14 \text{ kip}$$

$$\phi T_n = 114.61 \text{ kip}$$

$$\text{vs} \\ \text{BT} + n_b * Q_u = 31.15 \text{ kip}$$

PASS

Bolt Sizing and Number Calculations Continued...

Bearing Capacity of Bolt Holes:

Article 6.13.2.9

Spacing between bolts vs $2 * db$

5.000 vs 2.000 GREATER THAN

End Distance vs $2.0d$

3 vs 2.000 GREATER THAN

Equation to use

=

AASHTO 6.13.2.9-1

$$R_n = 2.4dtF_u \quad (6.13.2.9-1)$$

$$R_n = 136.500 \text{ kip}$$

$$R_n = 1.2L_c t F_u \quad (6.13.2.9-2)$$

$$R_n = 170.625 \text{ kip}$$

$$\phi b R_n = 109.200 \text{ kip}$$

vs

PASS

$$BS = 54.24 \text{ kip}$$

Bent Plate Capacity Calculations

Block Shear Rupture Resistance:

Article 6.13.4

$$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn}) \leq \phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn}) \quad (6.13.4-1)$$

Reduction Factor for Holes, R_p	=	0.9	(0.9 for punched, 1.0 for drilled holes)
Gross Area Along Plane Resisting Shear, A_g	=	2.625 in ²	(Beu * Bent Plate Thickness)
Net Area along Plane Resisting Shear, A_{vn}	=	2.133 in ²	((Beu - dh/2) * Bent Plate Thickness)
Reduction for Block Shear Resistance, U_{bs}	=	1	(0.5 for non uniform, 1.0 for uniform)
Net Area along Plane Resisting Tension, A_{tn}	=	2.133 in ²	(Same as Shear because of End Distance)
Minimum Yield Strength, F_y	=	50 ksi	
Minimum Tensile Strength of Connection, F_u	=	65 ksi	
Resistance Factor for Block Shear, ϕ_{bs}	=	0.8	(Article 6.5.4.2)

$$157.71 \text{ kip} \leq 154.63 \text{ kip}$$

$$R_r = 154.63 \text{ kip}$$

Shear Yielding:

Article 6.13.5.3

$$R_r = \phi_v 0.58 F_y A_{vg} \quad (6.13.5.3-1)$$

Resistance Factor for Shear, ϕ_v	=	1	(Article 6.5.4.2)
R_r	=	76.13 kip	

Shear Rupture:

Article 6.13.5.3

$$R_r = \phi_{vu} 0.58 R_p F_u A_{vn} \quad (6.13.5.3-2)$$

Resistance Factor for Shear Rupture, ϕ_{vu}	=	0.8
R_r	=	57.89 kip

Bent Plate Shear Resistance:

R_r	=	57.89 kip
vs		
BS	=	54.24 kip

PASS

Bent Plate Capacity Calculations Continued...

Tensile Resistance:

Article 6.8.2.1

Resistance Factor for Yielding Tension, ϕ_y	=	0.95	(Article 6.5.4.2)
Resistance Factor for Fracture Tension, ϕ_u	=	0.8	(Article 6.5.4.2)
Gross Cross-Sectional Area of Member, A_g	=	9.63 in ²	((2*Beu + (nb - 1) * B Spa.)*Thickness of Plate)
Net Area of Member, A_n	=	7.66 in ²	(Ag - (nb*Thickness of Plate*dh))
Shear Lag Reduction Factor, U	=	1	(Article 6.8.2.2)

$$P_r = \phi_y P_{ny} = \phi_y F_y A_g \quad (6.8.2.1-1)$$

$$= 457.19 \text{ kip}$$

$$P_r = \phi_u P_{nu} = \phi_u F_u A_n R_p U \quad (6.8.2.1-2)$$

$$= 358.31 \text{ kip}$$

$$Pr = 358.31 \text{ kip}$$

vs

$$BS = 54.24 \text{ kip}$$

PASS

Minor Axis Flexural Resistance:

Article 6.12.2.2.7

Flexural Resistance Factor, ϕ_f	=	1.000	(Article 6.5.4.2)
Depth of Bar, d	=	11 in	
Plastic Section Modulus for Minor Axis, Z_y	=	2.11 in ³	(For rectangles, $db^2/4$)
Modulus of Elasticity, E	=	29000 ksi	
Width of Bar Parallel to axis of bending, ty	=	11 in	
Unbraced Length, Lb	=	0.875 in	

$$\frac{L_b d}{t^2} \leq \frac{0.08E}{F_y} \quad 0.080 \leq 46.400 \quad \text{Use Eq. 6.12.2.2.7-1}$$

Elastic Section Modulus for Minor Axis, S_y	=	1.40 in ³	(For rectangles, $db^2/6$)
Yield Moment, M_{yy}	=	70.18 kip-in	($F_y S_y$)

$$M_n = M_p = F_y Z \leq 1.6 M_y \quad (6.12.2.2.7-1)$$

$$M_{ny} = 105.27 \text{ kip-in}$$

vs

$$M''^2 = M_{uy} = 74.36 \text{ kip-in}$$

PASS

(Sum $M''^2 = 0$; ($H1''^2 V''$) - ($V1''^2 H''$) + $M''^2 = 0$)

Equation to Change?

Major Axis Flexural Resistance:

Article 6.12.2.2.7

Width of Bar Parallel to axis of bending, ty	=	11 in	
Unbraced Length, Lb	=	23.22 in	

$$\frac{L_b d}{t^2} \leq \frac{0.08E}{F_y} \quad 2.111 \leq 46.400 \quad \text{Use Eq. 6.12.2.2.7-1}$$

Plastic Section Modulus for Major Axis, Z_x	=	26.47 in ³	(For rectangles, $bd^2/4$)
Elastic Section Modulus for Major Axis, S_x	=	17.65 in ³	(For rectangles, $bd^2/6$)
Yield Moment, M_{yx}	=	882.29 kip-in	

$$M_n = M_p = F_y Z \leq 1.6 M_y \quad (6.12.2.2.7-1)$$

$$M_{nx} = 1323.44 \text{ kip-in}$$

vs

$$M_{ux} = BS * "B"$$

$$M_{ux} = 122.04 \text{ kip-in}$$

PASS

(Vertical Force set to Same as BS)

Bent Plate Capacity Calculations Continued...

Combined Axial Tension, Flexure, and Flexural and/or Torsional Shear:

Article 6.8.2.3

$$\frac{P_u}{P_{ry}} < 0.2 \quad P_u / P_{ry} = 0.119$$

Use Eq. 6.8.2.3.1-1

$$\frac{P_u}{2P_{ry}} + \left(\frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}} \right) \leq 1.0 \quad (6.8.2.3.1-1)$$

$$0.858 \leq 1$$

PASS

$$\frac{P_u}{P_{ry}} + \frac{8}{9} \left(\frac{M_{ux}}{M_{rx}} + \frac{M_{uy}}{M_{ry}} \right) \leq 1.0 \quad (6.8.2.3.1-2)$$

$$0.769 \leq 1$$

PASS

Final Bent Plate Dimensions

Height	=	11 in
Width	=	10.5 in
Thickness	=	0.875 in
Angle of Bend	=	142.461 deg
Width of Plate Section with Bolts	=	6.5 in
Number of Bolt Lines	=	1
Number of Bolt Holes	=	2
Spacing of Bolts	=	5 in
Distance from Edge	=	3 in



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Calc By:	CAE	Date:	03/28/24
Check By:	xxx	Date:	xxx

Bearing Stiffener Sizing Calculation

Purpose:

To check the strength and required size of the bearing stiffener plate for the skewed crossframes. Equations and methodology are from AASHTO LRFD Bridge Design Specifications, 9th Edition, 2020.

Inputs

Beam Selected	=	W40x199	
Flange Width	=	15.8	in
Flange Thickness	=	1.07	in
Web Thickness	=	0.65	in
Depth of Section	=	38.7	in
Effective Length Factor, K	=	0.75	(Article 4.6.2.5, Welded connections)
Height of Stiffener	=	36.56	in
Width of Projecting Stiffener Element, bt	=	7.58	in
Width of Web Clip	=	1	in
Height of Web Clip	=	2	in
Minimum Yield Strength of Plate	=	50	ksi
Modulus of Elasticity of Plate	=	29000	ksi
		0.85	(Article 6.5.4.2, Similar to Shear connectors)
		0.95	(Article 6.5.4.2, for steel only)
Maximum Factored Positive Load on Stiffener	=	264	kip (From LEAP Steel)
Maximum Factored Negative Load on Stiffener	=	277	kip (From LEAP Steel)
Max Factored Load on Stiffener	=	277	kip (Absolute Value of Loads)

Calculations

Minimum Thickness:

Minimum Thickness of Stiffener, tp	>=	0.6552807	in (Eq 6.10.11.2.2-1)
Round up to nearest 1/8"	=	0.875	in (Manually do it)
Cross-Sectional Area of Stiffener, Ag	=	6.63	in^2

Bearing Resistance:

Nominal Bearing Resistance for fitted ends of Bearing Stiffeners	=	402.72	kip (Eq 6.10.11.2.3-2)
Factored Bearing Resistance for fitted ends of Bearing Stiffeners	=	342.31	kip (Eq 6.10.11.2.3-1)
Bearing Load on Plate	=	78.32	kip (Maximum Bearing of Stiffener to Flange)

Calculations Continued...

Axial Resitance (Double Plates):

Effective Web Length	=	12.58 in	(Article 6.9.2.1)
Moment of Inertia for Web	=	107.71 in ⁴	(9*tw on each Side + Plate Thickness)
Moment of Inertia for Single Plate	=	0.42 in ⁴	(b*h ³)/12
Moment of Inertia, I	=	108.56 in ⁴	(Mol for Each Plate and Web Mol)
Radius of Gyration, rs	=	2.25 in	rs=sqrt(I/A)
Effective Length	=	29.03 in	(Article 6.10.11.2.4a)
Elastic Critical Buckling Resistance, Pe	=	65566.77 kip	(Eq 6.9.4.1.2-1)
Factored Resistance, $\phi_c \cdot P_e$	=	62288.43 kip	

Strength Comparisons:

Bearing Load from Crossframe vs Bearing Resistance?

78.32	vs	342.31
kips		kips
PASS		

Axial Load vs Axial Resistance (Double Plate)?

277	vs	62288.43
kips		kips
PASS		

Conclusion:

The minimum plate thickness needs to be at least 7/8". This is more than enough for the bearing and axial resistance of the bearing stiffeners.

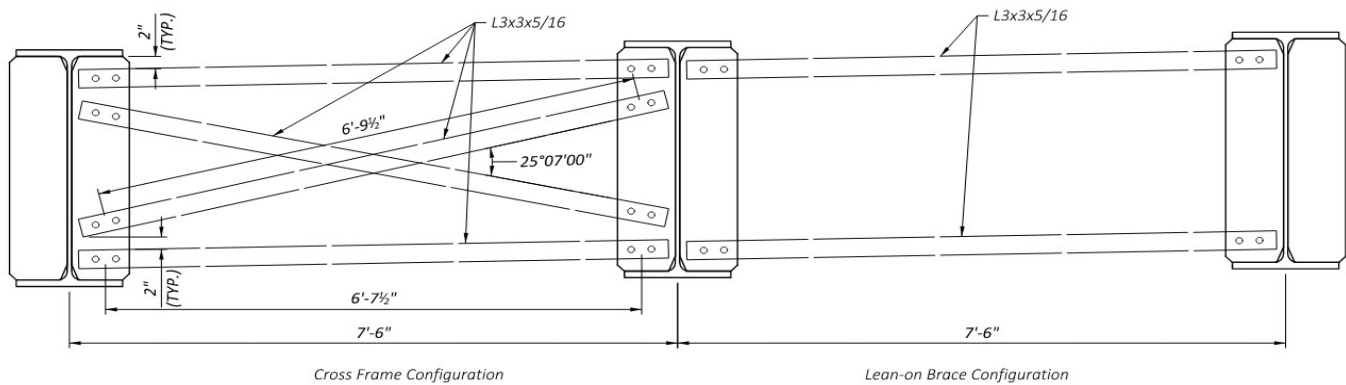


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PROJECT NAME:	LAK-6-2.06	DATE:	5/22/2024				
PROJECT LOCATION:		SUBJECT:	Brace design				
Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)							

Objective: Design and layout cross frame/lean-on bracing.

Reference: NSBA Lean-on Bracing Reference Guide, AASHTO LRFD.





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Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)							

Lean on Bracing Design, Positive Moment Region

Input Data

Span under consideration	L	=	95.25	ft	(Span 5)
Number of girders in cross section	n_g	=	5		
Girder Spacing	S	=	7.5	ft	
Skew	θ	=	31.88	degree	
Number of brace points in span	n	=	6		
Unbraced length of the segment	L_b	=	18.58	ft	

Cross Section Properties

Web depth	D	=	36.56	in
Web thickness	t_w	=	0.65	in
Flange Width	b_f	=	15.8	in
Flange Thickness	t_f	=	1.07	in
Moment of Inertia (strong axis)	I_x	=	14900	in^4
Moment of Inertia (weak axis)	I_y	=	695	in^4
Distance of centroid from bottom	d_{bottom}	=	19.35	in
Distance of centroid from top	d_{top}	=	19.35	in
Section modulus bottom	$S_{x-\text{bot}}$	=	770	in^3
Section modulus top	$S_{x-\text{top}}$	=	770	in^3

Distance from centroid of girder to centroid of compression flange

$$c = 18.815 \text{ in}$$

Distance from centroid of girder to centroid of tension flange

$$t = 18.815 \text{ in}$$

Distance between centroid of compression and tension flange

$$h_o = 37.63 \text{ in}$$

Moment of inertia of compression flange about vertical axis (Iy top flange)

$$I_{yc} = b_f^3 * t_f / 12 = 351.70 \text{ in}^4$$

Moment of inertia of tension flange about vertical axis (Iy bottom flange)

$$I_{yt} = b_f^3 * t_f / 12 = 351.70 \text{ in}^4$$



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Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)

Effective Moment of Inertia of girder about vertical axis

$$I_{eff} = I_{yc} + c / t * I_{yt} = 703.40 \text{ in}^4$$

Steel modulus of elasticity $E = 29000 \text{ ksi}$

Cross-Frame Properties

Connection Plate Properties:

Width of connection plate $b_s = 7.575 \text{ in}$

Thickness of connection plate $t_s = 0.375 \text{ in}$

Distance from top of cross frame to bottom of top flange $h_i = 2 \text{ in}$

Height of cross frame $h_b = 32.56 \text{ in}$

Diagonal Properties

Length of Diagonal, based on CAD Layout $L_d = 81.50 \text{ in}$

Strut Properties:

Length of Strut, based on CAD Layout $L_s = 79.5 \text{ in}$

Structural Loads

Unfactored dead load moment $M_{DL} = 5575.08 \text{ kip-in}$ (From Leap Steel)

Unfactored construction live load moment $M_{LL} = 3017.7 \text{ kip-in}$

Construction dead load factor $\gamma_{DL} = 1.25$

Construction live load factor $\gamma_{LL} = 1.5$

Factored positive moment $M_u = 11495.41 \text{ kip-in}$

Moment gradient modifier $C_b = 1$

Bolt Details

Bolt diameter $d_b = 0.875 \text{ in}$

Bolt yield strength $F_{yb} = 70 \text{ ksi}$

Bolt tensile strength $F_{ub} = 120 \text{ ksi}$



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PROJECT LOCATION:	SUBJECT: Brace design		
Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)			

Determine Actual Stiffness Provided with Lean-On Brace System

Brace Stiffness (Cross-Frame Stiffness)

Single Angle Section L3.5x3.5x3/8 (GSD-1-19)

$$\beta_{br} = \frac{ES^2 h_b^2}{n_{gc} L_d^3 + S^3 (n_{gc} - 1)^2} (A_b \times 0.65) = 135179.296 \text{ kip-in./rad}$$

$$\begin{aligned} n_g &= 5 \\ N_c &= 2 \\ n_{gc} &= 2.5 \\ A_b &= 2.50 \text{ in}^2 \end{aligned}$$

Cross-Sectional Stiffness

$$\beta_{sec} = 1E+100 \text{ kip-in./rad}$$

$$\begin{aligned} h_b &= 32.56 \text{ in} \\ D &= 36.56 \text{ in} \\ h_b/D &= 0.89 \end{aligned}$$

Assume infinity when $h_b/D \geq 0.80$

In-Plane Girder Stiffness

$$\beta_g = \frac{12(n_g - 1)^2 S^2 E I_x}{n_g L^3} = 90004.0015 \text{ kip-in./rad}$$

$$(\beta_T)_{act} = \frac{1}{\frac{1}{\beta_{br,skew}} + \frac{1}{\beta_{sec}} + \frac{1}{\beta_g}} = 54030.1066 \text{ kip-in./rad}$$

Determine Required Stiffness of Torsional Brace System

$$(\beta_T)_{req} = \frac{3.6 L}{\phi_{sb} C_b^2 n I_{eff} E} M_u^2 = 5553.34072 \text{ kip-in./rad}$$

$$\begin{aligned} n &= 6 \\ \phi_{sb} &= 0.8 \end{aligned}$$



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PROJECT LOCATION:	SUBJECT: Brace design		
Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)			

Torsional Brace Stiffness Requirements

$$(\beta_T)_{act} \geq (\beta_T)_{req}$$

Check Stiffness Requirement of the System

Actual provided stiffness $(\beta T)_{act} = 54030.11 \text{ kip-in./rad}$

Required stiffness $(\beta T)_{req} = 5553.34 \text{ kip-in./rad}$

$(\beta T)_{act} > (\beta T)_{req} \quad \text{OK}$

Check Strength Requirements of Lean-On Brace System (Positive Moment Case)

$$M_{br} = \frac{0.008 L L_b}{n E I_{yeff} h_o} \left(\frac{M_u}{C_b} \right)^2 = 43.88 \text{ kip-in.} \quad n = 8$$

$$M_{br,skew} = \frac{M_{br}}{\cos \theta} = 43.88 \text{ kip-in.} \quad \theta = 0 \text{ degree}$$

Calculate Applied Forces in the Cross-Frame Members

$$F_{br} = \frac{M_{br,skew}}{h_b} = 1.35 \text{ kip}$$

$$F_d = \frac{n_{gc} F_{br} L_d}{S} = 3.05 \text{ kip}$$

$$F_s = (n_{gc} - 1) F_{br} = 2.02 \text{ kip}$$



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Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)

Determine Tensile Capacity of Cross-Frame Diagonal Members

Single Angle Section L3.5x3.5x3/8 (GSD-1-19)

Gross area of angle	A_g	=	2.5	in ²
Thickness		=	0.375	in
Radius of gyration about major axis	r_x	=	1.07	in
Yield strength	F_y	=	50	ksi
Tensile strength	F_u	=	65	ksi
Bolt spacing	L	=	3.00	in
Distance of centroid in x direction	x	=	1	in
Shear lag reduction factor = $1 - x/L$	U	=	0.67	
Reduction factor for holes	R_p	=	1.00	
Net area of angle	A_n	=	2.10	in ²

$$A_n = A_g - 1 \times \left(d_b + \frac{1}{8} \right) \times t_{leg}$$

Determining Gross Section Yielding Capacity in Tension

$$\phi_y P_{ny} = \phi_y F_y A_g = 118.75 \text{ kip} \quad \phi_y = 0.95$$

Determining Net Section Fracture Capacity in Tension

$$\phi_u P_{nu} = \phi_u F_u A_n R_p U = 72.85 \text{ kip} \quad \phi_u = 0.8$$

$$\text{Factored Tensile Capacity } P_r = 72.85 \text{ kip} > F_d = 3.05 \text{ kip}$$

Pr > Fd OK



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PROJECT LOCATION:	SUBJECT: Brace design		
Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)			

Determine Compressive Capacity of Cross-Frame and Lean-On Struts

$$L_s/r_x = 74.30$$

If $\frac{\ell}{r_x} \leq 80$, then:

$$\left(\frac{K\ell}{r}\right)_{eff} = 72 + 0.75 \frac{\ell}{r_x} = 127.72 \quad \text{LRFD 6.9.4.4-1}$$

If $\frac{\ell}{r_x} > 80$, then:

$$\left(\frac{K\ell}{r}\right)_{eff} = 32 + 1.25 \frac{\ell}{r_x} = 124.87 \quad \text{LRFD 6.9.4.4-2}$$

$$P_o = F_y A_g = 125.00 \text{ kip}$$

$$P_e = \frac{\pi^2 E}{\left(\frac{K\ell}{r_s}\right)^2} A_g = 43.86 \text{ kip}$$

$$P_o/P_e = 2.85$$

If $\frac{P_o}{P_e} \leq 2.25$, then:

$$P_n = \left[0.658 \left(\frac{P_o}{P_e} \right) \right] P_o = 37.92 \text{ kip} \quad \text{LRFD 6.9.4.1.1-1}$$

Otherwise:

$$P_n = 0.877 P_e = 38.47 \text{ kip} \quad \text{LRFD 6.9.4.1.1-2}$$

$$\phi_c = 0.95$$

$$\text{Factored compressive resistance} \quad \phi_c P_n = 36.54 \text{ kip} > F_s = 2.02 \text{ kip}$$

$$\phi_c P_n > F_s \quad \text{OK}$$



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Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)

Area of bolt $A_b = 0.60$

Resistance factor for bolts in shear $\phi_s = 0.8$

Number of shear plane $N_s = 1$

Number of Bolts $= 2$

Nominal shear resistance of bolts

$$R_n = 0.45 A_b F_{ub} N_s \quad R_n = 64.94 \text{ kip}$$

Factored Shear resistance of bolts

$$\phi_s R_n = 51.95 \text{ kip} > F_d = 3.05 \text{ kip}$$

$\phi_s R_n > F_d$ OK

Determine Bearing Capacity of Bolt Holes

Thickness of bolt bearing element $t_{bearing} = 0.375$

Resistance factor for bolt bearing $\phi_b = 0.8$

Spacing between bolts $= 1.938 \text{ in} > 2d_b \quad 1.75 \text{ in}$

End distance $= 1.47 \text{ in} < 2d_b \quad 1.75 \text{ in}$

Bearing capacity of bolt hole

$$R_n = 2.4 d t_{bearing} F_u \quad R_n = 51.19 \text{ kip}$$

$$R_n = 1.2 L_e t F_u \quad R_n = 27.42 \text{ kip}$$

Factored bearing resistance of bolt holes

$$\phi_b R_n = 40.95 \text{ kip} > F_d = 3.05 \text{ kip}$$

$\phi_b R_n > F_d$ OK

Limiting Slenderness Ratio Check

$$\frac{Kl}{r_x} = 74.30 < 140 \quad K = 1$$

Satisfies slenderness ratio criteria OK



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Lean on Bracing Design, Positive Moment Region at Midspan Between Piers 4 and 5 (Critical Load)							

Summary

Check Stiffness Requirement of the System

$$(\beta T)_{act} = 54030.11 \text{ kip-in./rad}$$

$$(\beta T)_{req} = 5553.34 \text{ kip-in./rad}$$

$$(\beta T)_{act} > (\beta T)_{req} \quad \text{OK}$$

Determine Tensile Capacity of Cross-Frame Diagonal Members

$$Pr = 72.85 \text{ kip} > Fd = 3.05 \text{ kip}$$

$$Pr > Fd \quad \text{OK}$$

Determine Compressive Capacity of Cross-Frame and Lean-On Struts

$$\phi_c P_n = 36.54 \text{ kip} > F_s = 2.02 \text{ kip}$$

$$\phi_c P_n > F_s \quad \text{OK}$$

Determine Compressive Capacity of Cross-Frame and Lean-On Struts

$$\phi_s R_n = 51.95 \text{ kip} > Fd = 3.05 \text{ kip}$$

$$\phi_s R_n > Fd \quad \text{OK}$$

Determine Bearing Capacity of Bolt Holes

$$\phi_b R_n = 40.95 \text{ kip} > Fd = 3.05 \text{ kip}$$

Limiting Slenderness Ratio Check

$$\frac{Kl}{r_x} = 74.30 < 140$$

$$\text{Satisfies slenderness ratio criteria} \quad \text{OK}$$



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PROJECT LOCATION:		SUBJECT:	Brace design				
Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)							

Lean on Bracing Design, Negative Moment Region

Input Data

Span under consideration	L	=	89.625	ft	(Average of Spans 4 & 5)
Number of girders in cross section	n_g	=	5		
Girder Spacing	S	=	7.5	ft	
Skew	θ	=	31.88	degree	
Number of brace points in span	n	=	6		
Unbraced length of the segment	L_b	=	8.67	ft	

Cross Section Properties

Web depth	D	=	36.56	in	
Web thickness	t_w	=	0.65	in	
Flange Width	b_f	=	15.8	in	
Flange Thickness	t_f	=	1.07	in	
Moment of Inertia (strong axis)	I_x	=	14900	in^4	
Moment of Inertia (weak axis)	I_y	=	695	in^4	
Distance of centroid from bottom	d_{bottom}	=	19.35	in	
Distance of centroid from top	d_{top}	=	19.35	in	
Section modulus bottom	$S_{x-\text{bot}}$	=	770	in^3	
Section modulus top	$S_{x-\text{top}}$	=	770	in^3	
Distance from centroid of girder to centroid of compression flange	c	=	18.815	in	
Distance from centroid of girder to centroid of tension flange	t	=	18.815	in	
Distance between centroid of compression and tension flange	h_o	=	37.63	in	
Moment of inertia of compression flange about vertical axis (ly top flange)	$I_{yc} = b_f^3 * t_f / 12$	=	351.70	in^4	
Moment of inertia of tension flange about vertical axis (ly bottom flange)	$I_{yt} = b_f^3 * t_f / 12$	=	351.70	in^4	



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Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)

Effective Moment of Inertia of girder about vertical axis

$$I_{eff} = I_{yc} + c / t * I_{yt} = 703.40 \text{ in}^4$$

Steel modulus of elasticity $E = 29000 \text{ ksi}$

Cross-Frame Properties

Connection Plate Properties:

Width of connection plate $b_s = 7.575 \text{ in}$

Thickness of connection plate $t_s = 0.375 \text{ in}$

Distance from top of cross frame to bottom of top flange

$$h_i = 2 \text{ in}$$

Height of cross frame $h_b = 32.56 \text{ in}$

Diagonal Properties

Length of Diagonal, based on CAD Layout $L_d = 81.50 \text{ in}$

Strut Properties:

Length of Strut, based on CAD Layout $L_s = 79.5 \text{ in}$

Structural Loads

Unfactored dead load moment $M_{DL} = 9022.08 \text{ kip-in}$ (From Leap Steel)

Unfactored construction live load moment $M_{LL} = 4883.5 \text{ kip-in}$

Construction dead load factor $\gamma_{DL} = 1.25$

Construction live load factor $\gamma_{LL} = 1.5$

Factored positive moment $M_u = 18602.87 \text{ kip-in}$

Moment gradient modifier $C_b = 1$

Bolt Details

Bolt diameter $d_b = 0.875 \text{ in}$

Bolt yield strength $F_{yb} = 70 \text{ ksi}$

Bolt tensile strength $F_{ub} = 120 \text{ ksi}$



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PROJECT LOCATION:	SUBJECT: Brace design		
Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)			

Determine Actual Stiffness Provided with Lean-On Brace System

Brace Stiffness (Cross-Frame Stiffness)

Single Angle Section L3.5x3.5x3/8 (GSD-1-19)

$$\beta_{br} = \frac{ES^2 h_b^2}{n_{gc} L_d^3 + S^3 (n_{gc} - 1)^2} (A_b \times 0.65) = 135179.296 \text{ kip-in./rad}$$

$$\begin{aligned} n_g &= 5 \\ N_c &= 2 \\ n_{gc} &= 2.5 \\ A_b &= 2.50 \text{ in}^2 \end{aligned}$$

Cross-Sectional Stiffness

$$\beta_{sec} = 1E+100 \text{ kip-in./rad}$$

$$\begin{aligned} h_b &= 32.56 \text{ in} \\ D &= 36.56 \text{ in} \\ h_b/D &= 0.89 \end{aligned}$$

In-Plane Girder Stiffness

Assume infinity when $h_b/D \geq 0.80$

$$\beta_g = \frac{12(n_g - 1)^2 S^2 E I_x}{n_g L^3} = 108036.191 \text{ kip-in./rad}$$

$$(\beta_r)_{act} = \frac{1}{\frac{1}{\beta_{br, skew}} + \frac{1}{\beta_{sec}} + \frac{1}{\beta_g}} = 60046.5721 \text{ kip-in./rad}$$

Determine Required Stiffness of Torsional Brace System

$$(\beta_T)_{req} = \frac{3.6 L}{\phi_{sb} C_b^2 n I_{eff} E} M_u^2 = 13684.5224 \text{ kip-in./rad}$$

$$\begin{aligned} n &= 6 \\ \phi_{sb} &= 0.8 \end{aligned}$$



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Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)			

Torsional Brace Stiffness Requirements

$$(\beta_T)_{act} \geq (\beta_T)_{req}$$

Check Stiffness Requirement of the System

Actual provided stiffness $(\beta_T)_{act} = 60046.57 \text{ kip-in./rad}$

Required stiffness $(\beta_T)_{req} = 13684.52 \text{ kip-in./rad}$

$(\beta_T)_{act} > (\beta_T)_{req} \quad \text{OK}$

Check Strength Requirements of Lean-On Brace System (Negative Moment Case)

$$M_{br} = \frac{0.008 L L_b}{n E I_{yeff} h_o} \left(\frac{M_u}{C_b} \right)^2 = 50.43 \text{ kip-in.} \quad n = 8$$

$$M_{br,skew} = \frac{M_{br}}{\cos \theta} = 50.43 \text{ kip-in.} \quad \theta = 0 \text{ degree}$$

Calculate Applied Forces in the Cross-Frame Members

$$F_{br} = \frac{M_{br,skew}}{h_b} = 1.55 \text{ kip}$$

$$F_d = \frac{n_{gc} F_{br} L_d}{S} = 3.51 \text{ kip}$$

$$F_s = (n_{gc} - 1) F_{br} = 2.32 \text{ kip}$$



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PROJECT LOCATION:	SUBJECT: Brace design		

Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)

Determine Tensile Capacity of Cross-Frame Diagonal Members

Single Angle Section L3.5x3.5x3/8 (GSD-1-19)

Gross area of angle	A_g	=	2.5	in ²
Thickness		=	0.375	in
Radius of gyration about major axis	r_x	=	1.07	in
Yield strength	F_y	=	50	ksi
Tensile strength	F_u	=	65	ksi
Bolt spacing	L	=	3.00	in
Distance of centroid in x direction	x	=	1	in
Shear lag reduction factor	U	=	0.67	
Reduction factor for holes	R_p	=	1.00	
Net area of angle	A_n	=	2.10	in ²

$$A_n = A_g - 1 \times \left(d_b + \frac{1}{8} \right) \times t_{leg}$$

Determining Gross Section Yielding Capacity in Tension

$$\phi_y P_{ny} = \phi_y F_y A_g = 118.75 \text{ kip} \quad \phi_y = 0.95$$

Determining Net Section Fracture Capacity in Tension

$$\phi_u P_{nu} = \phi_u F_u A_n R_p U = 72.85 \text{ kip} \quad \phi_u = 0.8$$

$$\text{Factored Tensile Capacity } P_r = 72.85 \text{ kip} > F_d = 3.51 \text{ kip}$$

Pr > Fd OK



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PROJECT NAME: LAK-6-2.06	DATE: 5/22/2024		
PROJECT LOCATION:	SUBJECT: Brace design		
Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)			

Determine Compressive Capacity of Cross-Frame and Lean-On Struts

$$L_s/r_x = 74.30$$

If $\frac{\ell}{r_x} \leq 80$, then:

$$\left(\frac{K\ell}{r}\right)_{eff} = 72 + 0.75 \frac{\ell}{r_x} = 127.72 \quad \text{LRFD 6.9.4.4-1}$$

If $\frac{\ell}{r_x} > 80$, then:

$$\left(\frac{K\ell}{r}\right)_{eff} = 32 + 1.25 \frac{\ell}{r_x} = 124.87 \quad \text{LRFD 6.9.4.4-2}$$

$$P_o = F_y A_g = 125.00 \text{ kip}$$

$$P_e = \frac{\pi^2 E}{\left(\frac{K\ell}{r_s}\right)^2} A_g = 43.86 \text{ kip}$$

$$P_o/P_e = 2.85$$

If $\frac{P_o}{P_e} \leq 2.25$, then:

$$P_n = \left[0.658 \left(\frac{P_o}{P_e} \right) \right] P_o = 37.92 \text{ kip} \quad \text{LRFD 6.9.4.1.1-1}$$

Otherwise:

$$P_n = 0.877 P_e = 38.47 \text{ kip} \quad \text{LRFD 6.9.4.1.1-2}$$

$$\phi_c = 0.95$$

$$\text{Factored compressive resistance} \quad \phi_c P_n = 36.54 \text{ kip} > F_s = 2.32 \text{ kip}$$

$$\phi_c P_n > F_s \quad \text{OK}$$



CHA COMPUTATION PAD

COMPLETED BY: CAE	PROJECT 75926	PHASE	ORG
CHECKED BY: DOR	SHEET #:	OF	
PROJECT NAME: LAK-6-2.06	DATE: 5/22/2024		
PROJECT LOCATION:	SUBJECT: Brace design		
Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)			

Determine Bolt Capacity

Area of bolt	A_b	=	0.60
Resistance factor for bolts in shear	ϕ_s	=	0.8
Number of shear plane	N_s	=	1
Number of Bolts		=	2
Nominal shear resistance of bolts			
R_n	$= 0.45 A_b F_{ub} N_s$	R_n	= 64.94 kip

Factored Shear resistance of bolts

$$\phi_s R_n = 51.95 \text{ kip} > F_d = 3.51 \text{ kip}$$

$\phi_s R_n > F_d$ OK

Determine Bearing Capacity of Bolt Holes

Thickness of bolt bearing element	$t_{bearing}$	=	0.375
Resistance factor for bolt bearing	ϕ_b	=	0.8
Spacing between bolts		=	1.938 in > $2d_b$ 1.75 in
End distance		=	1.47 in < $2d_b$ 1.75 in
Bearing capacity of bolt hole			
R_n	$= 2.4 d t_{bearing} F_u$	R_n	= 55.13 kip
R_n	$= 1.2 L_c t F_u$	R_n	= 32.48 kip

Factored bearing resistance of bolt holes

$$\phi_b R_n = 44.10 \text{ kip} > F_d = 3.51 \text{ kip}$$

$\phi_b R_n > F_d$ OK

Limiting Slenderness Ratio Check

$$\frac{Kl}{r_x} = 74.30 < 140 \quad K = 1$$

Satisfies slenderness ratio criteria OK



CHA COMPUTATION PAD

COMPLETED BY:	CAE	PROJECT	75926	PHASE		ORG	
CHECKED BY:	DOR	SHEET #:		OF			
PROJECT NAME:	LAK-6-2.06	DATE:	5/22/2024				
PROJECT LOCATION:		SUBJECT:	Brace design				
Lean on Bracing Design, Negative Moment Region of Pier 4 (Critical Load)							

Summary

Check Stiffness Requirement of the System

$$(\beta T)_{act} = 60046.57 \text{ kip-in./rad}$$

$$(\beta T)_{req} = 13684.52 \text{ kip-in./rad}$$

$$(\beta T)_{act} > (\beta T)_{req} \quad \text{OK}$$

Determine Tensile Capacity of Cross-Frame Diagonal Members

$$P_r = 72.85 \text{ kip} > F_d = 3.51 \text{ kip}$$

$$P_r > F_d \quad \text{OK}$$

Determine Compressive Capacity of Cross-Frame and Lean-On Struts

$$\phi_c P_n = 36.54 \text{ kip} > F_s = 2.32 \text{ kip}$$

$$\phi_c P_n > F_s \quad \text{OK}$$

Determine Bolt Capacity

$$\phi_s R_n = 51.95 \text{ kip} > F_d = 3.51 \text{ kip}$$

$$\phi_s R_n > F_d \quad \text{OK}$$

Determine Bearing Capacity of Bolt Holes

$$\phi_b R_n = 44.10 \text{ kip} > F_d = 3.51 \text{ kip}$$

$$\phi_b R_n > F_d \quad \text{OK}$$

Limiting Slenderness Ratio Check

$$\frac{Kl}{r_x} = 74.30 < 140$$

$$\text{Satisfies slenderness ratio criteria} \quad \text{OK}$$

1.3 Bolted Field Splice Design



Department of
Transportation





NSBA Bolted Splice Designer - Plate Girder

Design Input

Cell Fill Color



User Input Field



Spreadsheet Status Field



Spreadsheet Calculated Field

Unfactored Loads - Splice Centerline

	Moment (kip-ft)	Shear (kip)
Noncomposite Dead Load (DC ₁)	190.32	-25.59
Superimposed Composite Dead Load (DC ₂)	40.62	-5.48
Future Wearing Surface (DW)	0.00	0.00
Positive Live Load plus Impact (LL ⁺ + I)	754.11	74.38
Negative Live Load plus Impact (LL ⁻ + I)	-372.69	-73.73
Deck Casting	0.00	0.00

Girder Properties

	Left	Right
Top Flange Material	Grade 50	Grade 50
Top Flange Thickness (in)	1 1/16	1 1/16
Top Flange Width (in)	15 4/5	15 4/5

Longitudinal Stiffener	No	No
Transverse Stiffener Spacing (d _o) (ft)	0	0
Transverse Stiffener Status	Unstiffened	Unstiffened

Web Material	Grade 50	Grade 50
Web Thickness (in)	5/8	5/8
Web Depth (in)	36 14/25	

Bottom Flange Material	Grade 50	Grade 50
Bottom Flange Thickness (in)	1 1/16	1 1/16
Bottom Flange Width (in)	15 4/5	15 4/5

Bolt Properties

Bolt Type	A325	
Bolt Diameter (in)	1	
Web Threads	Excluded	
Flange Threads	Excluded	
Surface Condition Factor (K _s)	A	
Hole Size Factor (K _h)	Standard	
Top Flange Rows	4	OK
Web Rows	2	OK
Bottom Flange Rows	4	OK

Concrete Deck Properties

Composite	Composite
Thickness (in)	10 1/2

Spacing and Clearance Values

Bolt Spacing (in)	3	OK
Edge Distance - Flange (in)	1 1/2	OK
End Distance - Flange (in)	1 1/2	OK
Edge Distance - Web (in)	1 1/2	OK
End Distance - Web (in)	1 1/2	OK
Web Weld Size (in)	1 1/4	

Haunch Properties

	Left	Right
Haunch (in)	2	2
Haunch Status	OK	

Splice Plate Properties

	Inner	Outer
Top Flange Splice Plate Material	Grade 50	
Top Flange Splice Plate Thickness (in)	7/8	3/4
Top Flange Splice Plate Width (in)	6 3/8	15 4/5
Total Agross (sq-in)	11.1563	11.8500
% Difference Ag Inner/Outer Area	6.03%	
Shear Planes per Bolt (N _s)	2	

Web Splice Plate Material	Grade 50
Web Splice Plate Thickness (in)	5/8

	Inner	Outer
Bottom Flange Splice Plate Material	Grade 50	
Bottom Flange Splice Plate Thickness (in)	7/8	3/4
Bottom Flange Splice Plate Width (in)	6 3/8	15 4/5
Total Agross (sq-in)	11.1563	11.8500
% Difference A _g Inner/Outer Area	6.03%	
Shear Planes per Bolt (N _s)	2	

Web Weld Clearance (in)	0
Web Gap (in)	1/4
Entering & Tightening Clearance (in)	0
Use Minimum Clearence	

Miscellaneous Properties

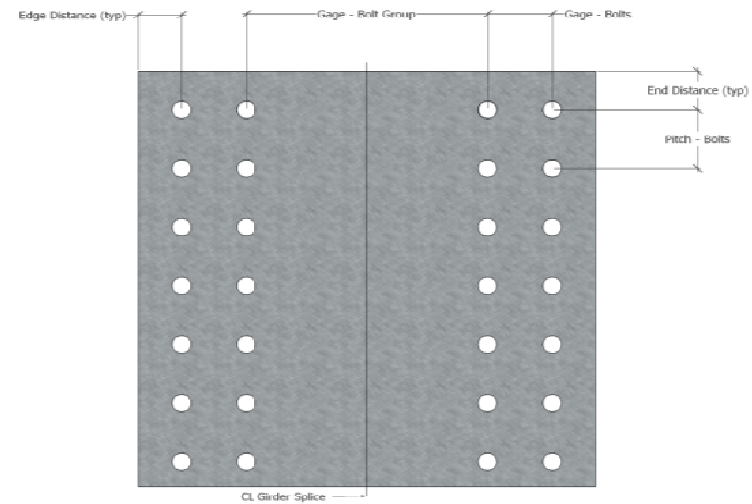
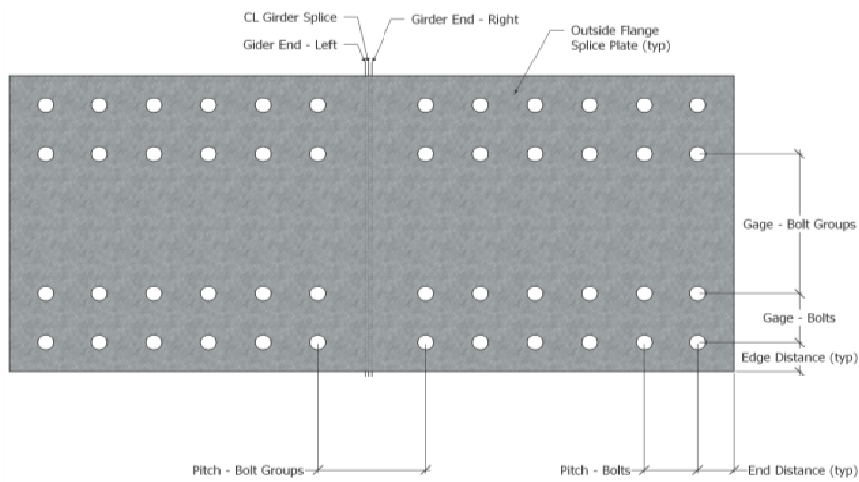
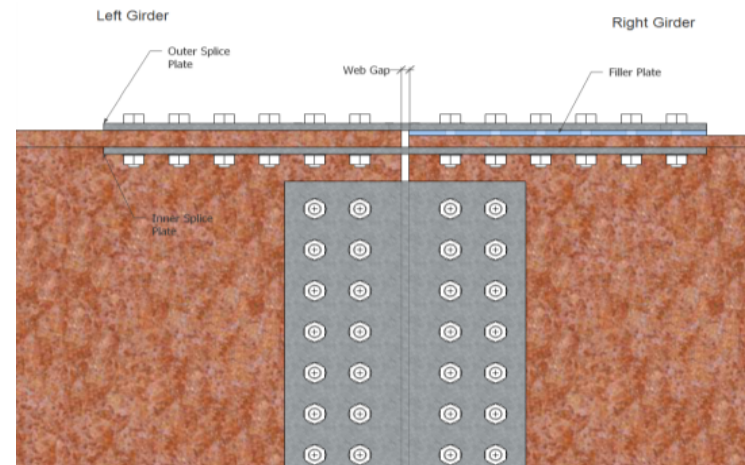
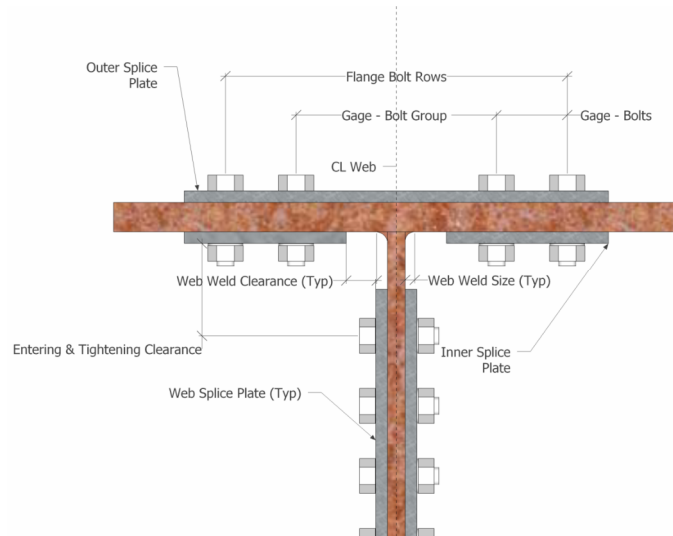
Splice Plate Hole Method	Drilled - Full Size
Alignment Mode	Web Center

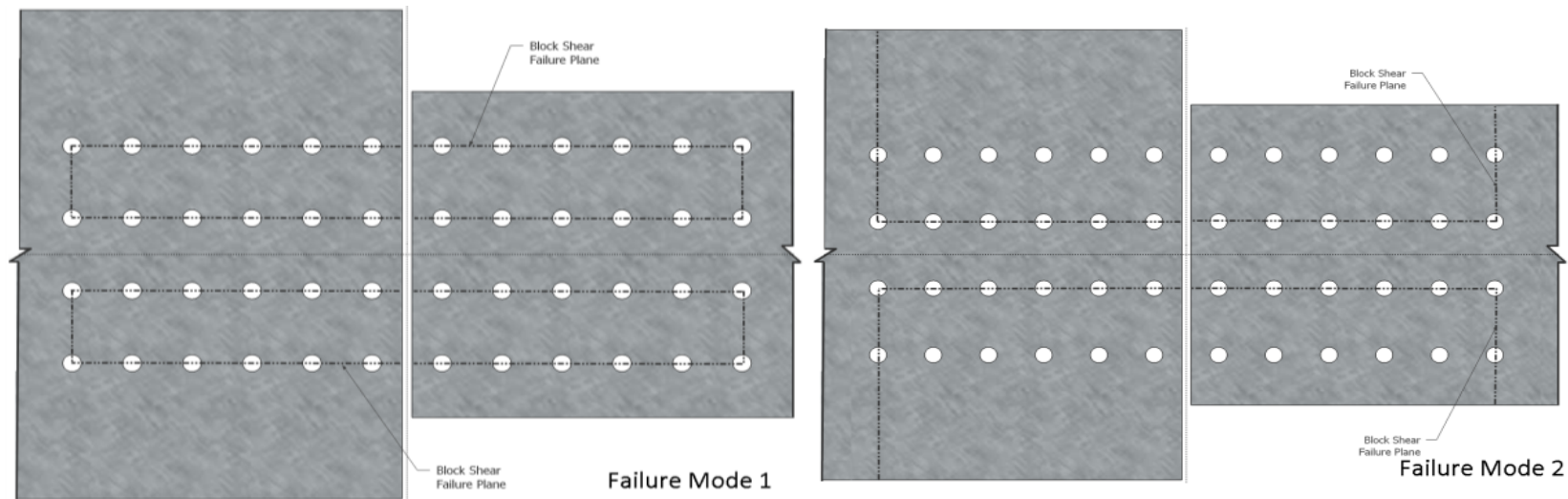
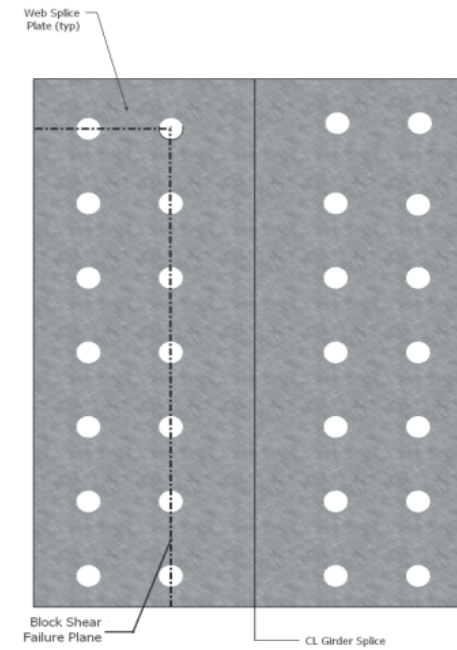
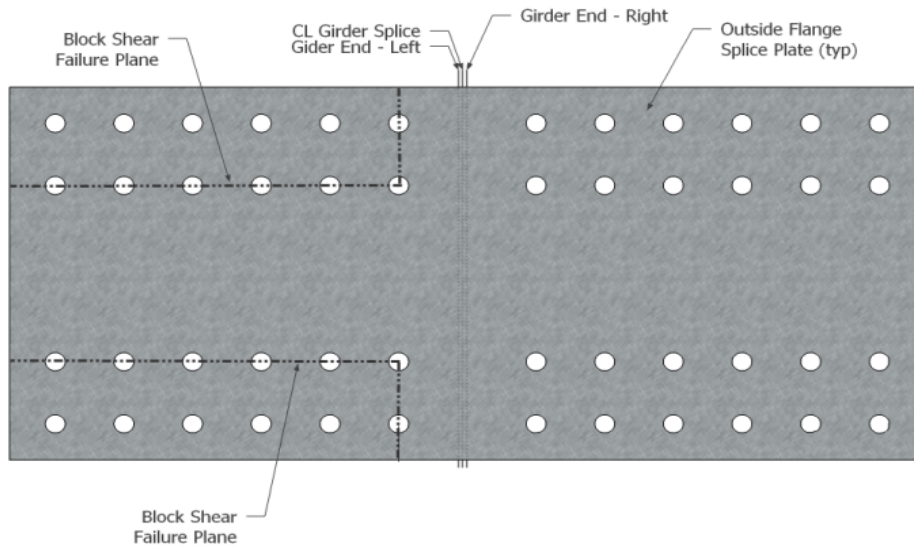
Bolt Count Overrides

	Count Override Status	Bolt Count - Calculated	Bolt Count - User Specified	Valid Override
Top Flange Bolt Count Override	User Specified	8	16	OK
Web Bolt Count Override	User Specified	12	12	OK
Bottom Flange Bolt Count Override	User Specified	8	16	OK

Status - Error Count

Design Status - Flange	0
Bolt Layout Status - Flange	0
Design Status - Web	0
Bolt Layout Status -Web	0







NSBA Bolted Splice Designer - Plate Girder

Design Result Summary

Cell Fill Color
 User Input Field
 Spreadsheet Status Field
 Spreadsheet Calculated Field

Bolts Arrangement

NOTICE: DO NOT MODIFY THIS SHEET

	Bolt Rows (Per Side)	Total Bolts (Per Side)	Design Basis
Top Flange	4	16	User Specified
Web	2	12	User Specified
Bottom Flange	4	16	User Specified

	Gage - Bolts (in)	Edge Distance (in)	Pitch - Bolts (in)	End Distance (in)	Gage - Bolt Groups (in)	Pitch - Bolt Groups (in)
Top Flange	3 3/8	1 1/2	3	1 1/2	6 1/20	3 1/4
Web	3	1 1/2	5 5/8	1 1/2	3 1/4	DNA
Bottom Flange	3 3/8	1 1/2	3	1 1/2	6 1/20	3 1/4

Splice Plate Dimensions

	Thickness (in)	Width (in)	Length (in)
Top Flange - Outer	3/4	15 4/5	24 1/4
Top Flange - Inner (Each)	7/8	6 3/8	
Web	5/8	12 1/4	31 1/8
Bottom Flange - Inner (Each)	7/8	6 3/8	24 1/4
Bottom Flange - Outer	3/4	15 4/5	

Filler Plate Dimensions

	Thickness (in)	Width (in)	Length (in)
Top Flange - Left Outer	0	0	0
Top Flange - Left Inner (Each)	0	0	0
Top Flange - Right Outer	0	0	0
Top Flange - Right Inner (Each)	0	0	0

	Thickness (in)	Width (in)	Length (in)	Quantity
Web Filler (Each)	0	0	0	0

	Thickness (in)	Width (in)	Length (in)
Bottom Flange - Left Outer	0	0	0
Bottom Flange - Left Inner (Each)	0	0	0
Bottom Flange - Right Outer	0	0	0
Bottom Flange - Right Inner (Each)	0	0	0



NSBA Bolted Splice Designer - Plate Girder

Design Check Summary

Cell Fill Color
 User Input Field
 Spreadsheet Status Field
 Spreadsheet Calculated Field

Design Check Status

NOTICE: DO NOT MODIFY THIS SHEET

Flange Splice

	Factored Yield Resistance Check - Tension	Net Section Fracture Check - Tension	Check $A_n \leq 0.85 A_g$ AASHTO 6.13.5.2	Block Shear Rupture Resistance	Bearing Resistance
Top Flange - Outer Splice Plate	OK	OK	OK	OK	OK
Top Flange - Inner Splice Plate	OK	OK	OK	OK	OK
Bottom Flange - Inner Splice Plate	OK	OK	OK	OK	OK
Bottom Flange - Outer Splice Plate	OK	OK	OK	OK	OK

	Block Shear Rupture Resistance - Mode 1	Block Shear Rupture Resistance - Mode 2	Bearing Resistance
Top Flange - Left	OK	OK	OK
Top Flange - Right	OK	OK	
Bottom Flange - Left	OK	OK	OK
Bottom Flange - Right	OK	OK	

Shear Planes per Bolt (Ns) - Top Flange	2
Shear Planes per Bolt (Ns) - Bottom Flange	2
M _{flange} Check - Positive	OK
M _{flange} Check - Negative	OK
Service II Moment Slip Check - Positive	OK
Service II Moment Slip Check - Negative	OK
Deck Casting Slip Check	OK

Web Splice

	Factored Yield Check	Factored Rupture Check	Block Shear Rupture Resistance
Web Splice Plate	OK	OK	OK

	Bearing Resistance
Web	OK

Deck Casting Slip Check	OK
Service II Shear Slip Check - Positive	OK
Service II Shear Slip Check - Negative	OK

Transverse Stiffener Check - Left	OK
Transverse Stiffener Check - Right	OK

Bolt Spacing Check Status

Flange Splice

	Gage - Bolts Check	Gage - Bolt Group Check - Outer	Edge Distance Check - Inner	Pitch - Bolt Group Check - Outer	Transverse Dimension Check - Outer	Transverse Dimension Check - Inner
Top Flange Splice Plates	OK	OK	OK	OK	OK	OK
Bottom Flange Splice Plates	OK	OK	OK	OK	OK	OK

Web Splice

	Pitch - Bolt Check	End Distance Check	Pitch - Bolt Group Check	Diagonal Edge Distance - Check	Splice Plate Height Check	Gage - Bolt Group Check
Web Splice Plates	OK	OK	OK	OK	OK	OK



NSBA Bolted Splice Designer - Plate Girder

NOTICE: DO NOT MODIFY THIS SHEET

Flange Calculations

Load Combinations - Factored Moment

Load Combination	Moment (kip-ft)						Factored (kip-ft)
	Noncomposite Dead Load (DC1)	Superimposed Composite Dead Load (DC2)	Future Wearing Surface (DW)	Positive Live Load plus Impact (LL+ + I)	Negative Live Load plus Impact (LL- + I)	Deck Casting	
Deck Casting	190.32	40.62	0.00	754.11	-372.69	0.00	0.00
Strength I - Positive	0.00	0.00	0.00	0.00	0.00	1.40	0.00
Strength I - Negative	1.25	1.25	0.65	1.75	0.00	0.00	1,608.36
Service II - Positive	0.90	0.90	0.65	0.00	1.75	0.00	-444.37
Service II - Negative	1.00	1.00	1.00	1.30	0.00	0.00	1,211.28
Service II - Negative	1.00	1.00	1.00	0.00	1.30	0.00	-253.56

Bolt Factored Shear Resistance

Location	Bolt Type	Bolt Area (sq-in)	K_h	ϕ_s	F_u (ksi)	P_t (kip)	R_r - Single Shear (kip)	R_r - Double Shear (kip)
Flange	A325 - Excluded	0.7854	Standard	0.80	120	51.00	42.22	84.45

Bolt Nominal Slip Resistance

Surface Condition Factor (K_s)	Hole Size Factor (K_h)	P_t (kip)	R_n - Double Shear (kip)
0.30	1.00	51.00	30.60

Strength Limit State Design

Location	Width (in)	Thickness (in)	Total A_{gross} (sq-in)	% Difference A_g Inner/Outer Area	Equally Divide P_{ty} ?	Design Force Ratio for Splice Plates
Top Flange - Outer Splice Plate	15 4/5	3/4	11.85	6.03%	OK	0.50
Top Flange - Inner Splice Plate	6 3/8	7/8	11.16			0.50
Bottom Flange - Inner Splice Plate	6 3/8	7/8	11.16	6.03%	OK	0.50
Bottom Flange - Outer Splice Plate	15 4/5	3/4	11.85			0.50

$$A_e = \left(\frac{\phi_u F_u}{\phi_y F_{yf}} \right) A_n = 0.84 \left(\frac{F_u}{F_{yf}} \right) A_n \leq A_g$$

Location	0.84 (F _u /F _y)	Flange A _{gross} (sq-in)	Flange A _{net} (sq-in)	A _e (sq-in)	A _e ≤ A _{gross} (Eq. 2.1.1.1-3)	P _{fy} = F _y A _e P _{fy} (kip)	Controlling Flange	Max. Design Force for Splice Plates (kip) AASHTO C6.13.6.1.3b
Top Flange - Left	1.09	16.79	12.01	13.11	OK	655.54	CONTROLS	327.77
Top Flange - Right	1.09	16.79	12.01	13.11	OK	655.54	CONTROLS	327.77
Bottom Flange - Left	1.09	16.79	12.01	13.11	OK	655.54	CONTROLS	327.77
Bottom Flange - Right	1.09	16.79	12.01	13.11	OK	655.54	CONTROLS	327.77

Filler Plate - Sizing and Reduction Factor

Location	Alignment Mode	Web Depth (in)	Top Flange Thickness (in)	Bottom Flange Thickness (in)	Height (in)
Left Girder	Web Center	36 14/25	1 1/16	1 1/16	38 50/73
Right Girder			1 1/16	1 1/16	38 50/73

Location	Flange Width (in)	Flange Thickness (in)	Filler Thickness - Outer (in)	Filler Width - Outer (in)	Filler Length - Outer (in)	Filler Thickness - Inner (in)	Filler Width - Inner (in)	Filler Length - Inner (in)
Top Flange - Left	15 4/5	1 1/16	0	0	0	0	0	0
Top Flange - Right	15 4/5	1 1/16	0	0	0	0	0	0
Bottom Flange - Left	15 4/5	1 1/16	0	0	0	0	0	0
Bottom Flange - Right	15 4/5	1 1/16	0	0	0	0	0	0

Location	Filler Thickness - Total (in)	Area Filler A _f (sq-in)	Area Splice Plate A _p (sq-in)	Area Connection Plate A _p (sq-in)	$\gamma = \frac{A_f}{A_p}$
Top Flange - Left	0	0.00	23.01	16.79	0.00
Top Flange - Right	0	0.00		16.79	0.00
Bottom Flange - Left	0	0.00	23.01	16.79	0.00
Bottom Flange - Right	0	0.00		16.79	0.00

Bolt Count - Summary

Location	P _{fy} (kip)	$R = \left[\frac{(1 + \gamma)}{(1 + 2\gamma)} \right]$ Filler Reduction - R	Total Bolt - Initial	Bolt Rows (Per Side)	Total Bolts (Per Side) - Calculated
Top Flange - Left	655.54	1.00	7.76	4	8
Top Flange - Right					
Bottom Flange - Left	655.54	1.00	7.76	4	8
Bottom Flange - Right					

Slip Resistance Design

Bolt Count - Summary (Initial)

	Moment (kip)	Moment Arm (in)	Per Bolt Pt (kip)	Total Bolt - Initial	Bolt Rows (Per Side)	Total Bolts (Per Side) - Calculated	Max Total Bolts (Per Side) - Calculated
Service II - Positive (kip-ft)	1211.28	44.34	30.60	10.71	4	12	12
Service II - Negative (kip-ft)	-253.56	37.62		2.64	4	4	4

Deck Casting Moment (kip-ft)	0.00	37.62		0.00	4	0	~

Bolt Count - Final

	Strength	Slip	Override	Controlling	Bolt Count Override
Top Flange	8	4	16	16	TRUE
Bottom Flange	8	12	16	16	TRUE

Bolt and Plate Geometric Layout

Maximum Bolt Spacing - Sealing

Location	Splice Plate Thickness (in)	Controlling Plate t (in)	Pitch - Bolts (in)	(4.0 + 4.0t)	$s \leq (4.0 + 4.0t) \leq 7.0 \text{ in.}$ $S_{\max}$ (in)	
Top Flange - Outer Splice Plate	3/4	3/4	3	7	7	
Top Flange - Inner Splice Plate	7/8					
Bottom Flange - Inner Splice Plate	7/8	3/4		7	7	
Bottom Flange - Outer Splice Plate	3/4					

Bolt Layout - Transverse Gage

Location	Width - Inner Plate (in)	Bolt Spacing (in)	Bolt Spacing - Minimum (in)	Edge Distance - Initial (in)	Edge Distance - Minimum (in)	Transverse Spacing Check	Edge Distance Inner - Final (in)	Gage - Bolts (in)
Top Flange	6 3/8	3	3	1 1/2	1 1/4	OK	1 1/2	3 3/8
Bottom Flange	6 3/8					OK	1 1/2	3 3/8

Location	Width - Outer Plate (in)	Edge Distance - Final (in)	Transverse Gage - Bolt Groups (in)
Top Flange	15 4/5	1 1/2	6 1/20
Bottom Flange	15 4/5	1 1/2	6 1/20

Location	Final Gage - Bolts Check	Final Gage - Bolt Group Check - Outer	Final Edge Distance Check - Inner Plate	Final Transverse Dimension Check - Outer	Final Transverse Dimension Check - Inner
Top Flange	OK	OK	OK	OK	OK
Bottom Flange	OK	OK	OK	OK	OK

Bolt Layout - Longitudinal Pitch

Location	Web Gap (in)	Bolt Spacing (in)	Minimum Pitch - Bolts (in)	End Distance (in)	Pitch - Bolt Groups (in)	Longitudinal Pitch - Bolt Group Check - Outer
Top Flange	1/4	3	3	1 1/2	3 1/4	OK
Bottom Flange						OK

Splice Plate Geometry - Plate Sizes

Location	Bolts Per Row - Calculated	Total Bolts - Calculated	Pitch - Bolts (in)	Pitch - Bolt Groups (in)	End Distance (in)	Splice Plate Width (in)	Splice Plate Thickness (in)	Splice Plate Length (in)			
Top Flange - Outer Splice Plate	4	16	3	3 1/4	1 1/2	15 4/5	3/4	24 1/4			
Top Flange - Inner Splice Plate						6 3/8	7/8				
Bottom Flange - Inner Splice Plate	4	16				3	3 1/4	1 1/2	6 3/8	7/8	24 1/4
Bottom Flange - Outer Splice Plate									15 4/5	3/4	

Bolt Layout - Diagonal Edge

Location	End Distance (in) - Final	Edge Distance (in)	Diagonal Edge Distance (in)	Final Diagonal Edge Distance - Check
Top Flange Splice	1.50	1.50	2.12	OK
Bottom Flange Splice				

Splice Plate - Bolt Shear Resistance Joint Length Reduction Check

Location	Bolt Shear Resistance Joint Length Reduction Factor
Top Flange Splice	1.00
Bottom Flange Splice	1.00

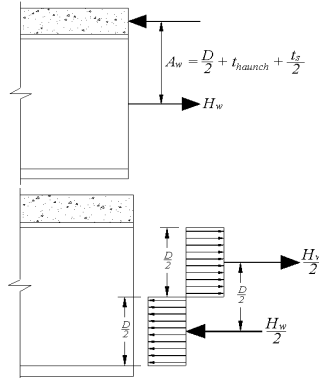
Moment Resistance

Positive Moment

Moment Arm (in)	44.34
Bottom Flange Force (k)	655.54
M_{flange} (kip-ft)	2,422.29
Strength I - Positive (kip-ft)	1,608.36
Check M_{flange}	OK
Hw (kip)	DNA

Negative Moment

Moment Arm (in)	37.62
Minimum Flange Force(k)	655.54
M_{flange} (kip-ft)	2,055.26
Strength I - Negative (kip-ft)	-444.37
Check M_{flange}	OK
Hw (kip)	DNA



Splice Plates

Location	Width (in)	Thickness (in)	Total A_{gross} (sq-in)
Top Flange - Outer Splice Plate	15 4/5	3/4	11.85
Top Flange - Inner Splice Plate	6 3/8	7/8	11.16
Bottom Flange - Inner Splice Plate	6 3/8	7/8	11.16
Bottom Flange - Outer Splice Plate	15 4/5	3/4	11.85

Factored Yield Resistance - Tension

Location	Design Force in Splice Plate (kip)	ϕ_y	F_y (ksi)	A_g (sq-in)	$R_r = \phi_y F_y A_g$ Rr (kip)	Factored Yield Check - Tension
Top Flange - Outer Splice Plate	327.77	0.95	50	11.85	562.88	OK
Top Flange - Inner Splice Plate	327.77			11.16	529.92	OK
Bottom Flange - Inner Splice Plate	327.77		50	11.16	529.92	OK
Bottom Flange - Outer Splice Plate	327.77			11.85	562.88	OK

Net Section to Gross Section Check - Tension

Location	A_n (sq-in)	A_g (sq-in)	$0.85 * A_g$ (sq-in)	Check $A_n \leq 0.85 A_g$ AASHTO 6.13.5.2	Controlling Section (sq-in)
Top Flange - Outer Splice Plate	8.48	11.85	10.07	OK	8.48
Top Flange - Inner Splice Plate	7.22	11.16	9.48	OK	7.22
Bottom Flange - Inner Splice Plate	7.22	11.16	9.48	OK	7.22
Bottom Flange - Outer Splice Plate	8.48	11.85	10.07	OK	8.48

Net Section Fracture Resistance - Tension

Location	Design Force in Splice Plate (kip)	ϕ_u	F_u (ksi)	Controlling Section (sq-in)	R_p	U	$R_r = \phi_u F_u A_n R_p U$ Rr (kip)	Net Section Fracture Check - Tension
Top Flange - Outer Splice Plate	327.77	0.80	65	8.48	1.00	1.00	440.70	OK
Top Flange - Inner Splice Plate	327.77			7.22			375.38	OK
Bottom Flange - Inner Splice Plate	327.77		65	7.22			375.38	OK
Bottom Flange - Outer Splice Plate	327.77			8.48			440.70	OK

Block Shear Rupture Resistance - Splice Plates

Location	Gross Path Length per Failure Plane - Tension (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Tension (in)	Splice Plate Thickness (in)	Net Area A_{tn} (sq-in)
Top Flange - Outer Splice Plate	4.88	1.5	1.125	2	6.38	3/4	4.78
Top Flange - Inner Splice Plate	4.88	1.5			6.38	7/8	5.58
Bottom Flange - Inner Splice Plate	4.88	1.5			6.38	7/8	5.58
Bottom Flange - Outer Splice Plate	4.88	1.5			6.38	3/4	4.78

Location	Gross Path Length per Failure Plane - Shear (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Shear (in)	Splice Plate Thickness (in)	Net Area A_{vn} (sq-in)
Top Flange - Outer Splice Plate	10.50	3.5	1.125	2	13.13	3/4	9.84
Top Flange - Inner Splice Plate	10.50	3.5			13.13	7/8	11.48
Bottom Flange - Inner Splice Plate	10.50	3.5			13.13	7/8	11.48
Bottom Flange - Outer Splice Plate	10.50	3.5			13.13	3/4	9.84

Location	Gross Path Length per Failure Plane - Shear (in)	Splice Plate Thickness (in)	Path Count	Gross Area A_{vg} (sq-in)
Top Flange - Outer Splice Plate	10.50	3/4	2	15.75
Top Flange - Inner Splice Plate	10.50	7/8		18.38
Bottom Flange - Inner Splice Plate	10.50	7/8		18.38
Bottom Flange - Outer Splice Plate	10.50	3/4		15.75

Location	ϕ_{bs}	R_p	F_u (ksi)	U_{bs}	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tm})$ R_r (kip)
Top Flange - Outer Splice Plate	0.80	1.00	65	1.00	545.51
Top Flange - Inner Splice Plate					636.43
Bottom Flange - Inner Splice Plate			65		636.43
Bottom Flange - Outer Splice Plate					545.51

Location	ϕ_{bs}	R_p	F_y (ksi)	F_u (ksi)	U_{bs}	$\phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_m)$	
Top Flange - Outer Splice Plate	0.80	1.00	50	65	1.00	614.03	
Top Flange - Inner Splice Plate						716.36	
Bottom Flange - Inner Splice Plate			50	65		716.36	
Bottom Flange - Outer Splice Plate						614.03	

Location	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ $\leq \phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$	Max. Design Force for Splice Plates (kip)	Block Shear Rupture Resistance Check
Top Flange - Outer Splice Plate	545.51	327.77	OK
Top Flange - Inner Splice Plate	636.43		OK
Bottom Flange - Inner Splice Plate	636.43	327.77	OK
Bottom Flange - Outer Splice Plate	545.51		OK

Block Shear Rupture Resistance - Girder (Mode 1)

Location	Gross Path Length per Failure Plane - Tension (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Tension (in)	Flange Thickness (in)	Net Area A_{tn} (sq-in)
Top Flange - Left	3.38	1	1.125	2	4.50	1	4.78
Top Flange - Right	3.38	1			4.50	1	4.78
Bottom Flange - Left	3.38	1			4.50	1	4.78
Bottom Flange - Right	3.38	1			4.50	1	4.78

Location	Gross Path Length per Failure Plane - Shear (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Shear (in)	Flange Thickness (in)	Net Area A_{vn} (sq-in)
Top Flange - Left	10.50	3.5	1.125	4	26.25	1	27.89
Top Flange - Right	10.50	3.5			26.25	1	27.89
Bottom Flange - Left	10.50	3.5			26.25	1	27.89
Bottom Flange - Right	10.50	3.5			26.25	1	27.89

Location	Gross Path Length per Failure Plane - Shear (in)	Flange Thickness (in)	Path Count	Gross Area A_{vg} (sq-in)
Top Flange - Left	10.50	1	4	44.63
Top Flange - Right	10.50	1		44.63
Bottom Flange - Left	10.50	1		44.63
Bottom Flange - Right	10.50	1		44.63

Location	ϕ_{bs}	R_p	F_u (ksi)	U_{bs}	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ R_r (kip)
Top Flange - Left	0.80	1.00	65	1.00	1089.81
Top Flange - Right			65		1089.81
Bottom Flange - Left			65		1089.81
Bottom Flange - Right			65		1089.81

Location	ϕ_{bs}	R_p	F_y (ksi)	F_u (ksi)	U_{bs}	$\phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$
Top Flange - Left	0.80	1.00	50	65	1.00	1283.93
Top Flange - Right			50	65		1283.93
Bottom Flange - Left			50	65		1283.93
Bottom Flange - Right			50	65		1283.93

Location	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ $\leq \phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$	P_{ty} (kip)	Block Shear Rupture Resistance Check
Top Flange - Left	1089.81	655.54	OK
Top Flange - Right	1089.81		OK
Bottom Flange - Left	1089.81	655.54	OK
Bottom Flange - Right	1089.81		OK

Block Shear Rupture Resistance - Girder (Mode 2)

Location	Gross Path Length per Failure Plane - Tension (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Tension (in)	Flange Thickness (in)	Net Area A_{tn} (sq-in)
Top Flange - Left	4.88	1.5	1.125	2	6.38	1	6.77
Top Flange - Right	4.88	1.5			6.38	1	6.77
Bottom Flange - Left	4.88	1.5			6.38	1	6.77
Bottom Flange - Right	4.88	1.5			6.38	1	6.77

Location	Gross Path Length per Failure Plane - Shear (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Shear (in)	Flange Thickness (in)	Net Area A_{vn} (sq-in)
Top Flange - Left	10.50	3.5	1.125	2	13.13	1	13.95
Top Flange - Right	10.50	3.5			13.13	1	13.95
Bottom Flange - Left	10.50	3.5			13.13	1	13.95
Bottom Flange - Right	10.50	3.5			13.13	1	13.95

Location	Gross Path Length per Failure Plane - Shear (in)	Flange Thickness (in)	Path Count	Gross Area A_{vg} (sq-in)
Top Flange - Left	10.50	1	2	22.31
Top Flange - Right	10.50	1		22.31
Bottom Flange - Left	10.50	1		22.31
Bottom Flange - Right	10.50	1		22.31

Location	ϕ_{bs}	R_p	F_u (ksi)	U_{bs}	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ R_r (kip)
Top Flange - Left	0.80	1.00	65	1.00	772.81
Top Flange - Right			65		772.81
Bottom Flange - Left			65		772.81
Bottom Flange - Right			65		772.81

Location	ϕ_{bs}	R_p	F_y (ksi)	F_u (ksi)	U_{bs}	$\phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$
Top Flange - Left	0.80	1.00	50	65	1.00	869.87
Top Flange - Right			50	65		869.87
Bottom Flange - Left			50	65		869.87
Bottom Flange - Right			50	65		869.87

Location	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ $\leq \phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$	P_{ty} (kip)	Block Shear Rupture Resistance Check
Top Flange - Left	772.81	655.54	OK
Top Flange - Right	772.81		OK
Bottom Flange - Left	772.81	655.54	OK
Bottom Flange - Right	772.81		OK

Bearing Resistance Check

Location	Thickness (in)	F_u (ksi)	(kip/in)	Controlling
Top Flange - Splice Plates	1.63	65	105.63	
Top Flange - Left	1.06	65	69.06	CONTROLS
Top Flange - Right	1.06	65	69.06	CONTROLS
Bottom Flange - Splice Plates	1.63	65	105.63	
Bottom Flange - Left	1.06	65	69.06	CONTROLS
Bottom Flange - Right	1.06	65	69.06	CONTROLS

Location	Hole Diameter (in)	Bolt Diameter - d (in)	2d (in)	End Distance (in)	Pitch - Bolts (in)	Total Bolts (Per Side) Calculated	Bolt Rows (Per Side)
Top Flange - Left	1 1/8	1	2.00	1 1/2	3	16	4
Top Flange - Right							
Bottom Flange - Left						16	4
Bottom Flange - Right							

				End Holes			
Location	Thickness (in)	F _u (ksi)	Φ _{bb}	Clear Distance - L _c (in)	R _n = 2.4dtF _u R _n (kip)	R _n = 1.2L _c tF _u R _n (kip)	R _r = Φ _{bb} R _n R _r (kip)
Top Flange - Outer Splice Plate	0.75	65	0.80	0.94	DNA	219.38	175.50
Top Flange - Left	1.06	65			DNA	310.78	248.63
Top Flange - Right							
Top Flange - Inner Splice Plate	0.88	65			DNA	255.94	204.75
Bottom Flange - Inner Splice Plate	0.88	65			DNA	255.94	204.75
Bottom Flange - Left	1.06	65			DNA	310.78	248.63
Bottom Flange - Right							
Bottom Flange - Outer Splice Plate	0.75	65			DNA	219.38	175.50

				Interior Holes			
Location	Thickness (in)	F _u (ksi)	Φ _{bb}	Clear Distance - L _c (in)	R _n = 2.4dtF _u R _n (kip)	R _n = 1.2L _c tF _u R _n (kip)	R _r = Φ _{bb} R _n R _r (kip)
Top Flange - Outer Splice Plate	0.75	65	0.80	1.88	DNA	1316.25	1053.00
Top Flange - Left	1.06	65			DNA	1864.6875	1491.75
Top Flange - Right							
Top Flange - Inner Splice Plate	0.88	65			DNA	1535.6250	1228.50
Bottom Flange - Inner Splice Plate	0.88	65			DNA	1535.6250	1228.50
Bottom Flange - Left	1.06	65			DNA	1864.6875	1491.75
Bottom Flange - Right							
Bottom Flange - Outer Splice Plate	0.75	65			DNA	1316.2500	1053.00

End			
Location	Bolt Capacity R_r (kip)	Bearing Resistance R_r (kip)	Controlling R_r (kip)
Top Flange - Outer Splice Plate	168.89	175.50	168.89
Top Flange - Left	337.78	248.63	248.63
Top Flange - Right			
Top Flange - Inner Splice Plate	168.89	204.75	168.89
Bottom Flange - Inner Splice Plate	168.89	204.75	168.89
Bottom Flange - Left	337.78	248.63	248.63
Bottom Flange - Right			
Bottom Flange - Outer Splice Plate	168.89	175.50	168.89

Interior			
Location	Bolt Capacity R_r (kip)	Bearing Resistance R_r (kip)	Controlling R_r (kip)
Top Flange - Outer Splice Plate	506.68	1053.00	506.68
Top Flange - Left	1013.35	1491.75	1013.35
Top Flange - Right			
Top Flange - Inner Splice Plate	506.68	1228.50	506.68
Bottom Flange - Inner Splice Plate	506.68	1228.50	506.68
Bottom Flange - Left	1013.35	1491.75	1013.35
Bottom Flange - Right			
Bottom Flange - Outer Splice Plate	506.68	1053.00	506.68

Location	Total Bearing Resistance - R_r (kip)	Design Force (kip)	Bearing Resistance Check
Top Flange - Outer Splice Plate	675.57	327.77	OK
Top Flange - Left	1261.98	655.54	OK
Top Flange - Right			
Top Flange - Inner Splice Plate	675.57	327.77	OK
Bottom Flange - Inner Splice Plate	675.57	327.77	OK
Bottom Flange - Left	1261.98	655.54	OK
Bottom Flange - Right			
Bottom Flange - Outer Splice Plate	675.57	327.77	OK

Slip Resistance Check

Service II - Positive Moment Check

Moment Arm (in)	44.34
Service II - Positive (kip-ft)	1,211.28
Total Bolts - Calculated	16
Per Bolt P_t (kip)	30.60
Total P_t (kip)	489.60
Moment (kip-ft)	1,809.12
Slip Check	OK
H_w (kip)	DNA

Service II - Negative Moment Check

Moment Arm (in)	37.62
Service II - Negative (kip-ft)	-253.56
Total Bolts - Calculated	16
Per Bolt P_t (kip)	30.60
Total P_t (kip)	489.60
Moment (kip-ft)	1,535.00
Slip Check	OK
H_w (kip)	DNA

Deck Casting Check

Moment Arm (in)	37.62
Deck Casting Moment (kip-ft)	0.00
Total Bolts - Calculated	16
Per Bolt P_t (kip)	30.60
Total P_t (kip)	489.60
Moment (kip-ft)	1,535.00
Slip Check	OK
H_w (kip)	DNA



NSBA Bolted Splice Designer - Plate Girder

NOTICE: DO NOT MODIFY THIS SHEET

Web Calculations

Load Combinations - Factored Shear

Load Combination	Shear (kip)						Factored Shear (kip)
	Noncomposite Dead Load (DC1)	Superimposed Composite Dead Load (DC2)	Future Wearing Surface (DW)	Positive Live Load plus Impact (LL+ + I)	Negative Live Load plus Impact (LL- + I)	Deck Casting	
Load Combination	-25.59	-5.48	0.00	74.38	-73.73	0.00	
Deck Casting	0.00	0.00	0.00	0.00	0.00	1.40	0.00
Service II - Positive	1.00	1.00	1.00	1.30	0.00	0.00	65.62
Service II - Negative	1.00	1.00	1.00	0.00	1.30	0.00	-126.92
CONTROLS							

Bolt Factored Shear Resistance

Location	Bolt Type	Bolt Area (sq-in)	K_h	ϕ_s	F_u (ksi)	P_t (kip)	R_v - Single Shear (kip)	R_v - Double Shear (kip)
Web	A325 - Excluded	0.7854	Standard	0.80	120	51.00	42.22	84.45

Bolt Nominal Slip Resistance

Faying Surface Class (K_s)	Hole Size Factor (K_h)	P_t (kip)	Slip Capacity - Double (kip)
0.30	1.00	51.00	30.60

Flange Design Results

Flange Moment Resistance Check Results

	H_w (kip)	Controlling
Positive	DNA	
Negative	DNA	

Flange Moment Slip Resistance Check Results

	H_w (kip)	Controlling
Positive	DNA	
Negative	DNA	
Deck Casting	DNA	

Strength Limit State Design

Web Shear Strength

Location	F_y (ksi)	E (ksi)	F_u (ksi)	$0.84 (F_u/F_y)$
Web - Left	50	29000	65	1.09
Web - Right	50	29000	65	1.09

Location	Depth (in)	Thickness (in)	A_{gross} (sq-in)	Filler Plate Thickness - Total (in)	Filler Plate Thickness - Each (in)	Filler Plate Quantity
Web - Left	36 5/9	5/8	22.85	0	0	0
Web - Right	36 5/9	5/8	22.85			

Location	Transverse Stiffener Status	D_w/t_w	d_o/D_w	Shear Buckling Coefficient - k	Web Slenderness Lower Limit	Web Slenderness Upper Limit	Shear Buckling to Yield Strength Ratio - C
Web - Left	Unstiffened	58.50	DNA	5.00	60.31	75.39	1.00
Web - Right	Unstiffened	58.50	DNA	5.00	60.31	75.39	1.00

Location	V_p (kip)	V_{cr} (kip)	$\frac{2Dt_w}{(b_{fc}t_{fc} + b_{ft}t_{ft})} \leq 2.5$	V_n (kip)
Web - Left	662.65	662.65	DNA	662.65
Web - Right	662.65	662.65	DNA	662.65

Bolt Count - Summary (Initial)

Location	Controlling H_w (kip)	V_n (kip)	ϕ_v	V_r (kip)
Web	0.00	662.65	1.00	662.65

Location	R (kip)	Total Bolt - Initial	Bolt Rows (Per Side)	Total Bolts (Per Side) - Calculated
Web	662.65	7.85	2	8

Slip Resistance Design

Bolt Count - Summary (Initial)

	Shear (kip)	H_w (kip)	Controlling H_w (kip)	Resultant R (kip)	Per Bolt P_t (kip)	Total Bolt - Initial	Bolt Rows (Per Side)	Total Bolts (Per Side) - Calculated	Max Total Bolts (Per Side) - Calculated
Deck Casting (kip)	0.00	DNA	DNA	0.00	30.60	0.00	2	0	6
Service II – Positive (kip)	65.62	DNA	DNA	65.62		2.14		4	
Service II – Negative (kip)	-126.92	DNA		-126.92		4.15		6	

Bolt and Plate Geometric Layout

Maximum Bolt Spacing - Seal

Location	Thickness - Initial (in)	$(4.0 + 4.0t)$	$s \leq (4.0 + 4.0t) \leq 7.0 \text{ in.}$ $S_{max} \text{ (in)}$
Web	5/8	6 1/2	6 1/2

Web Splice Plate End Distance - Splice Plate Height Adjustment

Location	End Distance (in)	Web Weld Size (in)	Web Weld Clearance (in)	Entering & Tightening Clearance (in)	End Distance - Calculated (in)	End Adjustment (in)
Web - Top	1 1/2	1 1/4	0	3 1/8	2 3/4	-1 1/4
Web - Bottom					2 3/4	-1 1/4

Web Splice Plate Height - Maximum

Location	Web Depth (in)	Splice Plate Height - Maximum (in)	Max End Adjustment (in)	Splice Plate Height - Estimated (in)
Web - Top	36 14/25	34 3/50	-1 1/4	31 14/25
Web - Bottom				

Bolt Count - Summary (Initial)

Location	Bolt Rows (Per Side)	Splice Plate Height - Maximum (in)	End Distance (in)	S_{max} (in)	Total Bolts (Per Side) - Calculated at Max Spacing
Web	2	31 14/25	1 1/2	6 1/2	12

Bolt Count - Final

	Strength	Slip	Pitch	Override	Controlling	Bolt Count Override
Web	8	6	12	12	12	TRUE

Layout Checks

Pitch and End Distance Verification

Location	End Distance - Final (in)	Pitch - Bolts (in) - Final	Splice Plate Height - Final (in)
Web	1 1/2	5 5/8	31 1/8

Location	Final Pitch Check	Final End Distance Check	Final Splice Plate Height Check
Web	OK	OK	OK

Bolt Layout - Gage

Location	Web Gap (in)	Gage - Bolts (in)	Edge Distance (in)	Gage - Bolt Groups (in)	Gage - Bolt Group Check
Web	1/4	3	1 1/2	3 1/4	OK

Bolt Layout - Diagonal Edge

Location	End Distance (in)	Edge Distance (in)	Diagonal Edge Distance (in)	Final Diagonal Edge Distance - Check
Web	1.5000	1.5000	2.1213	OK

Splice Plate Geometry - Plate Sizes

Location	Bolt Per Row - Calculated	Total Bolts - Calculated	Gage - Bolts (in)	Gage - Bolt Groups (in)	Edge Distance (in)	Splice Plate Height (in)	Splice Plate Thickness (in)	Splice Plate Width (in)
Web Splice Plate	2	12	3	3 1/4	1 1/2	31 1/8	5/8	12 1/4
Web - Filler						0	0	0

Splice Plates

Factored Shear Yielding Resistance

Location	ϕ_v	F_y (ksi)	Height - Final (in)	Thickness - Initial (in)	A_{vg} (sq-in)	$R_r = \phi_v 0.58 F_y A_{vg}$ Rr (kip)	Factored Shear Yield Check
Web Splice Plate	1.00	50	31 1/8	0.6250	38.91	1128.28	OK

Factored Shear Rupture Resistance

Location	Height - Final (in)	Thickness - Initial (in)	Total Bolts - Calculated	Bolt Rows (Per Side)	Hole Diameter (in)	A_{vn} (sq-in)
Web Splice Plate	31 1/8	0.6250	12	2	1.1250	30.47

Location	ϕ_{vu}	R_p	F_u (ksi)	$R_r = \phi_{vu} 0.58 R_p F_u A_{vn}$ Rr (kip)	V_r (kip)	Factored Shear Rupture Check Rr > Vr
Web Splice Plate	0.80	1.00	65	918.94	662.65	OK

Block Shear Rupture Resistance - Splice Plates

Location	Gross Path Length per Failure Plane - Tension (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Tension (in)	Splice Plate Thickness (in)	Net Area A_{tn} (sq-in)
Web Splice Plate	4.50	1.5	1.1250	2	5.63	5/8	3.52

Location	Gross Path Length per Failure Plane - Shear (in)	Hole Count / Path	Hole Diameter (in)	Path Count	Net Path Length - Shear (in)	Splice Plate Thickness (in)	Net Area A_{vn} (sq-in)
Web Splice Plate	29.63	5.5	1.1250	2	46.88	5/8	29.30

Location	Gross Path Length per Failure Plane - Shear (in)	Splice Plate Thickness (in)	Path Count	Gross Area A_g (sq-in)
Web Splice Plate	29.63	5/8	2	37.03

Location	ϕ_{bs}	R_p	F_u (ksi)	U_{bs}	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ R_r (kip)
Web Splice Plate	0.80	1.00	65	1.00	1066.41

Location	ϕ_{bs}	R_p	F_y (ksi)	F_u (ksi)	U_{bs}	$\phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$
Web Splice Plate	0.80	1.00	50	65	1.00	1041.94

Location	$R_r = \phi_{bs} R_p (0.58 F_u A_{vn} + U_{bs} F_u A_{tn})$ $\leq \phi_{bs} R_p (0.58 F_y A_{vg} + U_{bs} F_u A_{tn})$	V_r (kip)	$R_r > V_r$
Web Splice Plate	1041.94	662.65	OK

Bearing Resistance Check

Location	Thickness t_w (in)	F_u (ksi)	$t_w * F_u$ (kip/in)	Controlling Web
Web - Left	5/8	65	40.63	CONTROLS
Web - Right	5/8	65	40.63	CONTROLS

Location	Web Splice Plate Thickness - t_{sp} (in)	Splice Plate - F_u (ksi)	$2t_{sp} * F_u$ (kip/in)
Web	5/8	65	81.25

Location	V_r (kip)	R (kip)
Web	662.65	662.65

Location	Bolt Diameter - d (in)	2d (in)	Total Bolts (Per Side) - Calculated	Bolt Rows (Per Side)
Web Splice	1	2.00	12	2

Location	$V_r == R$	$(2t_{sp} * F_u) < (t_w * F_u)$
Web	TRUE	FALSE

Location	Controlling t (in)	Controlling F_u (ksi)
Web	5/8	65

						End Holes	Interior Holes
Location	Hole Diameter (in)	Web End Clear Distance (in)	End Clear Distance (in)	Edge Clear Distance (in)	Clear Pitch - Bolts (in)	Clear Distance - L_c (in)	
Web	1 1/8	3.66	0.94	0.94	4.50	3.66	4.50

				End Holes			
Location	Controlling Web Thickness (in)	Controlling F_u (ksi)	ϕ_{bb}	Clear Distance - L_c (in)	$R_n = 2.4dtF_u$ Rn (kip)	$R_n = 1.2L_ctF_u$ Rn (kip)	$R_r = \phi_{bb}R_n$ R_r (kip)
Web Splice	5/8	65	0.80	3.66	195.00	DNA	156.0

				Interior Holes			
Location	Controlling Web Thickness (in)	Controlling F_u (ksi)	ϕ_{bb}	Clear Distance - L_c (in)	$R_n = 2.4dtF_u$ Rn (kip)	$R_n = 1.2L_ctF_u$ Rn (kip)	$R_r = \phi_{bb}R_n$ R_r (kip)
Web Splice	5/8	65	0.80	4.50	975.00	DNA	780.00

End			
Location	Bolt Capacity (kip)	Web Capacity R _r (kip)	Controlling R _r (kip)
Web Splice	168.89	156.00	156.00

Interior			
Location	Bolt Capacity (kip)	Web Capacity R _r (kip)	Controlling R _r (kip)
Web Splice	844.46	780.00	780.00

Location	Total Bearing Resistance - R _r (kip)	R (kip)	R _r > R
Web Splice	936.00	662.65	OK

Slip Resistance Check

Deck Casting - Shear Check

Deck Casting (kip)	0.00
H _w (kip)	DNA
Resultant R (kip)	0.00
Total Bolts - Calculated	12
Per Bolt P _t (kip)	30.60
Total P _t (kip)	367.20
Slip Check	OK

Service II - Positive Shear Check

Service II – Positive (kip)	65.62
H _w (kip)	DNA
Controlling H _w (kip)	DNA
Resultant R (kip)	65.62
Total Bolts - Calculated	12
Per Bolt P _t (kip)	30.60
Total P _t (kip)	367.20
Slip Check	OK

Service II - Negative Shear Check

Service II – Negative (kip)	-126.92
H _w (kip)	DNA
Controlling H _w (kip)	DNA
Resultant R (kip)	-126.92
Total Bolts - Calculated	12
Per Bolt P _t (kip)	30.60
Total P _t (kip)	367.20
Slip Check	OK

1.4 Shear Stud Connector Design



Department of
Transportation



		471 E Broad St, Suite 2010 Columbus, OH 43215 Phone: (614) 225-8868			Project:	LAK-6-2.06	Calc By:	CAE	Date:	12/30/24
					Description:	Shear Stud Connector	Check By:	DOR	Date:	01/26/25
					Project No:	75926				
Field Splice Name	Location (ft)	Length of Plate (ft)	Splice Plate Limits		Length of Plate + 2" on each end (ft)	Stud Limits				
			Start (ft)	Stop (ft)		Stop (ft)	Start (ft)			
FS 1	88.010	2.021	87.000	89.021	2.354	86.833	89.188			
FS 2	186.760	2.021	185.750	187.771	2.521	185.500	188.021			
FS 3	259.927	2.021	258.917	260.938	2.521	258.667	261.188			
FS 4	352.594	2.021	351.583	353.604	2.521	351.333	353.854			
FS 5	396.594	2.021	395.583	397.604	2.521	395.333	397.854			

	Segment Length		Pitch (in)	Number of spaces		Revised Segments (ft)	Final Pitch (in)
FS 1	85.583	@	1.083	79		85.583	13
	1.167	@	1.167	1		1.167	14
	2.750	@	2.750	1		2.750	33
	1.094	@	1.094	1		1.094	13.125
FS 2	94.875	@	0.958	99		94.875	11.5
	2.750	@	2.750	1		2.750	33
	68.750	@	1.042	66		68.750	12.5
FS 3	1.667	@	0.833	2		1.667	10
	2.521	@	2.521	1		2.750	33
	1.833	@	0.917	2		1.833	11
FS 4	86.250	@	0.938	92		86.250	11.25
	1.833	@	0.917	2		1.833	11
	2.521	@	2.521	1		2.750	33
	1.958	@	0.979	2		1.958	11.75
	37.333	@	1.167	32		37.333	14
FS 5	1.958	@	0.979	2		1.958	11.75
	2.521	@	2.521	1		2.750	33
	0.979	@	0.979	1		0.854	10.25
	88.833	@	1.083	82		88.833	13
	0.979	@	0.979	1		0.865	10.375



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Project No:	75926				

Revised Segments (ft)		Final Pitch (in)	Number of Spaces	Difference in Spacings	Sum of Difference in Spacings	Sum of Updated Segments	Location (ft)	Are the studs in the right place?	Pitch over the FS is less than 48"?
85.583	@	13.000"	79	0.000			85.583		
1.167	@	14.000"	1	0.000			86.750	OKAY	
2.750	@	33.000"	1	0.000	0.00000	5.010	89.500	OKAY	PASS
1.094	@	13.125"	1	0.000			90.594		
94.875	@	11.500"	99	0.000			185.469	OKAY	
2.750	@	33.000"	1	0.000	0.00000	2.750	188.219	OKAY	PASS
68.750	@	12.500"	66	0.000			256.969		
1.667	@	10.000"	2	0.000			258.635	OKAY	
2.750	@	33.000"	1	0.229	0.22917	4.583	261.385	OKAY	PASS
1.833	@	11.000"	2	0.000			263.219		
86.250	@	11.250"	92	0.000			349.469		
1.833	@	11.000"	2	0.000			351.302	OKAY	
2.750	@	33.000"	1	0.229	0.229	4.708	354.052	OKAY	PASS
1.958	@	11.750"	2	0.000			356.010		
37.333	@	14.000"	32	0.000			393.344		
1.958	@	11.750"	2	0.000			395.302	OKAY	
2.750	@	33.000"	1	0.229	0.104	3.604	398.052	OKAY	PASS
0.854	@	10.250"	1	-0.125			398.906		
88.833	@	13.000"	82	0.000			487.740		
0.865	@	10.375"	1	-0.115			488.604		

Bridge Length 488.604 ft
Total # of Studs 1880

Additional Checks

Bridge Length PASS
Number of Studs PASS

1.5 Bearing Design



Department of
Transportation



COMPLETED BY: CAE		PROJECT NAME: LAK-06-2.06
CHECKED BY: DOR		PROJECT NUMBER: 75926.001
RECTANGULAR BEARING - ABUTMENT		STEEL REINFORCED ELASTOMERIC BEARING DESIGN, METHOD A
CIRCULAR BEARING DESIGN: Abutment Bearing		

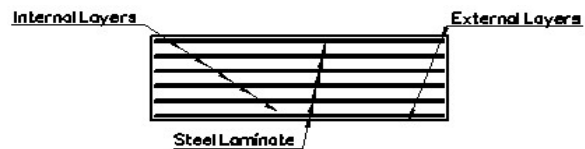
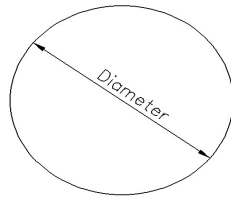
References:

AASHTO LRFD Bridge Design Specifications 2020, ninth edition
Ohio DOT 2020 BDM

Methodology:

Design a circular bearing per Method A. ODOT uses Method A per 2020 BDM 1014.8

Sketches:



If $S_i^2 / n < 16$ for circular Method A (AASHTO C14.7.6.1)

$$S_i^2 / n = 6.75$$

Bearing Dimensions and Properties

Bearing Size			layer thickness		
Type:	Circle		thickness	# of Layers	
Diameter, D =	16.000 in		Internal Layer, h_{i1} :	0.770 in	4
			External Layer, h_{e1} :	0.400 in	1
Area of Elastomer =	201.06 in ²		Total Elastomer Thickness, h_{t1} :	3.48 in	
Shear Modulus, G =	0.130 ksi		Thickness of steel reinforcement, h_s :	0.1046 in (12 Guage)	
Elastomer Hardness, Shore A =	60		Total Thickness with steel laminate =	3.8984 in	

OK

Reactions, Displacements and Rotations

Dead Load:	31.23 kips	<i>*All reactions and rotations shall be service limit state</i> <i>*Bearings assumed to be subject to shear deformation</i> <i>*LL Reaction is Maximum from LEAPSTEEL output</i> (AASHTO Figure 14.7.5.2-1) (AASHTO Table 14.7.5.2-1) (AASHTO Table 14.7.5.2-1) (AASHTO Table 3.12.2.1-1)
Live Load:	70.39 kips	
Temperature Zone:	C	
50 Year Low Temperature:	-30	
Min. Low Temperature Elastomer Grade:	3	
Design Temp. Range (-30 to 120°F):	90 °F (Assuming built at 60° and BDM 1003.21)	
Coefficient of Thermal Expansion, α :	0.0000065	
Length of Thermal Expansion:	247.43 ft	(No expansion length because the bearing is fixed)
Thermal Displacement, $\alpha L (T_{max} - T_{min}), \Delta_T$:	1.74 in	(AASHTO 3.12.2.3)
Creep Displacement, Δ_C :	0 in	(AASHTO Table 14.7.6.2-1)
Abutment Tip, 0.25" Per 10' of Height, Δ_A :	0 in	

Stress and Shape Factor

(AASHTO 14.7.5.1)

Total Dead Load (σ_D)	0.155 ksi
Total Live Load (σ_L)	0.350 ksi
Total Load (σ_s)	0.505 ksi

Shape Factor, S $S_i = D / 4 \cdot h_r$

(AASHTO 14.7.5.1-2)

$$S_{i \text{ INT}} = 5.195$$

$$S_{i \text{ EXT}} = 10.000$$

COMPLETED BY: CAE		PROJECT NAME: LAK-06-2.06
CHECKED BY: DOR		PROJECT NUMBER: 75926.001
RECTANGULAR BEARING - ABUTMENT		STEEL REINFORCED ELASTOMERIC BEARING DESIGN, METHOD A

Requirements for Method A

(AASHTO 14.7.6.3)

Compressive Stress:

$$\sigma_s = 0.505 \text{ ksi}$$

$$\sigma_s \leq 1.25 G S_l = 0.844 \text{ ksi} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.2-7})$$

$$\sigma_s \leq 1.250 \text{ ksi} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.2-8})$$

Compressive Deflection:

$$\text{Strain: } \varepsilon = \sigma / (4.8 G S_l^2) \quad (\text{AASHTO C14.7.5.3.6-1})$$

$$\text{Dead Load Strain, } \varepsilon_d \quad \text{Internal} = 0.00922 \quad \text{External} = 0.00249$$

$$\text{Live Load Strain, } \varepsilon_L \quad \text{Internal} = 0.02079 \quad \text{External} = 0.00561$$

$$\text{Initial DL deflection: } \delta_d = \sum \varepsilon_{di} h_{ri} \quad (\text{AASHTO 14.7.5.3.6-2})$$

$$\delta_d = 0.02941 \text{ in}$$

$$\text{Instant LL deflection: } \delta_L = \sum \varepsilon_{Li} h_{ri} \quad (\text{AASHTO 14.7.5.3.6-1})$$

$$\delta_L = 0.06628 \text{ in}$$

$$\text{Long Term DL def.: } \delta_{lt} = \delta_d + a_{cr} \delta_d \quad (\text{AASHTO 14.7.5.3.6-3})$$

$$a_{cr} = 0.00$$

(AASHTO Table 14.7.6.2-1)

$$\delta_{lt} = 0.02941 \text{ in}$$

$$\text{Max. deflection: } \delta_{MAX} = 0.125 \text{ in} \quad (\text{AASHTO C14.7.5.3.6})$$

$$\text{Check LL def.: } \delta_L \leq \delta_{MAX} \quad 0.06628 \leq 0.125 \quad \text{OK}$$

$$\text{Check Long term DL deflection: } \delta_{lt} \leq \delta_{MAX} \quad 0.02941 \leq 0.125 \quad \text{OK}$$

$$\text{Instantaneous Live Load and Initial Dead Load Compressive Deflection} \leq 0.09 h_{ri} \quad (\text{AASHTO 14.7.6.3.3})$$

$$\text{Instantaneous Live Load and Initial Dead Load Compressive Deflection} = 0.0231 \text{ in}$$

$$0.09 h_{ri} = 0.0693 \text{ in}$$

OK

Shear Deformation:

Max. Horz. Disp., $\Delta_o = \Delta_T +$ movements caused by creep, shrinkage, and post-tensioning

$$\Delta_o = \text{Maximum Shear Deformation} = \Delta_s = 1.737 \text{ in}$$

$$\text{Check: } h_{ri} \geq 2\Delta_s \quad (\text{AASHTO 14.7.5.3.2-1})$$

$$3.48 \geq 3.47 \quad \text{OK}$$

Rotation:

The "no lift-off" provisions have been removed from the 2013 code.

(AASHTO C14.7.6.3.5a)

Stability:

$$\text{Total Pad Thickness} < D/4 = 4.00 \text{ in} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.6})$$

$$\text{Total Bearing Thickness} = 3.8984 \text{ in}$$

COMPLETED BY: CAE		PROJECT NAME: ODOT D12, LAK-06-2.06
CHECKED BY: DOR		PROJECT NUMBER: 75926
RECTANGULAR BEARING - ABUTMENT		STEEL REINFORCED ELASTOMERIC BEARING DESIGN, METHOD A
RECTANGULAR BEARING DESIGN: Interior Beam (Member 2 & 4) at Pier 3		

References:

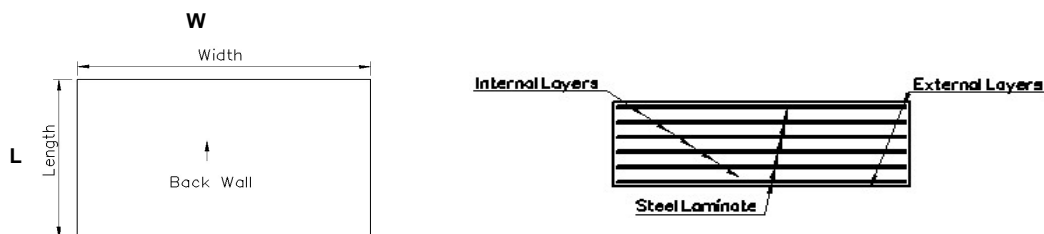
AASHTO LRFD Bridge Design Specifications 2020, ninth edition
Ohio DOT 2020 BDM

Methodology:

Design a rectangular bearing per Method B, and check Method A differences at end of calculation.

Sketches:

ODOT uses Method A per 2020 BDM 1014.8



If $S_i^2 / n < 20$, Consider using Method A (AASHTO C14.7.6.1)

$S_i^2 / n = 19.30$ Method A Checks Apply

Bearing Dimensions and Properties

Bearing Size		layer thickness		
Type:	Square	thickness	# of Layers	
Length, L =	14.000 in	Internal Layer, h_{ti} :	0.460 in	3
Width, W =	14.000 in	External Layer, h_{te} :	0.200 in	1
Area of Elastomer=	196.00 in ²	Total Elastomer Thickness, h_{ti} :	1.58 in	OK
Shear Modulus, G =	0.130 ksi	Thickness of steel reinforcement, h_s :	0.1046 in (12 Guage)	
Elastomer Hardness, Shore A =	60	Total Thickness with steel laminate =	1.8938 in	

Reactions, Displacements and Rotations

Dead Load:	102.00 kips	<i>*All reactions and rotations shall be service limit state</i> <i>*Bearings assumed to be subject to shear deformation</i> <i>*LL Reaction is Maximum from LEAPSTEEL output</i> (AASHTO Figure 14.7.5.2-1) (AASHTO Table 14.7.5.2-1) (AASHTO Table 14.7.5.2-1) (AASHTO Table 3.12.2.1-1)
Live Load:	138.88 kips	
Temperature Zone:	C	
50 Year Low Temperature:	-30	(No expansion length because the bearing is fixed) (AASHTO 3.12.2.3) (AASHTO Table 14.7.6.2-1)
Min. Low Temperature Elastomer Grade:	3	
Design Temp. Range (-30 to 120°F):	90 °F (Assuming built at 60° and BDM 1003.21)	
Coefficient of Thermal Expansion, α :	0.0000065	
Length of Thermal Expansion:	0.00 ft	
Thermal Displacement, $\alpha L (T_{max} - T_{min})$, Δ_T :	0.00 in	
Creep Displacement, Δ_C :	0.35 in	
Abutment Tip, 0.25" Per 10' of Height, Δ_A :	0 in	

Stress and Shape Factor

(AASHTO 14.7.5.1)

Total Dead Load(σ_D)	0.520 ksi
Total Live Load(σ_L)	0.709 ksi
Total Load(σ_s)	1.229 ksi

Shape Factor, S $S_i = (LW) / (2h_{ti}(L + W))$

(AASHTO 14.7.5.1-1)

$S_{i\text{ INT}} = 7.609$

$S_{i\text{ EXT}} = 17.500$

COMPLETED BY: CAE		PROJECT NAME: ODOT D12, LAK-06-2.06
CHECKED BY: DOR		PROJECT NUMBER: 75926
RECTANGULAR BEARING - ABUTMENT		STEEL REINFORCED ELASTOMERIC BEARING DESIGN, METHOD A

Requirements for Method A

(AASHTO 14.7.6.3)

Compressive Stress:

$$\sigma_s = 1.229 \text{ ksi}$$

$$\sigma_s \leq 1.25 G S_l = 1.236 \text{ ksi} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.2-7})$$

$$\sigma_s \leq 1.250 \text{ ksi} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.2-8})$$

Compressive Deflection:

$$\text{Strain: } \varepsilon = \sigma / (4.8 G S_l^2) \quad (\text{AASHTO C14.7.5.3.6-1})$$

$$\text{Dead Load Strain, } \varepsilon_d \quad \text{Internal} = 0.01441 \quad \text{External} = 0.00272$$

$$\text{Live Load Strain, } \varepsilon_L \quad \text{Internal} = 0.01961 \quad \text{External} = 0.00371$$

$$\text{Initial DL deflection: } \delta_d = \sum \varepsilon_{di} h_{ri} \quad (\text{AASHTO 14.7.5.3.6-2})$$

$$\delta_d = 0.02042 \text{ in}$$

$$\text{Instant LL deflection: } \delta_L = \sum \varepsilon_{Li} h_{ri} \quad (\text{AASHTO 14.7.5.3.6-1})$$

$$\delta_L = 0.02781 \text{ in}$$

$$\text{Long Term DL def.: } \delta_{lt} = \delta_d + a_{cr} \delta_d \quad (\text{AASHTO 14.7.5.3.6-3})$$

$$a_{cr} = 0.35$$

(AASHTO Table 14.7.6.2-1)

$$\delta_{lt} = 0.02757 \text{ in}$$

$$\text{Max. deflection: } \delta_{MAX} = 0.125 \text{ in} \quad (\text{AASHTO C14.7.5.3.6})$$

$$\text{Check LL def.: } \delta_L \leq \delta_{MAX} \quad 0.02781 \leq 0.125 \quad \text{OK}$$

$$\text{Check Long term DL deflection: } \delta_{lt} \leq \delta_{MAX} \quad 0.02757 \leq 0.125 \quad \text{OK}$$

$$\text{Instantaneous Live Load and Initial Dead Load Compressive Deflection} \leq 0.09 h_{ri} \quad (\text{AASHTO 14.7.6.3.3})$$

$$\text{Instantaneous Live Load and Initial Dead Load Compressive Deflection} = 0.0156 \text{ in}$$

$$0.09 h_{ri} = 0.0414 \text{ in}$$

OK

Shear Deformation:

Max. Horz. Disp., $\Delta_o = \Delta_T + \text{movements caused by creep, shrinkage, and post-tensioning}$

$$\Delta_o = \text{Maximum Shear Deformation} = \Delta_s = 0.000 \text{ in}$$

$$\text{Check: } h_{ri} \geq 2\Delta_s \quad (\text{AASHTO 14.7.5.3.2-1})$$

$$1.58 \geq 0.00 \quad \text{OK}$$

Rotation:

The "no lift-off" provisions have been removed from the 2013 code.

(AASHTO C14.7.6.3.5a)

Stability:

$$\text{Total Pad Thickness} < L/3 = 4.67 \text{ in} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.6})$$

$$W/3 = 4.67 \text{ in} \quad \text{OK}$$

$$\text{Total Bearing Thickness} = 1.8938 \text{ in}$$

COMPLETED BY: CAE		PROJECT NAME: ODOT D12, LAK-06-2.06
CHECKED BY: DOR		PROJECT NUMBER: 75926
RECTANGULAR BEARING - ABUTMENT		STEEL REINFORCED ELASTOMERIC BEARING DESIGN, METHOD A
RECTANGULAR BEARING DESIGN: Interior Beam (Member 2 & 4) at Pier 4		

References:

AASHTO LRFD Bridge Design Specifications 2020, ninth edition
Ohio DOT 2020 BDM

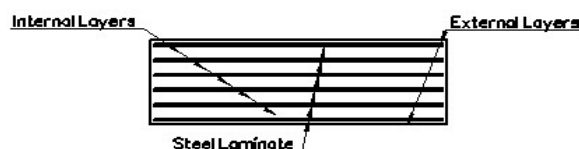
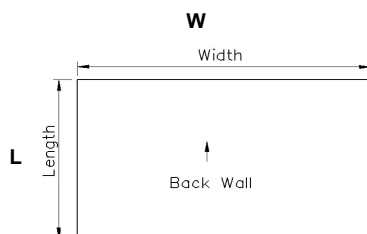
Note: Pier 4 is the extreme case for 1, 2, & 5

Methodology:

Design a rectangular bearing per Method B, and check Method A differences at end of calculation.

Sketches:

ODOT uses Method A per 2020 BDM 1014.8



If $S_i^2 / n < 20$, Consider using Method A (AASHTO C14.7.6.1)

$S_i^2 / n = 11.25$ Method A Checks Apply

Bearing Dimensions and Properties

Bearing Size		layer thickness	thickness	# of Layers
Type:	Square			
Length, L =	15.000 in	Internal Layer, h_{li} :	0.500 in	5
Width, W =	15.000 in	External Layer, h_{le} :	0.250 in	1 OK
Area of Elastomer=	225.00 in ²	Total Elastomer Thickness, h_{lt} :	2.75 in	
Shear Modulus, G =	0.130 ksi	Thickness of steel reinforcement, h_s :	0.1046 in (12 Gauge)	
Elastomer Hardness, Shore A =	60	Total Thickness with steel laminate =	3.273 in	

Reactions, Displacements and Rotations

Dead Load:	116.73 kips	*All reactions and rotations shall be service limit state
Live Load:	139.54 kips	*Bearings assumed to be subject to shear deformation
Temperature Zone:	C	*LL Reaction is Maximum from LEAPSTEEL output
50 Year Low Temperature:	-30	(AASHTO Figure 14.7.5.2-1)
Min. Low Temperature Elastomer Grade:	3	(AASHTO Table 14.7.5.2-1)
Design Temp. Range (-30 to 120°F):	90 °F (Assuming built at 60° and BDM 1003.21)	(AASHTO Table 14.7.5.2-1)
Coefficient of Thermal Expansion, α :	0.0000065	(AASHTO Table 3.12.2.1-1)
Length of Thermal Expansion:	179.25 ft	(length from fixed support, no reference in BDM for expansion joints)
Thermal Displacement, $\alpha L (T_{max} - T_{min}), \Delta_T$:	1.26 in	(AASHTO 3.12.2.3)
Creep Displacement, Δ_C :	0.35 in	(AASHTO Table 14.7.6.2-1)

Stress and Shape Factor

(AASHTO 14.7.5.1)

Total Dead Load (σ_D)	0.519 ksi
Total Live Load (σ_L)	0.620 ksi
Total Load (σ_s)	1.139 ksi

Shape Factor, S $S_i = (LW) / (2h_{li} (L + W))$

(AASHTO 14.7.5.1-1)

$S_{i \text{ INT}}$	= 7.500
$S_{i \text{ EXT}}$	= 15.000

COMPLETED BY: CAE		PROJECT NAME: ODOT D12, LAK-06-2.06
CHECKED BY: DOR		PROJECT NUMBER: 75926
RECTANGULAR BEARING - ABUTMENT		STEEL REINFORCED ELASTOMERIC BEARING DESIGN, METHOD A

Requirements for Method A

(AASHTO 14.7.5.3.2)

Compressive Stress:

$$\sigma_s = 1.139 \text{ ksi}$$

$$\sigma_s \leq 1.25 G S_l = 1.219 \text{ ksi} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.2-7})$$

$$\sigma_s \leq 1.250 \text{ ksi} \quad \text{OK} \quad (\text{AASHTO 14.7.6.3.2-8})$$

Compressive Deflection:

$$\text{Strain: } \varepsilon = \sigma / (4.8 G S_l^2) \quad (\text{AASHTO C14.7.5.3.6-1})$$

$$\text{Dead Load Strain, } \varepsilon_d \quad \text{Internal} = 0.01478 \quad \text{External} = 0.00370$$

$$\text{Live Load Strain, } \varepsilon_L \quad \text{Internal} = 0.01767 \quad \text{External} = 0.00442$$

$$\begin{aligned} \text{Initial DL deflection: } \delta_d &= \sum \varepsilon_{di} h_{ri} \quad (\text{AASHTO 14.7.5.3.6-2}) \\ \delta_d &= 0.03788 \text{ in} \end{aligned}$$

$$\begin{aligned} \text{Instant LL deflection: } \delta_L &= \sum \varepsilon_{Li} h_{ri} \quad (\text{AASHTO 14.7.5.3.6-1}) \\ \delta_L &= 0.04528 \text{ in} \end{aligned}$$

$$\begin{aligned} \text{Long Term DL def.: } \delta_{lt} &= \delta_d + a_{cr} \delta_d \quad (\text{AASHTO 14.7.5.3.6-3}) \\ a_{cr} &= 0.35 \quad (\text{AASHTO Table 14.7.6.2-1}) \\ \delta_{lt} &= 0.05113 \text{ in} \end{aligned}$$

$$\text{Max. deflection: } \delta_{MAX} = 0.125 \text{ in} \quad (\text{AASHTO C14.7.5.3.6})$$

$$\text{Check LL def.: } \delta_L \leq \delta_{MAX} \quad 0.04528 \leq 0.125 \quad \text{OK}$$

$$\text{Check Long term DL deflection: } \delta_{lt} \leq \delta_{MAX} \quad 0.05113 \leq 0.125 \quad \text{OK}$$

$$\text{Initial Compressive Deflection} \leq 0.09 h_{ri} \quad (\text{AASHTO 14.7.6.3.3})$$

$$\begin{aligned} \text{Initial Compressive Deflection} &= 0.0379 \text{ in} \\ 0.09 h_{ri} &= 0.045 \text{ in} \quad \text{OK} \end{aligned}$$

Shear Deformation:

Max. Horz. Disp., $\Delta_O = 0.65 \Delta_T$ + movements caused by creep, shrinkage, and post-tensioning

$$\Delta_O = \text{Maximum Shear Deformation} = \Delta_S = 1.168 \text{ in}$$

$$\text{Check: } h_{ri} \geq 2 \Delta_S \quad (\text{AASHTO 14.7.5.3.2-1})$$

$$2.75 \geq 2.34 \quad \text{OK}$$

Rotation:

The "no lift-off" provisions have been removed from the 2013 code.

(AASHTO C14.7.6.3.5a)

Stability:

$$\begin{aligned} \text{Total Pad Thickness} < L/3 &= 5.00 \text{ in} \quad \text{OK} \\ &W/3 = 5.00 \text{ in} \quad \text{OK} \end{aligned} \quad (\text{AASHTO 14.7.6.3.6})$$

$$\text{Total Bearing Thickness} = 3.273 \text{ in}$$



471 E Broad St, Suite 2010
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Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Load Plate Design		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/02/24
Check By:	DOR	Date:	01/26/25

CAE Updated with Final Bearing Designs - 05/10/2024

Taper Plate Design

PVI Station	18+75.00
PVI Elevation	886.91
Vertical Curve Length	800 ft
g1	0.16%
g2	-2.84%

Provide Beveled Steel Load Plate if Local Slope is > 1% (0.01 rad.)
AASHTO LRFD 14.8.2

$$\text{Local Slope} = (g2 - g1) \times L + g1$$

x = distance from PVC Station to point of interest

$$(g2 - g1)/L = -0.000037500$$

PVC Station 14+75.00

Minimum Load Plate Thickness 0' - 1 1/2" BDM C306.4.2.1

Rear Abutment

Load Plate Length 17.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	16+39.28	164.28	-0.0046	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 2	16+34.61	159.61	-0.0044	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 3	16+29.95	154.95	-0.0042	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 4	16+25.28	150.28	-0.0040	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 5	16+20.62	145.62	-0.0039	NO	0' - 1 1/2"	0' - 1 1/2"

Pier No. 1

Taper Plate Length 17.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	17+04.46	229.46	-0.0070	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 2	16+99.79	224.79	-0.0068	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 3	16+95.13	220.13	-0.0067	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 4	16+90.46	215.46	-0.0065	NO	0' - 1 1/2"	0' - 1 1/2"
Beam 5	16+85.80	210.80	-0.0063	NO	0' - 1 1/2"	0' - 1 1/2"

Pier No. 2

Taper Plate Length 17.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	17+96.46	321.46	-0.0105	YES	0' - 1 5/8"	0' - 1 1/2"
Beam 2	17+91.79	316.79	-0.0103	YES	0' - 1 5/8"	0' - 1 1/2"
Beam 3	17+87.13	312.13	-0.0101	YES	0' - 1 5/8"	0' - 1 1/2"
Beam 4	17+82.46	307.46	-0.0099	YES	0' - 1 5/8"	0' - 1 1/2"
Beam 5	17+77.80	302.80	-0.0098	YES	0' - 1 5/8"	0' - 1 1/2"



471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Load Plate Design		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/02/24
Check By:	DOR	Date:	01/26/25

CAE Updated with Final Bearing Designs - 05/10/2024

Taper Plate Design

Pier No. 3

Taper Plate Length 15.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	18+80.46	405.46	-0.0136	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 2	18+75.79	400.79	-0.0134	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 3	18+71.13	396.13	-0.0133	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 4	18+66.46	391.46	-0.0131	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 5	18+61.80	386.80	-0.0129	YES	0' - 1 3/4"	0' - 1 1/2"

Pier No. 4

Taper Plate Length 17.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	19+64.46	489.46	-0.0168	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 2	19+59.79	484.79	-0.0166	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 3	19+55.13	480.13	-0.0164	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 4	19+50.46	475.46	-0.0162	YES	0' - 1 3/4"	0' - 1 1/2"
Beam 5	19+45.80	470.80	-0.0161	YES	0' - 1 3/4"	0' - 1 1/2"

Pier No. 5

Taper Plate Length 17.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	20+59.71	584.71	-0.0203	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 2	20+55.04	580.04	-0.0202	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 3	20+50.38	575.38	-0.0200	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 4	20+45.71	570.71	-0.0198	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 5	20+41.05	566.05	-0.0196	YES	0' - 1 7/8"	0' - 1 1/2"

Forward Abutment

Taper Plate Length 17.00 in

Location	CL Brg. Station	Distance from PVC (ft)	Local Slope	Need Beveled Plate	Rear Load Plate Thickness tr (in)	Forward Load Plate Thickness tf (in)
Beam 1	21+27.88	652.88	-0.0229	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 2	21+23.22	648.22	-0.0227	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 3	21+18.55	643.55	-0.0225	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 4	21+13.89	638.89	-0.0224	YES	0' - 1 7/8"	0' - 1 1/2"
Beam 5	21+09.22	634.22	-0.0222	YES	0' - 1 7/8"	0' - 1 1/2"

1.6 Deck Design



Department of
Transportation





471 East Broad Street, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Deck Design		
Project No:	075926.000	PID No:	112996
Calc By:	UL	Date:	01/11/24
Check By:	CAE	Date:	01/31/24
Updated By:	DOR	Date:	01/26/25

DECK DESIGN

Bridge Data

Girder spacing	=	7.500	ft
Number of girders	=	5	
Overall deck width	=	36.667	ft
Deck slab thickness, t_{deck}	=	8.5	in
Overhang thickness, t_{overh}	=	11	in
Deck top cover	=	2.5	in
Deck bottom cover	=	1.5	in
Wearing surface thickness, t_{ws}	=	1	in
Compressive strength of concrete, f'_c	=	4.5	ksi
Yield strength of steel, f_y	=	60	ksi
Deck reinforced concrete unit weight, w_c	=	0.15	kcf
Deck wearing surface unit weight, w_{ws}	=	0.14	kcf
Effective Span	=	6.81	ft

LRFD 9.7.2.3

Use 7.5ft Effective Span from ODOT BDM Figure 309-3

Eff. Span Length (ft.)	Deck Thick (in.)	Overhang Deck Thick (in.) (see Note 2k)	Transverse Steel						Longitudinal Steel			
			Top Bars				Bottom Bars		Top Bars		Bottom Bars	
			Size	Spa. (in.)	Additional Overhang Bar Size	Cutoff Length (in.)	Size	Spa.	Size	Spa.	Size	Spa.
7.0	8.50	10.50	#5	6.00	#5	54.0	#5	6.00	#4	12.50	#5	10.75
7.5	8.50	10.50	#5	6.05	#5	54.0	#5	6.00	#4	12.00	#5	10.25

Deck Design (per ODOT BDM Figure 309-3)

Transverse top bars	=	#5	
Transverse top bars diameter	=	0.625	in
Transverse top bars area	=	0.31	in ²
Transverse top bars spacing	=	6	in
			6.05" per table but use 6".
Transverse additional overhang top bars	=	#5	
Transverse additional overhang top bars diameter	=	0.625	in
Transverse additional overhang top bars area	=	0.31	in ²
Transverse additional overhang top bars spacing	=	6	in
Transverse bottom bars	=	#5	
Transverse bottom bars diameter	=	0.625	in
Transverse bottom bars area	=	0.31	in ²
Transverse bottom bars spacing	=	6	in
Longitudinal top bars	=	#4	
Longitudinal top bars diameter	=	0.5	in
Longitudinal top bars area	=	0.20	in ²
Longitudinal top bars spacing	=	12	in
Longitudinal bottom bars	=	#5	
Longitudinal bottom bars diameter	=	0.625	in
Longitudinal bottom bars area	=	0.31	in ²
Longitudinal bottom bars spacing	=	10.25	in

Additional Longitudinal Reinforcement over Piers (per AASHTO 6.10.1.7)

The total longitudinal reinforcement should not be less than 1 percent of the total slab cross-sectional area. these bars must have a specified minimum yield strength of at least 60 ksi. Also, the bar size cannot be larger than a #6 bar.

Deck cross sectional area, A_{deck}	=	102	in^2/ft
1 % of total deck cross sectional area	=	1.02	in^2/ft

Two-thirds of the required longitudinal reinforcement should be placed uniformly in the top layer of the deck, and the remaining portion should be placed uniformly in the bottom layer. For both rows, the spacing should not exceed 6 inches.

Area of steel required in top layer, $A_{s(top)_{reqd}}$	=	0.68	in^2/ft
Area of steel required in bottom layer, $A_{s(bottom)_{reqd}}$	=	0.34	in^2/ft

Top Longitudinal Bar

Longitudinal top bars	=	#4	
Longitudinal top bars diameter	=	0.5	in
Longitudinal top bars area	=	0.20	in^2
Longitudinal top bars spacing	=	12	in
Area of steel provided , $A_{s1(top)_{prov}}$	=	0.20	in^2/ft

Additional Longitudinal top bars	=	#5	
Additional Longitudinal top bars diameter	=	0.625	in
Additional Longitudinal top bars area	=	0.31	in^2
Additional nos. of bar between #4	=	2	
Area of steel provided in top layer, $A_{s2(top)_{prov}}$	=	0.61	in^2/ft

(Provide 2 additional #5
between #4)

Total Area of steel provided in top layer, $A_{s(top)_{prov}}$	=	0.81	in^2/ft

OK

Bottom Longitudinal Bar

Longitudinal bottom bars	=	#5	
Longitudinal bottom bars spacing	=	10.25	in
Total Area of steel provided in bottom layer, $A_{s(bottom)_{prov}}$	=	0.36	in^2/ft

OK

No additional bar required



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Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Termination of Additional Top Longit. Steel		
Project No:	075926.000		
Calc By:	UL	Date:	1/11/2024
Check By:	CAE	Date:	1/31/2024

Termination of Additional Top Longitudinal Steel - from LEAP output

Per AASHTO 6.10.1.7

Terminate additional top Longitudinal steel when top concrete tensile stress is less than f_r

SDL S_c Values obtained from LEAP Output - Section Properties

LL S_c Final Default Strength I (S - strong axis T/slab)

SDL Moment - Value obtained from LEAP Output - Girder Forces - DL

Neg. Truck LL Moment - Value obtained from LEAP Output - Girder Forces - LL

f'_c = 4500 psi

f_r = 509.1169 psi AASHTO 6.10.1.7 Conc. Rupture Stress $f_r = 0.24\sqrt{f'_c}$

ϕf_r = 458.2052 psi $\phi = 0.90$

$2f_r$ = 1018.234 psi

Modular Ratio (n) = 7

Member	Location	SDL S_c (Concrete Top Slab)	LL S_c (Concrete Top Slab)	SDL Moment (k- ft)	SDL Concrete Stress Top (ksi)	Neg. Truck LL Moment (k-ft)	LL Concrete Stress Top (ksi)	Top Concrete Stress (ksi)	
1	0.000	2619.472	2619.472	0.00	0.000	0.00	0.000	0.000	
1	0.100	2619.472	2619.472	0.52	0.000	-1.10	0.001	0.001	
1	2.000	2619.472	2619.472	10.03	-0.007	-22.06	0.019	0.012	
1	4.000	2619.472	2619.472	19.14	-0.013	-44.13	0.038	0.025	
1	6.515	2619.472	2619.472	29.28	-0.019	-71.87	0.061	0.042	
1	13.029	2619.472	2619.472	48.78	-0.032	-143.73	0.122	0.090	
1	13.630	2619.472	2619.472	50.08	-0.033	-150.35	0.128	0.095	
1	19.544	2619.472	2619.472	58.50	-0.038	-215.60	0.183	0.145	
1	23.259	2619.472	2619.472	59.66	-0.039	-256.58	0.218	0.179	
1	26.071	2619.472	2619.472	58.43	-0.038	-287.60	0.245	0.206	
1	32.589	2619.472	2619.472	48.56	-0.032	-359.50	0.306	0.274	
1	32.889	2619.472	2619.472	47.87	-0.031	-362.80	0.309	0.277	
1	39.106	2619.472	2619.472	28.91	-0.019	-431.39	0.367	0.348	
1	42.518	2619.472	2619.472	14.71	-0.010	-469.03	0.399	0.389	
1	45.624	2619.472	2619.472	-0.54	0.000	-503.29	0.428	0.429	
1	46.017	2619.472	2619.472	-2.63	0.002	-507.63	0.432	0.434	47.89
1	49.516	2619.472	2619.472	-22.79	0.015	-546.23	0.465	0.480	19.54
1	52.142	2619.472	2619.472	-39.77	0.026	-578.38	0.492	0.518	
1	53.015	2619.472	2619.472	-45.77	0.030	-588.05	0.500	0.530	
1	56.513	2619.472	2619.472	-71.57	0.047	-636.23	0.541	0.588	
1	58.659	2619.472	2619.472	-88.79	0.058	-695.37	0.592	0.650	65.18
1	60.846	2619.472	2619.472	-107.43	0.070	-794.55	0.676	0.746	
1	65.077	2619.472	2619.472	-146.63	0.096	-1013.37	0.862	0.958	
1	65.177	2619.472	2619.472	-147.60	0.10	-1018.92	0.87	0.963	
1	65.277	2619.472	2619.472	-146.55	0.096	-1013.54	0.862	0.958	13.16
1	67.178	2619.472	2619.472	-127.04	0.083	-911.62	0.776	0.859	
1	69.178	2619.472	2619.472	-107.40	0.070	-808.67	0.688	0.758	
1	72.758	2619.472	2619.472	-74.55	0.049	-639.72	0.544	0.593	
1	74.377	2619.472	2619.472	-60.67	0.040	-569.72	0.485	0.524	

A
=
19'-7"

B
=
13'-2"



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Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Termination of Additional Top Longit. Steel		
Project No:	075926.000		
Calc By:	UL	Date:	1/11/2024
Check By:	CAE	Date:	1/31/2024

1	76.338	2619.472	2619.472	-44.66	0.029	-492.82	0.419	0.449	76.09	
1	83.577	2619.472	2619.472	6.77	-0.004	-328.72	0.280	0.275		
1	86.035	2619.472	2619.472	21.48	-0.014	-313.11	0.266	0.252		
1	87.899	2619.472	2619.472	31.71	-0.021	-304.47	0.259	0.238		
1	88.099	2619.472	2619.472	32.76	-0.021	-303.54	0.258	0.237		
1	92.777	2619.472	2619.472	54.70	-0.036	-281.85	0.240	0.204		
1	95.731	2619.472	2619.472	65.95	-0.043	-268.15	0.228	0.185		
1	101.977	2619.472	2619.472	83.12	-0.054	-239.19	0.204	0.149		
1	105.428	2619.472	2619.472	88.75	-0.058	-223.19	0.190	0.132		
1	111.177	2619.472	2619.472	92.04	-0.060	-196.54	0.167	0.107		
1	115.125	2619.472	2619.472	89.89	-0.059	-214.35	0.182	0.124		
1	120.377	2619.472	2619.472	81.46	-0.053	-239.61	0.204	0.151		
1	124.822	2619.472	2619.472	69.36	-0.045	-260.99	0.222	0.177		
1	129.577	2619.472	2619.472	51.37	-0.034	-283.86	0.241	0.208		
1	134.518	2619.472	2619.472	27.16	-0.018	-307.62	0.262	0.244		
1	138.017	2619.472	2619.472	6.62	-0.004	-328.12	0.279	0.275		
1	138.777	2619.472	2619.472	1.78	-0.001	-333.71	0.284	0.283		
1	141.516	2619.472	2619.472	-16.75	0.011	-363.74	0.309	0.320		
1	145.015	2619.472	2619.472	-42.93	0.028	-468.71	0.399	0.427	145.83	
1	147.977	2619.472	2619.472	-67.31	0.044	-583.56	0.496	0.541		
1	148.513	2619.472	2619.472	-71.94	0.047	-607.25	0.517	0.564		
1	152.846	2619.472	2619.472	-111.77	0.073	-810.99	0.690	0.763	13.70	A
1	157.077	2619.472	2619.472	-154.85	0.101	-1036.24	0.882	0.983		=
1	157.177	2619.472	2619.472	-155.91	0.102	-1041.84	0.886	0.988		13'-9"
1	157.277	2619.472	2619.472	-154.91	0.10	-1036.37	0.88	0.983	157.28	
1	159.178	2619.472	2619.472	-136.28	0.089	-935.63	0.796	0.885		B
1	161.178	2619.472	2619.472	-117.58	0.077	-838.71	0.714	0.790		=
1	165.577	2619.472	2619.472	-79.69	0.052	-648.98	0.552	0.604	18.62	18'-8"
1	168.133	2619.472	2619.472	-59.72	0.039	-601.01	0.511	0.550		
1	173.977	2619.472	2619.472	-19.72	0.013	-516.95	0.440	0.453	173.65	
1	175.088	2619.472	2619.472	-13.01	0.009	-501.74	0.427	0.435		
1	182.377	2619.472	2619.472	23.98	-0.016	-405.96	0.345	0.330		
1	185.946	2619.472	2619.472	37.63	-0.025	-359.07	0.305	0.281		
1	186.649	2619.472	2619.472	39.97	-0.026	-349.82	0.298	0.271		
1	186.849	2619.472	2619.472	40.62	-0.027	-347.20	0.295	0.269		
1	190.777	2619.472	2619.472	51.43	-0.034	-295.58	0.251	0.218		
1	196.803	2619.472	2619.472	61.10	-0.040	-216.40	0.184	0.144		
1	199.177	2619.472	2619.472	62.61	-0.041	-185.21	0.158	0.117		
1	207.577	2619.472	2619.472	57.54	-0.038	-74.83	0.064	0.026		
1	207.661	2619.472	2619.472	57.41	-0.038	-73.74	0.063	0.025		
1	215.977	2619.472	2619.472	36.20	-0.024	-20.45	0.017	-0.006		
1	218.518	2619.472	2619.472	26.55	-0.017	-67.16	0.057	0.040		
1	222.017	2619.472	2619.472	10.82	-0.007	-172.26	0.147	0.139		
1	224.377	2619.472	2619.472	-1.39	0.001	-262.92	0.224	0.225		
1	225.516	2619.472	2619.472	-7.74	0.005	-310.97	0.265	0.270		
1	229.015	2619.472	2619.472	-29.11	0.019	-478.91	0.407	0.426	229.64	
1	232.513	2619.472	2619.472	-53.30	0.035	-668.35	0.569	0.603		A
1	232.777	2619.472	2619.472	-55.24	0.036	-683.72	0.582	0.618		=
1	236.846	2619.472	2619.472	-87.17	0.057	-929.67	0.791	0.848	13.79	13'-10"
1	241.077	2619.472	2619.472	-124.42	0.081	-1209.02	1.029	1.110		
1	241.177	2619.472	2619.472	-125.35	0.08	-1215.80	1.03	1.116	241.18	
1	241.277	2619.472	2619.472	-120.98	0.079	-1214.29	1.033	1.112		



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Project:	LAK-6-2.06		
Description:	Termination of Additional Top Longit. Steel		
Project No:	075926.000		
Calc By:	UL	Date:	1/11/2024
Check By:	CAE	Date:	1/31/2024

1	243.178	2619.472	2619.472	-103.97	0.068	-1086.58	0.924	0.992	13.88	B = 13'-11"
1	245.178	2619.472	2619.472	-86.97	0.057	-955.55	0.813	0.870		
1	249.577	2619.472	2619.472	-52.83	0.035	-687.29	0.585	0.619		
1	254.869	2619.472	2619.472	-17.66	0.012	-404.49	0.344	0.356	252.81	
1	257.977	2619.472	2619.472	-0.02	0.000	-265.26	0.226	0.226		
1	264.560	2619.472	2619.472	30.01	-0.020	-52.09	0.044	0.025		
1	266.377	2619.472	2619.472	36.54	-0.024	-20.77	0.018	-0.006		
1	274.252	2619.472	2619.472	56.04	-0.037	-72.34	0.062	0.025		
1	274.777	2619.472	2619.472	56.83	-0.037	-79.69	0.068	0.031		
1	283.177	2619.472	2619.472	60.86	-0.040	-197.23	0.168	0.128		
1	283.943	2619.472	2619.472	60.42	-0.040	-207.95	0.177	0.137		
1	291.577	2619.472	2619.472	48.63	-0.032	-314.78	0.268	0.236		
1	293.231	2619.472	2619.472	44.31	-0.029	-337.91	0.287	0.258		
1	295.504	2619.472	2619.472	37.34	-0.024	-369.73	0.315	0.290		
1	295.704	2619.472	2619.472	36.67	-0.024	-372.53	0.317	0.293		
1	299.977	2619.472	2619.472	20.15	-0.013	-432.32	0.368	0.355		
1	302.518	2619.472	2619.472	8.33	-0.005	-467.88	0.398	0.393		
1	306.017	2619.472	2619.472	-10.38	0.007	-516.84	0.440	0.447		
1	308.377	2619.472	2619.472	-24.60	0.016	-550.77	0.469	0.485	306.74	
1	309.516	2619.472	2619.472	-31.92	0.021	-566.79	0.482	0.503		
1	313.015	2619.472	2619.472	-56.27	0.037	-618.99	0.527	0.563		
1	316.513	2619.472	2619.472	-83.44	0.055	-681.75	0.580	0.635	20.69	A = 20'-9"
1	316.777	2619.472	2619.472	-85.60	0.056	-687.03	0.585	0.641		
1	320.846	2619.472	2619.472	-120.99	0.079	-857.54	0.730	0.809		
1	325.077	2619.472	2619.472	-161.85	0.106	-1077.64	0.917	1.023	325.18	
1	325.177	2619.472	2619.472	-162.87	0.11	-1083.32	0.92	1.028		
1	325.277	2619.472	2619.472	-161.77	0.106	-1077.65	0.917	1.023		
1	327.178	2619.472	2619.472	-141.32	0.092	-971.46	0.826	0.919	14.26	B = 14'-4"
1	329.178	2619.472	2619.472	-120.70	0.079	-863.04	0.734	0.813		
1	334.702	2619.472	2619.472	-68.55	0.045	-597.85	0.509	0.553		
1	338.472	2619.472	2619.472	-36.99	0.024	-451.94	0.384	0.409	337.18	
1	344.227	2619.472	2619.472	4.86	-0.003	-328.19	0.279	0.276		
1	347.766	2619.472	2619.472	26.81	-0.018	-305.80	0.260	0.243		
1	353.752	2619.472	2619.472	57.37	-0.038	-279.61	0.238	0.200		
1	357.060	2619.472	2619.472	70.71	-0.046	-265.13	0.226	0.179		
1	363.277	2619.472	2619.472	88.97	-0.058	-237.93	0.202	0.144		
1	366.354	2619.472	2619.472	94.71	-0.062	-224.47	0.191	0.129		
1	372.802	2619.472	2619.472	99.66	-0.065	-205.86	0.175	0.110		
1	375.649	2619.472	2619.472	98.80	-0.065	-219.97	0.187	0.122		
1	382.327	2619.472	2619.472	89.44	-0.059	-253.07	0.215	0.157		
1	384.943	2619.472	2619.472	82.98	-0.054	-266.03	0.226	0.172		
1	391.852	2619.472	2619.472	58.32	-0.038	-300.28	0.255	0.217		
1	394.855	2619.472	2619.472	44.18	-0.029	-315.16	0.268	0.239		
1	396.504	2619.472	2619.472	35.52	-0.023	-323.33	0.275	0.252		
1	396.704	2619.472	2619.472	34.43	-0.023	-324.33	0.276	0.253		
1	401.377	2619.472	2619.472	6.29	-0.004	-351.49	0.299	0.295		
1	404.766	2619.472	2619.472	-17.26	0.011	-391.20	0.333	0.344		
1	408.265	2619.472	2619.472	-44.35	0.029	-498.47	0.424	0.453		
1	410.902	2619.472	2619.472	-66.64	0.044	-601.75	0.512	0.556	408.40	
1	411.763	2619.472	2619.472	-74.26	0.049	-638.95	0.544	0.592		
1	416.096	2619.472	2619.472	-115.21	0.075	-847.22	0.721	0.796		
1	420.327	2619.472	2619.472	-159.39	0.104	-1076.45	0.916	1.020	14.38	A = 14'-5"



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1	420.427	2619.472	2619.472	-160.48	0.105	-1082.13	0.921	1.026	420.53	21.63	B = 21'-8"
1	420.527	2619.472	2619.472	-159.46	0.10	-1076.40	0.92	1.020			
1	422.428	2619.472	2619.472	-140.51	0.092	-970.45	0.826	0.918			
1	424.428	2619.472	2619.472	-121.48	0.080	-864.13	0.735	0.815	439.91		
1	427.245	2619.472	2619.472	-96.24	0.063	-731.12	0.622	0.685			
1	431.430	2619.472	2619.472	-62.10	0.041	-632.94	0.538	0.579			
1	434.063	2619.472	2619.472	-42.70	0.028	-601.58	0.512	0.540			
1	438.432	2619.472	2619.472	-14.03	0.009	-550.53	0.468	0.478			
1	440.880	2619.472	2619.472	0.12	0.000	-523.67	0.446	0.445			
1	445.311	2619.472	2619.472	22.20	-0.015	-475.05	0.404	0.390			
1	447.698	2619.472	2619.472	32.23	-0.021	-448.86	0.382	0.361			
1	459.068	2619.472	2619.472	61.96	-0.041	-324.10	0.276	0.235			
1	461.333	2619.472	2619.472	64.32	-0.042	-299.24	0.255	0.212			
1	465.946	2619.472	2619.472	65.48	-0.043	-248.63	0.212	0.169			
1	468.151	2619.472	2619.472	64.30	-0.042	-224.43	0.191	0.149			
1	469.445	2619.472	2619.472	63.08	-0.041	-210.24	0.179	0.138			
1	472.943	2619.472	2619.472	57.87	-0.038	-171.85	0.146	0.108			
1	474.969	2619.472	2619.472	53.56	-0.035	-149.62	0.127	0.092			
1	476.442	2619.472	2619.472	49.84	-0.033	-133.46	0.114	0.081			
1	479.940	2619.472	2619.472	38.99	-0.026	-95.07	0.081	0.055			
1	481.786	2619.472	2619.472	32.12	-0.021	-74.81	0.064	0.043			
1	484.272	2619.472	2619.472	21.64	-0.014	-47.54	0.040	0.026			
1	488.504	2619.472	2619.472	0.55	0.000	-1.10	0.001	0.001			
1	488.604	2619.472	2619.472	0.00	0.00	0.00	0.00	0.000			

Check with Member 2

Member	Location	SDL S _c (Concrete Top Slab)	LL S _c (Concrete Top Slab)	SDL Moment (k- ft)	SDL Concrete Stress Top (ksi)	Neg. Truck LL Moment (k-ft)	LL Concrete Stress Top (ksi)	Top Concrete Stress (ksi)	
2	0.000	2717.853	2717.853	0.00	0.000	0.00	0.000	0.000	
2	0.100	2717.853	2717.853	0.52	0.000	-0.99	0.001	0.000	
2	4.333	2717.853	2717.853	20.56	-0.013	-43.06	0.035	0.022	
2	6.515	2717.853	2717.853	29.28	-0.018	-64.75	0.053	0.035	
2	8.665	2717.853	2717.853	36.80	-0.023	-86.13	0.071	0.047	
2	13.029	2717.853	2717.853	48.78	-0.031	-129.51	0.106	0.075	
2	18.295	2717.853	2717.853	57.39	-0.036	-181.84	0.149	0.113	
2	19.544	2717.853	2717.853	58.50	-0.037	-194.26	0.159	0.122	
2	26.071	2717.853	2717.853	58.43	-0.037	-259.14	0.212	0.176	
2	27.924	2717.853	2717.853	56.62	-0.036	-277.56	0.228	0.192	
2	32.589	2717.853	2717.853	48.56	-0.031	-323.92	0.266	0.235	
2	37.554	2717.853	2717.853	34.48	-0.022	-373.27	0.306	0.284	
2	39.106	2717.853	2717.853	28.91	-0.018	-388.70	0.319	0.300	
2	45.624	2717.853	2717.853	-0.54	0.000	-453.49	0.372	0.372	
2	47.183	2717.853	2717.853	-9.03	0.006	-468.98	0.385	0.390	
2	50.682	2717.853	2717.853	-30.13	0.019	-503.76	0.413	0.432	
2	52.142	2717.853	2717.853	-39.77	0.025	-496.07	0.407	0.432	
2	54.180	2717.853	2717.853	-54.05	0.034	-516.24	0.423	0.457	54.23



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2	57.679	2717.853	2717.853	-80.80	0.051	-563.01	0.462	0.513	13.20	A = 13'-3"
2	58.659	2717.853	2717.853	-88.79	0.056	-595.93	0.489	0.545		
2	61.178	2717.853	2717.853	-110.36	0.070	-694.87	0.570	0.639		
2	63.178	2717.853	2717.853	-128.53	0.081	-779.90	0.639	0.721		
2	65.077	2717.853	2717.853	-146.63	0.092	-868.47	0.712	0.805	65.18	B = 10'-11"
2	65.177	2717.853	2717.853	-147.61	0.09	-873.23	0.72	0.809		
2	65.277	2717.853	2717.853	-146.56	0.092	-868.59	0.712	0.805		
2	69.510	2717.853	2717.853	-104.23	0.066	-678.51	0.556	0.622		
2	73.842	2717.853	2717.853	-65.19	0.041	-508.02	0.417	0.458	73.83	
2	74.377	2717.853	2717.853	-60.67	0.038	-488.52	0.401	0.439		
2	77.423	2717.853	2717.853	-36.19	0.023	-389.01	0.319	0.342		
2	81.003	2717.853	2717.853	-10.14	0.006	-301.78	0.247	0.254		
2	83.577	2717.853	2717.853	6.77	-0.004	-281.70	0.231	0.227		
2	87.899	2717.853	2717.853	31.71	-0.020	-250.37	0.205	0.185		
2	88.099	2717.853	2717.853	32.76	-0.021	-249.60	0.205	0.184		
2	90.700	2717.853	2717.853	45.58	-0.029	-239.69	0.197	0.168		
2	92.777	2717.853	2717.853	54.70	-0.034	-231.77	0.190	0.156		
2	100.396	2717.853	2717.853	79.62	-0.050	-202.72	0.166	0.116		
2	101.977	2717.853	2717.853	83.12	-0.052	-196.69	0.161	0.109		
2	110.093	2717.853	2717.853	92.00	-0.058	-165.74	0.136	0.078		
2	111.177	2717.853	2717.853	92.04	-0.058	-161.61	0.133	0.074		
2	119.789	2717.853	2717.853	82.72	-0.052	-194.74	0.160	0.108		
2	120.377	2717.853	2717.853	81.46	-0.051	-197.07	0.162	0.110		
2	129.486	2717.853	2717.853	51.77	-0.033	-233.10	0.191	0.158		
2	129.577	2717.853	2717.853	51.37	-0.032	-233.46	0.191	0.159		
2	138.777	2717.853	2717.853	1.78	-0.001	-277.67	0.228	0.227		
2	139.183	2717.853	2717.853	-0.86	0.001	-280.48	0.230	0.231		
2	142.682	2717.853	2717.853	-25.16	0.016	-328.41	0.269	0.285		
2	146.180	2717.853	2717.853	-52.28	0.033	-425.54	0.349	0.382	148.46	A = 11'-0"
2	147.977	2717.853	2717.853	-67.31	0.042	-485.97	0.398	0.441		
2	149.679	2717.853	2717.853	-82.23	0.052	-549.08	0.450	0.502		
2	153.178	2717.853	2717.853	-115.00	0.073	-689.48	0.565	0.638		
2	155.178	2717.853	2717.853	-135.00	0.085	-776.52	0.637	0.722	10.97	B = 12'-10"
2	157.077	2717.853	2717.853	-154.85	0.098	-861.97	0.707	0.804		
2	157.177	2717.853	2717.853	-155.91	0.10	-866.60	0.71	0.809		
2	157.277	2717.853	2717.853	-154.91	0.098	-862.02	0.707	0.805		
2	161.510	2717.853	2717.853	-114.57	0.072	-684.20	0.561	0.633	12.81	
2	165.577	2717.853	2717.853	-79.69	0.050	-540.09	0.443	0.493		
2	165.842	2717.853	2717.853	-77.55	0.049	-534.57	0.438	0.487		
2	172.798	2717.853	2717.853	-27.16	0.017	-443.41	0.364	0.381		
2	173.977	2717.853	2717.853	-19.72	0.012	-430.42	0.353	0.365	167.74	
2	179.753	2717.853	2717.853	12.07	-0.008	-371.20	0.304	0.297		
2	182.377	2717.853	2717.853	23.98	-0.015	-342.14	0.281	0.265		
2	186.649	2717.853	2717.853	39.97	-0.025	-294.83	0.242	0.217		
2	186.849	2717.853	2717.853	40.62	-0.026	-292.61	0.240	0.214		
2	190.611	2717.853	2717.853	51.04	-0.032	-250.95	0.206	0.174		
2	190.777	2717.853	2717.853	51.43	-0.032	-249.11	0.204	0.172		
2	199.177	2717.853	2717.853	62.61	-0.039	-156.08	0.128	0.088		
2	201.468	2717.853	2717.853	62.84	-0.040	-130.71	0.107	0.068		
2	207.577	2717.853	2717.853	57.54	-0.036	-63.05	0.052	0.015		
2	212.326	2717.853	2717.853	47.48	-0.030	-10.46	0.009	-0.021		
2	215.977	2717.853	2717.853	36.20	-0.023	-17.23	0.014	-0.009		



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2	223.183	2717.853	2717.853	4.95	-0.003	-180.56	0.148	0.145		
2	224.377	2717.853	2717.853	-1.39	0.001	-221.30	0.181	0.182		
2	226.682	2717.853	2717.853	-14.54	0.009	-305.92	0.251	0.260		
2	230.180	2717.853	2717.853	-36.85	0.023	-454.29	0.373	0.396	231.64	
2	232.777	2717.853	2717.853	-55.24	0.035	-575.40	0.472	0.507		A
2	233.679	2717.853	2717.853	-61.99	0.039	-620.78	0.509	0.548		=
2	237.178	2717.853	2717.853	-89.95	0.057	-800.90	0.657	0.713	11.78	11'-10"
2	239.178	2717.853	2717.853	-107.19	0.068	-911.78	0.748	0.815		
2	241.077	2717.853	2717.853	-124.42	0.078	-1018.40	0.835	0.914		
2	241.177	2717.853	2717.853	-125.35	0.08	-1024.09	0.84	0.919	241.18	
2	241.277	2717.853	2717.853	-120.98	0.076	-1023.15	0.839	0.915		B
2	245.510	2717.853	2717.853	-84.24	0.053	-787.75	0.646	0.699		=
2	249.577	2717.853	2717.853	-52.83	0.033	-578.67	0.474	0.508	11.89	11'-11"
2	249.842	2717.853	2717.853	-50.91	0.032	-565.37	0.464	0.496		
2	257.977	2717.853	2717.853	-0.02	0.000	-223.25	0.183	0.183	250.82	
2	259.534	2717.853	2717.853	7.98	-0.005	-171.34	0.140	0.135		
2	266.377	2717.853	2717.853	36.54	-0.023	-17.48	0.014	-0.009		
2	269.225	2717.853	2717.853	45.24	-0.029	-1.66	0.001	-0.027		
2	274.777	2717.853	2717.853	56.83	-0.036	-67.13	0.055	0.019		
2	278.917	2717.853	2717.853	60.85	-0.038	-115.95	0.095	0.057		
2	283.177	2717.853	2717.853	60.86	-0.038	-166.19	0.136	0.098		
2	288.608	2717.853	2717.853	54.81	-0.035	-230.23	0.189	0.154		
2	291.577	2717.853	2717.853	48.64	-0.031	-265.24	0.217	0.187		
2	295.504	2717.853	2717.853	37.34	-0.024	-311.55	0.255	0.232		
2	295.704	2717.853	2717.853	36.67	-0.023	-313.91	0.257	0.234		
2	297.896	2717.853	2717.853	28.72	-0.018	-339.75	0.279	0.260		
2	299.977	2717.853	2717.853	20.15	-0.013	-364.30	0.299	0.286		
2	307.183	2717.853	2717.853	-17.24	0.011	-449.27	0.368	0.379		
2	308.377	2717.853	2717.853	-24.60	0.016	-456.31	0.374	0.390		
2	310.682	2717.853	2717.853	-39.71	0.025	-483.39	0.396	0.421	313.10	
2	314.180	2717.853	2717.853	-65.00	0.041	-528.95	0.434	0.475		A
2	316.777	2717.853	2717.853	-85.60	0.054	-569.20	0.467	0.521		=
2	317.679	2717.853	2717.853	-93.12	0.059	-593.27	0.486	0.545		14'-4"
2	321.178	2717.853	2717.853	-124.05	0.078	-723.19	0.593	0.671	14.33	
2	323.178	2717.853	2717.853	-143.00	0.090	-807.04	0.662	0.752		
2	325.077	2717.853	2717.853	-161.85	0.102	-892.57	0.732	0.834		
2	325.177	2717.853	2717.853	-162.87	0.10	-897.24	0.74	0.838	325.18	
2	325.277	2717.853	2717.853	-161.77	0.102	-892.53	0.732	0.834		B
2	329.510	2717.853	2717.853	-117.37	0.074	-699.96	0.574	0.648	11.52	=
2	333.842	2717.853	2717.853	-76.21	0.048	-525.88	0.431	0.479		11'-7"
2	334.702	2717.853	2717.853	-68.55	0.043	-495.01	0.406	0.449	334.44	
2	343.137	2717.853	2717.853	-2.48	0.002	-279.65	0.229	0.231		
2	344.227	2717.853	2717.853	4.86	-0.003	-271.87	0.223	0.220		
2	352.431	2717.853	2717.853	51.33	-0.032	-232.68	0.191	0.158		
2	353.752	2717.853	2717.853	57.37	-0.036	-227.96	0.187	0.151		
2	361.725	2717.853	2717.853	85.24	-0.054	-199.51	0.164	0.110		
2	363.277	2717.853	2717.853	88.97	-0.056	-193.98	0.159	0.103		
2	371.019	2717.853	2717.853	99.25	-0.063	-166.35	0.136	0.074		
2	372.802	2717.853	2717.853	99.66	-0.063	-167.62	0.137	0.075		
2	380.314	2717.853	2717.853	93.34	-0.059	-197.91	0.162	0.103		
2	382.327	2717.853	2717.853	89.44	-0.056	-206.03	0.169	0.113		
2	389.608	2717.853	2717.853	67.54	-0.043	-235.40	0.193	0.150		



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Check By:	CAE	Date:	1/31/2024

2	391.852	2717.853	2717.853	58.32	-0.037	-244.45	0.200	0.164		
2	396.021	2717.853	2717.853	38.12	-0.024	-261.26	0.214	0.190		
2	396.504	2717.853	2717.853	35.52	-0.022	-263.21	0.216	0.193		
2	396.704	2717.853	2717.853	34.43	-0.022	-264.01	0.216	0.195		
2	401.377	2717.853	2717.853	6.29	-0.004	-297.83	0.244	0.240		
2	402.433	2717.853	2717.853	-0.76	0.000	-305.48	0.250	0.251		
2	405.932	2717.853	2717.853	-25.97	0.016	-359.27	0.295	0.311		
2	409.430	2717.853	2717.853	-54.00	0.034	-460.12	0.377	0.411	410.82	
2	410.902	2717.853	2717.853	-66.64	0.042	-510.78	0.419	0.461		A
2	412.929	2717.853	2717.853	-84.86	0.054	-587.42	0.482	0.535		=
2	416.428	2717.853	2717.853	-118.54	0.075	-733.37	0.601	0.676	11.95	12'-0"
2	418.428	2717.853	2717.853	-139.05	0.088	-823.91	0.676	0.763		
2	420.327	2717.853	2717.853	-159.39	0.101	-913.68	0.749	0.850		
2	420.427	2717.853	2717.853	-160.48	0.101	-918.51	0.753	0.854		
2	420.527	2717.853	2717.853	-159.46	0.10	-913.64	0.75	0.850	420.53	
2	424.760	2717.853	2717.853	-118.41	0.075	-719.17	0.590	0.664		B
2	427.245	2717.853	2717.853	-96.24	0.061	-619.95	0.508	0.569	14.90	=
2	429.092	2717.853	2717.853	-80.67	0.051	-568.06	0.466	0.517		14'-11"
2	434.063	2717.853	2717.853	-42.70	0.027	-510.45	0.419	0.445	433.17	
2	436.095	2717.853	2717.853	-28.82	0.018	-512.76	0.420	0.439		
2	440.880	2717.853	2717.853	0.12	0.000	-466.03	0.382	0.382		
2	443.097	2717.853	2717.853	11.73	-0.007	-444.38	0.364	0.357		
2	447.698	2717.853	2717.853	32.23	-0.020	-399.45	0.328	0.307		
2	449.976	2717.853	2717.853	40.57	-0.026	-377.21	0.309	0.284		
2	454.516	2717.853	2717.853	53.63	-0.034	-332.88	0.273	0.239		
2	456.854	2717.853	2717.853	58.50	-0.037	-310.04	0.254	0.217		
2	461.333	2717.853	2717.853	64.32	-0.041	-266.30	0.218	0.178		
2	463.733	2717.853	2717.853	65.53	-0.041	-242.87	0.199	0.158		
2	468.151	2717.853	2717.853	64.30	-0.041	-199.73	0.164	0.123		
2	470.611	2717.853	2717.853	61.66	-0.039	-175.71	0.144	0.105		
2	474.110	2717.853	2717.853	55.51	-0.035	-141.54	0.116	0.081		
2	474.969	2717.853	2717.853	53.56	-0.034	-133.15	0.109	0.075		
2	477.608	2717.853	2717.853	46.53	-0.029	-107.38	0.088	0.059		
2	481.107	2717.853	2717.853	34.74	-0.022	-73.22	0.060	0.038		
2	481.786	2717.853	2717.853	32.12	-0.020	-66.58	0.055	0.034		
2	484.605	2717.853	2717.853	20.13	-0.013	-39.05	0.032	0.019		
2	486.605	2717.853	2717.853	10.51	-0.007	-19.53	0.016	0.009		
2	488.504	2717.853	2717.853	0.55	0.000	-0.98	0.001	0.000		
2	488.604	2717.853	2717.853	0.00	0.00	0.00	0.00	0.00		

Determine length from support to end of each bar. Bar termination will be at first non shaded cell. Add development length to this distance and round to next higher inch.

Member 1 gives larger extent of rebar cutoff zone. Use values from Member 1 for whole width of the bridge.

Development Length of #5 bar = 2'-3"

1.7 Seismic Analysis



Department of
Transportation



Project:	LAK-6-2.06		
Description:	Bearing Design		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/02/24
Check By:	DOR	Date:	01/26/25

Updated: CAE 5/10/2024

Updated loading of crossframes based on Crossframe Spacing

Steel Reinforced Elastomeric Bearing Design Load and Seismic Lateral Analysis

Part 1: Bearing Load Calculation

W40x199 Rolled Steel Bridge with Lean-on Bracing

Reaction obtained from LEAPSteel. Service Load.

Exterior Beam 1, 5

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	4.459	17.246	17.627	15.733	17.995	17.990	4.677
Self Weight X Frames	0.241	0.678	0.646	0.610	0.651	0.645	0.349
Self Weight Slab	17.129	66.250	67.712	60.437	69.126	69.106	17.966
Additional Overhang & Haunch	2.754	10.651	10.886	9.716	11.115	11.104	2.610
Fench	0.273	1.056	1.080	0.964	1.102	1.101	0.259
Concrete Parapet	4.972	19.228	19.653	17.542	20.063	20.057	5.215
Total Dead Load	29.83	115.11	117.60	105.00	120.05	120.00	31.07
Total Live Load w/o Impact	62.52	122.41	123.97	125.21	125.77	124.69	63.58

Interior Beam 2, 3, 4;

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	4.459	17.246	17.627	15.733	17.995	17.990	4.677
Self Weight X Frames	0.432	1.325	1.275	1.127	1.360	1.352	1.352
Self Weight Slab	18.136	70.146	71.695	63.992	73.192	73.171	19.023
Additional Overhang & Haunch	0.749	2.896	2.960	2.642	3.022	3.019	0.710
Fench	0.273	1.056	1.080	0.964	1.102	1.101	0.259
Concrete Parapet	4.972	19.228	19.653	17.542	20.063	20.057	5.215
Total Dead Load	29.02	111.90	114.29	102.00	116.73	116.69	31.23
Total Live Load w/o Impact	69.44	135.75	137.61	138.88	139.54	138.32	70.39

Abutment Bearing Design Load			
Dead Load	=	31.23	Kips
Live Load	=	70.39	Kips

Pier Bearing Design Load			
Dead Load	=	120.05	Kips
Live Load	=	139.54	Kips

Project:	LAK-6-2.06		
Description:	Bearing Design		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/02/24
Check By:	DOR	Date:	01/26/25

Updated: CAE 5/10/2024

Updated loading of crossframes based on Crossframe Spacing

Steel Reinforced Elastomeric Bearing Design Load and Seismic Lateral Analysis

Part 2: Horizontal Connection Force

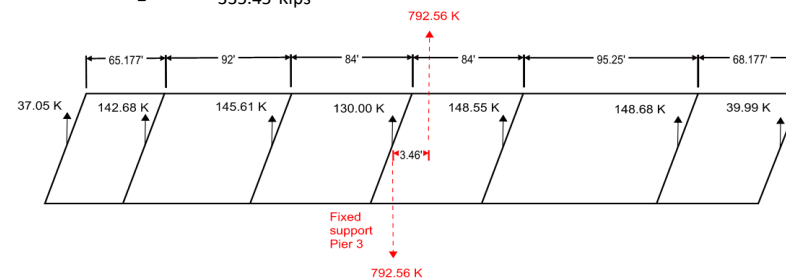
Extreme Event I Dead Load Factor	=	1.0	AASHTO Table 3.4.1-1
Strength I Dead Load Factor	=	1.25	AASHTO Table 3.4.1-2
Horizontal Connection Force	=	0.25 times the Tributary permanent load	BDM 303.1.4.1.b

Support	Abut. 1 (Kips) (Exp.)	Pier 1 (Kips) (Exp.)	Pier 2 (Kips) (Exp.)	Pier 3 (Kips) (Fix.)	Pier 4 (Kips) (Exp.)	Pier 5 (Kips) (Exp.)	Abut. 2 (Kips) (Exp.)
Location (ft)	0.000	65.177	157.177	241.177	325.177	420.427	488.604
Member 1 (Exterior)	7.457	28.777	29.401	26.250	30.013	30.001	7.769
Member 2 (Interior)	7.255	27.974	28.572	25.500	29.184	29.173	7.809
Member 3 (Interior)	7.255	27.974	28.572	25.500	29.184	29.173	7.809
Member 4 (Interior)	7.255	27.974	28.572	25.500	29.184	29.173	7.809
Member 5 (Exterior)	7.457	28.777	29.401	26.250	30.013	30.001	7.769
Total	36.68	141.48	144.52	129.00	147.58	147.52	38.96

Total lat. seismic connection force (Extreme Event I)	=	785.73 Kips
Eccentricity of centroid of load from Pier 3	=	3.30 ft
Unbalanced moment at Pier 3	=	2594.01 kips*ft
Additional shear on external bearing at Pier 3	=	111.21 Kips
Additional shear on first interior bearing at Pier 3	=	55.61 Kips

Shear on Bearing 1 at Pier 3	=	268.36 Kips
Shear on Bearing 2 at Pier 3	=	212.75 Kips
Shear on Bearing 3 at Pier 3	=	157.15 Kips
Shear on Bearing 4 at Pier 3	=	212.75 Kips
Shear on Bearing 5 at Pier 3	=	268.36 Kips

Max. Shear (Strength I) (Exterior Bearing)	=	335.45 Kips





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Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Bearing Design		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/02/24
Check By:	DOR	Date:	01/26/25

Updated: CAE 5/10/2024

Updated loading of crossframes based on Crossframe Spacing

Steel Reinforced Elastomeric Bearing Design Load and Seismic Lateral Analysis

Anchor Bolt

Material	=	ASTM F1554, Grade 105	(Reference from Eddy Road Project.)
Minimum Tensile Strength, F_{ub}	=	125 ksi	
Yield Strength, F_{yb}	=	105 ksi	
Diameter	=	1.75 in	
Total Fixed Bearing, Pier No. 3	=	5 ea.	
Anchor Rod per Bearing	=	4 ea.	

Shear Resistance of Anchor Bolt $\phi_s R_r = \phi_s * 0.5 * A_b * F_{ub} * N_s$ AASHTO 6.13.2.12

ϕ_s	=	0.75	AASHTO 6.5.4.2
A_b	=	2.405 in ²	
F_{ub}	=	125 ksi	
N_s	=	1	
$\phi_s R_s$	=	112.75 Kips	x 4 No. of Bolts
		450.99 Kips	≥ 335.45 Kips
			<u>OK</u>

No need to provide seismic pedestal.

2.1 Dead Load Reaction Comparison Check



Department of
Transportation





471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:			
Project No:	075926.001		
Calc By:	CAE	Date:	04/05/24
Check By:	DOR	Date:	05/24/24

Existing vs Proposed Dead Load Increase Analysis

Purpose:

To check the increase in dead load on the existing footing to make sure that it does not settle anymore from the additional loading. For this to occur, the BDM specifies that an increase of more than 15% in dead load should be cause for a new analysis of the footing. Piers 3 and 4 are the two possible critical elements depending on the additional concrete loading.

Existing Loads at Piers 3 and 4

Existing Plate Girder Bridge

Reaction obtained from LEAPSteel. Modified to be original construction values (Removed utility and 1" overlay of 2" wearing) Girder 1, 5

Load Type	Pier 3 (Kips)	Pier 4 (Kips)
Self Weight Steel	11.522	15.833
Self Weight Stiffeners	1.401	1.599
Self Weight X Frames	0.487	0.561
Self Weight Slab	56.975	65.641
Additional Overhang & Haunch	3.035	3.497
Type A Alum. Rail & Fench	1.31	1.509
Concrete Parapet	7.189	8.282
Sidewalks	14.311	16.488
Total	96.23	113.41

Girder 2, 3, 4;

Load Type	Pier 3 (Kips)	Pier 4 (Kips)
Self Weight Steel	11.522	15.833
Self Weight Stiffeners	1.416	1.564
Self Weight X Frames	0.973	1.12
Self Weight Slab	61.78	71.176
Additional Overhang & Haunch	0.28	0.322
Type A Alum. Rail & Fench	1.31	1.509
Concrete Parapet	7.189	8.282
Sidewalks	14.311	16.488
Total	98.78	116.29

Proposed Loads at Piers 3 and 4

Proposed W40x199 I-Girder Bridge

Reaction obtained from LEAPSteel.

Girder 1, 5

Load Type	Pier 3 (Kips)	Pier 4 (Kips)
Self Weight Steel	15.733	17.995
Self Weight X Frames	0.52	0.521
Self Weight Slab	60.437	69.126
Additional Overhang & Haunch	9.716	11.115
Fence	0.964	1.102
Concrete Parapet	17.542	20.063
Total	104.91	119.92

Girder 2, 3, 4;

Load Type	Pier 3 (Kips)	Pier 4 (Kips)
Self Weight Steel	15.733	17.995
Self Weight X Frames	0.965	1.056
Self Weight Slab	63.992	73.192
Additional Overhang & Haunch	2.642	3.022
Fence	0.964	1.102
Concrete Parapet	17.542	20.063
Total	101.84	116.43

Additional Concrete Loading from 3'-6" Wide Column and Cap

Pier 3:

Density of Concrete	=	0.15 kcf	
Existing Column Diameter	=	3 ft	
Proposed Column Diameter	=	3.5 ft	
Existing Cap Height	=	3.72 ft	(Proposed to match)
Existing Cap Length	=	35.33 ft	
Existing Column Height above Footing	=	17 ft	(Existing Plans)
Proposed Column Height above Footing	=	19.438 ft	
Column Section Increased Height	=	2.438 ft	(Proposed - Existing)
Increased Height Section Volume	=	51.69962 cf	(Existing Cross-section*Height*3 Columns)
Increased Column Diameter Volume	=	148.84905 cf	(Prop Cross Area-Ex Cross Area)*Prop Height*3
Increased Cap Width Volume	=	65.72 cf	(Prop Cap Width-Ex)*Length of Cap*Cap Height
Increased Cap End Volume	=	9.50 cf	(Prop Cross Area-Ex)*Cap Height
Total Volume	=	275.76 cf	
Total Load	=	41.36 kip	

Proposed Loads at Piers 3 and 4 continued...

Pier 4:

Density of Concrete	=	0.15 kcf	
Existing Column Diameter	=	3 ft	
Proposed Column Diameter	=	3.5 ft	
Existing Cap Height	=	3.794 ft	(Proposed to match)
Existing Cap Length	=	35.33 ft	
Existing Column Height above Footing	=	15.16 ft	(Existing Plans)
Proposed Column Height above Footing	=	17.618 ft	
Column Section Increased Height	=	2.458 ft	(Proposed - Existing)
Increased Height Section Volume	=	52.123735 cf	(Existing Cross-section*Height*3 Columns)
Increased Column Diameter Volume	=	134.91216 cf	(Prop Cross Area-Ex Cross Area)*Prop Height*3
Increased Cap Width Volume	=	67.027333 cf	(Prop Cap Width-Ex)*Length of Cap*Cap Height
Increased Cap End Volume	=	9.68 cf	(Prop Cross Area-Ex)*Cap Height
Total Volume	=	263.75 cf	
Total Load	=	39.56 kip	

Loads at Piers 3 and 4 Compared

	Pier 3	Pier 4
Existing Loads	488.80	575.70
Proposed Loads	556.70	628.70
<15% Increase?	PASS	PASS

The proposed substructure is not increasing the loading on the footing more than 15%. So, no additional analysis needs to be provided to verify capacity.

Project:	LAK-6-2.06		
Description:	Reaction Comparison		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/01/24
Check By:	DOR	Date:	10/01/24

Dead Load Reaction

Existing Plate Girder Bridge

Reaction obtained from LEAPSteel.

Girder 1, 5

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	2.442	13.452	15.049	11.522	15.833	15.199	2.772
Self Weight Stiffeners	0.413	1.524	1.571	1.401	1.599	1.482	0.43
Self Weight X Frames	0.253	0.545	0.565	0.487	0.561	0.597	0.238
Self Weight Slab	15.527	62.479	64.591	56.975	65.641	65.38	16.239
Additional Overhang & Haunch	0.827	3.329	3.441	3.035	3.497	3.483	0.865
Type A Alum. Rail & Fench	0.357	1.437	1.485	1.31	1.509	1.503	0.373
Utility	1.937	7.796	8.059	7.109	8.19	8.158	2.026
Wearing Surface	3.265	13.139	13.583	11.982	13.804	13.749	3.415
Concrete Parapet	1.959	7.883	8.15	7.189	8.282	8.25	2.049
Sidewalks	3.9	15.694	16.224	14.311	16.488	16.423	4.079
Total	30.88	127.28	132.72	115.32	135.40	134.22	32.49

Girder 2, 3, 4;

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	2.442	13.452	15.049	11.522	15.833	15.199	2.772
Self Weight Stiffeners	0.405	1.494	1.541	1.416	1.564	1.601	0.42
Self Weight X Frames	0.453	1.085	1.133	0.973	1.12	1.194	0.535
Self Weight Slab	16.836	67.749	70.038	61.78	71.176	70.894	17.609
Additional Overhang & Haunch	0.076	0.307	0.317	0.28	0.322	0.321	0.08
Type A Alum. Rail & Fench	0.357	1.437	1.485	1.31	1.509	1.503	0.373
Utility	1.937	7.796	8.059	7.109	8.19	8.158	2.026
Wearing Surface	3.265	13.139	13.583	11.982	13.804	13.749	3.415
Concrete Parapet	1.959	7.883	8.15	7.189	8.282	8.25	2.049
Sidewalks	3.9	15.694	16.224	14.311	16.488	16.423	4.079
Total	31.63	130.04	135.58	117.87	138.29	137.29	33.36

Project:	LAK-6-2.06		
Description:	Reaction Comparison		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/01/24
Check By:	DOR	Date:	10/01/24

Dead Load Reaction

Proposed W40x199 Rolled Steel Bridge

Reaction obtained from LEAPSteel.

Girder 1, 5

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	4.459	17.246	17.627	15.733	17.995	17.990	4.677
Self Weight X Frames	0.448	1.279	1.209	1.137	1.167	1.232	0.659
Self Weight Slab	17.129	66.250	67.712	60.437	69.126	69.106	17.966
Additional Overhang & Haunch	2.754	10.651	10.886	9.716	11.115	11.104	2.610
Fench	0.273	1.056	1.080	0.964	1.102	1.101	0.259
Concrete Parapet	4.972	19.228	19.653	17.542	20.063	20.057	5.215
Total	30.03	115.71	118.17	105.53	120.57	120.59	31.38

Girder 2, 3, 4;

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	4.458922	17.246109	17.626711	15.732945	17.994804	17.989773	4.67686
Self Weight X Frames	0.792499	2.533015	2.351871	2.104387	2.31469	2.50915	2.50915
Self Weight Slab	18.136129	70.146477	71.694527	63.991867	73.191704	73.171242	19.022566
Additional Overhang & Haunch	0.748775	2.896094	2.960008	2.641882	3.022215	3.019051	0.709563
Fench	0.273129	1.056293	1.079647	0.963616	1.102333	1.101142	0.258826
Concrete Parapet	4.971786	19.227793	19.652905	17.541523	20.06325	20.056955	5.214765
Total	29.38	113.11	115.37	102.98	117.69	117.85	32.39



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Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Reaction Comparison		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/01/24
Check By:	DOR	Date:	10/01/24

COMPARISON - EXISTING GIRDER AND PROPOSED STEEL ROLLED BEAMS REACTIONS

Total Reaction on Proposed Structure.

Load Type	Rear Abut. (Kips)	Pier 1 (Kips)	Pier 2 (Kips)	Pier 3 (Kips)	Pier 4 (Kips)	Pier 5 (Kips)	Fwd. Abut. (Kips)
Self Weight Steel	22.29	86.23	88.13	78.66	89.97	89.95	23.38
Self Weight X Frames	3.27	10.16	9.47	8.59	9.28	9.99	8.85
Self Weight Slab	88.67	342.94	350.51	312.85	357.83	357.73	93.00
Additional Overhang & Haunch	7.75	29.99	30.65	27.36	31.30	31.26	7.35
Fench	1.37	5.28	5.40	4.82	5.51	5.51	1.29
Concrete Parapet	24.86	96.14	98.26	87.71	100.32	100.28	26.07
Total	148.21	570.74	582.43	519.99	594.20	594.72	159.94

2.2 Abutment Design

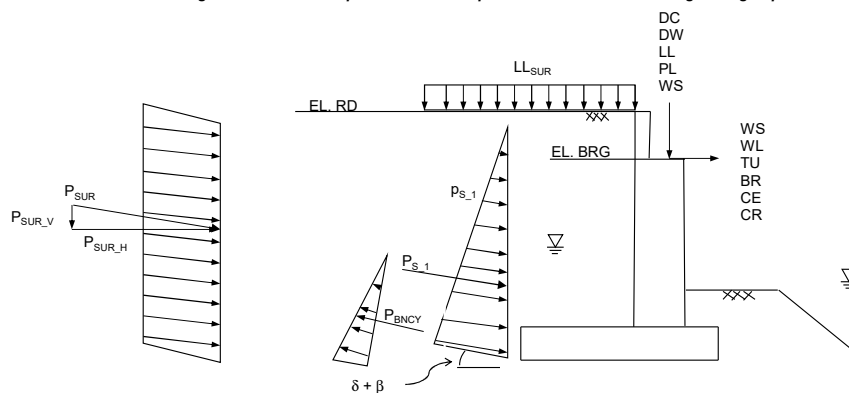


Department of
Transportation



Reference	CALCULATIONS	NOTES/OUTPUT

Design of Abutment on Spread Foundation per 2013 AASHTO LRFD Bridge Design Specifications (English)



INPUT

Geometry

EL. Road =	879.51	ft
EL. Bearing =	875.08	ft
Backwall Height =	4.43	ft
EL. Top Footing =	869.76	ft
Stem Height =	5.32	ft
Footing Thick. =	3	ft
Total Height =	12.75	ft
BW Thick. =	1.75	ft
Bearing Seat Width =	2.25	ft
CL Bearing =	1.25	ft
Stem Width =	4	ft
Toe Width =	2	ft
Footing Width =	6	ft
Heel Width =	0	ft
Abutment Length =	42.11	ft
Span 1 Length =	68.18	ft
Span 2 Length =	95.25	ft
Deck Width =	36.67	ft
Superstr. Wind Ht. =	0	ft
Skew =	31.88°	
Soil Depth Over Toe =	1.5	ft
EL. FF Water =	0	ft

Engineering Properties

W_{conc}	=	0.15	kcf
W_{water}	=	0.064	kcf
W_{soil}	=	0.125	kcf
f_c	=	4	ksi
E_c	=	3640	ksi
f_y	=	60	ksi
E_s	=	29000	ksi

Soil

$\phi_b =$	0.45	Strength Limit State, Bearing
$\phi_{soil} =$	0.8	Strength Limit State, Sliding
$\phi =$	1.0	Service Limit State
$\phi =$	1.0	Extreme Limit State
Service Bearing Resistance =	ksf	(factored value)
Bearing Resistance =	ksf	(unfactored value)
Coeff. Of Friction = $\Phi_c =$		

AASHTO Table 10.5.5.2.2-1
AASHTO Table 10.5.5.2.2-1
AASHTO 10.5.5.1
AASHTO 10.5.5.3.3

AASHTO Table C10.6.2.6.1-1
AASHTO 10.6.3.4

		Bar Size	Bar Spacing	Bar Diameter	Bar Area Per Foot	Required Area or Spacing
Stem Rear Tension & Rear Temperature Rebar	By Design @ 6"	3	6 in	0.375	0.22	0.01
	By Design @ 12"	3	12 in	0.375	0.11	0.01
	Crack Control	5	12	0.625	0.31	99.99
	Shrinkage/Temperature	5	@ 12 in.	0.625	0.31	0.30
	Interface Shear @ Footing	5	12	0.625	0.31	OK
Stem Front Temperature Rebar	Shrinkage/Temperature	5	@ 12 in.	0.625	0.31	0.30
	Interface Shear @ Footing	5	12	0.625	0.31	OK
Backwall Rebar	By Design	3	@ 12 in	0.375	0.11	0.07
	Crack Control	5	12	0.625	0.31	99.99
	Shrinkage/Temperature	4	@ 12 in.	0.5	0.20	0.16
	Interface Shear, Stem Front	5	12	0.625	0.31	OK
	Interface Shear, Stem Back	5	12	0.625	0.31	OK

Loads

		0	
	Total EQ =		
	Total DC =	155.14	=31.04*2+
	Total DW =	0	31.02*3 K
			=95.2K x 2
	Total LL =	190.4	Lanes x 1 MP
	Vert. Wind Superstr. =	25.00	k
	Horiz. Wind Superstr. =	0.00	k
	Wind on LL. =	0.00	k
121.71	TU _{TOT} =	74.03	k
	CR _{TOT} =	0.00	k
	LL _{sur} =	2	ft

$$\begin{aligned} \text{TU} &= (\Delta \times G \times A/h_{rt}) \times \#Brgs \\ \text{CB} &= (\Delta \times G \times A/h_{rt}) \times \#Brgs \end{aligned}$$

Rebar Clearances

Footing =	5	in
Stem =	5	in
Backwall =	5	in

Max of {

- 25% of Design Truck Axle Weight
- 25% of Design Tandem Axle Weight
- 5% of Design Truck Axle Weight plus Lane Load
- 5% of Design Tandem Axle Weight plus Lane Load

This force is applied horizontally 6 ft above backwall if bearing is fixed. If bearing is expansion, apply force at top of bearing.

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Reference	CALCULATIONS					NOTES/OUTPUT
AASHTO Table 3.11.5.3-1 3.11.5.3	Soil Pressure Coefficients					Coulomb Eqn.
	$\phi = 30.^\circ$ $\theta = 90.^\circ$	0.67 ϕ	$k_a = \frac{\sin^2(\theta + \phi_f')}{[\sin^2 \theta \sin(\theta - \delta)] \left[1 + \sqrt{\frac{\sin(\phi_f' + \delta) \sin(\phi_f' - \beta)}{\sin(\theta - \delta) \sin(\theta + \beta)}} \right]^2}$			
	$\delta = 20.1^\circ$ $\beta = .^\circ$					
	Coulomb $k_a = 0.297$					
3.11.5.3	Rankine $k_a = 0.333$					Rankine Eqn.
	$k_a = \cos(\beta) \frac{\cos(\beta) - \sqrt{\cos^2(\beta) - \cos^2(\phi)}}{\cos(\beta) + \sqrt{\cos^2(\beta) - \cos^2(\phi)}}$					
	$\beta_{\text{PASSIVE}} = .^\circ$					
	Coulomb $k_p = 6.132$					
	Ignore k_p ? Yes (Yes or No)					Coulomb Eqn. similar results to AASHTO 3.11.5.4, log-spiral failure theory
	$k_p = \frac{\sin^2(\theta - \phi_f')}{[\sin^2 \theta \sin(\theta + \delta)] \left[1 - \sqrt{\frac{\sin(\phi_f' + \delta) \sin(\phi_f' + \beta)}{\sin(\theta + \delta) \sin(\theta + \beta)}} \right]^2}$					
C3.11.5.3	$\alpha = 30.^\circ$ heel/top of wall angle = $.^\circ$					
Figure C3.11.5.3-1	Since alpha > heel/top of wall angle, use Coulomb active earth pressure coefficient.					
C11.8.6	The Extreme Event I Load Case Must Include the Seismic Effect of the Earth Pressure. The soil pressure coefficient k_{ae} needs to be used to determine seismic earth pressures.					
C11.8.6	Acceleration Coefficient, $A_s = 0.096$					
	Horizontal Acceleration Coefficient, $k_h = 0.5 * A_s = 0.048$					
	Vertical Acceleration Coefficient, $k_v = 0$					
	Back fill slope angle, $i = .^\circ$					
Figure A11.3.1-1	Slope of Wall to Vertical, CCW is Negative, $\beta = .^\circ$					
	Angle of friction of soil, $\phi = 30.^\circ$					
	Wall Backfill Interface Friction Angle, $\delta = 20.1^\circ$					
	$\theta_{MO} = \arctan ((k_h / (1 - k_v))) = 2.75^\circ$					
	$(1 - k_v) * \tan(\phi_{\text{back}} - i) = 0.58 > k_h \quad \text{OK}$					
	$\psi = 2.62$					
A11.3.1-1	$k_{ae} = \frac{\cos^2(\phi - \theta_{MO} - \beta)}{\cos \theta_{MO} \cos^2 \beta \cos(\delta + \beta + \theta_{MO})} \times \left(1 + \sqrt{\frac{\sin(\phi + \delta) \sin(\phi - \theta_{MO} - i)}{\cos(\delta + \beta + \theta_{MO}) \cos(i - \beta)}} \right)^{-2}$					
	$k_{ae} = \frac{0.79032}{0.92048} \times \left(1 + \sqrt{\frac{0.35129}{0.92154}} \right)^{-2}$					
	$k_{ae} = 0.328$					
	$k_a = 0.297$					
	Thrust Factor, $F_t = 1.104$					

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Reference	CALCULATIONS					NOTES/OUTPUT
	SUBSTRUCTURE LOADS (Unfactored)					
	Dead Loads (DC)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	Footing	2.70	0.00	3.00	0.00	8.10
	Stern	3.19	0.00	4.00	0.00	12.77
	Backwall	1.16	0.00	5.13	0.00	5.96
	DL Brg Rxn	3.68	0.00	3.25	0.00	11.97
	Construction	7.05	0.00		0.00	26.83
	Total	10.74	0.00		0.00	38.80
	Future Wearing Surface (DW)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	FWS	0.00	0.00	3.25	0.00	0.00
	Total	0.00	0.00		0.00	0.00
	Vertical Earth Pressure (EV)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	Soil Over Heel	0.00	0.00	6.00	0.00	0.00
	Soil Over Toe	0.38	0.00	1.00	0.00	0.38
	Total	0.38	0.00		0.00	0.38
	Horizontal Earth Pressure (EH)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	EH _{SOIL_V}	1.04	0.00	6.00	0.00	6.23
	EH _{SOIL_H}	0.00	2.84	4.25	12.05	0.00
	EH _{PASSIVE SOIL}	0.00	0.00	1.50	0.00	0.00
	Total, Active	1.04	2.84		12.05	6.23
	Total, Passive	0.00	0.00		0.00	0.00
	Water Pressure (WA)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	EV _{BNCY}	0.00	0.00	3.00	0.00	0.00
	EH _{SOIL_V}	0.00	0.00	6.00	0.00	0.00
	EH _{SOIL_H}	0.00	0.00	-288.92	0.00	0.00
	Total	0.00	0.00		0.00	0.00
	Live Load					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	LL Brg Rxn	4.52	0.00	3.25	0.00	14.69
	LS _V	0.33	0.00	6.00	0.00	1.95
	LS _H	0.00	0.89	6.38	5.67	0.00
	BR	0	0.00	8.82	0.00	0.00
	Construction	0.33	0.89		5.67	1.95
	Total	4.85	0.89		5.67	16.65
	Wind on Structure (WS)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	Vert. on Sup.	0.59	0.00	3.25	0.00	1.93
	Hor. on Sup.	0.00	0.00	8.32	0.00	0.00
	Total	0.59	0.00		0.00	1.93
	Wind on Live Load (WL)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	WL	0.00	0.00	18.75	0.00	0.00
	Total	0.00	0.00		0.00	0.00
	Temperature Force from bearings (TU)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	TU	0.00	1.76	8.32	14.62	0.00
	Total	0.00	1.76		14.62	0.00
	Creep Force from bearings (CR)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	CR	0.00	0.00	8.32	0.00	0.00
	Total	0.00	0.00		0.00	0.00
	Earthquake Loads (EQ)					
	Description	V (k)	H (k)	Arm (ft)	M _{over} (k-ft)	M _{resist} (k-ft)
	EQ	0.00	0.00	8.32	0.00	0.00
	Total	0.00	0.00		0.00	0.00
						These are the effect of water in soil, counteracting soil pressure.

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Reference	CALCULATIONS										NOTES/OUTPUT
	ANALYZE SLIDING/OVERTURNING										
	Factored Loads										
	STR I	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}
	DC, Constr.	0.90	7.05	0.00	0.00	26.83	6.35	0.00	0.00	24.14	
	DC, Total	0.90	10.74	0.00	0.00	38.80	9.66	0.00	0.00	34.92	
	DW	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	EV	1.00	0.38	0.00	0.00	0.38	0.38	0.00	0.00	0.38	
	EH, Active	1.50	1.04	2.84	12.05	6.23	1.56	4.25	18.08	9.34	
	EH, Passive	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	LL, Constr.	1.75	0.00	0.89	5.67	0.00	0.00	1.56	9.93	0.00	
LL, Total	1.75	0.00	0.89	5.67	0.00	0.00	1.56	9.93	0.00		
WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
							Constr. =	8.28	5.81	28.01	33.86
							Total =	11.60	7.57	42.63	44.64
STR III	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}	
DC	0.90	10.74	0.00	0.00	38.80	9.66	0.00	0.00	34.92		
DW	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
EV	1.00	0.38	0.00	0.00	0.38	0.38	0.00	0.00	0.38		
EH, Active	1.50	1.04	2.84	12.05	6.23	1.56	4.25	18.08	9.34		
WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
WS	1.40	0.59	0.00	0.00	1.93	0.83	0.00	0.00	2.70		
TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
							Total =	12.43	6.01	32.71	47.34
STR V	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}	
DC	0.90	10.74	0.00	0.00	38.80	9.66	0.00	0.00	34.92		
DW	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
EV	1.00	0.38	0.00	0.00	0.38	0.38	0.00	0.00	0.38		
EH, Active	1.50	1.04	2.84	12.05	6.23	1.56	4.25	18.08	9.34		
LL	1.35	0.00	0.89	5.67	0.00	0.00	1.20	7.66	0.00		
WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
WS	0.40	0.59	0.00	0.00	1.93	0.24	0.00	0.00	0.77		
WL	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
TU	0.50	0.00	1.76	14.62	0.00	0.00	0.88	7.31	0.00		
CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
							Total =	11.83	6.33	33.05	45.41
EE I	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}	
DC	0.90	10.74	0.00	0.00	38.80	9.66	0.00	0.00	34.92		
DW	0.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
EV	1.00	0.38	0.00	0.00	0.38	0.38	0.00	0.00	0.38		
EH, Active	1.50	1.04	3.13	12.05	6.23	1.56	4.70	18.08	9.34		
LL	0.50	0.00	0.89	5.67	0.00	0.00	0.44	2.84	0.00		
WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
EQ	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
							Total =	11.60	5.14	20.92	44.64
SERV I	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}	
DC	1.00	10.74	0.00	0.00	38.80	10.74	0.00	0.00	38.80		
DW	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
EV	1.00	0.38	0.00	0.00	0.38	0.38	0.00	0.00	0.38		
EH, Active	1.00	1.04	2.84	12.05	6.23	1.04	2.84	12.05	6.23		
LL	1.00	0.00	0.89	5.67	0.00	0.00	0.89	5.67	0.00		
WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
WS	0.30	0.59	0.00	0.00	1.93	0.18	0.00	0.00	0.58		
WL	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
							Total =	12.33	5.48	32.35	45.98

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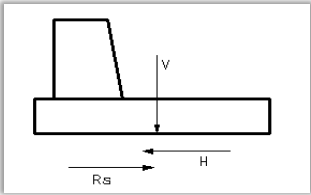
Reference

CALCULATIONS

NOTES/OUTPUT

10.6.3.4

Sliding



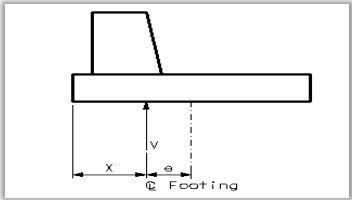
$$\Phi_s R_s = \Phi_s \times \gamma V \times \tan \phi_s$$
$$\text{To Pass } R_s/H \geq 1.0$$

	γV (k)	γH (k)	$\Phi_s R_s$	$\Phi R_s/\gamma H$
STR I, Constr.	8.28	5.81	0.00	0.00
STR I, Total	11.60	7.57	0.00	0.00
STR III	12.43	6.01	0.00	0.00
STR V	11.83	6.33	0.00	0.00
EE I	11.60	5.14	0.00	0.00
SERV I	12.33	5.48	0.00	0.00

Min Ratio = 0.00 NG

11.6.3.2

Overturning



$$X = \frac{\gamma M_{\text{resist}} - \gamma M_{\text{over}}}{\gamma V}$$
$$e = W_r/2 - X$$
$$e_{\text{max}} = W_r/3 \text{ (soil)}, W_r*0.45 \text{ (rock)}$$

	γV (k)	$\gamma M_{\text{resist}} - \gamma M_{\text{over}}$	X (ft)	e	e_{max}	Ratio
STR I, Constr.	8.28	5.85	0.71	2.29	2.00	0.87
STR I, Total	11.60	2.00	0.17	2.83	2.00	0.71
STR III	12.43	14.63	1.18	1.82	2.00	1.10
STR V	11.83	12.36	1.04	1.96	2.00	1.02
EE I	11.60	23.72	2.05	0.95	2.00	2.09
SERV I	12.33	13.63	1.11	1.89	2.00	1.06

Min Ratio = 0.71 NG

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Reference	CALCULATIONS										NOTES/OUTPUT	
ANALYZE BEARING CAPACITY												
Factored Loads												
STR I	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}		
	DC	1.25	10.74	0.00	0.00	38.80	13.42	0.00	0.00	48.50		
	DW	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	EV	1.35	0.38	0.00	0.00	0.38	0.51	0.00	0.00	0.51		
	EH, Active	1.50	1.04	2.84	12.05	6.23	1.56	4.25	18.08	9.34		
	LL	1.75	4.85	0.89	5.67	16.65	8.48	1.56	9.93	29.13		
	WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
	CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total =						23.97	7.57	42.63	87.48		
STR III	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}		
	DC	1.25	10.74	0.00	0.00	38.80	13.42	0.00	0.00	48.50		
	DW	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	EV	1.35	0.38	0.00	0.00	0.38	0.51	0.00	0.00	0.51		
	EH, Active	1.50	1.04	2.84	12.05	6.23	1.56	4.25	18.08	9.34		
	WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	WS	1.40	0.59	0.00	0.00	1.93	0.83	0.00	0.00	2.70		
	TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
	CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total =						16.32	6.01	32.71	61.05		
STR V	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}		
	DC	1.25	10.74	0.00	0.00	38.80	13.42	0.00	0.00	48.50		
	DW	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	EV	1.35	0.38	0.00	0.00	0.38	0.51	0.00	0.00	0.51		
	EH, Active	1.50	1.04	2.84	12.05	6.23	1.56	4.25	18.08	9.34		
	LL	1.35	4.85	0.89	5.67	16.65	6.54	1.20	7.66	22.47		
	WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	WS	0.40	0.59	0.00	0.00	1.93	0.24	0.00	0.00	0.77		
	WL	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
	CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total =						22.27	7.21	40.36	81.59		
EE I	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}		
	DC	1.25	10.74	0.00	0.00	38.80	13.42	0.00	0.00	48.50		
	DW	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	EV	1.35	0.38	0.00	0.00	0.38	0.51	0.00	0.00	0.51		
	EH, Active	1.50	1.04	3.13	12.05	6.23	1.56	4.70	18.08	9.34		
	LL	0.50	4.85	0.89	5.67	16.65	2.42	0.44	2.84	8.32		
	WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	EQ	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total =						17.91	5.14	20.92	66.67		
SERV I	Description	γ	V (k)	H (k)	M_{over} (k-ft)	M_{resist} (k-ft)	γV (k)	γH (k)	γM_{over}	γM_{resist}		
	DC	1.00	10.74	0.00	0.00	38.80	10.74	0.00	0.00	38.80		
	DW	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	EV	1.00	0.38	0.00	0.00	0.38	0.38	0.00	0.00	0.38		
	EH, Active	1.00	1.04	2.84	12.05	6.23	1.04	2.84	12.05	6.23		
	LL	1.00	4.85	0.89	5.67	16.65	4.85	0.89	5.67	16.65		
	WA	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	WS	0.30	0.59	0.00	0.00	1.93	0.18	0.00	0.00	0.58		
	WL	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	TU	1.00	0.00	1.76	14.62	0.00	0.00	1.76	14.62	0.00		
	CR	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
	Total =						17.18	5.48	32.35	62.63		
$\frac{V}{W_f - 2e}$ (on soil) CASE 1 $q_{B-MAX} = \sigma_v = \frac{V}{W_f} (1 + 6e/W_f)$ (on rock, $e < W/6$) CASE 2 $\frac{2V}{3 [(W_f/2) - e]}$ (on rock, $e > W/6$) CASE 3												11.6.3.2-1
												11.6.3.2-2
												11.6.3.2-4
Bearing												
		γV (k)	$\gamma M_{resist} - \gamma M_{over}$	X (ft)	e	Case Num.	σ_v (ksf)	q_R	Ratio			
	STR I	23.97	44.85	1.87	1.13	Case 1	6.40	0	0.00			
	STR III	16.32	28.34	1.74	1.26	Case 1	4.70	0	0.00			
	STR V	22.27	41.23	1.85	1.15	Case 1	6.01	0	0.00			
	EE I	17.91	45.75	2.55	0.45	Case 1	3.51	0.0	0.00			
	SERV I	17.18	30.28	1.76	1.24	Case 1	4.87	0.0	0.00			
Min Ratio = 0.00 NG												

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STEM DESIGN

AT STEM BASE

h =

5.32

ft below seat

9.75

ft below road

0.00

ft above top of footing

Loads

Horz. Forces on Stem

	EH _{SOIL-H}	LS _H	Total	
Base Pressure (ksf)	0.34	0.07		
Moment (k-ft)	5.39	3.32		
STR I	1.50	1.75		
STR III	1.50	0.00		
STR V	1.50	1.35		
SERV I	1.00	1.00		
Factored Moments	STR I	8.09	5.81	13.89
	STR III	8.09	0.00	8.09
	STR V	8.09	4.48	12.56
	SERV I	5.39	3.32	8.71

Horizontal Moment Arm =

5.32

ft

Vertical Eccentricity =

0.75

ft

Vertical Reactions

	LL	DC	DW	Wall DC	Total	
Force (k)	4.52	3.68	0.00	4.35		
Moment (k-ft)	3.39	2.76	0.00	0.00		
STR I	1.75	1.25	1.50	1.25		
STR III	0.00	1.25	1.50	1.25		
STR V	1.35	1.25	1.50	1.25		
SERV I	1.00	1.00	1.00	1.00		
Factored Forces	STR I	7.91	4.60	0.00	5.44	17.96
	STR III	0.00	4.60	0.00	5.44	10.05
	STR V	6.10	4.60	0.00	5.44	16.15
	SERV I	4.52	3.68	0.00	4.35	12.56
Factored Moments	STR I	5.93	3.45	0.00	0.00	9.39
	STR III	0.00	3.45	0.00	0.00	3.45
	STR V	4.58	3.45	0.00	0.00	8.03
	SERV I	3.39	2.76	0.00	0.00	6.15

Horizontal Reactions

	TU	CR	WS	WL	BR	Total
Force (k)	1.76	0.00	0.00	0.00	0.00	
Moment (k-ft)	9.35	0.00	0.00	0.00	0.00	
STR I	0.50	1.00	0.00	0.00	1.75	
STR III	0.50	1.00	1.40	0.00	0.00	
STR V	0.50	1.00	0.40	1.00	1.35	
SERV I	1.00	1.00	0.30	1.00	1.00	
Factored Forces	STR I	0.88	0.00	0.00	0.00	0.88
	STR III	0.88	0.00	0.00	0.00	0.88
	STR V	0.88	0.00	0.00	0.00	0.88
	SERV I	1.76	0.00	0.00	0.00	1.76
Factored Moments	STR I	4.68	0.00	0.00	0.00	4.68
	STR III	4.68	0.00	0.00	0.00	4.68
	STR V	4.68	0.00	0.00	0.00	4.68
	SERV I	9.35	0.00	0.00	0.00	9.35

Total	M _u (k-ft)	P _u (k)
STR I	27.95	17.96
STR III	16.21	10.05
STR V	25.27	16.15
SERV I	24.21	12.56

These forces are separated since they are based on depth

WA not included since it would only decrease Moment

The backwall and stem selfweight are calculated; however, the moment due to selfweight is conservatively omitted.

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Reference	CALCULATIONS	NOTES/OUTPUT
	STEM DESIGN, Continued	
5.7.3.3.2	Height Interval to display = 0.5 ft At any section of a flexural component, the amount of prestressed and nonprestressed tensile reinforcement shall be adequate to develop a factored flexural resistance, M_u, at least equal to the lesser of the following: 1.33 Times the factored moment required by the applicable strength load combinations; and $M_{cr} = \gamma_3 \left[(\gamma_1 f_r + \gamma_2 f_{cpe}) S_c - M_{dnc} ((S_c/S_{nc}) - 1) \right]$ γ_1 = flexural cracking variability factor 1.2 for precast segmental structures 1.6 for all other concrete structures γ_2 = prestress variability factor 1.1 for bonded tendons 1.0 for unbonded tendons γ_3 = ratio of specified minimum yield strength to ultimate tensile strength of the reinf. 0.67 for A615 (plain/deformed steel), Grade 60 Reinforcement 0.75 for A706 (low alloy), Grade 60 Reinforcement 1.00 for prestressed concrete structures Cracking Moment, M_{cr}: $M_{cr} = \gamma_3 \left[(\gamma_1 f_r + \gamma_2 f_{cpe}) S_c - M_{dnc} ((S_c/S_{nc}) - 1) \right]$ $f_r = 0.24 * \text{SQRT}(f'_c) = 0.48 \text{ ksi}$ f_{cpe} = compressive stress in concrete due to effective prestress forces only (after allowance for all prestress losses) at extreme fiber of section where tensile stress is caused by external loads. $f_{cpe} = 0.00 \text{ ksi}$ M_{dnc} = total unfactored moment due to non-composite dead loads $M_{dnc} = 0.00 \text{ k-in}$ $I_g = 1/12 * b * h^3 = 110592.00 \text{ in}^4$ $y_t = h / 2 = 24.00 \text{ in}$ $S_c = 4608.00 \text{ in}^3$ $S_{nc} = 4608.00 \text{ in}^3$ $M_{cr} = 2654.21 \text{ k-in} \quad 221.18 \text{ k-ft/ft}$ $d = 42.50 \text{ in}$ $\beta_1 = 0.85$ $\phi_p = 0.75$ $\phi_m = 0.9$	5.7.3.3.2-1 5.7.3.3.2-1 5.4.2.6 Steel is assumed to have yielded

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STEM DESIGN, Continued

Height Below Road	Height Above Top of Ftg.	Capacity (Moment or Axial)	Unfactored	STR I	STR III	STR V	SER I	Max. Value	M _r (K-ft)
-0.25	10.00	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
0.25	9.50	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
0.75	9.00	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
1.25	8.50	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
1.75	8.00	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
2.25	7.50	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
2.75	7.00	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
3.25	6.50	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
3.75	6.00	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
4.25	5.50	Mu	BW	BW	BW	BW	BW	N.A.	N.A.
		Pu	BW	BW	BW	BW	BW	N.A.	
4.75	5.00	Mu	8.13	11.98	4.67	10.31	8.13	11.98	15.94
		Pu	9.56	14.21	6.30	12.40	9.56	14.21	
5.25	4.50	Mu	9.40	13.05	5.44	11.31	9.40	13.05	17.36
		Pu	9.86	14.59	6.67	12.78	9.86	14.59	
5.75	4.00	Mu	10.73	14.22	6.27	12.41	10.73	14.22	18.92
		Pu	10.16	14.96	7.05	13.15	10.16	14.96	
6.25	3.50	Mu	12.14	15.50	7.18	13.60	12.14	15.50	20.62
		Pu	10.46	15.34	7.42	13.53	10.46	15.34	
6.75	3.00	Mu	13.61	16.89	8.18	14.90	13.61	16.89	22.47
		Pu	10.76	15.71	7.80	13.90	10.76	15.71	
7.25	2.50	Mu	15.16	18.40	9.26	16.31	15.16	18.40	24.47
		Pu	11.06	16.09	8.17	14.28	11.06	16.09	
7.75	2.00	Mu	16.79	20.03	10.43	17.84	16.79	20.03	26.64
		Pu	11.36	16.46	8.55	14.65	11.36	16.46	
8.25	1.50	Mu	18.51	21.80	11.71	19.49	18.51	21.80	28.99
		Pu	11.66	16.84	8.92	15.03	11.66	16.84	
8.75	1.00	Mu	20.31	23.70	13.09	21.28	20.31	23.70	31.53
		Pu	11.96	17.21	9.30	15.40	11.96	17.21	
9.25	0.50	Mu	22.21	25.75	14.59	23.20	22.21	25.75	34.25
		Pu	12.26	17.59	9.67	15.78	12.26	17.59	
9.75	0.00	Mu	24.21	27.95	16.21	25.27	24.21	27.95	37.18
		Pu	12.56	17.96	10.05	16.15	12.56	17.96	

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Reference	CALCULATIONS	NOTES/OUTPUT															
	STEM DESIGN, Continued <table><tr><td>Use</td><td>5</td><td>spaced</td><td>@ 12 in.</td><td>max</td></tr><tr><td>A_s =</td><td>0.31</td><td></td><td>in²</td><td></td></tr><tr><td>Dia =</td><td>0.625</td><td></td><td>in</td><td></td></tr></table> Spacing shall not exceed 12" for walls > 18" Thick: Wall Thickness exceed 18"? YES Use 12 in Spacing Max Stem Crack Control The control of cracking by distribution of reinforcement must be checked. 5.7.3.4 This section applies to all members in which tension in the cross-section exceeds 80% of the modulus of rupture at service limit state. For this requirement the modulus of rupture is: $f_r = 0.24 \sqrt{f'_c} = 0.24 \sqrt{4} \text{ ksi} = 0.480 \text{ ksi}$ 5.4.2.6 $0.80 f_r = (0.80)(0.480 \text{ ksi}) = 0.384 \text{ ksi}$ The stress in the uncracked section under service loads is as follows: $f_s = M_s / S_c = 24.21 \text{ k-ft (12) / 4608.00 in} = 0.063 \text{ ksi}$ Since the service limit state stress is less than 80% of the cracking stress the provisions of this section need not be satisfied. The spacing, s, of mild steel reinforcement in the layer closest to the tension face shall satisfy the following: $s \leq (700 \gamma_e / \beta_s f_{ss}) - 2d_c$ 5.7.3.4-1 $\beta_s = 1 + (d_c / 0.7(h - d_c)) = 1.18$ $\gamma_e = 1$ for Class 1 exposure condition (stem not subjected to water seepage) $d_c = 5.3125 \text{ in.}$ (concrete cover from extreme tension fiber to center of flexural reinforcement) $h = 48.0 \text{ in.}$ (overall depth of component) f_{ss} = calculated tensile stress in mild steel reinforcement at the service limit state not to exceed 0.60 fy = 36.0 ksi max Calculate f_{ss} - Tensile Stress in the Steel Reinforcement at the Service Limit State Service Positive Moment: $M_u = 24.21 \text{ kip-ft / ft}$ $290.55 \text{ kip-in / ft}$ Calculate Actual Stress in Reinforcement: To solve for the actual stress in the reinforcement, the transformed moment of inertia and the distance from the neutral axis to the centroid of the reinforcement must be computed. $d_e = 42.69 \text{ in}$ $A_s = 0.31 \text{ in}^2$ $n = 7.97$ $\rho = A_s / (b * d_e) = 0.0006052$ $k = \text{SQRT}[(\rho * n)^2 + (2 * \rho * n)] - (\rho * n) = 0.093$ $k * d_e = 3.99$ Determine Transformed Moment of Inertia: $I_t = 1/3 * 12 \text{ in/ft} * (k * d_e)^3 + n * A_s * (d_e - k * d_e)^2 = 3952.57 \text{ in}^4/\text{ft}$ Determine actual stress in reinforcement: $y = d_e - k * d_e = 38.70$ $f_{ss} = (n * (M_u * y)) / I_t = 22.66 \text{ ksi}$ The spacing, s, of mild steel reinforcement in the layer closest to the tension face shall satisfy the following: $s \leq (700 \gamma_e / \beta_s f_{ss}) - 2d_c = 99.99 \text{ in.}$ 5.7.3.4-1	Use	5	spaced	@ 12 in.	max	A _s =	0.31		in ²		Dia =	0.625		in		
Use	5	spaced	@ 12 in.	max													
A _s =	0.31		in ²														
Dia =	0.625		in														

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	<u>BACKWALL DESIGN, Continued</u>					
	1.33 time M_u					
	$1.33 * M_u = 5.23 \text{ k-ft}$					
	The lesser of M_{cr} and $1.33 M_u = 5.23 \text{ k-ft}$					
	Final Design Moment, Max of M_{min} and $M_u = 5.23 \text{ k-ft}$					
	$M_r = \phi M_n$					

Reference	CALCULATIONS	NOTES/OUTPUT															
	$k \cdot d_e = 2.34$ BACKWALL DESIGN, Continued Determine Transformed Moment of Inertia: $I_t = 1/3 \cdot 12 \text{ in/ft} \cdot (k \cdot d_u)^3 + n \cdot A_s \cdot (d_e - k \cdot d_u)^2 = 491.26 \text{ in}^4/\text{ft}$ Determine actual stress in reinforcement: $y = d_e - k \cdot d_e = 13.34$ $f_{ss} = (n \cdot (M_u \cdot y)) / I_t = 6.03 \text{ ksi}$ The spacing, s, of mild steel reinforcement in the layer closest to the tension face shall satisfy the following: $s \leq (700 \gamma_e / \beta_s f_{ss}) - 2d_c = 99.99 \text{ in.}$ Shrinkage and Temperature Reinforcement for Footing: Area of reinforcement per foot, on each face, and in each direction, shall satisfy: $A_s \geq (1.30 b h) / (2(b+h) f_y)$ $0.11 \leq A_s \leq 0.60$ $b = \text{least width of section} = 53.2 \text{ in}$ $h = \text{least thickness of section} = 21.0 \text{ in}$ $f_y = 60.0 \text{ ksi}$ $A_s \geq (1.30 b h) / (2(b+h) f_y) = 0.16 \text{ in}^2 / \text{ft}$ $A_s \geq 0.11 \text{ in}^2 / \text{ft}$ $A_s \leq 0.60 \text{ in}^2 / \text{ft}$ Therefore, Required $A_s = 0.16 \text{ in}^2 / \text{ft}$ Therefore, Minimum $A_s = 0.20 \text{ in}^2 / \text{ft}$ <table><tr><td>Use</td><td>4</td><td>spaced</td><td>@ 12 in.</td><td>max</td></tr><tr><td></td><td>$A_s =$</td><td>0.20</td><td>in^2</td><td></td></tr><tr><td></td><td>Dia =</td><td>0.500</td><td>in</td><td></td></tr></table> Spacing shall not exceed 12" for walls > 18" Thick: Wall Thickness exceed 18"? YES Use 12 in Spacing Max	Use	4	spaced	@ 12 in.	max		$A_s =$	0.20	in^2			Dia =	0.500	in		5.7.3.4-1 5.10.8-1 5.10.8-2
Use	4	spaced	@ 12 in.	max													
	$A_s =$	0.20	in^2														
	Dia =	0.500	in														

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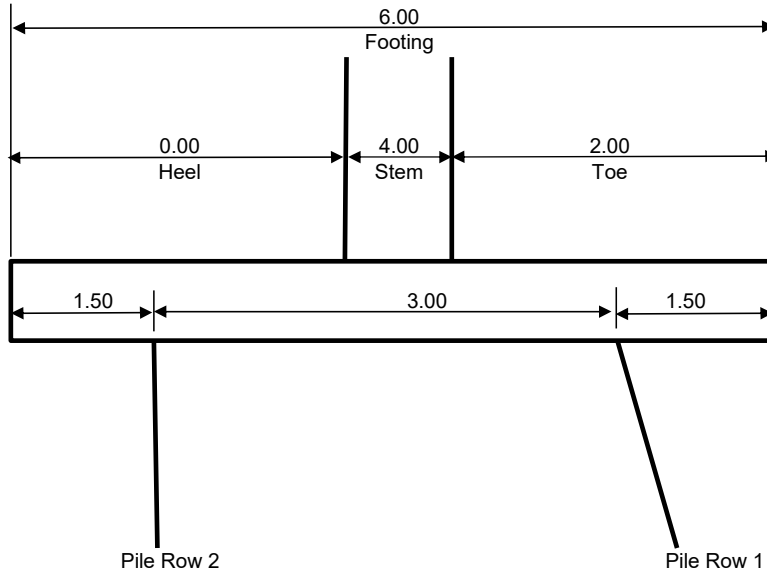
Reference	CALCULATIONS	NOTES/OUTPUT
	<u>BACKWALL & STEM INTERFACE SHEAR CHECK</u> Factored interface shear resistance: $V_{ri} = \phi V_{ni}$ $V_{ri} \geq V_{ui}$ $\phi = 0.90$ $V_{ni} = C A_{cv} + \mu L (A_{st} f_y + P_c)$ Must be $\leq$ the lesser of $K_1 f_c A_{cv}$ $K_2 A_{cv}$ A_{cv} = Area of concrete in shear transfer = 252.0 in² A_{st} = Area of Interface Shear Reinforcement = 0.62 in² C = 0.0750 ksi μL = 0.60 K_1 = 0.20 K_2 = 0.80 ksi f_y = 60.00 ksi f_c = 4.00 ksi P_c = Permanent compressive force normal to shear plane. 0.00 kip It is conservative to ignore this so it will be taken as zero. $V_{ni} = C A_{cv} + \mu L (A_{st} f_y + P_c) = 41.2 \text{ kip}$ Must be $\leq$ the lesser of $K_1 f_c A_{cv} = 201.6 \text{ kip}$ $K_2 A_{cv} = 201.6 \text{ kip}$ Therefore, $V_{ni} = 41.2 \text{ kip}$ $V_{ri} = \phi V_{ni} = 37.10 \text{ kip}$$\text{Max Force} = V_u = 0.51 \text{ kip} \quad \text{OK}$ Check minimum shear reinforcement at interface: $A_{st} \geq (0.05) A_{cv} / f_y$ $A_{st} = 0.62 \text{ in}^2$$(0.05) A_{cv} / f_y = 0.21 \text{ in}^2 \quad \text{OK}$ OK	5.8.4.1-1 5.8.4.1-2 5.5.4.2.1 5.8.4.1-3 5.8.4.1-4 5.8.4.1-5 5.8.4.3 (for a clean, unroughened surface)

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PROJ. NAME & LOCATION		LAK-6-2.06 Forward Abutment - Proposed Configuration		SUBJECT		ABUTMENT DESIGN CHECK	

Reference	CALCULATIONS	NOTES/OUTPUT
	STEM & FOOTING INTERFACE SHEAR CHECK Factored interface shear resistance: $V_{ri} = \phi V_{ni}$ $V_{ri} \geq V_{ui}$ $\phi = 0.90$ $V_{ni} = C A_{cv} + \mu L (A_{st} f_y + P_c)$ Must be $\leq$ the lesser of $K_1 f_c A_{cv}$ $K_2 A_{cv}$ A_{cv} = Area of concrete in shear transfer = 576.0 in² A_{st} = Area of Interface Shear Reinforcement = 0.62 in² C = 0.0750 ksi μL = 0.60 K_1 = 0.20 K_2 = 0.80 ksi f_y = 60.00 ksi f_c = 4.00 ksi P_c = Permanent compressive force normal to shear plane. 0.00 kip It is conservative to ignore this so it will be taken as zero. $V_{ni} = C A_{cv} + \mu L (A_{st} f_y + P_c) = 65.5 \text{ kip}$ Must be $\leq$ the lesser of $K_1 f_c A_{cv} = 460.8 \text{ kip}$ $K_2 A_{cv} = 460.8 \text{ kip}$ Therefore, $V_{ni} = 65.5 \text{ kip}$ $V_{ri} = \phi V_{ni} = 58.97 \text{ kip}$$\text{Max Force} = V_u = 2.63 \text{ kip} \quad \text{OK}$ Check minimum shear reinforcement at interface: $A_{st} \geq (0.05) A_{cv} / f_y$ $A_{st} = 0.62 \text{ in}^2$$(0.05) A_{cv} / f_y = 0.48 \text{ in}^2 \quad \text{OK}$ OK	5.8.4.1-1 5.8.4.1-2 5.5.4.2.1 5.8.4.1-3 5.8.4.1-4 5.8.4.1-5 5.8.4.3 (for a clean, unroughened surface)

COMPLETED BY DATE CHECKED BY PROJ. NO. PROJ. NAME & LOCATION SUBJECT **DETERMINE PILE LAYOUT AND AXIAL LOADS:**Footing and Pile Layout:

All dimensions in feet:

Calculate The Pile Group Eccentricity and Moment of Inertia About the Footing Center:

Item	Longitud. Spacing	Batter XH:12V	# Pile/ft	Edge Dist or Spacing	e	#Pile * e	e' =	#Pile * e'^2 =
Row 1	5.75	3	0.17	1.50	1.50	0.26	1.50	0.39
Row 2	5.75	0	0.17	3	-1.50	-0.26087	-1.50	0.39
			0.34782609	e =	0.00	0	I =	0.78

Determine the Loads Acting on The Piles:

Vertical Load, Horizontal Load, and Moment at Footing Bottom per Foot:

	V at Footing Bottom (k) ¹	H at Footing Bottom (k) ²	e vertical load (ft) ¹	Moment Arm = (e vertical load) - (e pile group)	Moment about CG Pile = Moment Arm * V
STR I	24.0	7.6	1.13	1.13	27.06
STR III	16.3	6.0	1.26	1.26	20.61
STR V	22.3	6.3	1.15	1.15	25.57
EE I	17.9	5.1	0.45	0.45	7.98
SERV I	17.2	5.5	1.24	1.24	21.25

1. From bearing load table.
2. From sliding load table.

Vertical Pile Loads per Foot per Row:

	V _{R2} (k)	V _{R1} (k)
STR I	17.048	120.768
STR III	7.410	86.415
STR V	15.005	113.030
EE I	36.204	66.777
SERV I	8.649	90.115

$$V_{R1}, V_{R2} = \frac{V}{\text{Total \# of Pile per ft}} + \frac{M e'}{I}$$

COMPLETED BY DATE CHECKED BY PROJ. NO. PROJ. NAME & LOCATION SUBJECT Determine the Loads Acting on The Piles: (continued)

Total Horizontal Pile Load Due to Batter and Applied Vertical Load, Compare to Actual Horizontal Applied Force (per foot):

	H (k)	FS
STR I	30.192	3.989
STR III	21.604	3.593
STR V	28.257	4.461
EE I	16.694	3.247
SERV I	22.529	4.108

$$H = \left(\frac{V_{R2}}{12} * \text{Row 2 Batter} \right) + \left(\frac{V_{R1}}{12} * \text{Row 1 Batter} \right)$$

$$\text{Factor of Safety} = FS = \left(\frac{H}{H \text{ at Footing Bottom}} \right)$$

Min FS= 3.25

Pile Axial Load per Pile:

	A _{R2} (k/ft)	A _{R1} (k/ft)
STR I	17.048	124.485
STR III	7.410	89.075
STR V	15.005	116.508
EE I	36.204	68.832
SERV I	8.649	92.888

Factored Pile Axial Capacity = 152.00 kips per pile

$$A_{R1}, A_{R2} = \frac{V_{Rn}}{12} * \sqrt{\text{Row } n \text{ Batter}^2 + 12^2}$$

Strength I= 124.48 OK 1.221 C/D Ratio



Project:

LAK-6-2.06

Subject:

Dowel Check

Project No.:

75926

Prepared By:

UL

Date:

1/18/2024

Checked By:

DOR

Date:

2/15/2024

Check Dowel Requirement

From Stem Design, Moment and axial force at the base of stem

Total	Mu (k-ft)	Pu (k)
STR I	27.95	17.96
STR III	16.21	10.05
STR V	25.27	16.15
SERV I	24.21	12.56

Calculate f_{ss} - Tensile Stress in the Steel Reinforcement due to the moment acting at the base of stem. For conservative approach ignore compression axial force (Pu).

Positive Moment:

$$M_u = \begin{array}{ll} 27.95 & \text{kip-ft / ft} \\ 335.44 & \text{kip-in / ft} \end{array}$$

Calculate Actual Stress in Reinforcement:

To solve for the actual stress in the reinforcement, the transformed moment of inertia and the distance from the neutral axis to the centroid of the reinforcement must be computed.

$$\begin{array}{llll} d_{e1} = & 42.69 & \text{in} & \\ d_{e2} = & 36.00 & \text{in} & \\ A_{s1} = & 0.31 & \text{in}^2 & \text{(#5 Dowel bars)} \\ A_{s2} = & 0.44 & \text{in}^2 & \text{(Use #6 bar from existing stem)} \\ n = & 7.97 & & \end{array}$$

$$r = A_s / (b * d_e) = 0.0005870$$

$$k = \text{SQRT}[(r * n)^2 + (2 * r * n)] - (r * n) = 0.092$$

$$k * d_e = 3.93$$

Determine Transformed Moment of Inertia:

$$I_t = 1/3 * 12 \text{ in/ft} * (k * d_e)^3 + \Sigma(n * A_s * (d_e - k * d_e)^2) = 7557.26 \text{ in}^4/\text{ft}$$

Determine actual stress in reinforcement:

$$y = d_e - k * d_e = 38.75$$

$$f_{ss} = (n * (M_u * y)) / I_t = 13.70 \text{ ksi} \quad \text{(Stress in #5 Dowel bars)}$$

$$P_{\text{Max}} = f_{ss} * A_s = 4.25 \text{ Kips} \quad \text{(Force in #5 Dowel bars)}$$



Project:
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Dowel Check
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Steel Strength in Tension:

$$\phi_t T_n = \phi_t * 0.76 * A_b * F_{tb}$$

LRFD 6.13.2.10.2-1

$$\begin{aligned}\phi_t &= 0.8 \\ A_b &= 0.310 \text{ in}^2 \\ F_{tb} &= 60 \text{ ksi} \\ \phi_t T_n &= 11.31 \text{ Kips} \geq 4.25 \text{ Kips}\end{aligned}$$

OK

Concrete Breakout Strength of Anchor in Tension

$$\text{Breakout Strength } \phi N_{cb} = \phi (\psi_{ed,N}) (\psi_{c,N}) (\psi_{cp,N}) N_b * A_{nc} / A_{nco}$$

ACI 17.6.2.1a

$$\begin{aligned}\phi &= 0.75 \\ C_{a,1} &= 5 \text{ in} \\ C_{a,min} &= 5 \text{ in} \\ h_{ef} &= 12 \text{ in} \\ f'_c &= 4000 \text{ psi}\end{aligned}$$

$$\psi_{ed,N} = 0.7 + 0.3 * C_{a,min} / (1.5 h_{ef}) = 0.783333 \quad \text{ACI 17.6.2.4.1b}$$

$$\psi_{c,N} = 1.4 \quad \text{ACI 17.6.2.5}$$

$$\psi_{cp,N} = 1 \quad (\text{Supplementary reinforcement provided}) \quad \text{ACI 17.6.2.6}$$

$$N_b = K_c \lambda_a (f'_c)^{1.5} = 44.69 \text{ Kips} \quad k_c = 17; \lambda_a = 1$$

$$S_1 = 1.00 \text{ ft}$$

$$S_2 = 1.00 \text{ ft}$$

$$A_{nco} = 9 h_{ef}^2 = 9 \text{ ft}^2$$

$$A_{nc} = (C_{a,1} + 1.5 h_{ef}) * (S_1 / 2 + S_2 / 2) = 1.917 \text{ ft}^2$$

$$\phi N_{cb} = 7.83 \text{ Kips} \geq 4.25 \text{ Kips}$$

OK



Project:
Subject:
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Checked By:

LAK-6-2.06

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DOR

Project No.:	75926
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Date:	2/15/2024

Bond Strength of Adhesive Anchor in tension

$$\text{Bond Strength } \phi N_a = \phi(\psi_{ed,Na})(\psi_{cp,Na})Nba * A_{na} / A_{nao}$$

ACI 17.6.5.1a

$$\phi = 0.75$$

$$d_a = 0.625 \text{ in}$$

$$\tau_{uncr} = 260 \text{ psi}$$

$$C_{Na} = 3.0 \text{ in}$$

$$C_{a,min} = 5 \text{ in}$$

ACI Table 17.6.5.2.5

ACI 17.6.5.2b

$$\psi_{ed,Na} = 1$$

$$\psi_{cp,Na} = 1$$

(Supplementary reinforcement provided)

ACI 17.6.5.4.1a

ACI 17.6.5.5.1

$$A_{na} = (C_a + 1 + 1.5h_{ef}) * (S_1/2 + S_2/2) =$$

$$1.917 \text{ ft}^2$$

$$A_{nao} = (2C_{Na})^2 =$$

$$0.256 \text{ ft}^2$$

ACI 17.6.5.2a

$$\tau_{cr} = 80 \text{ psi}$$

ACI Table 17.6.5.2.5

$$Nba = \lambda_a * \tau_{cr} * \pi * d_a * h_{ef} =$$

$$1.88 \text{ Kips}$$

$$\phi N_a = 10.57 \text{ Kips}$$

≥

$$4.25 \text{ Kips}$$

OK

COMPLETED BY:	UL		DATE:	January 25, 2024
CHECKED BY:	DOR		PROJ. NO:	75926
PROJECT NAME:	LAK-6-2.06 PID 112996		SUBJECT:	Pile Capacity

CALCULATIONS	REFERENCE																																																																																																																																				
<u>HP PILE CAPACITY CALCULATION:</u> <u>References:</u> AASHTO LRFD Bridge Design Specifications 2020, ninth edition <u>Methodology:</u> Determine the axial and moment capacity of the the HP pile. Per AASHTO 6.15.3.1, the axial resistance shall be per Article 6.9.2.1 using the resistance factor in Article 6.5.4.2. Per AASHTO 6.15.3.2, combined axial and moment force effects shall be per Article 6.9.2.2 using the resistance factors in Article 6.5.4.2 <u>Inputs:</u> <table style="width: 100%;"> <tr> <td style="width: 30%;">Corrosion =</td> <td style="width: 40%;">=0.00047in/yr*(75+60)yrs</td> <td style="width: 10%;">0.06345 in</td> <td style="width: 20%;"></td> </tr> </table> <table style="width: 100%; margin-top: 10px;"> <tr> <td colspan="4">HP Pile Type: Modified 12BP53</td> </tr> <tr><td>HP Depth, d =</td><td>11.65</td><td>in</td><td></td></tr> <tr><td>Web Thickness, t_w =</td><td>0.308</td><td>in</td><td></td></tr> <tr><td>HP Distance to Fillet Radius, k =</td><td>1.125</td><td>in</td><td></td></tr> <tr><td>Flange Width, b_f:</td><td>11.9</td><td>in</td><td></td></tr> <tr><td>Flange Thickness, t_f:</td><td>0.308</td><td>in</td><td></td></tr> <tr><td>Area of HP Shape = A =</td><td>11.01</td><td>in²</td><td></td></tr> <tr><td>Modulus of Elasticity for Steel, E =</td><td>29000</td><td>ksi</td><td></td></tr> <tr><td>Yield Strength of Steel, F_y =</td><td>32</td><td>ksi</td><td></td></tr> <tr><td>Section Modulus About Weak Y-Axis, S_y =</td><td>14.6</td><td>in³</td><td></td></tr> <tr><td>Section Modulus About Strong X-Axis, S_x =</td><td>48.8</td><td>in³</td><td></td></tr> <tr><td>Plastic Modulus About Weak Y-Axis, Z_y =</td><td>22.2</td><td>in³</td><td></td></tr> <tr><td>Radius of Gyration, r_y =</td><td>2.78</td><td>in</td><td></td></tr> <tr><td>Radius of Gyration, r_x =</td><td>5.03</td><td>in</td><td></td></tr> <tr><td>Moment of Inertia, I_y =</td><td>87.00</td><td>in⁴</td><td></td></tr> <tr><td>Moment of Inertia, I_x =</td><td>284.00</td><td>in⁴</td><td></td></tr> <tr><td>Warping Torsional Constant, C_w =</td><td>2782.00</td><td>in⁶</td><td></td></tr> <tr><td>St. Venant Torsional Constant, J =</td><td>0.34</td><td>in⁴</td><td></td></tr> <tr><td>Compression resistance factor, H-Piles Axial Only, Φ_c =</td><td>0.50</td><td></td><td>AASHTO 6.5.4.2</td></tr> <tr><td>Compression resistance factor, H-Piles Combined Axial & Flexure, Φ_c =</td><td>0.70</td><td></td><td>AASHTO 6.5.4.2</td></tr> <tr><td>Compression resistance factor, H-Piles Extreme Event, Φ_c =</td><td>1.00</td><td></td><td>AASHTO 6.5.5</td></tr> <tr><td>Flexural Resistance Factor, Φ_f =</td><td>1.00</td><td></td><td>AASHTO 6.5.4.2</td></tr> <tr><td>Flange Plate Buckling Coefficient, k =</td><td>0.56</td><td></td><td>AASHTO Tbl 6.9.4.2.1-1</td></tr> <tr><td>Web Plate Buckling Coefficient, k =</td><td>1.49</td><td></td><td>AASHTO Tbl 6.9.4.2.1-1</td></tr> <tr><td>Strong X-Axis Effective Length Factor, K_x =</td><td>0.65</td><td></td><td>AASHTO 4.6.2.5</td></tr> <tr><td>Strong X- Axis Unbraced Length for Compression Flexural Buckling, L_x =</td><td>144</td><td>in</td><td>8 pile diameters</td></tr> <tr><td>Weak Y-Axis Effective Length Factor, K_y =</td><td>0.65</td><td></td><td></td></tr> <tr><td>Weak Y- Axis Unbraced Length for Compression Flexural Buckling, L_y 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COMPLETED BY:	UL		DATE:	January 25, 2024
CHECKED BY:	DOR		PROJ. NO:	75926
PROJECT NAME:	LAK-6-2.06 PID 112996		SUBJECT:	Pile Capacity

CALCULATIONS	REFERENCE																		
HP PILE CAPACITY CALCULATION (CONTINUED):																			
<u>Axial Capacity:</u>	AASHTO 6.9.2.1																		
Determine Compressive Resistance:																			
$P_r = \phi_c P_n$	AASHTO 6.9.2.1-1																		
H-Piles Axial Only, $\phi_c =$	0.50 AASHTO 6.5.4.2																		
H-Piles Combined Axial & Flexure, $\phi_c =$	0.70 AASHTO 6.5.4.2																		
H-Piles Extreme Event, $\phi_c =$	1.00 AASHTO 6.5.5																		
P_n = nominal compressive resistance	AASHTO 6.9.4																		
Consider flexural buckling and torsional buckling.	AASHTO 6.9.4.1.1 & Table 6.9.4.1.1-1																		
<u>Check for Slender Elements:</u>																			
The compression capacity depends on if there are slender elements. Check for slender elements per Article 6.9.4.2.1.																			
Longitudinally unstiffened cross section elements satisfying the following limit shall be defined as nonslender for axial compression:																			
$b / t \leq \lambda r$	AASHTO Eq. 6.9.4.2.1-1																		
<table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">Flange:</td> <td style="text-align: center;">Web:</td> </tr> <tr> <td>b=</td> <td style="text-align: center;">5.94</td> <td style="text-align: center;">9.40</td> </tr> <tr> <td>t=</td> <td style="text-align: center;">0.3081</td> <td style="text-align: center;">0.3081</td> </tr> <tr> <td>k =</td> <td style="text-align: center;">0.56</td> <td style="text-align: center;">1.49</td> </tr> <tr> <td>b/t =</td> <td style="text-align: center;">19.27</td> <td style="text-align: center;">30.51</td> </tr> <tr> <td>$\lambda r = k \sqrt{E/F_y} =$</td> <td style="text-align: center;">16.86</td> <td style="text-align: center;">44.85</td> </tr> </table>		Flange:	Web:	b=	5.94	9.40	t=	0.3081	0.3081	k =	0.56	1.49	b/t =	19.27	30.51	$\lambda r = k \sqrt{E/F_y} =$	16.86	44.85	AASHTO Tbl 6.9.4.2.1-1
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$\lambda r = k \sqrt{E/F_y} =$	16.86	44.85																	
Slender Non-Slender																			
Equation to Use = Slender																			
<u>Nominal Compression Resistance for Nonslender and Longitudinally Unstiffened Members:</u>	AASHTO 6.9.4.1																		
For nonslender longitudinally unstiffened elements satisfying the width-to-thickness or slenderness ratio limits in Article 6.9.4.2.1, P_n shall be determined as follows:																			
If $P_o / P_e \leq 2.25$, then:																			
$P_n = (0.658^{(P_o/P_e)}) P_o$	AASHTO 6.9.4.1.1-1																		
Otherwise:																			
$P_n = 0.877 P_e$	AASHTO 6.9.4.1.1-2																		
P_o = nominal yield resistance = $F_y A_g$																			
$F_y = 32.00$ ksi																			
$A_g = 11.01$ in ²																			
$P_o = 352.32$ kips																			

COMPLETED BY:	UL		DATE:	January 25, 2024
CHECKED BY:	DOR		PROJ. NO:	75926
PROJECT NAME:	LAK-6-2.06 PID 112996		SUBJECT:	Pile Capacity

CALCULATIONS	REFERENCE
HP PILE CAPACITY CALCULATION (CONTINUED):	
<u>Axial Capacity (Continued):</u>	
<u>Determine Pe for Flexural Buckling:</u> Determine Pe: Pe = Flexural Buckling Elastic critical buckling resistance $P_e = \frac{\pi^2 E}{(K L / r_s)^2} A_g$ P_{ex} = 9100.59 kips P_{ey} = 2779.86 kips Therefore, Pe = 2779.86 kips (Flexural Buckling) <u>Determine Pe for Torsional Buckling:</u> Pe = Torsional Buckling Elastic critical buckling resistance $P_e = \left[\frac{\pi^2 E C_w}{(K_z L_z)^2} + G J \right] \frac{A_g}{I_x + I_y}$ G = 0.385 E = 11165.00 ksi Pe = 1252.89 kips (Torsional Buckling) <u>Determine Controlling Pe:</u> Final Pe = 1252.89 kips <u>Determine Pn for nonslender and longitudinally unstiffened elements:</u> P_o / Pe = 0.28 If P_o / Pe <= 2.25, then: $P_n = (0.658^{(P_o/P_e)}) P_o = 313.20 \text{ kips}$ Otherwise: $P_n = 0.877 P_e = 1098.79 \text{ kips}$ Therefore, Pn = 313.20 kips (nonslender)	AASHTO 6.9.4.1.2 AASHTO 6.9.4.1.2-1 AASHTO 6.9.4.1.3-1 AASHTO 6.9.4.1.1-1 AASHTO 6.9.4.1.1-2

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PROJECT NAME: LAK-6-2.06 PID 112996



DATE: January 25, 2024

PROJ. NO: 75926

SUBJECT: Pile Capacity

CALCULATIONS	REFERENCE
HP PILE CAPACITY CALCULATION (CONTINUED):	
<u>Axial Capacity (Continued):</u>	
<u>Nominal Compression Resistance for Slender and Longitudinally Unstiffened:</u>	
For compression members with cross sections containing any slender elements, Pn shall be determined as specified in Article 6.9.4.2.2.	AASHTO 6.9.4.1.1
For compression members containing any slender elements, the nominal compressive resistance, Pn, shall be taken as the smallest value based on the applicable modes of flexural buckling, torsional buckling, and flexural-torsional buckling and shall be computed as follows:	AASHTO 6.9.4.2.2a
$P_n = F_{cr} A_{eff}$	AASHTO 6.9.4.2.2a-1
$F_{cr} = \frac{P_{cr}}{A_g}$	AASHTO 6.9.4.2.2a-2
$P_{cr} = 313.20 \text{ kips}$ $A_g = 11.01 \text{ in}^2$ $F_{cr} = 28.45 \text{ ksi}$	Per Eq. 6.9.4.1.1-1 or Eq. 6.9.4.1.1-2 Above
A_{eff} = Effective area of the cross section (in ²)	
For rolled section,	
$A_{eff} = A_g - \sum (b - b_e) t$	AASHTO 6.9.4.2.2a-3
Effective Width:	
If $\frac{b}{t} \leq \lambda_r \sqrt{\frac{F_y}{F_{cr}}}$	
$b_e = b$	AASHTO 6.9.4.2.2b-1
If $\frac{b}{t} > \lambda_r \sqrt{\frac{F_y}{F_{cr}}}$	
$b_e = b \left[\left(1 - c_1 \sqrt{\frac{F_{el}}{F_{cr}}} \right) \sqrt{\frac{F_{el}}{F_{cr}}} - c_3 \right]$	AASHTO 6.9.4.2.2b-2

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CALCULATIONS

REFERENCE

HP PILE CAPACITY CALCULATION (CONTINUED):

Axial Capacity (Continued):

Nominal Compression Resistance for Slender and Longitudinally Unstiffened (Continued):

Effective Width (Continued):

	Flange:	Web:	
c1 =	0.22	0.18	Tbl. 6.9.4.2.2b-1
c2 =	1.49	1.31	Tbl. 6.9.4.2.2b-1
c3 =	0	0	Tbl. 6.9.4.2.2b-1
b =	5.94	9.40	in
t =	0.3081	0.3081	in
b/t =	19.27	30.51	
λ_r =	16.86	44.85	6.9.4.2.2b
$F_{el} = \left(c_2 \frac{\lambda_r}{\left(\frac{b}{t} \right)} \right)^2 F_y =$	54.38	118.70	AASHTO 6.9.4.2.2b-4
sqrt(F_y / F_{cr}) =	1.0606	1.0606	
$\lambda_r * \text{sqrt}(F_y / F_{cr}) =$	17.88	47.57	
Eq. To Use for b_e =	b-2	b-1	
b_e Per Eq. AASHTO 6.9.4.2.2b-1	5.94	9.40	
b_e per AASHTO 6.9.4.2.2b-2	5.71	12.14	
Final b_e =	5.71	9.40	in

Effective Area:

$$A_{eff} = A_g - \sum (b - b_e) t$$

	Flange:	Web:	
b - b_e	0.23	0.00	in
t	0.3081	0.3081	in
(b - b_e) t	0.07	0.00	in ²
Sum = (4* Flange) + Web =	0.28	in ²	
A_g =	11.01	in ²	
A_{eff} =	10.73	in²	

$$P_n = F_{cr} A_{eff}$$

F_{cr} =	28.45	ksi
A_{ef} =	10.73	in ²
P_n =	305.31	kip (slender)

AASHTO 6.9.4.2.2a-1

Determine Compressive Resistance:

Slender or Non-Slender: Slender
Therefore, P_n = 305.31

P _r (Extreme Event) =	305.31	kips
P _r (Strength, Axial Only) =	152.65	kips
P _r (Strength, Combined Axial and Flexure) =	213.71	kips

COMPLETED BY: UL

CHECKED BY: DOR

PROJECT NAME: LAK-6-2.06 PID 112996



DATE: January 25, 2024

PROJ. NO: 75926

SUBJECT: Pile Capacity

CALCULATIONS

REFERENCE

HP PILE CAPACITY CALCULATION (CONTINUED):

Minor Axis Flexural Capacity:

Determine the Moment Capacity of the HP Pile about the weak Y-Axis:

Weak Axis Moment Resistance:

$$M_{ry} = \Phi_f M_{ny}$$

AASHTO 6.12.1.2.1-2

$$\Phi_f = 1.0$$

AASHTO 6.5.4.2

Determine the flange slenderness ratios:

$$\lambda_f = \text{flange slenderness ratio} = b_f / 2t_f =$$

AASHTO 6.12.2.2.1-3

$$\lambda_f = 19.27$$

$$\lambda_{pf} = \text{limiting slenderness ratio for a compact flange} = 0.38 \sqrt{E/F_y}$$

AASHTO 6.12.2.2.1-4

$$\lambda_{pf} = 11.44$$

$$\lambda_{rf} = \text{limiting slenderness ratio for a non-compact flange} = 0.83 \sqrt{E/F_y}$$

AASHTO 6.12.2.2.1-5

$$\lambda_{rf} = 24.99$$

If $\lambda_f \leq \lambda_{pf}$, Moment Capacity is as follows:

$$M_{ny} = M_p$$

AASHTO 6.12.2.2.1-1

$$\text{For H-Shapes, } M_p = 1.5 F_y S = 700.80 \text{ kip-in}$$

If $\lambda_{pf} < \lambda_f \leq \lambda_{rf}$, Moment Capacity is as follows:

$$M_n = \left[1 - \left(1 - \frac{S_y}{Z_y} \right) \left(\frac{\lambda_f - \lambda_{pf}}{0.45 \sqrt{\frac{E}{F_y}}} \right) \right] F_y Z_y$$

AASHTO 6.12.2.2.1-2

$$S_y / Z_y = 0.6577$$

$$\lambda_f - \lambda_{pf} = 7.8287$$

$$0.45 \sqrt{E/F_y} = 13.5468$$

$$F_y Z_y = 710.40$$

$$M_{ny} = 569.85 \text{ kip-in}$$

Therefore, M_{ry} is as follows:

$$M_{ry} = 569.85 \text{ kip-in}$$

COMPLETED BY:	UL	DATE:	January 25, 2024
CHECKED BY:	DOR	PROJ. NO:	75926
PROJECT NAME:	LAK-6-2.06 PID 112996	SUBJECT:	Pile Capacity



CALCULATIONS	REFERENCE
HP PILE CAPACITY CALCULATION (CONTINUED):	
Major Axis Flexural Capacity:	
Per 6.12.2.2.1, for flexure about an axis perpendicular to the web, section 6.10 shall apply.	
Compression Flange Flexural Resistance:	AASHTO 6.10.8.2
Flexural resistance of the compression flange shall be taken as the smaller of the local buckling resistance and the lateral torsional buckling resistance.	
Local Buckling Resistance:	AASHTO 6.10.8.2.2
The local buckling resistance of the compression flange shall be taken as:	
λ_f = flange slenderness of the compression flange = $b_{fc} / 2t_{fc}$ =	AASHTO 6.10.8.2.2-3
λ_f = 19.27	
λ_{pf} = limiting slenderness for a compact flange = $0.38 \sqrt{E/F_{yc}}$	AASHTO 6.10.8.2.2-4
λ_{pf} = 11.44	
λ_{rf} = limiting slenderness for a non-compact flange = $0.56 \sqrt{E/F_{yr}}$	AASHTO 6.10.8.2.2-5
$F_{yr} = 0.7 F_{yc} = 22.40$	
$\lambda_{rf} = 20.15$	
If $\lambda_f \leq \lambda_{pf}$, then $F_{nc} = R_b R_h F_{yc}$	AASHTO 6.10.8.2.2-1
Otherwise,	
$F_{nc} = \left[1 - \left(1 - \frac{F_{yr}}{R_h F_{yc}} \right) \left(\frac{\lambda_f - \lambda_{pf}}{\lambda_{rf} - \lambda_{pf}} \right) \right] R_b R_h F_{yc}$	AASHTO 6.10.8.2.2-2
Determine F_{nc} per 6.10.8.2.2-1:	AASHTO 6.10.8.2.2-1
If $2D_c / t_w \leq \lambda_{rw}$, $R_b = 1.0$	AASHTO 6.10.1.10.2-1
$D_c = 5.52$	
$2D_c / t_w = 35.81$	
$\lambda_{rw} = 4.6 \sqrt{\frac{E}{F_{yc}}} \leq \lambda_{rw} = \left(3.1 + \frac{5.0}{a_{wc}} \right) \sqrt{\frac{E}{F_{yc}}} \leq 5.7 \sqrt{\frac{E}{F_{yc}}}$	AASHTO 6.10.1.10.2-5
$a_{wc} = (2 D_c t_w) / (b_{fc} t_{fc}) = 0.93$	AASHTO 6.10.1.10.2-8
$(3.1 + (5.0/a_{wc})) = 8.48$	
Coefficient = C = 5.70	
$\lambda_{rw} = C \sqrt{E / F_y} = 171.59$	AASHTO 6.10.1.10.2-5
Use $R_b = 1.0$	
Otherwise:	
$R_b = 1 - \left(\frac{a_{wc}}{1200+300 a_{wc}} \right) \left(\frac{2D_c}{t_w} - \lambda_{rw} \right) \leq 1.0$	AASHTO 6.10.1.10.2-3
$R_b = 1.00$	
Therefore, $R_b = 1.00$	
$R_h = 1.00$	AASHTO 6.10.1.10.1
$F_{nc} = R_b R_h F_{yc} = 32.00$ ksi	
$M_n = F_{nc} * S_x = 1561.60$ k-in	

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CALCULATIONS	REFERENCE
HP PILE CAPACITY CALCULATION (CONTINUED):	
Major Axis Flexural Capacity (Continued):	
Determine F_{nc} per 6.10.8.2.2-2:	
$F_{nc} = \left[1 - \left(1 - \frac{F_{yr}}{R_h F_{yc}} \right) \left(\frac{\lambda_f - \lambda_{pf}}{\lambda_{rf} - \lambda_{pf}} \right) \right] R_b R_h F_{yc}$	AASHTO 6.10.8.2.2-2
$F_{yr} = 22.40$	
$R_h F_{yc} = 32.00$	
$\lambda_f - \lambda_{pf} = 7.83$	
$\lambda_{rf} - \lambda_{pf} = 8.71$	
$R_b R_h F_{yc} = 32.00$	
$F_{nc} = 23.37 \text{ ksi}$	
$M_n = F_{nc} * S_x = 1140.52 \text{ k-in}$	
Therefore, $M_n = 1140.52 \text{ kip-in}$ (Local Buckling)	
Lateral Torsional Buckling Resistance:	
Lateral torsional buckling resistance of the compression flange shall be calculated as follows:	
$L_b = 144 \text{ in}$	
L_p = limiting unbraced length to achieve the nominal flexural resistance of $R_b R_h F_{yc}$ under uniform bending.	
$L_p = 1.0 r_t \sqrt{E/F_{yc}}$	AASHTO 6.10.8.2.3-4
$r_t = \frac{b_{fc}}{\sqrt{12 \left(1 + \frac{1}{3} \frac{D_c t_w}{b_{fc} t_{fc}} \right)}}$	AASHTO 6.10.8.2.3-9
$b_{fc} = 11.87$	
$D_c t_w / b_{fc} t_{fc} = 0.46$	
$r_t = 3.19$	
$L_p = 96.01 \text{ in}$	

COMPLETED BY:

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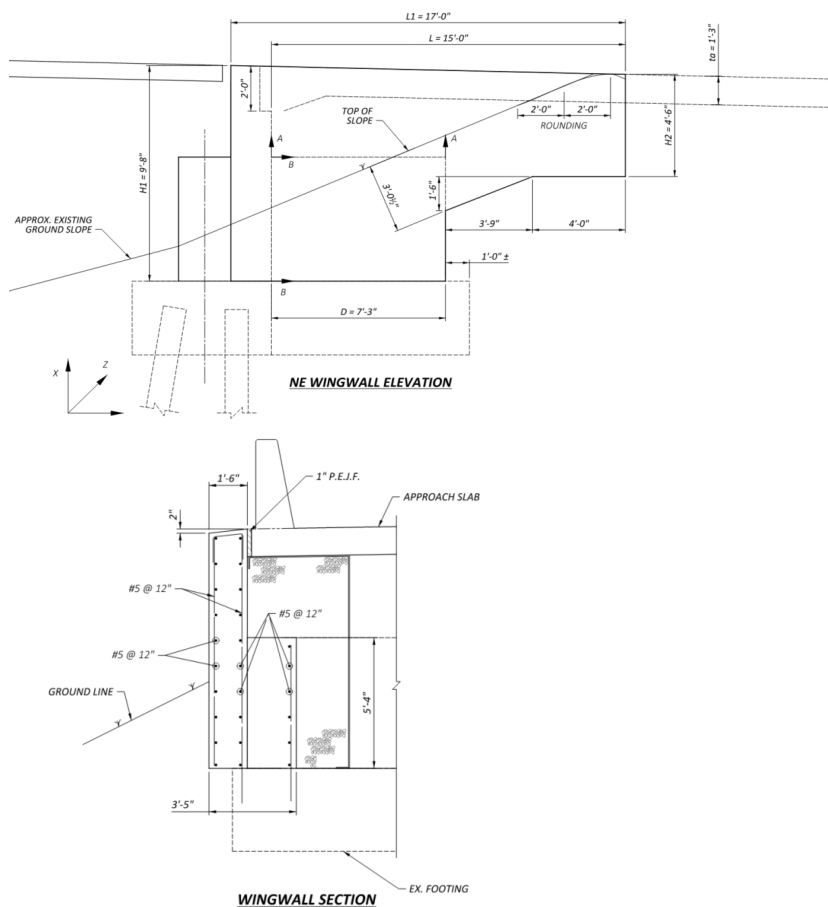
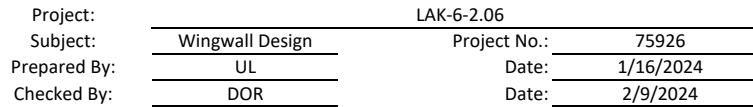
CALCULATIONS	REFERENCE
HP PILE CAPACITY CALCULATION (CONTINUED):	
Major Axis Flexural Capacity (Continued):	
L_r = limiting unbraced length to achieve the onset of nominal yielding under uniform bending with consideration of compression-flange residual stress effects. $L_r = \pi r_t \sqrt{E / F_{yr}} = 360.52 \text{ in}$ If $L_b \leq L_p$, then $F_{nc} = R_b R_h F_{yc} = 32.00 \text{ ksi}$ If $L_p < L_b \leq L_r$, then: $F_{nc} = C_b \left[1 - \left(1 - \frac{F_{yr}}{R_h F_{yc}} \right) \left(\frac{L_b - L_p}{L_r - L_p} \right) \right] R_b R_h F_{yc} \leq R_b R_h F_{yc}$ $C_b = 1.00$ $F_{yr} / R_h F_{yc} = 0.70$ $L_b - L_p / L_r - L_p = 0.18$ $R_b R_h F_{yc} = 32.00$ $F_{nc} = 30.26$ If $L_b > L_r$, then, $F_{nc} = F_{cr} \leq R_b R_h F_{yc}$ $F_{yr} = 0.7 F_{yc} = 22.40 \text{ ksi}$ $F_{cr} = \frac{C_b R_b \pi^2 E}{(L_b / r_t)^2}$ $F_{cr} = 140.40 \text{ ksi}$ $R_b R_h F_{yc} = 32.00 \text{ ksi}$ $F_{nc} = 32.00 \text{ ksi}$ Therefore, $F_{nc} = 30.26 \text{ ksi}$ Therefore, $M_n = 1476.61 \text{ kip-in}$ (Lateral Torsional Buckling) $M_{rz} = 1140.52 \text{ kip-in}$	AASHTO 6.10.8.2.3-5 AASHTO 6.10.8.2.3-1 AASHTO 6.10.8.2.3-2 AASHTO A6.3.3-6 AASHTO 6.10.8.2.3-8

2.3 Wingwall Design



Department of
Transportation







Project:	LAK-6-2.06		
Subject:	Wingwall Design	Project No.:	75926
Prepared By:	UL	Date:	1/16/2024
Checked By:	DOR	Date:	2/9/2024

Length, L_1	=	17.00	ft	
Length, L	=	15.00	ft	
Height, H_1	=	9.71	ft	
Height, H_2	=	4.50	ft	
Thickness, t	=	1.50	ft	
D	=	7.25	ft	
Live Load Surcharge Height, S	=	2	ft	LRFD Table 3.11.6.4-2
Approach Slab Thickness, t_a	=	1.25	ft	
Concrete Unit Weight, γ_c	=	150	pcf	
Backfill Unit Weight, γ_b	=	120	pcf	
Angle of Internal Friction of Backfill, ϕ	=	30	degree	Assumption
Active Earth Pressure Coefficient, $K_a = \frac{1 - \sin(\phi)}{1 + \sin(\phi)}$	=	0.33		
Structural Dead Load, LF_{DC}	=	1.25		LRFD Table 3.4.1-2
Horizontal Earth Pressure Factor, LF_{EH} (Active)	=	1.5		LRFD Table 3.4.1-2
Live Load Surcharge Factor, LF_{LS}	=	1.75		LRFD Table 3.4.1-1
Surcharge Load Factor, LF_{ES}	=	1.5		LRFD Table 3.4.1-2

Design Section A-A

A1. Earth Pressure

K_a	=	0.33
γ_b	=	120 pcf
H_2	=	4.50 ft
t_a	=	1.25 ft
$H = H_2 + t_a$	=	3.25 ft
L	=	15.00 ft
$K_a \gamma_b H L$	=	1.95 klf

$$M_{EH} = \frac{1}{2} K_a \gamma_b H L * H * \frac{H}{3} = 3.43 \text{ ft-kips}$$

$$V_{EH} = \frac{1}{2} K_a \gamma_b H L * H = 3.17 \text{ kips}$$

A2. Live Load Surcharge

K_a	=	0.33
γ_b	=	120 pcf
S	=	2.00 ft
H_2	=	4.50 ft
$H = H_2$	=	4.50 ft
L	=	15.00 ft
$K_a \gamma_b S L$	=	1.20 klf

$$M_{LS} = K_a \gamma_b S L * \frac{H^2}{2} = 12.15 \text{ ft-kips}$$

$$V_{LS} = K_a \gamma_b S L * H = 5.40 \text{ kips}$$



Project:	LAK-6-2.06		
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A3. Approach Slab Surcharge

$$\begin{aligned}K_a &= 0.33 \\ \gamma_c &= 150 \text{ pcf} \\ t_a &= 1.25 \text{ ft} \\ H_2 &= 4.50 \text{ ft} \\ H = H_2 - t_a &= 3.25 \text{ ft} \\ L &= 15.00 \text{ ft} \\ K_a \gamma_c t_a L &= 0.94 \text{ klf}\end{aligned}$$

$$\begin{aligned}M_{ES} &= K_a \gamma_c t_a L * \frac{H^2}{2} = 4.95 \text{ ft-kips} \\ V_{ES} &= K_a \gamma_c t_a L * H = 3.05 \text{ kips}\end{aligned}$$

Summary		Service I		Strength I	
	LF	Moment	Shear	Moment	Shear
A1. Earth Pressure	1.5	3.43	3.17	5.15	4.75
A2. Live Load Surcharge	1.75	12.15	5.40	21.26	9.45
A3. Approach Slab Surcharge	1.5	4.95	3.05	7.43	4.57
Total		20.53	11.62	33.84	18.77
Unit		ft -kips	kips	ft -kips	kips
Per ft of length (7.25ft)		2.83	1.60	4.67	2.59
Unit		ft -kips/ft	kips/ft	ft -kips/ft	kips/ft

Design Section B-B

B1. Earth Pressure

$$\begin{aligned}K_a &= 0.33 \\ \gamma_b &= 120 \text{ pcf} \\ H_2 &= 4.50 \text{ ft} \\ t_a &= 1.25 \text{ ft} \\ H = H_2 - t_a &= 3.25 \text{ ft} \\ L &= 15.00 \text{ ft} \\ H_1 &= 9.71 \text{ ft} \\ H_t = H_2 - t_a &= 3.25 \text{ ft} \\ H_b = H_1 + t_a &= 8.46 \text{ ft} \\ D &= 7.61 \text{ ft} \\ &(\text{Increase } D \text{ by } 5\% \text{ to capture triangular notch})\end{aligned}$$

Zone 1: Area above top of triangular notch

$$\begin{aligned}K_a \gamma_b H &= 0.13 \text{ klf/ft} \\ M_{EH1} &= \frac{1}{2} K_a \gamma_b H * H * \frac{L^2}{2} = 23.77 \text{ ft-kips} \\ V_{EH1} &= \frac{1}{2} K_a \gamma_b H * H * L = 3.17 \text{ kips}\end{aligned}$$

Zone 2: Area below top of triangular notch

$$\begin{aligned}K_a \gamma_b H_t &= 0.13 \text{ klf/ft} \\ K_a \gamma_b H_b &= 0.34 \text{ klf/ft} \\ M_{EH2} &= \frac{1}{2} (K_a \gamma_b H_t + K_a \gamma_b H_b) * (H_b - H_t) * \frac{D^2}{2} = 35.35 \text{ ft-kips} \\ V_{EH2} &= \frac{1}{2} (K_a \gamma_b H_t + K_a \gamma_b H_b) * (H_b - H_t) * D = 9.29 \text{ kips}\end{aligned}$$

$$\begin{aligned}\text{Total} \\ M_{EH} &= M_{EH1} + M_{EH2} = 59.12 \text{ ft-kips} \\ V_{EH} &= V_{EH1} + V_{EH2} = 12.46 \text{ kips}\end{aligned}$$



Project:	LAK-6-2.06		
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B2. Live Load Surcharge

Ka	=	0.33		
Y _b	=	120 pcf		
S	=	2.00 ft	H ₁	= 9.71 ft
H ₂	=	4.50 ft	H _t =H ₂	= 4.50 ft
H=H ₂	=	4.50 ft	H _b =H ₁	= 9.71 ft
L	=	15.00 ft	D	= 7.61 ft
(Increase D by 5% to capture triangular notch)				

Zone 1: Area above top of triangular notch

$$K_a Y_b S = 0.08 \text{ klf/ft}$$

$$M_{LS1} = k_o Y_b S * H * \frac{L^2}{2} = 40.50 \text{ ft-kips}$$

$$V_{LS1} = k_o Y_b S * H * L = 5.40 \text{ kips}$$

Zone 2: Area below top of triangular notch

$$K_a Y_b S = 0.08 \text{ klf/ft}$$

$$M_{LS2} = K_a Y_b S * (Hb - Ht) * \frac{D^2}{2} = 12.08 \text{ ft-kips}$$

$$V_{LS2} = K_a Y_b S * (Hb - Ht) * D = 3.17 \text{ kips}$$

Total

$$M_{LS} = M_{LS1} + M_{LS2} = 52.58 \text{ ft-kips}$$

$$V_{LS} = V_{LS1} + V_{LS2} = 8.57 \text{ kips}$$

B3. Approach Slab Surcharge

Ka	=	0.33		
Y _c	=	150 pcf		
t _a	=	1.25 ft	H ₁	= 9.71 ft
H ₂	=	4.50 ft	H _t =H ₂ -t _a	= 3.25 ft
H = H ₂ -t _a	=	3.25 ft	H _b =H ₁ -t _a	= 8.46 ft
L	=	15.00 ft	D	= 7.61 ft
(Increase D by 5% to capture triangular notch)				

Zone 1: Area above top of triangular notch

$$K_a Y_c t_a = 0.06 \text{ klf/ft}$$

$$M_{ES1} = K_a Y_c t_a * H * \frac{L^2}{2} = 22.85 \text{ ft-kips}$$

$$V_{ES1} = K_a Y_c t_a * H * L = 3.05 \text{ kips}$$



Project:	LAK-6-2.06
Subject:	Wingwall Design
Prepared By:	UL
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Zone 2: Area below top of triangular notch

$$K_a Y_b S = 0.06 \text{ klf/ft}$$

$$M_{ES2} = K_a Y_b t_a * (Hb - Ht) * \frac{D^2}{2} = 9.44 \text{ ft-kips}$$

$$V_{ES2} = K_a Y_b t_a * (Hb - Ht) * D = 2.48 \text{ kips}$$

Total

$$M_{ES} = M_{ES1} + M_{ES2} = 32.29 \text{ ft-kips}$$

$$V_{ES} = V_{ES1} + V_{ES2} = 5.53 \text{ kips}$$

Design Section B-B

Summary

	LF	Service I		Strength I	
		Moment	Shear	Moment	Shear
B1. Earth Pressure	1.5	23.77	3.17	35.65	4.75
	1.5	35.35	9.29	53.03	13.93
B2. Live Load Surcharge	1.75	40.50	5.40	70.88	9.45
	1.75	12.08	3.17	21.13	5.55
B3. Approach Slab Surcharge	1.5	22.85	3.05	34.28	4.57
	1.5	9.44	2.48	14.15	3.72
Total		143.98	26.56	229.12	41.98
Unit		ft -kips	kips	ft -kips	kips
Per ft of Height (5.333 ft)*		27.00	4.98	42.96	7.87
Unit		ft -kips/ft	kips/ft	ft -kips/ft	kips/ft

* Take height from top of footing to the beam seat elevation. For conservative approach, ignore height of shallower section between beam seat and approach slab seat.



Project:	LAK-6-2.06		
Subject:	Wingwall Design	Project No.:	75926
Prepared By:	UL	Date:	1/16/2024
Checked By:	DOR	Date:	2/9/2024

Design Section A-A along beam seat

Load	Service		Strength I	
Moment	2.83	ft-Kips/ft	4.67	ft-Kips/ft
Shear	1.60	Kips/ft	2.59	Kips/ft

Vertical Flexural Reinforcement	#5	@	12	in
Yield Strength of Reinforcement, f_y	=	60.0	ksi	
Elastic Modulus of Steel, E_s	=	29000	ksi	LRFD 5.4.3.2
Compressive Strength of Concrete, f'_c	=	4.0	ksi	BDM 304.2.1
Elastic Modulus of Concrete, E_c	=	3645	ksi	
Modular Ratio, $n = E_s/E_c$	=	7.96	--	
Top Bar Cover, cover	=	2.0	in	
Design Section Width, b	=	12.0	in	
Concrete Flexural Design Factor, β_1	=	0.85	--	LRFD 5.6.2.2
Concrete Shear Beta Factor, β	=	2.00		LRFD 5.7.3.3



Project:	LAK-6-2.06		
Subject:	Wingwall Design	Project No.:	75926
Prepared By:	UL	Date:	1/16/2024
Checked By:	DOR	Date:	2/9/2024

Strength I (LRFD 5.6.3.2)Check $\Phi M_n > M_u$

Wall Thickness, t	=	T_{wall}	
Effective Depth, d	=	t - cover - (1/2 x Horiz. Bar Diam.)	
Depth of Compression Block, a	=	$(A_s \times f_y) / (0.85 \times f'_c \times b)$	
Depth of N.A., c	=	a / β_1	
Resistance Factor for Flexure, Φ	=	$0.75 + 0.15(\epsilon_t - \epsilon_{cl}) / (\epsilon_{tl} - \epsilon_{cl}) < 0.90$, but > 0.75	
	ϵ_{cl}	=	0.002 LRFD Eq. 5.5.4.2-2
	ϵ_{tl}	=	0.005
	ϵ_t	=	$0.003 * (d/c - 1)$
Ultimate Moment, M_u	=	See Table Above	
Factored Flexural Capacity, ΦM_n	=	$\Phi \times A_{s_{PROVIDED}} \times f_y \times (d - a/2)$	

Provided Steel $A_{s_{PROVIDED}}$ (in ²)	Wall Thickness t (in)	Eff. Depth of Wall d (in)	Depth of Comp. Block a (in)	Depth of N.A. c (in)	Steel Tensile Strain ϵ_t --	Resistance Factor Φ --	Factored Resistance ΦM_n (ft-kips/ft)	Strength I Moment M_u (ft-kips/ft)	Performance Ratio --
0.31	18.00	15.06	0.46	0.54	0.0813	0.90	20.7	4.7	0.23

Limits of Reinforcement (LRFD 5.6.3.3)Check $\Phi M_n > \text{Min}(1.33M_u, M_{CR})$

Factored Flexural Capacity, ΦM_n	=	$\Phi \times A_{s_{PROVIDED}} \times f_y \times (d - a/2)$	
33% Greater Moment than Required, $1.33M_u$	=	(See table below)	
Cracking Moment, M_{CR}	=	$\gamma_3(\gamma_1 f_r) S_c / 12$	LRFD Eq. 5.6.3.3-1
Modulus of Rupture, f_r	=	$0.24(f'_c)^{0.5}$	LRFD 5.4.2.6
Section Modulus, S_c	=	$(bt^2 / 6)$	
Section Width, b	=	12.0 in	
Section Depth, t	=	(See table below)	
Compressive Strength of Concrete, f'_c	=	4.0 ksi	
Flexural Cracking Variability Factor, γ_1	=	1.60	LRFD 5.6.3.3
Ratio of Min. Yield Str. to Ultimate Tensile Str., γ_3	=	0.75	LRFD 5.6.3.3

Wall Thickness t (in)	Section Modulus S_c (in ³)	Modulus of Rupture f_r (ksi)	Cracking Moment M_{CR} (k-ft)	Factored Moment M_u (k-ft)	Adjusted Fact. Mom. $1.33M_u$ (k-ft)	Factored Resistance ΦM_n (k-ft)	Performance Ratio
18.0	648.0	0.480	31.1	4.7	6.2	20.7	0.30



Project:	LAK-6-2.06
Subject:	Wingwall Design
Prepared By:	UL
Checked By:	DOR
Project No.:	75926
Date:	1/16/2024
Date:	2/9/2024

Crack Control (LRFD 5.6.7)

Check that spacing of tension reinforcement is less than allowable to control cracking.

Thickness of Concrete Cover, d_c	=	$t - d$	
Flexural Strain Ratio, β_s	=	$1 + d_c / (0.7(t - d_c))$	LRFD Eq. 5.6.7-2
Reinforcement Ratio, ρ	=	$A_{s\text{PROVIDED}} / (bd)$	
Variable for Tensile Stress Calculation, k	=	$((\rho n)^2 + 2\rho n)^{0.5} - \rho n$	
Variable for Tensile Stress Calculation, j	=	$1 - k/3$	
Service Moment, M_{SERVICE}	=	$M_{\text{SERVICE}} \times 12$	
Tensile Stress in Concrete at Service Limits, f_s	=	$M_{\text{SERVICE}} / (A_{s\text{PROVIDED}} \times jd)$	
Modular Ratio, n	=	7.96	
Section Width, b	=	12.00 in	
Exposure Factor, γ_e	=	0.75 Class 2	LRFD 5.6.7
Maximum Spacing Allowable, S_{MAX}	=	$(700\gamma_e) / (\beta_s \times f_s) - 2d_c$	LRFD Eq. 5.6.7-1

d_c (in)	Flexural Strain Ratio β_s -	Provided Steel $A_{s\text{PROVIDED}}$ (in ²)	Reinforce Ratio ρ -	Variable k -	Variable j -	Service Moment M_{SERVICE} (k-in)	Tens. Stress in Rebar f_s (ksi)	Allowable Spacing S_{MAX} (in)	Bar Spa. S (in)	Performance Ratio --
2.94	1.28	0.31	0.0017	0.152	0.949	34.0	7.7	47.7	12	0.25

Shear Design

Wingwall Shear Design (LRFD 5.7.3.3)

Shear Capacity of Concrete Section, ΦV_c	=	$\Phi * 0.0316 \beta f'_c^{1/2} b_v d_v$	AASHTO 5.7.3.3-3
Resistance Factor for Shear, Φ	=	0.90	
Thickness for Shear, $h = t$	=	1.50 ft	
Depth from Compression Fiber to Reinforcement, d	=	1.26 ft	
Effective Shear Depth, d_v	=	$Mn / (A_s \times f_y)$	AASHTO 5.7.2.8
		Not less than Max of (0.9d or 0.72h)	
Design Width, b_v	=	12.0 in	
Beta Factor, β	=	2.0	AASHTO 5.7.3.4.1
Shear Capacity of Stirrups, ΦV_s	=	$\Phi (A_v \times f_y \times d_v / s)$	
Area of Reinforcement (Stirrup), A_v	=	0.00 in ²	
Stirrup Spacing, s	=	0 in	
Total Shear Capacity of Section, ΦV	=	$\Phi V_s + \Phi V_c$	

Capacity

d_v in	Φ_{SHEAR} -	β -	b_v in	ΦV_c klf	ΦV_s klf	ΦV klf	V_u klf	Performance Ratio
14.83	0.90	2.0	12.0	20.3	0.0	20.3	2.59	0.13



Project:	LAK-6-2.06		
Subject:	Wingwall Design	Project No.:	75926
Prepared By:	UL	Date:	1/16/2024
Checked By:	DOR	Date:	2/9/2024

Design Section B-B below beam seat

Load	Service		Strength I	
Moment	27.00	ft-Kips/ft	42.96	ft-Kips/ft
Shear	4.98	Kips/ft	7.87	Kips/ft

Horizontal Flexural Reinforcement	#5	@	12	in	*
*2 Layers of horizontal reinforcement in tension. 1st layer @ 3.06"; 2nd layer @ 26.06" from extreme tension fiber					
Yield Strength of Reinforcement, f_y	=	60.0	ksi		
Elastic Modulus of Steel, E_s	=	29000	ksi	LRFD 5.4.3.2	
Compressive Strength of Concrete, f'_c	=	4.0	ksi	BDM 304.2.1	
Elastic Modulus of Concrete, E_c	=	3645	ksi		
Modular Ratio, $n = E_s/E_c$	=	7.96	--		
Top Bar Cover, cover	=	2.0	in		
Design Section Width, b	=	12.0	in		
Concrete Flexural Design Factor, β_1	=	0.85	--	LRFD 5.6.2.2	
Concrete Shear Beta Factor, β	=	2.00		LRFD 5.7.3.3	



Project:	LAK-6-2.06		
Subject:	Wingwall Design	Project No.:	75926
Prepared By:	UL	Date:	1/16/2024
Checked By:	DOR	Date:	2/9/2024

Strength I (LRFD 5.6.3.2)Check $\Phi M_n > M_u$

Wall Thickness, t	=	T_{wall}	
Effective Depth, d	=	t - cover - (1/2 x Horiz. Bar Diam.)	
Depth of Compression Block, a	=	$(A_s \times f_y) / (0.85 \times f'_c \times b)$	
Depth of N.A., c	=	a / β_1	
Resistance Factor for Flexure, Φ	=	$0.75 + 0.15(\epsilon_t - \epsilon_{cl}) / (\epsilon_{tl} - \epsilon_{cl}) < 0.90$, but > 0.75	
	ϵ_{cl}	= 0.002	LRFD Eq. 5.5.4.2-2
	ϵ_{tl}	= 0.005	
	ϵ_t	= $0.003 * (d/c - 1)$	
Ultimate Moment, M_u	=	See Table Above	
Factored Flexural Capacity, ΦM_n	=	$\Phi \times A_{s_{PROVIDED}} \times f_y \times (d - a/2)$	

Provided Steel $A_{s_{PROVIDED}}$ (in ²)	Wall Thickness t (in)	Eff. Depth of Wall d (in)	Depth of Comp. Block a (in)	Depth of N.A. c (in)	Steel Tensile Strain ϵ_t --	Resistance Factor Φ --	Factored Resistance ΦM_n (ft-kips/ft)	Strength I Moment M_u (ft-kips/ft)	Performance Ratio --
0.62	41.00	27.97	0.91	1.07	0.0752	0.90	76.8	43.0	0.56

Limits of Reinforcement (LRFD 5.6.3.3)Check $\Phi M_n > \text{Min}(1.33M_u, M_{CR})$

Factored Flexural Capacity, ΦM_n	=	$\Phi \times A_{s_{PROVIDED}} \times f_y \times (d - a/2)$	
33% Greater Moment than Required, $1.33M_u$	=	(See table below)	
Cracking Moment, M_{CR}	=	$\gamma_3(\gamma_1 f_r) S_c / 12$	LRFD Eq. 5.6.3.3-1
Modulus of Rupture, f_r	=	$0.24(f'_c)^{0.5}$	LRFD 5.4.2.6
Section Modulus, S_c	=	$(bt^2 / 6)$	
Section Width, b	=	12.0 in	
Section Depth, t	=	(See table below)	
Compressive Strength of Concrete, f'_c	=	4.0 ksi	
Flexural Cracking Variability Factor, γ_1	=	1.60	LRFD 5.6.3.3
Ratio of Min. Yield Str. to Ultimate Tensile Str., γ_3	=	0.75	LRFD 5.6.3.3

Wall Thickness t (in)	Section Modulus S_c (in ³)	Modulus of Rupture f_r (ksi)	Cracking Moment M_{CR} (k-ft)	Factored Moment M_u (k-ft)	Adjusted Fact. Mom. $1.33M_u$ (k-ft)	Factored Resistance ΦM_n (k-ft)	Performance Ratio --
41.0	3362.0	0.480	161.4	43.0	57.1	76.8	0.74



Project:	LAK-6-2.06		
Subject:	Wingwall Design	Project No.:	75926
Prepared By:	UL	Date:	1/16/2024
Checked By:	DOR	Date:	2/9/2024

Crack Control (LRFD 5.6.7)

Check that spacing of tension reinforcement is less than allowable to control cracking.

Thickness of Concrete Cover, d_c	=	$t - d$	
Flexural Strain Ratio, β_s	=	$1 + d_c / (0.7(t - d_c))$	LRFD Eq. 5.6.7-2
Reinforcement Ratio, ρ	=	$A_{s\text{PROVIDED}} / (bd)$	
Variable for Tensile Stress Calculation, k	=	$((\rho n)^2 + 2\rho n)^{0.5} - \rho n$	
Variable for Tensile Stress Calculation, j	=	$1 - k/3$	
Service Moment, M_{SERVICE}	=	$M_{\text{SERVICE}} \times 12$	
Tensile Stress in Concrete at Service Limits, f_s	=	$M_{\text{SERVICE}} / (A_{s\text{PROVIDED}} \times jd)$	
Modular Ratio, n	=	7.96	
Section Width, b	=	12.00 in	
Exposure Factor, γ_e	=	0.75 Class 2	LRFD 5.6.7
Maximum Spacing Allowable, S_{MAX}	=	$(700\gamma_e) / (\beta_s \times f_s) - 2d_c$	LRFD Eq. 5.6.7-1

d_c (in)	Flexural Strain Ratio β_s -	Provided Steel $A_{s\text{PROVIDED}}$ (in ²)	Reinforce Ratio ρ -	Variable k -	Variable j -	Service Moment M_{SERVICE} (k-in)	Tens. Stress in Rebar f_s (ksi)	Allowable Spacing S_{MAX} (in)	Bar Spa. S (in)	Performance Ratio --
3.06	1.12	0.62	0.0018	0.157	0.948	324.0	19.7	17.7	12	0.68

Shear Design

Wingwall Shear Design (LRFD 5.7.3.3)

Shear Capacity of Concrete Section, ΦV_c	=	$\Phi * 0.0316 \beta f'_c^{1/2} b_v d_v$	AASHTO 5.7.3.3-3
Resistance Factor for Shear, Φ	=	0.90	
Thickness for Shear, $h = t$	=	3.42 ft	
Depth from Compression Fiber to Reinforcement, d	=	2.33 ft	
Effective Shear Depth, d_v	=	$Mn / (A_s \times f_y)$	AASHTO 5.7.2.8
		Not less than Max of (0.9d or 0.72h)	
Design Width, b_v	=	12.0 in	
Beta Factor, β	=	2.0	AASHTO 5.7.3.4.1
Shear Capacity of Stirrups, ΦV_s	=	$\Phi (A_v \times f_y \times d_v / s)$	
Area of Reinforcement (Stirrup), A_v	=	0.00 in ²	
Stirrup Spacing, s	=	0 in	
Total Shear Capacity of Section, ΦV	=	$\Phi V_s + \Phi V_c$	

Capacity

d_v in	Φ_{SHEAR} -	β -	b_v in	ΦV_c klf	ΦV_s klf	ΦV klf	V_u klf	Performance Ratio
29.52	0.90	2.0	12.0	40.3	0.0	40.3	7.87	0.20



Project:	LAK-6-2.06		
Subject:	Bridge Geometry	Project No.	075926
Prepared By:	UL	Date:	1/15/2024
Checked By:	DOR	Date:	1/26/2025

Top of Deck, Beam Seat Elevation and Wingwall Length Calculation

Vertical curve data along PGL			
PVI _{sta} =	018+75.00	m (ft) =	3.000
PVI _{elev} =	886.91	PVC _{sta} =	014+75.00
LVC (ft) =	800.00	PVC _{elev} =	886.27
Offset PGL to Crown =	0.0	G1 (%) =	0.1600
slope =	1.60%	G2 (%) =	-2.8400
		PVT _{sta} =	22+75.00
		PVT _{elev} =	875.55

Span 1

D-Dimension

Beam 1=	10.500 in
Beam 2=	10.500 in
Beam 3=	10.500 in
Beam 4=	10.500 in
Beam 5=	10.500 in
Beam 11=	

Skew = 31 Deg 52 Min 50.00 Sec 31.881 Deg

Beam Height = 38.70 in

Bearing Thickness Bent 1 = 3.8776 in

Bearing Thickness Bent 2 = 3.8776 in

Bearing Length = 15.0 in

Approx. Structure Depth All bents

Beam 1=	53.08 in	= 4.4231 ft
Beam 2=	53.08 in	= 4.4231 ft
Beam 3=	53.08 in	= 4.4231 ft
Beam 4=	53.08 in	= 4.4231 ft
Beam 5=	53.08 in	= 4.4231 ft

Approx. Structure Depth All bents

Beam 1=	53.08 in	= 4.4231 ft
Beam 2=	53.08 in	= 4.4231 ft
Beam 3=	53.08 in	= 4.4231 ft
Beam 4=	53.08 in	= 4.4231 ft
Beam 5=	53.08 in	= 4.4231 ft



Project:	LAK-6-2.06		
Subject:	Bridge Geometry	Project No.	075926
Prepared By:	UL	Date:	1/15/2024
Checked By:	DOR	Date:	1/26/2025

Top of Deck, Beam Seat Elevation and Wingwall Length Calculation

Top of Deck Elevations - PGL														
Span Length		Rear Abt.	RA F/BW	CL Brg Pier 1	CL Brg Pier 2	CL Brg Pier 3	CL Brg Pier 4	CL Brg Pier 5	CL Brg Pier 6	CL Brg Pier 7	CL Brg Pier 8	CL Brg Pier 9	FA F/BW	Fwd. Abt.
				65.18	92.00	84.00	84.00	95.25	68.18					
STA =		016+27.30	016+28.77	16+95.127	17+87.127	18+71.127	19+55.127	20+50.377	21+18.554				021+19.73	021+21.20
PGL Elev =		886.0788	886.0727	885.7137	884.9427	883.9616	882.7159	880.9833	879.5341				879.5077	879.4744
Offset		0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000
slope adj		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Top of Deck Elevation		886.08	886.07	885.71	884.94	883.96	882.72	880.98	879.53	0.00	0.00	0.00	879.51	879.47

Bridge Deck Elevations - Beam 1													
	Rear Abt.	RA F/BW	CL Brg Pier 1	CL Brg Pier 2	CL Brg Pier 3	CL Brg Pier 4	CL Brg Pier 5	CL Brg Pier 6	CL Brg Pier 7	CL Brg Pier 8	CL Brg Pier 9	FA F/BW	Fwd. Abt.
STA =	016+36.63	016+38.10	017+04.456	017+96.456	018+80.456	019+64.456	020+59.706	021+27.883				021+29.06	021+30.53
PGL Elev =	886.0388	886.0322	885.6499	884.8468	883.8363	882.5612	880.7953	879.3223				879.2954	879.2616
Offset	-15.000	-15.000	-15.00	-15.00	-15.00	-15.00	-15.00	-15.00				-15.000	-15.000
slope adj	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	0.000	0.000	0.000	-0.240	-0.240
Top of Deck Elevation =	885.80	885.79	885.41	884.61	883.60	882.32	880.56	879.08	0.00	0.00	0.00	879.06	879.02
Structure Depth =		4.423	4.423	4.423	4.423	4.423	4.423	4.423				4.423	
Beam Seat Elevation =		881.37	880.99	880.18	879.17	877.90	876.13	874.66				874.63	

Bridge Deck Elevations - Beam 2													
	Rear Abt.	RA F/BW	CL Brg Pier 1	CL Brg Pier 2	CL Brg Pier 3	CL Brg Pier 4	CL Brg Pier 5	CL Brg Pier 6	CL Brg Pier 7	CL Brg Pier 8	CL Brg Pier 9	FA F/BW	Fwd. Abt.
STA =	016+31.96	016+33.44	016+99.791	017+91.791	018+75.791	019+59.791	020+55.041	021+23.218				021+24.39	021+25.86
PGL Elev =	886.0592	886.0528	885.6822	884.8952	883.8994	882.6390	880.8997	879.4286				879.4019	879.3684
Offset	-7.500	-7.500	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50				-7.500	-7.500
slope adj	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	0.000	0.000	0.000	-0.120	-0.120
Top of Deck Elevation	885.94	885.93	885.56	884.78	883.78	882.52	880.77	879.31	0.00	0.00	0.00	879.28	879.25
Structure Depth =		4.423	4.423	4.423	4.423	4.423	4.423	4.423				4.423	
Beam Seat Elevation =		881.51	881.14	880.35	879.36	878.10	876.35	874.89				874.86	

Bridge Deck Elevations - Beam 3													
	Rear Abt.	RA F/BW	CL Brg Pier 1	CL Brg Pier 2	CL Brg Pier 3	CL Brg Pier 4	CL Brg Pier 5	CL Brg Pier 6	CL Brg Pier 7	CL Brg Pier 8	CL Brg Pier 9	FA F/BW	Fwd. Abt.
STA =	016+27.30	016+28.77	016+95.126	017+87.126	018+71.126	019+55.126	020+50.376	021+18.553				021+19.73	021+21.20
PGL Elev =	886.0788	886.0727	885.7137	884.9427	883.9616	882.7159	880.9833	879.5342				879.5077	879.4744
Offset	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00				0.000	0.000
slope adj	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Top of Deck Elevation	886.08	886.07	885.71	884.94	883.96	882.72	880.98	879.53	0.00	0.00	0.00	879.51	879.47
Structure Depth =		4.423	4.423	4.423	4.423	4.423	4.423	4.423				4.423	
Beam Seat Elevation =		881.65	881.29	880.52	879.54	878.29	876.56	875.11				875.08	

Bridge Deck Elevations - Beam 4													
	Rear Abt.	RA F/BW	CL Brg Pier 1	CL Brg Pier 2	CL Brg Pier 3	CL Brg Pier 4	CL Brg Pier 5	CL Brg Pier 6	CL Brg Pier 7	CL Brg Pier 8	CL Brg Pier 9	FA F/BW	Fwd. Abt.
STA =	016+22.64	016+24.11	016+90.461	017+82.461	018+66.461	019+50.461	020+45.711	021+13.888				021+15.06	021+16.54
PGL Elev =	886.0975	886.0917	885.7443	884.9895	884.0231	882.7920	881.0760	879.6389				879.6126	879.5796
Offset	-7.500	-7.500	-7.50	-7.50	-7.50	-7.50	-7.50	-7.50				-7.500	-7.500
slope adj	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	-0.120	0.000	0.000	0.000	-0.120	-0.120
Top of Deck Elevation	885.98	885.97	885.62	884.87	883.90	882.67	880.96	879.52	0.00	0.00	0.00	879.49	879.46
Structure Depth =		4.423	4.423	4.423	4.423	4.423	4.423	4.423				4.423	
Beam Seat Elevation =		881.55	881.20	880.45	879.48	878.25	876.53	875.10				875.07	

Bridge Deck Elevations - Beam 5													
	Rear Abt.	RA F/BW	CL Brg Pier 1	CL Brg Pier 2	CL Brg Pier 3	CL Brg Pier 4	CL Brg Pier 5	CL Brg Pier 6	CL Brg Pier 7	CL Brg Pier 8	CL Brg Pier 9	FA F/BW	Fwd. Abt.
STA =	016+17.97	016+19.44	016+85.797	017+77.797	018+61.797	019+45.797	020+41.047	021+09.224				021+10.40	021+11.87
PGL Elev =	886.1155	886.1099	885.7741	885.0354	884.0837	882.8673	881.1680	879.7428				879.7167	879.6839
Offset	-15.000	-15.000	-15.00	-15.00	-15.00	-15.00	-15.00	-15.00				-15.000	-15.000
slope adj	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	-0.240	0.000	0.000	0.000	-0.240	-0.240
Top of Deck Elevation	885.88	885.87	885.53	884.80	883.84	882.63	880.93	879.50	0.00	0.00	0.00	879.48	879.44
Structure Depth =		4.423	4.423	4.423	4.423	4.423	4.423	4.423				4.423	
Beam Seat Elevation =		881.45	881.11	880.37	879.42	878.20	876.50	875.08				875.05	



Project:	LAK-6-2.06		
Subject:	Bridge Geometry	Project No.	075926
Prepared By:	UL	Date:	1/15/2024
Checked By:	DOR	Date:	1/26/2025

Top of Deck, Beam Seat Elevation and Wingwall Length Calculation

Rear Abutment Wingwall Elevation			
SW Corner		SE Corner	
Lt. Wingwall Begin		Rt. Wingwall Begin	
STA =	016+40.23	STA =	016+17.32
PGL Elev =	886.02	PGL Elev =	886.12
Offset	-18.417	Offset	-18.417
slope adj	-0.295	slope adj	-0.295
Top of Wingwall Elev =	885.73	Top of Wingwall Elev =	885.82
Avg. Slope Elevation =	878.69	Avg. Slope Elevation =	878.69
Length of Wingwall =	15.28	Length of Wingwall =	15.47
Take Length of Wingwall =	17.00	Take Length of Wingwall =	17.00
Lt. Wingwall End		Rt. Wingwall End	
STA =	016+23.23	STA =	016+00.32
PGL Elev =	886.0952	PGL Elev =	886.1760
Offset	-18.417	Offset	-18.417
slope adj	-0.295	slope adj	-0.295
Top of Wingwall Elev =	885.80	Top of Wingwall Elev =	885.88
Elevation difference =	0.87 in	Elevation difference =	0.70 in
Bottom of Footing Elev. =	873.61	Bottom of Footing Elev. =	873.61
Footing Thickness =	3	Footing Thickness =	3
Height of Wingwall =	9.19	Height of Wingwall =	9.27
Length of wingwall = ((top of wing - avg. slope elev +elev difference)*2 + rounding (1') - seat width(2.25'))/cos(skew angle)			
Slope of failue plane behind backwall (Perpendicular to face of abut.)		1 2	
Slope of failue plane behind backwall (along skew direction)		1 2.355	
Forward Abutment Wingwall Elevation			
NW Corner		NE Corner	
Lt. Wingwall Begin		Rt. Wingwall Begin	
STA =	021+31.18	STA =	021+08.27
PGL Elev =	879.25	PGL Elev =	879.76
Offset	-18.417	Offset	-18.417
slope adj	-0.295	slope adj	-0.295
Top of Wingwall Elev =	878.95	Top of Wingwall Elev =	879.47
Avg. Slope Elevation =	871.44	Avg. Slope Elevation =	871.44
Length of Wingwall =	15.29	Length of Wingwall =	16.54
Take Length of Wingwall =	17.00	Take Length of Wingwall =	17.00
Lt. Wingwall End		Rt. Wingwall End	
STA =	021+48.18	STA =	021+25.27
PGL Elev =	878.8501	PGL Elev =	879.3819
Offset	-18.417	Offset	-18.417
slope adj	-0.295	slope adj	-0.295
Top of Wingwall Elev =	878.56	Top of Wingwall Elev =	879.09
Elevation difference =	-4.76 in	Elevation difference =	-4.58 in
Bottom of Footing Elev. =	866.76	Bottom of Footing Elev. =	866.76
Footing Thickness =	3	Footing Thickness =	3
Height of Wingwall =	9.19	Height of Wingwall =	9.71
Take Wingwall Length = 17 ft at all four corners (Length measured on the inside face of wingwall from front face of backwall to the end)			



471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-06-2.06		
Description:	Drainage Pipe Length Calculation		
Project No:	075926.000		
Calc By:	CAE	Date:	01/21/25
Check By:	DOR	Date:	01/26/25

Abutment Drainage Pipe Length Calculation

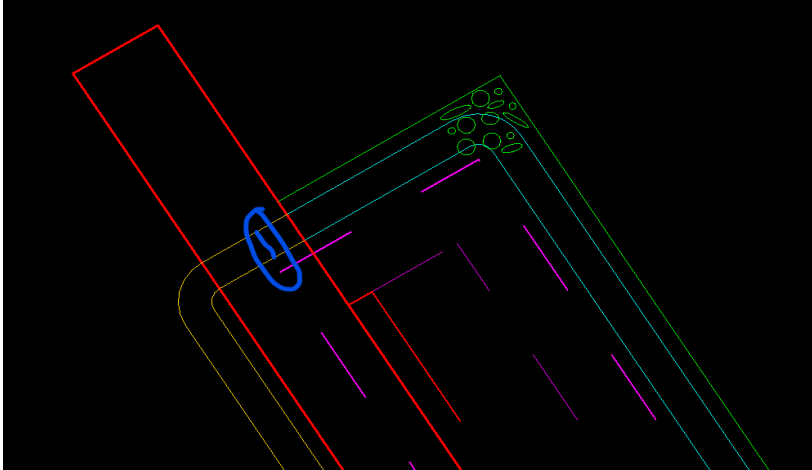
Purpose:

Determine the lengths and outlet stations for the porous backfill drainage pipes.

Figure 1: Location of Reference Point of Pipe

Fixed Points of Elevation for Pipe

*Assume bottom of pipe is at the top of footing when it passes the outer edge of the footing as seen below



Forward Abutment Left, Northeast

Starting Elevation	=	869.76 ft	
Slope of Pipe	=	0.01 ft/ft	
Distance from Starting Point to Elev 870	=	21.97 ft	
Elevation at 870	=	870.00 ft	
Slope of Slope	=	2.79 ft/ft	Measured from CAD
Length of Pipe to Centerline from Starting Point	=	31.09 ft	
Elevation at Centerline	=	870.07 ft	
Length of Pipe to Daylight from Slope	=	23.29 ft	
Elevation at Daylight	=	869.53 ft	

	Distance	Length	Elevation
Elev 870	0.00	21.97	870.00
Daylight	1.32	23.29	869.53

Using Goal Seek, set Difference to 0 by modifying Length of Pipe to Daylight from Slope

Difference	=	0.000
PCPP Length	=	30.59 ft
NPCPP Length	=	23.79 ft
Pipe Length	=	54.38 ft

Forward Abutment Right, Southeast

Starting Elevation	=	869.76	ft
Slope of Pipe	=	0.01	ft/ft
Distance from Starting Point to Elev 870	=	25.849	ft
Elevation at 870	=	870	ft
Slope of Slope	=	2.4898	ft/ft
Length of Pipe to Centerline from Starting Point	=	26.404	ft
Elevation at Centerline	=	870.02404	ft
Length of Pipe to Daylight from Slope	=	27.121831	ft
Elevation at Daylight	=	869.489	ft

Measured from CAD

	Distance	Length	Elevation
Elev 870	0.00	25.85	870.00
Daylight	1.27	27.12	869.49

Using Goal Seek, set Difference to 0 by
modifying Length of Pipe to Daylight
from Slope

Difference = 0.000

PCPP Length	=	26.906	ft
NPCPP Length	=	26.620	ft
Pipe Length	=	53.526	ft

Intersection of Pipe Location from Each Side for Forward Abutment

Difference between Left and Right	=	0.047	ft
Elevation at Peak	=	870.047	ft
Distance from Centerline to get peak	=	2.344	ft
Total PCPP Length	=	57.495	ft
Total NPCPP Length	=	50.410	ft
Total Length	=	107.905	ft

LEFT

Rear Abutment Left, Northwest

Starting Elevation	=	876.61	ft
Slope of Pipe	=	0.01	ft/ft
Distance from Starting Point to Elev 880	=	18.636	ft
Elevation at 880	=	880	ft
Slope of Slope	=	1.8862	ft/ft
Length of Pipe to Centerline from Starting Point	=	26.406	ft
Elevation at Centerline	=	876.87406	ft
Length of Pipe to Daylight from Slope	=	25.511414	ft
Elevation at Daylight	=	876.355	ft

Measured from CAD

	Distance	Length	Elevation
Elev 880	0.00	18.64	880.00
Daylight	6.88	25.51	876.35

Using Goal Seek, set Difference to 0 by
modifying Length of Pipe to Daylight
from Slope

Difference = 0.000

PCPP Length	=	25.909	ft
NPCPP Length	=	26.008	ft
Pipe Length	=	51.917	ft

Rear Abutment Right, Southwest

Starting Elevation	=	876.61 ft	
Slope of Pipe	=	0.01 ft/ft	
Distance from Starting Point to Elev 880	=	18.462 ft	
Elevation at 880	=	880 ft	Measured from CAD
Slope of Slope	=	1.7602 ft/ft	
Length of Pipe to Centerline from Starting Point	=	31.09 ft	
Elevation at Centerline	=	876.9209 ft	
Length of Pipe to Daylight from Slope	=	24.866783 ft	
Elevation at Daylight	=	876.361 ft	

	Distance	Length	Elevation
Elev 880	0.00	18.46	880.00
Daylight	6.40	24.87	876.36

Difference = 0.000

PCPP Length = 30.587 ft

NPCPP Length = 25.370 ft

Pipe Length = 55.957 ft

Intersection of Pipe Location from Each Side for the Rear Abutment

Difference between Left and Right	=	0.047 ft	
Elevation at Peak	=	876.897 ft	
Distance from Centerline to get peak	=	2.342 ft	RIGHT
Total PCPP Length	=	56.496 ft	
Total NPCPP Length	=	51.378 ft	
Total Length	=	107.874 ft	

Grand Total of Both Abutments

Grand Total PCPP Length	=	113.991 ft
Grand Total NPCPP Length	=	101.788 ft
Grand Total Length	=	215.779 ft

2.4 Pier Design



Department of
Transportation





471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-06-02.060		
Description:	U.S. 6 over I-271		
Project No:	075926.001		
Calc By:	CAE	Date:	05/03/24
Check By:	DOR	Date:	05/13/24

Pier Column Spiral Reinforcement

Purpose:

To determine the amount of spiral reinforcement required for the extreme pier column (Pier 3, middle column) based on the ODOT BDM, 2020 and LRFD BDS 9th Edition, 2020.

Inputs

Spiral Reinforcing Number	=	4
Spiral Bar Diameter	=	0.5 in
Spiral Pitch, p	=	3 in
Area of spiral reinforcement, A _s	=	0.196 in ²
Compressive Strength of Concrete, f' _c	=	4 ksi
Yield strength of spiral reinforcement, f _{yh}	=	60 ksi
Diameter of Column, D	=	42 in
Concrete Cover	=	5 in
Diameter of concrete core from out to out of spiral, d _c	=	32 in
Centerline diameter of the spiral reinforcement, d _s	=	31.5 in

Spiral Reinforcement Calculations

Notes:

$$\rho_s = \frac{4A_s \sqrt{p^2 + (\pi d_s)^2}}{\pi p d_c^2}$$

Spiral reinforcement Ratio, ρ _s	=	0.00806	ODOT BDM 1005.6

$$\rho_s \geq 0.12 \frac{f'_c}{f_{yh}}$$

Minimum limit of Ratio for ρ _s	=	0.00800	LRFD BDS Eq. 5.11.4.1.4-1

Is the ratio large enough to pass?	PASS

Conclusion

Spiral Being Used = # 4 @ 3 " pitch

				Sheet #	1
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

PROJECT DATA

PROJECT DATA

Project:	LAK-6 Pier Analysis
User Job No.:	075926
Designer:	CAE
Date:	05/17/2024
Checker:	DOR
Checked date:	05/21/2024
State:	Ohio
State Job No.:	
Structure type:	Pier.
Pier View:	Upstation.
State Specification:	None
Code:	AASHTO LRFD 9th Edition
Comments:	

		Sheet # 2	
		Job # 075926	
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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx		Date 05/21/2024

PIER GEOMETRY

Pier Info:

Pier View:	Upstation.
Pier Type:	Multi Column

Cap Shape

Cap Shape: Straight
Top Elevations: start = 21.51 ft end = 21.51 ft
Depth(Z) = 42.00 in Skew angle = 31.88 Reduction of I = 1.000
Length(X) = 38.83 ft Height(Y) = 36.00 in

Column Shape : Round

Number of columns: 3

Column number 1

Location from the left edge of the cap(X): 1.75 ft
Elevations: bottom = 0.00 ft top = 20.01 ft Reduction of I = 1.000
Column Bottom is Fixed

Column Section Dimensions

Diameter = 42.00 in

Column number 2

Location from the left edge of the cap(X): 19.42 ft
Elevations: bottom = 0.00 ft top = 20.01 ft Reduction of I = 1.000
Column Bottom is Fixed

Column Section Dimensions

Diameter = 42.00 in

Column number 3

Location from the left edge of the cap(X): 37.08 ft
Elevations: bottom = 0.00 ft top = 20.01 ft Reduction of I = 1.000
Column Bottom is Fixed

Column Section Dimensions

Diameter = 42.00 in

				Sheet #	3
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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

SUPERSTRUCTURE INFO

Superstructure info:

Total number of spans:	2
Span number rear to current pier:	2
Number of traffic lanes:	2
Barrier height :	108.00 in
Depth of slab :	10.63 in
Curb to curb distance:	33.330 ft

Beam info:

Height in	Section area in^2	Inertia (Ixx) in^4	Inertia (Iyy) in^4	Beam CG in
38.70	58.80	14900.00	695.00	19.35

Span #	Span length ft	Bridge Width ft
1	84.000	36.667
2	95.250	36.667
		36.667

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BEARING POINTS

Number of bearing lines: 1

First bearing line Eccentricity = 0.00 ft

Point	Distance ft
1	1.75
2	10.58
3	19.42
4	28.25
5	37.08

				Sheet #	5
				Job #	075926
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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

MATERIAL PROPERTIES

MATERIAL PROPERTIES

	Cap	Column	Footing
Concrete Type	normal	normal	normal
Concrete Strength (psi)	4000.00	4000.00	3000.00
Concrete Density (lb/ft3)	150.00	150.00	150.00
Concrete Modulus Ec (ksi)	3986.55	3986.55	3625.50
Steel Strength Fy (ksi)	60.00	60.00	40.00

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				Job #	075926
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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

DESIGN PARAMETERS

Resistance factors for reinf. concrete

Flexure and tension	0.90
Shear and torsion (normal)	0.90
Shear and torsion (lightweight)	0.90
Axial compression (ties)	0.75
Axial compression (spiral)	0.75
Compression in STM	0.70

Multi presence factors for live load

1 Lane	1.20
2 Lanes	1.00
3 Lanes	0.85
4 Lanes	0.65
5 Lanes	0.65
6 Lanes	0.65

Dynamic load allowance IM

	Truck	Lane	Fatigue
Cap	0.33	0.00	0.15
Column	0.33	0.00	0.15
Footing	0.00	0.00	0.00

	Exposure factors	Clear cover in	Clear side cover in
Cap	1.00	2.00	2.00
Column	1.00	2.00	
Footing	1.00	3.00	3.00

Degree of fixity in foundations for Moment Magnify Method: $G_a = 5.00$

SEISMIC DESIGN PARAMETERS

Strength Reduction factors for reinf. Concrete Seismic Design

Tension controlled	0.90
Shear and torsion (normal)	0.90
Shear and torsion (lightweight)	0.70
Compression Controlled (ties)	0.75
Compression Controlled (spiral)	0.75

Seismic Overstrength

Flexure and tension	1.30
Axial compression (ties)	1.30
Axial compression (spiral)	1.30

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File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Response Modification Factor	1.00

Use core area for plastic hinging calculations.

Design Factors

Cap Design Factor	1.20
Footing Design Factor	1.20

Plastic Hinge Moment

Use actual computed Plastic Hinging Moment for each column in all combinations.

		Sheet # 8	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Date 05/17/2024
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Checked DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Date 05/21/2024

LOADS

Pier Info:

Pier View: Upstation.

Load Cases: 67

Longitudinal Reaction: Continuous Bridge Model

Selected Vehicles:	Design Truck Design Truck + Lane Load Design Tandem + Lane Load Two Design Trucks + Lane Load

Transverse Positioning

Number of loaded lanes	All combinations
Live Load Positions	Constant Spacing
Minimum Distance from Curb	2.000000
Center to Center Spacing	10.000000

Generate Braking/Longitudinal Force	Selected
Generate Centrifugal Force	Not Selected

Number of single regular truck positions	6
Number of all possible combinations of regular truck positions	16

Loadcase ID: DC1 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	Y	-120.05
1	2	Y	-116.73
1	3	Y	-116.73
1	4	Y	-116.73
1	5	Y	-120.05

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				Job #	075926
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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WL1 Name: Angle: 60

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.47
1	1	Y	-0.67
1	1	Z	0.14
1	2	X	-0.47
1	2	Y	-0.00
1	2	Z	0.14
1	3	X	-0.47
1	3	Y	-0.00
1	3	Z	0.14
1	4	X	-0.47
1	4	Y	-0.00
1	4	Z	0.14
1	5	X	-0.47
1	5	Y	0.67
1	5	Z	0.14

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 60.00 deg Live load length = 47.63 ft

				Sheet #	10
				Job #	075926
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File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Loadcase ID: WL2 Name: Angle: 45

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.69
1	1	Y	-1.00
1	1	Z	-0.07
1	2	X	-0.69
1	2	Y	-0.00
1	2	Z	-0.07
1	3	X	-0.69
1	3	Y	-0.00
1	3	Z	-0.07
1	4	X	-0.69
1	4	Y	-0.00
1	4	Z	-0.07
1	5	X	-0.69
1	5	Y	1.00
1	5	Z	-0.07

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 45.00 deg Live load length = 47.63 ft

Loadcase ID: WL3 Name: Angle: 30

Multiplier = 1.000

				Sheet #	11
				Job #	075926
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File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.78
1	1	Y	-1.13
1	1	Z	-0.22
1	2	X	-0.78
1	2	Y	-0.00
1	2	Z	-0.22
1	3	X	-0.78
1	3	Y	-0.00
1	3	Z	-0.22
1	4	X	-0.78
1	4	Y	-0.00
1	4	Z	-0.22
1	5	X	-0.78
1	5	Y	1.13
1	5	Z	-0.22

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 30.00 deg Live load length = 47.63 ft

Loadcase ID: WL4 Name: Angle: 15

Multiplier = 1.000

		Sheet # 12	
		Job # 075926	
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Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.77
1	1	Y	-1.11
1	1	Z	-0.35
1	2	X	-0.77
1	2	Y	-0.00
1	2	Z	-0.35
1	3	X	-0.77
1	3	Y	-0.00
1	3	Z	-0.35
1	4	X	-0.77
1	4	Y	-0.00
1	4	Z	-0.35
1	5	X	-0.77
1	5	Y	1.11
1	5	Z	-0.35

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 15.00 deg Live load length = 47.63 ft

Loadcase ID: WL5 Name: Angle: 0

Multiplier = 1.000

		Sheet # 13	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.81
1	1	Y	-1.17
1	1	Z	-0.50
1	2	X	-0.81
1	2	Y	-0.00
1	2	Z	-0.50
1	3	X	-0.81
1	3	Y	-0.00
1	3	Z	-0.50
1	4	X	-0.81
1	4	Y	-0.00
1	4	Z	-0.50
1	5	X	-0.81
1	5	Y	1.17
1	5	Z	-0.50

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 0.00 deg Live load length = 47.63 ft

Loadcase ID: WL6 Name: Angle: -15

Multiplier = 1.000

		Sheet # 14	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.65
1	1	Y	-0.94
1	1	Z	-0.54
1	2	X	-0.65
1	2	Y	-0.00
1	2	Z	-0.54
1	3	X	-0.65
1	3	Y	-0.00
1	3	Z	-0.54
1	4	X	-0.65
1	4	Y	-0.00
1	4	Z	-0.54
1	5	X	-0.65
1	5	Y	0.94
1	5	Z	-0.54

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -15.00 deg Live load length = 47.63 ft

Loadcase ID: WL7 Name: Angle: -30

Multiplier = 1.000

		Sheet # 15	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.54
1	1	Y	-0.78
1	1	Z	-0.61
1	2	X	-0.54
1	2	Y	-0.00
1	2	Z	-0.61
1	3	X	-0.54
1	3	Y	-0.00
1	3	Z	-0.61
1	4	X	-0.54
1	4	Y	-0.00
1	4	Z	-0.61
1	5	X	-0.54
1	5	Y	0.78
1	5	Z	-0.61

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -30.00 deg Live load length = 47.63 ft

Loadcase ID: WL8 Name: Angle: -45

Multiplier = 1.000

				Sheet #	16
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.37
1	1	Y	-0.54
1	1	Z	-0.59
1	2	X	-0.37
1	2	Y	-0.00
1	2	Z	-0.59
1	3	X	-0.37
1	3	Y	-0.00
1	3	Z	-0.59
1	4	X	-0.37
1	4	Y	-0.00
1	4	Z	-0.59
1	5	X	-0.37
1	5	Y	0.54
1	5	Z	-0.59

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -45.00 deg Live load length = 47.63 ft

Loadcase ID: WL9 Name: Angle: -60

Multiplier = 1.000

		Sheet # 17	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.08
1	1	Y	-0.12
1	1	Z	-0.48
1	2	X	-0.08
1	2	Y	-0.00
1	2	Z	-0.48
1	3	X	-0.08
1	3	Y	-0.00
1	3	Z	-0.48
1	4	X	-0.08
1	4	Y	-0.00
1	4	Z	-0.48
1	5	X	-0.08
1	5	Y	0.12
1	5	Z	-0.48

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -60.00 deg Live load length = 47.63 ft

Loadcase ID: TU1 Name:

Multiplier = 1.000

		Sheet # 18	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.51
1	1	Z	-5.64
1	2	X	3.51
1	2	Z	-5.64
1	3	X	3.51
1	3	Z	-5.64
1	4	X	3.51
1	4	Z	-5.64
1	5	X	3.51
1	5	Z	-5.64

Auto generation details:

Bearing type

Elastomeric Bearings
Direction of thermal force: +(Z)
Length of Superstructure Contributing, L: 84.000 ft
Change in temperature: 90.000 °F
Coefficient of thermal expansion: 6.5e-06 ft/°F
Area of bearing: 169.00 in^2
Shear modulus of Elastomer: 0.13 kips
Total Elastomer Thickness: 1.47 in

Loadcase ID: SH1 Name:

Multiplier = 1.000

Unit strain: -0.000413

				Sheet #	19
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Loadcase ID: EV1 Name:

Multiplier = 1.000

Footing loads

Footing #	Type	Dir	Mag1	y1/L	Mag2	y2/L
1	UDL	Y	-3.600 klf	0.00		1.00
2	UDL	Y	-3.600 klf	0.00		1.00
3	UDL	Y	-3.600 klf	0.00		1.00

Loadcase ID: LL1 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	0.00	
1	3	Y	0.00	
1	4	Y	-33.73	
1	5	Y	-42.07	
1	1	Y	0.00	L
1	2	Y	0.00	L
1	3	Y	-0.15	L
1	4	Y	-13.84	L
1	5	Y	-17.78	L

				Sheet #	20
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 30.00 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 3	node 5	Fx = 99.9393
Member 3	node 6	Fx = -99.9393
Member 1	node 1	Mz = 1.4550
Member 1	node 2	Mz = 8.0845
Member 9	node 9	Mz = -2.7491
Member 8	node 9	Mz = 2.7491
Member 8	node 18	Mz = -5.0743
Member 7	node 18	Mz = 5.0743
Member 7	node 2	Mz = -8.0845

Loadcase ID: LL2 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-42.09	
1	2	Y	-33.70	
1	3	Y	0.00	
1	4	Y	0.00	
1	5	Y	0.00	
1	1	Y	-17.79	L
1	2	Y	-13.83	L
1	3	Y	-0.15	L
1	4	Y	0.00	L
1	5	Y	0.00	L

				Sheet #	21
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 6.67 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 3	node 5	Mz = -1.4557
Member 3	node 6	Mz = -8.0815
Member 1	node 1	Fx = 99.9640
Member 1	node 2	Fx = -99.9640
Member 18	node 6	Mz = 8.0815
Member 18	node 21	Mz = -5.0727
Member 1	node 21	Mz = 5.0727
Member 1	node 1	Mz = -2.7486
Member 1	node 1	Mz = 2.7486

Loadcase ID: LL3 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-19.38	
1	2	Y	-45.48	
1	3	Y	-10.94	
1	4	Y	0.00	
1	5	Y	0.00	
1	1	Y	-7.21	L
1	2	Y	-20.88	L
1	3	Y	-3.67	L
1	4	Y	0.00	L
1	5	Y	0.00	L

				Sheet #	22
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 10.00 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 3	node 5	Fx = -3.8468
Member 3	node 6	Fx = 3.8468
Member 2	node 3	Mz = 50.0965
Member 2	node 4	Mz = 89.1291
Member 18	node 6	Fy = -3.8468
Member 18	node 21	Fy = 3.8468
Member 1	node 21	Fy = -3.8468
Member 1	node 1	Fy = 3.8468
Member 1	node 1	Fy = -3.8468
Member 1	node 13	Fy = 3.8468
Member 1	node 13	Mz = 28.6165
Member 15	node 13	Mz = -28.6165

Loadcase ID: LL4 Name:

Multiplier = 1.000

		Sheet # 23	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Date 05/17/2024
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Checked DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx		Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	-5.62	
1	3	Y	-37.90	
1	4	Y	-47.74	
1	5	Y	-35.06	
1	1	Y	0.00	L
1	2	Y	-1.96	L
1	3	Y	-16.79	L
1	4	Y	-19.37	L
1	5	Y	-14.82	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load Positions of the center of each load measured from the left of the bridge : TRUCK TYPE : Regular Truck No. 1 - center line at: 30.00 - lane load on bearing line No. 1 Truck No. 2 - center line at: 20.00 - lane load on bearing line No. 1 Multi lane reduction factor used : 1.0000

				Sheet #	24
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Maximum effects in members :

Member 3	node 5	Mz = 45.4704
Member 3	node 6	Mz = 100.4395
Member 18	node 6	Fy = 38.3548
Member 18	node 6	Mz = -100.4395
Member 18	node 21	Fy = -38.3548
Member 18	node 21	Mz = 66.8790
Member 1	node 21	Fy = 38.3548
Member 1	node 21	Mz = -66.8790
Member 1	node 1	Fy = -38.3548
Member 1	node 1	Fy = 38.3548
Member 1	node 13	Mz = -238.3872
Member 1	node 13	Fy = -38.3548
Member 15	node 13	Fy = -44.5122
Member 15	node 13	Mz = 238.3872
Member 15	node 12	Fy = 44.5122
Member 14	node 12	Fy = -44.5122
Member 14	node 20	Fy = 44.5122
Member 13	node 20	Fy = -44.5122
Member 13	node 4	Fy = 44.5122

Loadcase ID: LL5 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	-19.65	
1	3	Y	-47.02	
1	4	Y	-43.52	
1	5	Y	-16.14	
1	1	Y	0.00	L
1	2	Y	-7.84	L
1	3	Y	-19.73	L
1	4	Y	-19.37	L
1	5	Y	-6.00	L

				Sheet #	25
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 26.67 - lane load on bearing line No. 1
Truck No. 2 - center line at: 16.67 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 2	node 3	Fx = 144.9025
Member 2	node 4	Fx = -144.9025
Member 1	node 1	Mz = 42.1248
Member 1	node 1	Mz = -42.1248

Loadcase ID: LL6 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	0.00	
1	3	Y	-10.95	
1	4	Y	-45.48	
1	5	Y	-19.37	
1	1	Y	0.00	L
1	2	Y	0.00	L
1	3	Y	-3.68	L
1	4	Y	-20.88	L
1	5	Y	-7.21	L

				Sheet #	26
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 26.67 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 2	node 3	Mz = -50.0973
Member 2	node 4	Mz = -89.1335
Member 1	node 1	Fx = -3.8468
Member 1	node 2	Fx = 3.8468
Member 10	node 10	Mz = 28.6127
Member 9	node 10	Fy = 3.8468
Member 9	node 10	Mz = -28.6127
Member 9	node 9	Fy = -3.8468
Member 8	node 9	Fy = 3.8468
Member 8	node 18	Fy = -3.8468
Member 7	node 18	Fy = 3.8468
Member 7	node 2	Fy = -3.8468

Loadcase ID: LL7 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-35.08	
1	2	Y	-47.73	
1	3	Y	-37.90	
1	4	Y	-5.62	
1	5	Y	0.00	
1	1	Y	-14.82	L
1	2	Y	-19.37	L
1	3	Y	-16.79	L
1	4	Y	-1.96	L
1	5	Y	0.00	L

				Sheet #	27
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 16.67 - lane load on bearing line No. 1
Truck No. 2 - center line at: 6.67 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 1	node 1	Mz = -45.4619
Member 1	node 2	Mz = -100.4249
Member 12	node 4	Fy = 44.4964
Member 12	node 19	Fy = -44.4964
Member 11	node 19	Fy = 44.4964
Member 11	node 11	Fy = -44.4964
Member 10	node 11	Fy = 44.4964
Member 10	node 10	Mz = -238.3492
Member 10	node 10	Fy = -44.4964
Member 9	node 10	Fy = -38.3532
Member 9	node 10	Mz = 238.3492
Member 9	node 9	Fy = 38.3532
Member 8	node 9	Fy = -38.3532
Member 8	node 18	Fy = 38.3532
Member 8	node 18	Mz = 66.8658
Member 7	node 18	Mz = -66.8658
Member 7	node 18	Fy = -38.3532
Member 7	node 2	Fy = 38.3532
Member 7	node 2	Mz = 100.4249

Loadcase ID: LL8 Name:

Multiplier = 1.000



Sheet # 28

Job # 075926

Program: LEAP® Bridge Concrete CONNECT Edition

CHA Consulting, Inc. - NY

Designed CAE

Module: Substructure

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Version: 21.01.00.22

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Phone: 1-800-778-4277

Checked DOR

File Name: LAK-6 42 in Dia Pier Analysis.Ibcx

Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-16.15	
1	2	Y	-37.90	
1	3	Y	-18.24	
1	4	Y	-37.90	
1	5	Y	-16.14	
1	1	Y	-6.01	L
1	2	Y	-17.40	L
1	3	Y	-6.12	L
1	4	Y	-17.40	L
1	5	Y	-6.00	L

Auto generation details:**Generated Live Load**

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 26.67 - lane load on bearing line No. 1
Truck No. 2 - center line at: 10.00 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 15	node 12	Mz = 116.9078
Member 14	node 12	Mz = -116.9078
Member 14	node 20	Mz = 143.7941
Member 13	node 20	Mz = -143.7941
Member 13	node 4	Mz = 178.6004
Member 12	node 4	Mz = -178.5967
Member 12	node 19	Mz = 143.7965
Member 11	node 19	Mz = -143.7965
Member 11	node 11	Mz = 116.9149
Member 10	node 11	Mz = -116.9149

Loadcase ID: LL9 Name:

Multiplier = 1.000

		Sheet # 29	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Date 05/17/2024
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Checked DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx		Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-16.15	
1	2	Y	-43.52	
1	3	Y	-47.01	
1	4	Y	-19.64	
1	5	Y	0.00	
1	1	Y	-6.01	L
1	2	Y	-19.37	L
1	3	Y	-19.73	L
1	4	Y	-7.84	L
1	5	Y	0.00	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Design Truck + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular
Truck No. 1 - center line at: 20.00 - lane load on bearing line No. 1
Truck No. 2 - center line at: 10.00 - lane load on bearing line No. 1
Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 9	node 9	Mz = 42.1237
Member 8	node 9	Mz = -42.1237

Loadcase ID: BR1 Name:

Multiplier = 1.000

				Sheet #	30
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR2 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		

		Sheet # 31	
		Job # 075926	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Designed CAE
Version:	21.01.00.22	www.bentley.com	Date 05/17/2024
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx	Phone: 1-800-778-4277	Checked DOR
			Date 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR3 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		

				Sheet #	32
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR4 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

				Sheet #	33
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR5 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

				Sheet #	34
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR6 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		

				Sheet #	35
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR7 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

				Sheet #	36
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR8 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

				Sheet #	37
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR9 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

				Sheet #	38
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: WS1 Name: STR III-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.21 kips	0.50		
UDL	Z		-0.16 klf	0.00		1.00

				Sheet #	39
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.006 klf	0.15		0.93
3	UDL	Z	-0.189 klf	0.15		0.93
2	UDL	X	0.006 klf	0.15		0.93
2	UDL	Z	-0.189 klf	0.15		0.93
1	UDL	X	0.006 klf	0.15		0.93
1	UDL	Z	-0.189 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.48
1	1	Y	-0.45
1	1	Z	-2.76
1	2	X	-0.48
1	2	Y	-0.00
1	2	Z	-2.76
1	3	X	-0.48
1	3	Y	-0.00
1	3	Z	-2.76
1	4	X	-0.48
1	4	Y	-0.00
1	4	Z	-2.76
1	5	X	-0.48
1	5	Y	0.45
1	5	Z	-2.76

Auto generation details:

				Sheet #	40
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 3.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS2 Name: STR III-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.42 kips	0.50		
UDL	Z		-0.16 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.043 klf	0.15		0.93
3	UDL	Z	-0.185 klf	0.15		0.93
2	UDL	X	-0.043 klf	0.15		0.93
2	UDL	Z	-0.185 klf	0.15		0.93
1	UDL	X	-0.043 klf	0.15		0.93
1	UDL	Z	-0.185 klf	0.15		0.93

Bentley				Sheet #	41
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.15
1	1	Y	-2.00
1	1	Z	-3.41
1	2	X	-2.15
1	2	Y	-0.00
1	2	Z	-3.41
1	3	X	-2.15
1	3	Y	-0.00
1	3	Z	-3.41
1	4	X	-2.15
1	4	Y	-0.00
1	4	Z	-3.41
1	5	X	-2.15
1	5	Y	2.00
1	5	Z	-3.41

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

				Sheet #	42
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Loadcase ID: WS3 Name: STR III-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-2.75 kips	0.50		
UDL	Z		-0.13 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.089 klf	0.15		0.93
3	UDL	Z	-0.167 klf	0.15		0.93
2	UDL	X	-0.089 klf	0.15		0.93
2	UDL	Z	-0.167 klf	0.15		0.93
1	UDL	X	-0.089 klf	0.15		0.93
1	UDL	Z	-0.167 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.13
1	1	Y	-2.90
1	1	Z	-3.50
1	2	X	-3.13
1	2	Y	-0.00
1	2	Z	-3.50
1	3	X	-3.13
1	3	Y	-0.00
1	3	Z	-3.50
1	4	X	-3.13
1	4	Y	-0.00
1	4	Z	-3.50
1	5	X	-3.13
1	5	Y	2.90
1	5	Z	-3.50

Auto generation details:

				Sheet #	43
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS4 Name: STR III-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-3.41 kips	0.50		
UDL	Z		-0.09 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.130 klf	0.15		0.93
3	UDL	Z	-0.138 klf	0.15		0.93
2	UDL	X	-0.130 klf	0.15		0.93
2	UDL	Z	-0.138 klf	0.15		0.93
1	UDL	X	-0.130 klf	0.15		0.93
1	UDL	Z	-0.138 klf	0.15		0.93

Bentley				Sheet #	44
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.76
1	1	Y	-3.49
1	1	Z	-3.11
1	2	X	-3.76
1	2	Y	-0.00
1	2	Z	-3.11
1	3	X	-3.76
1	3	Y	-0.00
1	3	Z	-3.11
1	4	X	-3.76
1	4	Y	-0.00
1	4	Z	-3.11
1	5	X	-3.76
1	5	Y	3.49
1	5	Z	-3.11

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

				Sheet #	45
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS5 Name: STR III-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-3.24 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.161 klf	0.15		0.93
3	UDL	Z	-0.100 klf	0.15		0.93
2	UDL	X	-0.161 klf	0.15		0.93
2	UDL	Z	-0.100 klf	0.15		0.93
1	UDL	X	-0.161 klf	0.15		0.93
1	UDL	Z	-0.100 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.67
1	1	Y	-6.41
1	1	Z	-2.90
1	2	X	-4.67
1	2	Y	6.99
1	2	Z	-2.90
1	3	X	-4.67
1	3	Y	6.99
1	3	Z	-2.90
1	4	X	-4.67
1	4	Y	6.99
1	4	Z	-2.90
1	5	X	-4.67
1	5	Y	20.38
1	5	Z	-2.90

Auto generation details:

				Sheet #	46
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS6 Name: STR III-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-2.27 kips	0.50		
UDL	Z		-0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.181 klf	0.15		0.93
3	UDL	Z	-0.055 klf	0.15		0.93
2	UDL	X	-0.181 klf	0.15		0.93
2	UDL	Z	-0.055 klf	0.15		0.93
1	UDL	X	-0.181 klf	0.15		0.93
1	UDL	Z	-0.055 klf	0.15		0.93

Bentley				Sheet #	47
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.46
1	1	Y	-4.13
1	1	Z	-1.99
1	2	X	-4.46
1	2	Y	-0.00
1	2	Z	-1.99
1	3	X	-4.46
1	3	Y	-0.00
1	3	Z	-1.99
1	4	X	-4.46
1	4	Y	-0.00
1	4	Z	-1.99
1	5	X	-4.46
1	5	Y	4.13
1	5	Z	-1.99

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	48
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS7 Name: STR III-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.78 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.189 klf	0.15		0.93
3	UDL	Z	-0.006 klf	0.15		0.93
2	UDL	X	-0.189 klf	0.15		0.93
2	UDL	Z	-0.006 klf	0.15		0.93
1	UDL	X	-0.189 klf	0.15		0.93
1	UDL	Z	-0.006 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.52
1	1	Y	-4.20
1	1	Z	-1.26
1	2	X	-4.52
1	2	Y	-0.00
1	2	Z	-1.26
1	3	X	-4.52
1	3	Y	-0.00
1	3	Z	-1.26
1	4	X	-4.52
1	4	Y	-0.00
1	4	Z	-1.26
1	5	X	-4.52
1	5	Y	4.20
1	5	Z	-1.26

Auto generation details:

				Sheet #	49
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

Loadcase ID: WS8 Name: STR III-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.93 kips	0.50		
UDL	Z		0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.185 klf	0.15		0.93
3	UDL	Z	0.043 klf	0.15		0.93
2	UDL	X	-0.185 klf	0.15		0.93
2	UDL	Z	0.043 klf	0.15		0.93
1	UDL	X	-0.185 klf	0.15		0.93
1	UDL	Z	0.043 klf	0.15		0.93

				Sheet #	50
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.01
1	1	Y	-3.72
1	1	Z	-0.42
1	2	X	-4.01
1	2	Y	-0.00
1	2	Z	-0.42
1	3	X	-4.01
1	3	Y	-0.00
1	3	Z	-0.42
1	4	X	-4.01
1	4	Y	-0.00
1	4	Z	-0.42
1	5	X	-4.01
1	5	Y	3.72
1	5	Z	-0.42

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	51
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS9 Name: STR III-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-3.07 kips	0.50		
UDL	Z		0.04 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.167 klf	0.15		0.93
3	UDL	Z	0.089 klf	0.15		0.93
2	UDL	X	-0.167 klf	0.15		0.93
2	UDL	Z	0.089 klf	0.15		0.93
1	UDL	X	-0.167 klf	0.15		0.93
1	UDL	Z	0.089 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.69
1	1	Y	-2.50
1	1	Z	0.79
1	2	X	-2.69
1	2	Y	-0.00
1	2	Z	0.79
1	3	X	-2.69
1	3	Y	-0.00
1	3	Z	0.79
1	4	X	-2.69
1	4	Y	-0.00
1	4	Z	0.79
1	5	X	-2.69
1	5	Y	2.50
1	5	Z	0.79

Auto generation details:

				Sheet #	52
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

Loadcase ID: WS10 Name: SER IV-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.12 kips	0.50		
UDL	Z		-0.09 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.003 klf	0.15		0.93
3	UDL	Z	-0.107 klf	0.15		0.93
2	UDL	X	0.003 klf	0.15		0.93
2	UDL	Z	-0.107 klf	0.15		0.93
1	UDL	X	0.003 klf	0.15		0.93
1	UDL	Z	-0.107 klf	0.15		0.93

				Sheet #	53
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.27
1	1	Y	-0.25
1	1	Z	-1.55
1	2	X	-0.27
1	2	Y	-0.00
1	2	Z	-1.55
1	3	X	-0.27
1	3	Y	-0.00
1	3	Z	-1.55
1	4	X	-0.27
1	4	Y	-0.00
1	4	Z	-1.55
1	5	X	-0.27
1	5	Y	0.25
1	5	Z	-1.55

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
	Overturning 20.000 psf	
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
	Overturning not considered	
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	54
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS11 Name: SER IV-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.80 kips	0.50		
UDL	Z		-0.09 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.024 klf	0.15		0.93
3	UDL	Z	-0.104 klf	0.15		0.93
2	UDL	X	-0.024 klf	0.15		0.93
2	UDL	Z	-0.104 klf	0.15		0.93
1	UDL	X	-0.024 klf	0.15		0.93
1	UDL	Z	-0.104 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.21
1	1	Y	-1.12
1	1	Z	-1.92
1	2	X	-1.21
1	2	Y	-0.00
1	2	Z	-1.92
1	3	X	-1.21
1	3	Y	-0.00
1	3	Z	-1.92
1	4	X	-1.21
1	4	Y	-0.00
1	4	Z	-1.92
1	5	X	-1.21
1	5	Y	1.12
1	5	Z	-1.92

Auto generation details:

				Sheet #	55
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 3.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS12 Name: SER IV-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.55 kips	0.50		
UDL	Z		-0.07 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.050 klf	0.15		0.93
3	UDL	Z	-0.094 klf	0.15		0.93
2	UDL	X	-0.050 klf	0.15		0.93
2	UDL	Z	-0.094 klf	0.15		0.93
1	UDL	X	-0.050 klf	0.15		0.93
1	UDL	Z	-0.094 klf	0.15		0.93

Bentley				Sheet #	56
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.76
1	1	Y	-1.63
1	1	Z	-1.97
1	2	X	-1.76
1	2	Y	-0.00
1	2	Z	-1.97
1	3	X	-1.76
1	3	Y	-0.00
1	3	Z	-1.97
1	4	X	-1.76
1	4	Y	-0.00
1	4	Z	-1.97
1	5	X	-1.76
1	5	Y	1.63
1	5	Z	-1.97

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

				Sheet #	57
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS13 Name: SER IV-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.92 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.073 klf	0.15		0.93
3	UDL	Z	-0.078 klf	0.15		0.93
2	UDL	X	-0.073 klf	0.15		0.93
2	UDL	Z	-0.078 klf	0.15		0.93
1	UDL	X	-0.073 klf	0.15		0.93
1	UDL	Z	-0.078 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.11
1	1	Y	-1.96
1	1	Z	-1.75
1	2	X	-2.11
1	2	Y	-0.00
1	2	Z	-1.75
1	3	X	-2.11
1	3	Y	-0.00
1	3	Z	-1.75
1	4	X	-2.11
1	4	Y	-0.00
1	4	Z	-1.75
1	5	X	-2.11
1	5	Y	1.96
1	5	Z	-1.75

Auto generation details:

				Sheet #	58
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 3.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS14 Name: SER IV-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.82 kips	0.50		
UDL	Z		-0.03 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.091 klf	0.15		0.93
3	UDL	Z	-0.056 klf	0.15		0.93
2	UDL	X	-0.091 klf	0.15		0.93
2	UDL	Z	-0.056 klf	0.15		0.93
1	UDL	X	-0.091 klf	0.15		0.93
1	UDL	Z	-0.056 klf	0.15		0.93

Bentley				Sheet #	59
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.63
1	1	Y	-2.44
1	1	Z	-1.63
1	2	X	-2.63
1	2	Y	-0.00
1	2	Z	-1.63
1	3	X	-2.63
1	3	Y	-0.00
1	3	Z	-1.63
1	4	X	-2.63
1	4	Y	-0.00
1	4	Z	-1.63
1	5	X	-2.63
1	5	Y	2.44
1	5	Z	-1.63

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

				Sheet #	60
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS15 Name: SER IV-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.28 kips	0.50		
UDL	Z		-0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.102 klf	0.15		0.93
3	UDL	Z	-0.031 klf	0.15		0.93
2	UDL	X	-0.102 klf	0.15		0.93
2	UDL	Z	-0.031 klf	0.15		0.93
1	UDL	X	-0.102 klf	0.15		0.93
1	UDL	Z	-0.031 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.51
1	1	Y	-2.33
1	1	Z	-1.12
1	2	X	-2.51
1	2	Y	-0.00
1	2	Z	-1.12
1	3	X	-2.51
1	3	Y	-0.00
1	3	Z	-1.12
1	4	X	-2.51
1	4	Y	-0.00
1	4	Z	-1.12
1	5	X	-2.51
1	5	Y	2.33
1	5	Z	-1.12

Auto generation details:

				Sheet #	61
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS16 Name: SER IV-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.44 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.107 klf	0.15		0.93
3	UDL	Z	-0.003 klf	0.15		0.93
2	UDL	X	-0.107 klf	0.15		0.93
2	UDL	Z	-0.003 klf	0.15		0.93
1	UDL	X	-0.107 klf	0.15		0.93
1	UDL	Z	-0.003 klf	0.15		0.93

				Sheet #	62
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.54
1	1	Y	-2.36
1	1	Z	-0.71
1	2	X	-2.54
1	2	Y	-0.00
1	2	Z	-0.71
1	3	X	-2.54
1	3	Y	-0.00
1	3	Z	-0.71
1	4	X	-2.54
1	4	Y	-0.00
1	4	Z	-0.71
1	5	X	-2.54
1	5	Y	2.36
1	5	Z	-0.71

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	63
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS17 Name: SER IV-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.09 kips	0.50		
UDL	Z		0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.104 klf	0.15		0.93
3	UDL	Z	0.024 klf	0.15		0.93
2	UDL	X	-0.104 klf	0.15		0.93
2	UDL	Z	0.024 klf	0.15		0.93
1	UDL	X	-0.104 klf	0.15		0.93
1	UDL	Z	0.024 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.26
1	1	Y	-2.09
1	1	Z	-0.24
1	2	X	-2.26
1	2	Y	-0.00
1	2	Z	-0.24
1	3	X	-2.26
1	3	Y	-0.00
1	3	Z	-0.24
1	4	X	-2.26
1	4	Y	-0.00
1	4	Z	-0.24
1	5	X	-2.26
1	5	Y	2.09
1	5	Z	-0.24

Auto generation details:

				Sheet #	64
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS18 Name: SER IV-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.72 kips	0.50		
UDL	Z		0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.094 klf	0.15		0.93
3	UDL	Z	0.050 klf	0.15		0.93
2	UDL	X	-0.094 klf	0.15		0.93
2	UDL	Z	0.050 klf	0.15		0.93
1	UDL	X	-0.094 klf	0.15		0.93
1	UDL	Z	0.050 klf	0.15		0.93

				Sheet #	65
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.51
1	1	Y	-1.40
1	1	Z	0.44
1	2	X	-1.51
1	2	Y	-0.00
1	2	Z	0.44
1	3	X	-1.51
1	3	Y	-0.00
1	3	Z	0.44
1	4	X	-1.51
1	4	Y	-0.00
1	4	Z	0.44
1	5	X	-1.51
1	5	Y	1.40
1	5	Z	0.44

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	66
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS19 Name: STR V-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.10 kips	0.50		
UDL	Z		-0.08 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.003 klf	0.15		0.93
3	UDL	Z	-0.091 klf	0.15		0.93
2	UDL	X	0.003 klf	0.15		0.93
2	UDL	Z	-0.091 klf	0.15		0.93
1	UDL	X	0.003 klf	0.15		0.93
1	UDL	Z	-0.091 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.23
1	1	Y	-0.22
1	1	Z	-1.33
1	2	X	-0.23
1	2	Y	-0.00
1	2	Z	-1.33
1	3	X	-0.23
1	3	Y	-0.00
1	3	Z	-1.33
1	4	X	-0.23
1	4	Y	-0.00
1	4	Z	-1.33
1	5	X	-0.23
1	5	Y	0.22
1	5	Z	-1.33

Auto generation details:

				Sheet #	67
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 3.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS20 Name: STR V-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.69 kips	0.50		
UDL	Z		-0.08 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.021 klf	0.15		0.93
3	UDL	Z	-0.089 klf	0.15		0.93
2	UDL	X	-0.021 klf	0.15		0.93
2	UDL	Z	-0.089 klf	0.15		0.93
1	UDL	X	-0.021 klf	0.15		0.93
1	UDL	Z	-0.089 klf	0.15		0.93

Bentley				Sheet #	68
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.04
1	1	Y	-0.96
1	1	Z	-1.64
1	2	X	-1.04
1	2	Y	-0.00
1	2	Z	-1.64
1	3	X	-1.04
1	3	Y	-0.00
1	3	Z	-1.64
1	4	X	-1.04
1	4	Y	-0.00
1	4	Z	-1.64
1	5	X	-1.04
1	5	Y	0.96
1	5	Z	-1.64

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	69
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS21 Name: STR V-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.32 kips	0.50		
UDL	Z		-0.06 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.043 klf	0.15		0.93
3	UDL	Z	-0.081 klf	0.15		0.93
2	UDL	X	-0.043 klf	0.15		0.93
2	UDL	Z	-0.081 klf	0.15		0.93
1	UDL	X	-0.043 klf	0.15		0.93
1	UDL	Z	-0.081 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.51
1	1	Y	-1.40
1	1	Z	-1.69
1	2	X	-1.51
1	2	Y	-0.00
1	2	Z	-1.69
1	3	X	-1.51
1	3	Y	-0.00
1	3	Z	-1.69
1	4	X	-1.51
1	4	Y	-0.00
1	4	Z	-1.69
1	5	X	-1.51
1	5	Y	1.40
1	5	Z	-1.69

Auto generation details:

				Sheet #	70
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS22 Name: STR V-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.64 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.062 klf	0.15		0.93
3	UDL	Z	-0.067 klf	0.15		0.93
2	UDL	X	-0.062 klf	0.15		0.93
2	UDL	Z	-0.067 klf	0.15		0.93
1	UDL	X	-0.062 klf	0.15		0.93
1	UDL	Z	-0.067 klf	0.15		0.93



Bentley				Sheet #	71
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.81
1	1	Y	-1.68
1	1	Z	-1.50
1	2	X	-1.81
1	2	Y	-0.00
1	2	Z	-1.50
1	3	X	-1.81
1	3	Y	-0.00
1	3	Z	-1.50
1	4	X	-1.81
1	4	Y	-0.00
1	4	Z	-1.50
1	5	X	-1.81
1	5	Y	1.68
1	5	Z	-1.50

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	72
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS23 Name: STR V-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.56 kips	0.50		
UDL	Z		-0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.078 klf	0.15		0.93
3	UDL	Z	-0.048 klf	0.15		0.93
2	UDL	X	-0.078 klf	0.15		0.93
2	UDL	Z	-0.048 klf	0.15		0.93
1	UDL	X	-0.078 klf	0.15		0.93
1	UDL	Z	-0.048 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.25
1	1	Y	-2.08
1	1	Z	-1.40
1	2	X	-2.25
1	2	Y	-0.00
1	2	Z	-1.40
1	3	X	-2.25
1	3	Y	-0.00
1	3	Z	-1.40
1	4	X	-2.25
1	4	Y	-0.00
1	4	Z	-1.40
1	5	X	-2.25
1	5	Y	2.08
1	5	Z	-1.40

Auto generation details:

				Sheet #	73
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS24 Name: STR V-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.09 kips	0.50		
UDL	Z		-0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.087 klf	0.15		0.93
3	UDL	Z	-0.027 klf	0.15		0.93
2	UDL	X	-0.087 klf	0.15		0.93
2	UDL	Z	-0.027 klf	0.15		0.93
1	UDL	X	-0.087 klf	0.15		0.93
1	UDL	Z	-0.027 klf	0.15		0.93

				Sheet #	74
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.15
1	1	Y	-1.99
1	1	Z	-0.96
1	2	X	-2.15
1	2	Y	-0.00
1	2	Z	-0.96
1	3	X	-2.15
1	3	Y	-0.00
1	3	Z	-0.96
1	4	X	-2.15
1	4	Y	-0.00
1	4	Z	-0.96
1	5	X	-2.15
1	5	Y	1.99
1	5	Z	-0.96

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	75
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS25 Name: STR V-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.37 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.091 klf	0.15		0.93
3	UDL	Z	-0.003 klf	0.15		0.93
2	UDL	X	-0.091 klf	0.15		0.93
2	UDL	Z	-0.003 klf	0.15		0.93
1	UDL	X	-0.091 klf	0.15		0.93
1	UDL	Z	-0.003 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.18
1	1	Y	-2.02
1	1	Z	-0.61
1	2	X	-2.18
1	2	Y	-0.00
1	2	Z	-0.61
1	3	X	-2.18
1	3	Y	-0.00
1	3	Z	-0.61
1	4	X	-2.18
1	4	Y	-0.00
1	4	Z	-0.61
1	5	X	-2.18
1	5	Y	2.02
1	5	Z	-0.61

Auto generation details:

				Sheet #	76
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS26 Name: STR V-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.93 kips	0.50		
UDL	Z		0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.089 klf	0.15		0.93
3	UDL	Z	0.021 klf	0.15		0.93
2	UDL	X	-0.089 klf	0.15		0.93
2	UDL	Z	0.021 klf	0.15		0.93
1	UDL	X	-0.089 klf	0.15		0.93
1	UDL	Z	0.021 klf	0.15		0.93

				Sheet #	77
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.93
1	1	Y	-1.79
1	1	Z	-0.20
1	2	X	-1.93
1	2	Y	-0.00
1	2	Z	-0.20
1	3	X	-1.93
1	3	Y	-0.00
1	3	Z	-0.20
1	4	X	-1.93
1	4	Y	-0.00
1	4	Z	-0.20
1	5	X	-1.93
1	5	Y	1.79
1	5	Z	-0.20

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	78
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS27 Name: STR V-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.48 kips	0.50		
UDL	Z		0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.081 klf	0.15		0.93
3	UDL	Z	0.043 klf	0.15		0.93
2	UDL	X	-0.081 klf	0.15		0.93
2	UDL	Z	0.043 klf	0.15		0.93
1	UDL	X	-0.081 klf	0.15		0.93
1	UDL	Z	0.043 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.30
1	1	Y	-1.20
1	1	Z	0.38
1	2	X	-1.30
1	2	Y	-0.00
1	2	Z	0.38
1	3	X	-1.30
1	3	Y	-0.00
1	3	Z	0.38
1	4	X	-1.30
1	4	Y	-0.00
1	4	Z	0.38
1	5	X	-1.30
1	5	Y	1.20
1	5	Z	0.38

Auto generation details:

				Sheet #	79
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS28 Name: SER I-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.08 kips	0.50		
UDL	Z		-0.06 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.002 klf	0.15		0.93
3	UDL	Z	-0.070 klf	0.15		0.93
2	UDL	X	0.002 klf	0.15		0.93
2	UDL	Z	-0.070 klf	0.15		0.93
1	UDL	X	0.002 klf	0.15		0.93
1	UDL	Z	-0.070 klf	0.15		0.93



Bentley				Sheet #	80
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.18
1	1	Y	-0.17
1	1	Z	-1.02
1	2	X	-0.18
1	2	Y	-0.00
1	2	Z	-1.02
1	3	X	-0.18
1	3	Y	-0.00
1	3	Z	-1.02
1	4	X	-0.18
1	4	Y	-0.00
1	4	Z	-1.02
1	5	X	-0.18
1	5	Y	0.17
1	5	Z	-1.02

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 3.00 ft Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf Overturning 20.000 psf	Wind pressure for substructure: Pz = 54.170 psf
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf Overturning not considered	Wind pressure for substructure: Pz = 30.470 psf
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	81
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS29 Name: SER I-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.53 kips	0.50		
UDL	Z		-0.06 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.016 klf	0.15		0.93
3	UDL	Z	-0.068 klf	0.15		0.93
2	UDL	X	-0.016 klf	0.15		0.93
2	UDL	Z	-0.068 klf	0.15		0.93
1	UDL	X	-0.016 klf	0.15		0.93
1	UDL	Z	-0.068 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.79
1	1	Y	-0.74
1	1	Z	-1.26
1	2	X	-0.79
1	2	Y	-0.00
1	2	Z	-1.26
1	3	X	-0.79
1	3	Y	-0.00
1	3	Z	-1.26
1	4	X	-0.79
1	4	Y	-0.00
1	4	Z	-1.26
1	5	X	-0.79
1	5	Y	0.74
1	5	Z	-1.26

Auto generation details:

				Sheet #	82
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS30 Name: SER I-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.02 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.033 klf	0.15		0.93
3	UDL	Z	-0.062 klf	0.15		0.93
2	UDL	X	-0.033 klf	0.15		0.93
2	UDL	Z	-0.062 klf	0.15		0.93
1	UDL	X	-0.033 klf	0.15		0.93
1	UDL	Z	-0.062 klf	0.15		0.93

				Sheet #	83
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.16
1	1	Y	-1.07
1	1	Z	-1.29
1	2	X	-1.16
1	2	Y	-0.00
1	2	Z	-1.29
1	3	X	-1.16
1	3	Y	-0.00
1	3	Z	-1.29
1	4	X	-1.16
1	4	Y	-0.00
1	4	Z	-1.29
1	5	X	-1.16
1	5	Y	1.07
1	5	Z	-1.29

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	84
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS31 Name: SER I-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.26 kips	0.50		
UDL	Z		-0.03 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.048 klf	0.15		0.93
3	UDL	Z	-0.051 klf	0.15		0.93
2	UDL	X	-0.048 klf	0.15		0.93
2	UDL	Z	-0.051 klf	0.15		0.93
1	UDL	X	-0.048 klf	0.15		0.93
1	UDL	Z	-0.051 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.39
1	1	Y	-1.29
1	1	Z	-1.15
1	2	X	-1.39
1	2	Y	-0.00
1	2	Z	-1.15
1	3	X	-1.39
1	3	Y	-0.00
1	3	Z	-1.15
1	4	X	-1.39
1	4	Y	-0.00
1	4	Z	-1.15
1	5	X	-1.39
1	5	Y	1.29
1	5	Z	-1.15

Auto generation details:

				Sheet #	85
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 3.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS32 Name: SER I-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.20 kips	0.50		
UDL	Z		-0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.059 klf	0.15		0.93
3	UDL	Z	-0.037 klf	0.15		0.93
2	UDL	X	-0.059 klf	0.15		0.93
2	UDL	Z	-0.037 klf	0.15		0.93
1	UDL	X	-0.059 klf	0.15		0.93
1	UDL	Z	-0.037 klf	0.15		0.93

Bentley				Sheet #	86
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.72
1	1	Y	-1.60
1	1	Z	-1.07
1	2	X	-1.72
1	2	Y	-0.00
1	2	Z	-1.07
1	3	X	-1.72
1	3	Y	-0.00
1	3	Z	-1.07
1	4	X	-1.72
1	4	Y	-0.00
1	4	Z	-1.07
1	5	X	-1.72
1	5	Y	1.60
1	5	Z	-1.07

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	87
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS33 Name: SER I-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.84 kips	0.50		
UDL	Z		-0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.067 klf	0.15		0.93
3	UDL	Z	-0.020 klf	0.15		0.93
2	UDL	X	-0.067 klf	0.15		0.93
2	UDL	Z	-0.020 klf	0.15		0.93
1	UDL	X	-0.067 klf	0.15		0.93
1	UDL	Z	-0.020 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.65
1	1	Y	-1.53
1	1	Z	-0.74
1	2	X	-1.65
1	2	Y	-0.00
1	2	Z	-0.74
1	3	X	-1.65
1	3	Y	-0.00
1	3	Z	-0.74
1	4	X	-1.65
1	4	Y	-0.00
1	4	Z	-0.74
1	5	X	-1.65
1	5	Y	1.53
1	5	Z	-0.74

Auto generation details:

				Sheet #	88
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS34 Name: SER I-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.29 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.070 klf	0.15		0.93
3	UDL	Z	-0.002 klf	0.15		0.93
2	UDL	X	-0.070 klf	0.15		0.93
2	UDL	Z	-0.002 klf	0.15		0.93
1	UDL	X	-0.070 klf	0.15		0.93
1	UDL	Z	-0.002 klf	0.15		0.93

				Sheet #	89
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.67
1	1	Y	-1.55
1	1	Z	-0.47
1	2	X	-1.67
1	2	Y	-0.00
1	2	Z	-0.47
1	3	X	-1.67
1	3	Y	-0.00
1	3	Z	-0.47
1	4	X	-1.67
1	4	Y	-0.00
1	4	Z	-0.47
1	5	X	-1.67
1	5	Y	1.55
1	5	Z	-0.47

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 3.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

				Sheet #	90
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Loadcase ID: WS35 Name: SER I-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.71 kips	0.50		
UDL	Z		0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.068 klf	0.15		0.93
3	UDL	Z	0.016 klf	0.15		0.93
2	UDL	X	-0.068 klf	0.15		0.93
2	UDL	Z	0.016 klf	0.15		0.93
1	UDL	X	-0.068 klf	0.15		0.93
1	UDL	Z	0.016 klf	0.15		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.48
1	1	Y	-1.37
1	1	Z	-0.16
1	2	X	-1.48
1	2	Y	-0.00
1	2	Z	-0.16
1	3	X	-1.48
1	3	Y	-0.00
1	3	Z	-0.16
1	4	X	-1.48
1	4	Y	-0.00
1	4	Z	-0.16
1	5	X	-1.48
1	5	Y	1.37
1	5	Z	-0.16

Auto generation details:

				Sheet #	91
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 3.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS36 Name: SER I-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.13 kips	0.50		
UDL	Z		0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.062 klf	0.15		0.93
3	UDL	Z	0.033 klf	0.15		0.93
2	UDL	X	-0.062 klf	0.15		0.93
2	UDL	Z	0.033 klf	0.15		0.93
1	UDL	X	-0.062 klf	0.15		0.93
1	UDL	Z	0.033 klf	0.15		0.93



Sheet # 92

Job # 075926

Program: LEAP® Bridge Concrete CONNECT Edition

CHA Consulting, Inc. - NY

Designed: CAE

Module: Substructure

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Date: 05/17/2024

Version: 21.01.00.22

www.bentley.com

Phone: 1-800-778-4277

Checked: DOR

File Name: LAK-6 42 in Dia Pier Analysis.Ibcx

Date: 05/21/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.99
1	1	Y	-0.92
1	1	Z	0.29
1	2	X	-0.99
1	2	Y	-0.00
1	2	Z	0.29
1	3	X	-0.99
1	3	Y	-0.00
1	3	Z	0.29
1	4	X	-0.99
1	4	Y	-0.00
1	4	Z	0.29
1	5	X	-0.99
1	5	Y	0.92
1	5	Z	0.29

Auto generation details:**Generated Wind Load on Structure**

Angle of wind = 60.00 deg Elevation above which wind load acts = 3.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:
Pz = 44.010 psfWind pressure for substructure:
Pz = 54.170 psf

Overturning 20.000 psf

For SER IV

Wind pressure for superstructure:
Pz = 24.760 psfWind pressure for substructure:
Pz = 30.470 psf

Overturning not considered

For STR V

Wind pressure for superstructure:
Pz = 21.190 psfWind pressure for substructure:
Pz = 26.080 psf

For SER I

Wind pressure for superstructure:
Pz = 16.250 psfWind pressure for substructure:
Pz = 20.000 psf

				Sheet #	93
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.Ibcx			Date	05/21/2024

Selected load groups

- STRENGTH GROUP I

STRENGTH GROUP III

STRENGTH GROUP V

SERVICE GROUP I

EXTREME EVENT GROUP II

				Sheet #	1
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

CAP DESIGN

CAP DESIGN

Code: AASHTO LRFD 9
Units: US
Pier View: Upstation.

DESIGN PARAMETERS

$f'_c = 4000.0$ psi Fy flex = 60000.0 psi ϕ tens = 0.90 ϕ comp = 0.75 Tens above = 0.005 $E_c = 3986.6$ ksi Crack check as per current LRFD Crack control Exposure = 1.00 Concrete Type : Normal Weight. Design of cap at centerline of column.	F_y shear = 60000.0 psi ϕ shear = 0.90 Comp below = 0.002 $E_s = 29000.0$ ksi

CAP GEOMETRY

Straight Cap : Length(X) = 38.83 ft Depth(Z) = 42.00 in

Cap Section Properties

Sec.	Area ft ^2	Iz in ^4	Iy in ^4
1	10.50	163296.00	222264.00

MAIN REINFORCEMENT

	Bar size	Quantity	Bar dist. in	As total in^2	From ft	To ft	Hook
TOP	US#9[M29]	9	3.13	9.000	1.75	37.08	Both 90
BOTTOM	US#9[M29]	9	3.13	9.000	1.75	37.08	Both 180



Sheet #	2
Job #	075926
Designed	CAE
Date	05/17/2024
Checked	DOR
Date	05/21/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx	

STIRRUPS

From ft	To ft	Stirrup Size	n legs	Spacing in	Aprv/s in^2 / ft	Bar Type
1.75	10.00	US#5[M16]	2	12.00	0.62	Stirrup
10.00	28.83	US#5[M16]	2	8.00	0.93	Stirrup
28.83	36.83	US#5[M16]	2	12.00	0.62	Stirrup

Clear Cover on Sides = 2.00 in

FLEXURE DESIGN

Span 1: From 0.00 ft To 1.75 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips-ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb-req in^2	Asb-prv in^2	Asb-eff in^2	Ast-req in^2	Ast-prv in^2	Ast-eff in^2
0.0	0.0	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			0.0	-0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
0.2	0.2	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			-0.0	-0.0	1	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
0.9	0.9	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			-0.2	-0.2	1	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*

Ast-prv/-eff = 7-#10, As = 7 x 1.27in² = 8.89 in² bars extend and bend down column face.

Asb = 7-#10 = 8.89in². Bars developed at column face and extend into column.

ldh = 23" BDM Fig. 304-3. lprv = 21" Asb-eff = 8.89in² x 21 / 23 = 8.12in²

Confirmed OK



Bentley		CHA Consulting, Inc. - NY		Sheet #	3
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Span 2: From 1.75 ft To 19.42 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips- ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb- req in^2	Asb- prv in^2	Asb- eff in^2	Ast- req in^2	Ast- prv in^2	Ast- eff in^2
0.9	2.6	36	165.6	1256.8	148330	T	3.57	32.87	0.025	0.90	1.50	9.00	9.00	0.73	9.00	9.00
			-188.4	-	115	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	1.71	9.00	9.00
1.6	3.3	36	181.0	1256.8	148330	T	3.57	32.87	0.025	0.90	1.65	9.00	9.00	0.73	9.00	9.00
			-104.9	-	10557	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.95	9.00	9.00
8.8	10.6	36	876.9	1256.8	34	T	3.57	32.87	0.025	0.90	6.17	9.00	9.00	0.73	9.00	9.00
			0.0	-	0	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.73	9.00	9.00
16.1	17.9	36	0.0	1256.8	0	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.73	9.00	9.00
			-597.7	-	35	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	4.15	9.00	9.00
16.8	18.5	36	0.0	1256.8	0	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.73	9.00	9.00
			-729.2	-	35	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	5.10	9.00	9.00

Span 3: From 19.42 ft To 37.08 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips- ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb- req in^2	Asb- prv in^2	Asb- eff in^2	Ast- req in^2	Ast- prv in^2	Ast- eff in^2
0.9	20.3	36	0.0	1256.8	0	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.73	9.00	9.00
			-697.8	-	116	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	4.87	9.00	9.00
1.6	21.0	36	0.0	1256.8	0	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.73	9.00	9.00
			-569.7	-	116	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	3.95	9.00	9.00
8.8	28.2	36	867.5	1256.8	112	T	3.57	32.87	0.025	0.90	6.10	9.00	9.00	0.73	9.00	9.00
			0.0	-	0	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	0.73	9.00	9.00
16.1	35.5	36	177.4	1256.8	263270	T	3.57	32.87	0.025	0.90	1.61	9.00	9.00	0.73	9.00	9.00
			-146.4	-	43358	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	1.33	9.00	9.00
16.8	36.2	36	154.4	1256.8	263270	T	3.57	32.87	0.025	0.90	1.40	9.00	9.00	0.73	9.00	9.00
			-233.4	-	31	T	3.57	32.87	0.025	0.90	0.73	9.00	9.00	2.13	9.00	9.00

Sheet #	4
Job #	075926
Designed	CAE
Date	05/17/2024
Checked	DOR
Date	05/21/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx	

Span 4: From 37.08 ft To 38.83 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips- ft	Mr kips- ft	Comb	CL	c	dt in	eps_t	Phi	Asb- req in^2	Asb- prv in^2	Asb-eff in^2	Ast- req in^2	Ast- prv in^2	Ast-eff in^2
0.9	38.0	36	0.0	0.0	0	T	0.00	0.00	- 0.003	0.00	0.73	0.00*	-nan (ind)*	0.73	0.00*	-nan (ind)*
			-0.2	-0.2	1	T	0.00	0.00	- 0.003	0.00	0.73	0.00*	-nan (ind)*	0.73	0.00*	-nan (ind)*
1.6	38.6	36	0.0	0.0	0	T	0.00	0.00	- 0.003	0.00	0.73	0.00*	-nan (ind)*	0.73	0.00*	-nan (ind)*
			-0.0	-0.0	1	T	0.00	0.00	- 0.003	0.00	0.73	0.00*	-nan (ind)*	0.73	0.00*	-nan (ind)*
1.7	38.8	36	0.0	0.0	0	T	0.00	0.00	- 0.003	0.00	0.73	0.00*	-nan (ind)*	0.73	0.00*	-nan (ind)*
			0.0	-0.0	0	T	0.00	0.00	- 0.003	0.00	0.73	0.00*	-nan (ind)*	0.73	0.00*	-nan (ind)*

See Span 1 info, page 463

Flexure Design : Notes

CL: Section classification as per LRFD 2006 interims for provided reinforcement.
C = Compression controlled, I = In-Transition, T = Tension controlled.
* The provided reinforcement is not adequate, either less than required or larger than maximum allowed.

SHEAR AND TORSION DESIGN:

Span 1: From 0.00 ft To 1.75 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	Theta deg
0.00	0.00	R	0.0	0	0.0	0	165.2	69.2	0.00	0.00	0.00	0.00	0.00	183.60	0.00	1.92	36.00
0.20	0.20	L	0.0	1	0.0	0	165.2	69.2	0.00	0.00	0.00	0.00	0.00	183.60	0.00	1.92	36.00

				Sheet #	5
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

Span 2: From 1.75 ft To 19.42 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	Theta deg
1.55	3.30	R	136.8	115	117.2	34	296.6	70.5	0.33	0.10	0.53	0.62	0.00	226.38	103.15	2.72	3
8.83	10.58	L	122.5	115	117.2	34	299.7	70.5	0.31	0.11	0.53	0.93	0.00	174.11	158.86	2.09	3
		R	187.8	34	97.2	115	285.1	67.4	0.34	0.09	0.53	0.93	0.25	157.85	158.95	1.90	3
16.12	17.87	L	202.2	34	97.2	115	310.2	67.4	0.35	0.09	0.53	0.93	0.00	176.36	168.30	2.12	3

Span 3: From 19.42 ft To 37.08 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	Theta deg
1.55	20.97	R	197.1	112	97.2	112	320.2	70.5	0.35	0.09	0.53	0.93	0.00	184.00	171.75	2.21	3
8.83	28.25	L	182.7	112	97.2	112	291.6	70.5	0.34	0.09	0.53	0.93	0.00	162.57	161.48	1.95	3
		R	127.6	31	117.2	31	294.4	67.4	0.31	0.11	0.53	0.93	0.00	170.16	156.95	2.04	3
16.12	35.53	L	141.9	31	117.2	31	286.0	67.4	0.33	0.10	0.53	0.62	0.00	216.77	101.03	2.60	3

Span 4: From 37.08 ft To 38.83 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	Theta deg
1.55	38.63	R	0.0	1	0.0	0	590.2	69.2	0.00	0.00	0.00	0.00	-nan (ind)	655.73	0.00	6.86	27.60
1.75	38.83	L	0.0	0	0.0	0	590.2	69.2	0.00	0.00	0.00	0.00	-nan (ind)	655.73	0.00	6.86	27.60

Shear and Torsion Design : Notes

- Pos is the design position. L suggests the calculation is done at immediate left of "Loc" and R suggests at immediate right of it.
- T-lim is the limiting value of torsion for the concrete section. If actual torsion is higher than this value, torsional steel has to be provided.
- Avs/s is the required area of steel per unit length for shear force.
- Ats/s is the required area of steel per unit length for one leg of torsional reinforcement.
- Av/s is the total required area of steel per unit length due to shear plus torsion.
- Aprv/s is the total provided area of transverse steel reinforcement.
- Alx is the EFFECTIVE longitudinal steel required in addition to the PROVIDED EFFECTIVE flexural steel.
- Vc is the nominal shear resistance of concrete.
- Vs is the nominal shear resistance of transverse reinforcement.
- Beta is the factor indicating ability of diagonally cracked concrete to transmit tension and shear.
- Theta is the angle of inclination of diagonal compressive stress.
- # Vu is greater than phi*Vn.

Bentley				Sheet #	6
				Job #	075926
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

CRACKING/FATIGUE CHECK

Fatigue Design Not Needed for Concrete Structure

Span 1: From 0.00 ft To 1.75 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	0.0	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
0.20	0.2	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
0.88	0.9	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
1.75	1.8	36.0	0	0.0	2.6	5.0	4.5	0.00	0.00
			0	0.0	2.6	5.0	4.5	0.00	0.00

Span 2: From 1.75 ft To 19.42 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	1.8	36.0	0	0.0	2.6	5.0	4.5	0.00	0.00
			0	0.0	2.6	5.0	4.5	0.00	0.00
0.88	2.6	36.0	0	0.0	2.6	5.0	4.5	0.00	0.00
			253306	8.8	2.6	42.0	4.5	0.00	0.00
1.55	3.3	36.0	0	0.0	2.6	5.0	4.5	0.00	0.00
			253306	12.5	2.6	42.0	4.5	0.00	0.00
8.83	10.6	36.0	0	0.0	2.6	5.0	4.5	0.00	0.00
			253312	28.9	2.6	16.7	4.5	0.00	0.00
16.12	17.9	36.0	253313	22.4	2.6	23.0	4.5	0.00	0.00
			0	0.0	2.6	5.0	4.5	0.00	0.00
16.79	18.5	36.0	253313	27.1	2.6	18.2	4.5	0.00	0.00
			0	0.0	2.6	5.0	4.5	0.00	0.00
17.67	19.4	36.0	253313	33.2	2.6	13.9	4.5	0.00	0.00
			0	0.0	2.6	5.0	4.5	0.00	0.00

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Span 3: From 19.42 ft To 37.08 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	19.4	36.0	220508 0	30.0 0.0	2.6 2.6	15.9 5.0	4.5 4.5	0.00 0.00	0.00 0.00
0.88	20.3	36.0	220508 0	24.3 0.0	2.6 2.6	20.8 5.0	4.5 4.5	0.00 0.00	0.00 0.00
1.55	21.0	36.0	220508 0	19.9 0.0	2.6 2.6	26.5 5.0	4.5 4.5	0.00 0.00	0.00 0.00
8.83	28.2	36.0	0 220504	0.0 27.9	2.6 2.6	5.0 17.5	4.5 4.5	0.00 0.00	0.00 0.00
16.12	35.5	36.0	253310 220502	0.4 8.7	2.6 2.6	42.0 42.0	4.5 4.5	0.00 0.00	0.00 0.00
16.79	36.2	36.0	253309 220502	2.3 5.8	2.6 2.6	42.0 42.0	4.5 4.5	0.00 0.00	0.00 0.00
17.67	37.1	36.0	0 0	0.0 0.0	0.0 0.0	42.0 42.0	0.0 0.0	0.00 0.00	0.00 0.00

Span 4: From 37.08 ft To 38.83 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	37.1	36.0	0 0	0.0 0.0	0.0 0.0	42.0 42.0	0.0 0.0	0.00 0.00	0.00 0.00
0.88	38.0	36.0	0 0	0.0 0.0	0.0 0.0	42.0 42.0	0.0 0.0	0.00 0.00	0.00 0.00
1.55	38.6	36.0	0 0	0.0 0.0	0.0 0.0	42.0 42.0	0.0 0.0	0.00 0.00	0.00 0.00
1.75	38.8	36.0	0 0	0.0 0.0	0.0 0.0	42.0 42.0	0.0 0.0	0.00 0.00	0.00 0.00

Cracking and fatigue Check : Notes

* Cracking / fatigue checking failed.
Required bar spacing, Sreq, should not be less than 5 in per Art. 5.7.3.4.

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File Name:	LAK-6 42 in Dia Pier Analysis.lbcx			Date	05/21/2024

COLUMN DESIGN

COLUMN DESIGN - Column: 1

Code: AASHTO LRFD 9
Units: US
Pier View: Upstation.
Design/Analysis Method: Moment Magnification - Unbraced Column.

Column Type: Round D = 42.00 in

Column Section Properties

Sec.	Area ft ²	Ix in ⁴	Iz in ⁴
1	9.62	152745.02	152745.02

DESIGN PARAMETERS

f _c = 4000.0 psi	f _y = 60000.0 psi
phi tens = 0.90	phi comp = 0.75
Tens above = 0.005	Comp below = 0.002
phi shear = 0.90	f _y shear = 60000.00 psi
E _c = 3986.6 ksi	E _s = 29000 ksi
Concrete Type : Normal Weight.	

Reinforcement

Rebar Pattern: Circular
Rebar Orientation: Face Parallel

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Main Reinforcement Schedule

Layer	Size	No. bars	Bar Dist. in	From ft	To ft	Hook
1	US#11[M36]	9	6.20	0.00	20.01	None

Note:

Bar Dist refers to the distance between center of reinforcement and concrete surface.

Lateral Reinforcement Schedule

Layer	Size	Type	Pitch in	From ft	To ft
1	US#4[M13]	Spiral	3.00	0.00	20.01

Moment Magnification calculation - Mx (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	117	1.0000	1.0000	0.0835	----	1.0155	28860.92
20.01	117	1.0000	1.0000	0.2918	----	1.0161	24206.33
0.00	352	1.0000	1.0000	0.0427	----	1.0101	29989.64
20.01	352	1.0000	1.0000	0.1846	----	1.0102	26397.94

Moment Magnification calculation - Mz (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	117	1.2000	1.0000	1.0000	----	1.0362	10857.66
20.01	117	1.2000	1.0000	0.6277	----	1.0325	13341.27
0.00	352	1.2000	1.0000	0.2534	----	1.0199	17324.82
20.01	352	1.2000	1.0000	1.0000	----	1.0226	10857.66

Design values used after Moment Magnification (e-min effect included).

Loc ft	Comb	Fx kips	Fy kips	Fz kips	Mx kips-ft	My kips-ft	Mz kips-ft
0.00	117	18.9	377.3	-18.2	-491.8	24.7	-85.0
20.01	117	-18.9	343.9	18.2	122.7	24.7	-304.8
0.00	352	-18.3	150.0	27.2	688.5	-30.5	264.8
20.01	352	18.3	125.9	-27.2	-138.9	-30.5	109.7

COLUMN DESIGN

Bot/Top Elev. ft	Comb	Pu kips	Mux kips-ft	Muz kips-ft	pMn kips-ft	Incl deg	pPn/Pu	pMn/Mu
0.00	352	150.0	688.5	264.8	1110.8	21.03	1.00	1.50573
20.01	117	343.9	122.7	304.8	1288.7	68.07	1.00	3.92146

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COLUMN DESIGN

Bot/Top Elev. ft	As_min in^2	As_max in^2	As_prov in^2
0.00	12.47	110.84	14.04
20.01	12.47	110.84	14.04

SHEAR DESIGN:

Loc ft	Pos	Vu kips	Comb	phi*Vn kips	Av/s in^2/ft	Aprv/s in^2/ft	Vc kips	Vs kips	Beta	Theta deg	b in	dv in	Eps_s	Smax in	Sprv in
0.00	L	32.8	559	529.7	0.00	1.60	229.96	358.57	3.16	31.42	42.00	27.38	0.0007	21.90	3.00
20.01	R	32.8	559	638.6	0.00	1.60	321.03	388.57	4.41	29.41	42.00	27.38	0.0001	21.90	3.00

Slenderness ratio kL/r

Column	L ft	r	k	kL/r
1	20.01	0.88	1.20	27.44

K values for all columns used in unbraced moment magnification

Column	Kx	Kz
1	1.00	1.20
2	1.00	1.20
3	1.00	1.20

Column Design : Notes

Min reinforcement = 0.9000 % of Ag.

---- Values do not exist at that location as computation is done at the top and bottom of clear length of column.

Shear Design : Notes

- Pos is the design position. L suggests the calculation is done at immediate left of "Loc" and R suggests at immediate right of it.
- Av/s is the total required area of steel per unit length due to shear plus torsion.
- Aprv/s is the total provided area of transverse steel reinforcement.
- Vc is the nominal shear resistance of concrete.
- Vs is the nominal shear resistance of transverse reinforcement.
- Beta is the factor indicating ability of diagonally cracked concrete to transmit tension and shear.
- Theta is the angle of inclination of diagonal compressive stress.
- # Vu is greater tha phi*Vn.

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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/08/2024

PROJECT DATA

PROJECT DATA

Project:	LAK-6 Fixed Pier Design
User Job No.:	
Designer:	CAE
Date:	05/01/2024
Checker:	DOR
Checked date:	05/08/2024
State:	OHIO
State Job No.:	
Structure type:	Pier.
Pier View:	Upstation.
State Specification:	None
Code:	AASHTO LRFD 9th Edition
Comments:	Design and Analysis of Pier 3 which is a fixed pier.



Sheet #	2
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

PIER GEOMETRY

Pier Info:

Pier View:	Upstation.
Pier Type:	Multi Column

Cap Shape

Cap Shape:	Straight
Top Elevations:	start = 24.32 ft end = 24.32 ft
Depth(Z) =	42.00 in Skew angle = 31.88 Reduction of I = 1.000
Length(X) =	38.83 ft Height(Y) = 36.00 in

Column Shape : Round

Number of columns:	3

Column number 1

Location from the left edge of the cap(X):	1.75 ft
Elevations: bottom = 0.00 ft top = 22.82 ft Reduction of I = 1.000	
Column Bottom is Fixed	

Column Section Dimensions

Diameter =	42.00 in

Column number 2

Location from the left edge of the cap(X):	19.42 ft
Elevations: bottom = 0.00 ft top = 22.82 ft Reduction of I = 1.000	
Column Bottom is Fixed	

Column Section Dimensions

Diameter =	42.00 in

Column number 3

Location from the left edge of the cap(X):	37.08 ft
Elevations: bottom = 0.00 ft top = 22.82 ft Reduction of I = 1.000	
Column Bottom is Fixed	

Column Section Dimensions

Diameter =	42.00 in

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SUPERSTRUCTURE INFO

Superstructure info:

Total number of spans:	6
Span number rear to current pier:	3
Number of traffic lanes:	2
Barrier height :	108.00 in
Depth of slab :	10.63 in
Curb to curb distance:	33.330 ft

Beam info:

Height in	Section area in^2	Inertia (Ixx) in^4	Inertia (Iyy) in^4	Beam CG in
38.70	58.80	14900.00	695.00	19.35

Span #	Span length ft	Bridge Width ft
1	65.177	36.667
2	92.000	36.667
3	84.000	36.667
4	84.000	36.667
5	95.250	36.667
6	68.177	36.667

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BEARING POINTS

Number of bearing lines: 1

First bearing line Eccentricity = 0.00 ft

Point	Distance ft
1	1.75
2	10.58
3	19.42
4	28.25
5	37.08

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MATERIAL PROPERTIES

MATERIAL PROPERTIES

	Cap	Column	Footing
Concrete Type	normal	normal	normal
Concrete Strength (psi)	4000.00	4000.00	3000.00
Concrete Density (lb/ft3)	150.00	150.00	150.00
Concrete Modulus Ec (ksi)	3986.55	3986.55	3625.50
Steel Strength Fy (ksi)	60.00	60.00	40.00

DESIGN PARAMETERS

Resistance factors for reinf. concrete

Flexure and tension	0.90
Shear and torsion (normal)	0.90
Shear and torsion (lightweight)	0.90
Axial compression (ties)	0.75
Axial compression (spiral)	0.75
Compression in STM	0.70

Multi presence factors for live load

1 Lane	1.20
2 Lanes	1.00
3 Lanes	0.85
4 Lanes	0.65
5 Lanes	0.65
6 Lanes	0.65

Dynamic load allowance IM

	Truck	Lane	Fatigue
Cap	0.33	0.00	0.15
Column	0.33	0.00	0.15
Footing	0.00	0.00	0.00

	Exposure factors	Clear cover in	Clear side cover in
Cap	1.00	2.00	2.00
Column	1.00	2.00	
Footing	1.00	3.00	3.00

Degree of fixity in foundations for Moment Magnify Method: $G_a = 5.00$

SEISMIC DESIGN PARAMETERS

Strength Reduction factors for reinf. Concrete Seismic Design

Tension controlled	0.90
Shear and torsion (normal)	0.90
Shear and torsion (lightweight)	0.70
Compression Controlled (ties)	0.75
Compression Controlled (spiral)	0.75

Seismic Overstrength

Flexure and tension	1.30
Axial compression (ties)	1.30
Axial compression (spiral)	1.30

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Response Modification Factor 1.00

Use core area for plastic hinging calculations.

Design Factors

Cap Design Factor	1.20
Footing Design Factor	1.20

Plastic Hinge Moment

Use actual computed Plastic Hinging Moment for each column in all combinations.

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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/08/2024

LOADS

Pier Info:

Pier View: Upstation.

Load Cases: 66

Longitudinal Reaction: Continuous Bridge Model

Selected Vehicles:	Design Truck + Lane Load Design Tandem + Lane Load Design Truck Two Design Trucks + Lane Load

Traverse Positioning

Number of loaded lanes	All combinations
Live Load Positions	Constant Spacing
Minimum Distance from Curb	2.000000
Center to Center Spacing	10.000000

Generate Braking/Longitudinal Force	Selected
Generate Centrifugal Force	Not Selected

Number of single regular truck positions	6
Number of all possible combinations of regular truck positions	16

Loadcase ID: DC1 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	Y	-105.00
1	2	Y	-102.00
1	3	Y	-102.00
1	4	Y	-102.00
1	5	Y	-105.00



Sheet # 9

Job #

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Designed CAE

Module: Substructure

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Date 05/08/2024

Loadcase ID: WL1 Name: Angle: 60

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.82
1	1	Y	-1.19
1	1	Z	0.24
1	2	X	-0.82
1	2	Y	-0.00
1	2	Z	0.24
1	3	X	-0.82
1	3	Y	-0.00
1	3	Z	0.24
1	4	X	-0.82
1	4	Y	-0.00
1	4	Z	0.24
1	5	X	-0.82
1	5	Y	1.19
1	5	Z	0.24

Auto generation details:**Generated Wind Load on Live Load**

Angle of wind = 60.00 deg Live load length = 84.00 ft



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Loadcase ID: WL2 Name: Angle: 45

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.23
1	1	Y	-1.77
1	1	Z	-0.13
1	2	X	-1.23
1	2	Y	-0.00
1	2	Z	-0.13
1	3	X	-1.23
1	3	Y	-0.00
1	3	Z	-0.13
1	4	X	-1.23
1	4	Y	-0.00
1	4	Z	-0.13
1	5	X	-1.23
1	5	Y	1.77
1	5	Z	-0.13

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 45.00 deg Live load length = 84.00 ft

Loadcase ID: WL3 Name: Angle: 30

Multiplier = 1.000

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.38
1	1	Y	-2.00
1	1	Z	-0.39
1	2	X	-1.38
1	2	Y	-0.00
1	2	Z	-0.39
1	3	X	-1.38
1	3	Y	-0.00
1	3	Z	-0.39
1	4	X	-1.38
1	4	Y	-0.00
1	4	Z	-0.39
1	5	X	-1.38
1	5	Y	2.00
1	5	Z	-0.39

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 30.00 deg Live load length = 84.00 ft

Loadcase ID: WL4 Name: Angle: 15

Multiplier = 1.000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.36
1	1	Y	-1.97
1	1	Z	-0.61
1	2	X	-1.36
1	2	Y	-0.00
1	2	Z	-0.61
1	3	X	-1.36
1	3	Y	-0.00
1	3	Z	-0.61
1	4	X	-1.36
1	4	Y	-0.00
1	4	Z	-0.61
1	5	X	-1.36
1	5	Y	1.97
1	5	Z	-0.61

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 15.00 deg Live load length = 84.00 ft

Loadcase ID: WL5 Name: Angle: 0

Multiplier = 1.000

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.43
1	1	Y	-2.06
1	1	Z	-0.89
1	2	X	-1.43
1	2	Y	-0.00
1	2	Z	-0.89
1	3	X	-1.43
1	3	Y	-0.00
1	3	Z	-0.89
1	4	X	-1.43
1	4	Y	-0.00
1	4	Z	-0.89
1	5	X	-1.43
1	5	Y	2.06
1	5	Z	-0.89

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = 0.00 deg Live load length = 84.00 ft

Loadcase ID: WL6 Name: Angle: -15

Multiplier = 1.000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.15
1	1	Y	-1.66
1	1	Z	-0.95
1	2	X	-1.15
1	2	Y	-0.00
1	2	Z	-0.95
1	3	X	-1.15
1	3	Y	-0.00
1	3	Z	-0.95
1	4	X	-1.15
1	4	Y	-0.00
1	4	Z	-0.95
1	5	X	-1.15
1	5	Y	1.66
1	5	Z	-0.95

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -15.00 deg Live load length = 84.00 ft

Loadcase ID: WL7 Name: Angle: -30

Multiplier = 1.000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.96
1	1	Y	-1.38
1	1	Z	-1.07
1	2	X	-0.96
1	2	Y	-0.00
1	2	Z	-1.07
1	3	X	-0.96
1	3	Y	-0.00
1	3	Z	-1.07
1	4	X	-0.96
1	4	Y	-0.00
1	4	Z	-1.07
1	5	X	-0.96
1	5	Y	1.38
1	5	Z	-1.07

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -30.00 deg Live load length = 84.00 ft

Loadcase ID: WL8 Name: Angle: -45

Multiplier = 1.000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.66
1	1	Y	-0.95
1	1	Z	-1.04
1	2	X	-0.66
1	2	Y	-0.00
1	2	Z	-1.04
1	3	X	-0.66
1	3	Y	-0.00
1	3	Z	-1.04
1	4	X	-0.66
1	4	Y	-0.00
1	4	Z	-1.04
1	5	X	-0.66
1	5	Y	0.95
1	5	Z	-1.04

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -45.00 deg Live load length = 84.00 ft

Loadcase ID: WL9 Name: Angle: -60

Multiplier = 1.000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.15
1	1	Y	-0.21
1	1	Z	-0.84
1	2	X	-0.15
1	2	Y	-0.00
1	2	Z	-0.84
1	3	X	-0.15
1	3	Y	-0.00
1	3	Z	-0.84
1	4	X	-0.15
1	4	Y	-0.00
1	4	Z	-0.84
1	5	X	-0.15
1	5	Y	0.21
1	5	Z	-0.84

Auto generation details:

Generated Wind Load on Live Load

Angle of wind = -60.00 deg Live load length = 84.00 ft

Loadcase ID: SH1 Name:

Multiplier = 1.000

Unit strain: -0.000413



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Loadcase ID: LL1 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	0.00	
1	3	Y	0.00	
1	4	Y	-44.48	
1	5	Y	-55.48	
1	1	Y	0.00	L
1	2	Y	0.00	L
1	3	Y	-0.32	L
1	4	Y	-29.60	L
1	5	Y	-38.03	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 30.00 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 3	node 5	Fx = 151.1450
Member 3	node 6	Fx = -151.1450
Member 1	node 1	Mz = 2.4671
Member 1	node 2	Mz = 11.8659
Member 9	node 9	Mz = -3.4110
Member 8	node 9	Mz = 3.4110
Member 8	node 18	Mz = -7.0957
Member 7	node 18	Mz = 7.0957
Member 7	node 2	Mz = -11.8659



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Loadcase ID: LL2 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-55.51	
1	2	Y	-44.45	
1	3	Y	0.00	
1	4	Y	0.00	
1	5	Y	0.00	
1	1	Y	-38.05	L
1	2	Y	-29.58	L
1	3	Y	-0.32	L
1	4	Y	0.00	L
1	5	Y	0.00	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 6.67 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.2000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Maximum effects in members :

Member 3	node 5	Mz = -2.4688
Member 3	node 6	Mz = -11.8624
Member 1	node 1	Fx = 151.1823
Member 1	node 2	Fx = -151.1823
Member 18	node 6	Mz = 11.8624
Member 18	node 21	Mz = -7.0943
Member 1	node 21	Mz = 7.0943
Member 1	node 1	Mz = -3.4112
Member 1	node 1	Mz = 3.4112

Loadcase ID: LL3 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-25.56	
1	2	Y	-59.98	
1	3	Y	-14.42	
1	4	Y	0.00	
1	5	Y	0.00	
1	1	Y	-15.42	L
1	2	Y	-44.67	L
1	3	Y	-7.86	L
1	4	Y	0.00	L
1	5	Y	0.00	L

Auto generation details:

Generated Live Load



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 10.00 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 3	node 5	Fx = -6.1010
Member 3	node 6	Fx = 6.1010
Member 2	node 3	Mz = 71.9499
Member 2	node 4	Mz = 128.0088
Member 18	node 6	Fy = -6.1010
Member 18	node 21	Fy = 6.1010
Member 1	node 21	Fy = -6.1010
Member 1	node 1	Fy = 6.1010
Member 1	node 1	Fy = -6.1010
Member 1	node 13	Fy = 6.1010
Member 1	node 13	Mz = 46.6920
Member 15	node 13	Mz = -46.6920
Member 10	node 10	Mz = -366.7591
Member 9	node 10	Mz = 366.7591

Loadcase ID: LL4 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	-25.91	
1	3	Y	-62.01	
1	4	Y	-57.39	
1	5	Y	-21.28	
1	1	Y	0.00	L
1	2	Y	-16.77	L
1	3	Y	-42.21	L
1	4	Y	-41.42	L
1	5	Y	-12.84	L



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.Ibcx

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 26.67 - lane load on bearing line No. 1

Truck No. 2 - center line at: 16.67 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 3	node 5	Mz = 65.8837
Member 2	node 3	Fx = 220.1721
Member 2	node 4	Fx = -220.1721
Member 18	node 21	Mz = 93.7877
Member 1	node 21	Mz = -93.7877
Member 1	node 1	Mz = 57.5611
Member 1	node 1	Mz = -57.5611

Loadcase ID: LL5 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	-7.42	
1	3	Y	-49.98	
1	4	Y	-62.96	
1	5	Y	-46.23	
1	1	Y	0.00	L
1	2	Y	-4.20	L
1	3	Y	-35.92	L
1	4	Y	-41.43	L
1	5	Y	-31.69	L



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.Ibcx

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 30.00 - lane load on bearing line No. 1

Truck No. 2 - center line at: 20.00 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 3	node 6	Mz = 143.7207
Member 18	node 6	Fy = 57.7398
Member 18	node 6	Mz = -143.7207
Member 18	node 21	Fy = -57.7398
Member 1	node 21	Fy = 57.7398
Member 1	node 1	Fy = -57.7398
Member 1	node 1	Fy = 57.7398
Member 1	node 13	Fy = -57.7398
Member 15	node 13	Fy = -67.4326
Member 15	node 12	Fy = 67.4326
Member 14	node 12	Fy = -67.4326
Member 14	node 20	Fy = 67.4326
Member 13	node 20	Fy = -67.4326
Member 13	node 4	Fy = 67.4326

Loadcase ID: LL6 Name:

Multiplier = 1.000



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	0.00	
1	2	Y	0.00	
1	3	Y	-14.44	
1	4	Y	-59.98	
1	5	Y	-25.54	
1	1	Y	0.00	L
1	2	Y	0.00	L
1	3	Y	-7.86	L
1	4	Y	-44.67	L
1	5	Y	-15.41	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 26.67 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.2000

Maximum effects in members :

Member 2	node 3	Mz = -71.9515
Member 2	node 4	Mz = -128.0155
Member 1	node 1	Fx = -6.1010
Member 1	node 2	Fx = 6.1010
Member 1	node 13	Mz = -366.7701
Member 15	node 13	Mz = 366.7701
Member 10	node 10	Mz = 46.6860
Member 9	node 10	Fy = 6.1010
Member 9	node 10	Mz = -46.6860
Member 9	node 9	Fy = -6.1010
Member 8	node 9	Fy = 6.1010
Member 8	node 18	Fy = -6.1010
Member 7	node 18	Fy = 6.1010
Member 7	node 2	Fy = -6.1010



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Job #	
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Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Loadcase ID: LL7 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-21.30	
1	2	Y	-57.40	
1	3	Y	-62.00	
1	4	Y	-25.90	
1	5	Y	0.00	
1	1	Y	-12.85	L
1	2	Y	-41.42	L
1	3	Y	-42.21	L
1	4	Y	-16.76	L
1	5	Y	0.00	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 20.00 - lane load on bearing line No. 1

Truck No. 2 - center line at: 10.00 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 1	node 1	Mz = -65.8866
Member 9	node 9	Mz = 57.5573
Member 8	node 9	Mz = -57.5573
Member 8	node 18	Mz = 93.7932
Member 7	node 18	Mz = -93.7932



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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Loadcase ID: LL8 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-46.26	
1	2	Y	-62.95	
1	3	Y	-49.98	
1	4	Y	-7.41	
1	5	Y	0.00	
1	1	Y	-31.71	L
1	2	Y	-41.43	L
1	3	Y	-35.92	L
1	4	Y	-4.20	L
1	5	Y	0.00	L

Auto generation details:

Generated Live Load

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 16.67 - lane load on bearing line No. 1

Truck No. 2 - center line at: 6.67 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.0000



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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx		

Maximum effects in members :

Member 1	node 2	Mz = -143.7001
Member 12	node 4	Fy = 67.4095
Member 12	node 19	Fy = -67.4095
Member 11	node 19	Fy = 67.4095
Member 11	node 11	Fy = -67.4095
Member 10	node 11	Fy = 67.4095
Member 10	node 10	Fy = -67.4095
Member 9	node 10	Fy = -57.7378
Member 9	node 9	Fy = 57.7378
Member 8	node 9	Fy = -57.7378
Member 8	node 18	Fy = 57.7378
Member 7	node 18	Fy = -57.7378
Member 7	node 2	Fy = 57.7378
Member 7	node 2	Mz = 143.7001

Loadcase ID: LL9 Name:

Multiplier = 1.000

Bearing loads

Line #	Bearing #	Dir	Load kips	Lane Load
1	1	Y	-21.30	
1	2	Y	-49.98	
1	3	Y	-24.05	
1	4	Y	-49.98	
1	5	Y	-21.28	
1	1	Y	-12.85	L
1	2	Y	-37.22	L
1	3	Y	-13.10	L
1	4	Y	-37.23	L
1	5	Y	-12.84	L

Auto generation details:

Generated Live Load

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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

TRUCK IDENTIFICATION : Two Design Trucks + Lane Load
Positions of the center of each load measured from the left of the bridge :

TRUCK TYPE : Regular

Truck No. 1 - center line at: 26.67 - lane load on bearing line No. 1

Truck No. 2 - center line at: 10.00 - lane load on bearing line No. 1

Multi lane reduction factor used : 1.0000

Maximum effects in members :

Member 15	node 12	Mz = 179.3078
Member 14	node 12	Mz = -179.3078
Member 14	node 20	Mz = 220.7115
Member 13	node 20	Mz = -220.7115
Member 13	node 4	Mz = 274.3117
Member 12	node 4	Mz = -274.3061
Member 12	node 19	Mz = 220.7154
Member 11	node 19	Mz = -220.7154
Member 11	node 11	Mz = 179.3190
Member 10	node 11	Mz = -179.3190

Loadcase ID: BR1 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		

				Sheet #	29
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/01/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/08/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR2 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		



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Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program: LEAP® Bridge Concrete CONNECT Edition

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Module: Substructure

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.Ibcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR3 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		

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				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/01/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/08/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR4 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

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				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/01/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/08/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR5 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

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				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/01/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/08/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR6 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-185.45 k-ft	0.50		



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Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	2.28
1	1	Z	-3.67
1	1	Y	3.26
1	2	X	2.28
1	2	Z	-3.67
1	3	X	2.28
1	3	Z	-3.67
1	4	X	2.28
1	4	Z	-3.67
1	5	X	2.28
1	5	Z	-3.67
1	5	Y	-3.26

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 1

Loadcase ID: BR7 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

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Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/01/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/08/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR8 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		

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Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/01/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/08/2024

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: BR9 Name:

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Moment	X		-309.08 k-ft	0.50		



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Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	3.80
1	1	Z	-6.11
1	1	Y	5.44
1	2	X	3.80
1	2	Z	-6.11
1	3	X	3.80
1	3	Z	-6.11
1	4	X	3.80
1	4	Z	-6.11
1	5	X	3.80
1	5	Z	-6.11
1	5	Y	-5.44

Auto generation details:

Manual input
Maximum truck load = 72.00 kips
Maximum lane load = 57.36 kips
Number of loaded lanes = 2

Loadcase ID: EV1 Name:

Multiplier = 1.000

Footing loads

Footing #	Type	Dir	Mag1	y1/L	Mag2	y2/L
1	UDL	Y	-6.000 klf	0.00		1.00
2	UDL	Y	-6.000 klf	0.00		1.00
3	UDL	Y	-6.000 klf	0.00		1.00

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Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS1 Name: STR III-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.21 kips	0.50		
UDL	Z		-0.16 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.006 klf	0.22		0.93
3	UDL	Z	-0.189 klf	0.22		0.93
2	UDL	X	0.006 klf	0.22		0.93
2	UDL	Z	-0.189 klf	0.22		0.93
1	UDL	X	0.006 klf	0.22		0.93
1	UDL	Z	-0.189 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.85
1	1	Y	-0.79
1	1	Z	-4.87
1	2	X	-0.85
1	2	Y	-0.00
1	2	Z	-4.87
1	3	X	-0.85
1	3	Y	-0.00
1	3	Z	-4.87
1	4	X	-0.85
1	4	Y	-0.00
1	4	Z	-4.87
1	5	X	-0.85
1	5	Y	0.79
1	5	Z	-4.87



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.Ibcx

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 5.00 ft
Default wind pressure:

For STR III

Wind pressure for superstructure:
Pz = 44.010 psf

Wind pressure for substructure:
Pz = 54.170 psf

Overturning 20.000 psf

For SER IV

Wind pressure for superstructure:
Pz = 24.760 psf

Wind pressure for substructure:
Pz = 30.470 psf

Overturning not considered

For STR V

Wind pressure for superstructure:
Pz = 21.190 psf

Wind pressure for substructure:
Pz = 26.080 psf

For SER I

Wind pressure for superstructure:
Pz = 16.250 psf

Wind pressure for substructure:
Pz = 20.000 psf

Loadcase ID: WS2 Name: STR III-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.42 kips	0.50		
UDL	Z		-0.16 klf	0.00		1.00



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.043 klf	0.22		0.93
3	UDL	Z	-0.185 klf	0.22		0.93
2	UDL	X	-0.043 klf	0.22		0.93
2	UDL	Z	-0.185 klf	0.22		0.93
1	UDL	X	-0.043 klf	0.22		0.93
1	UDL	Z	-0.185 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.79
1	1	Y	-3.52
1	1	Z	-6.01
1	2	X	-3.79
1	2	Y	-0.00
1	2	Z	-6.01
1	3	X	-3.79
1	3	Y	-0.00
1	3	Z	-6.01
1	4	X	-3.79
1	4	Y	-0.00
1	4	Z	-6.01
1	5	X	-3.79
1	5	Y	3.52
1	5	Z	-6.01

Auto generation details:



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.Ibcx

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 5.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS3 Name: STR III-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-2.75 kips	0.50		
UDL	Z		-0.13 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.089 klf	0.22		0.93
3	UDL	Z	-0.167 klf	0.22		0.93
2	UDL	X	-0.089 klf	0.22		0.93
2	UDL	Z	-0.167 klf	0.22		0.93
1	UDL	X	-0.089 klf	0.22		0.93
1	UDL	Z	-0.167 klf	0.22		0.93



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Designed	CAE
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Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-5.52
1	1	Y	-5.12
1	1	Z	-6.17
1	2	X	-5.52
1	2	Y	-0.00
1	2	Z	-6.17
1	3	X	-5.52
1	3	Y	-0.00
1	3	Z	-6.17
1	4	X	-5.52
1	4	Y	-0.00
1	4	Z	-6.17
1	5	X	-5.52
1	5	Y	5.12
1	5	Z	-6.17

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 5.00 ft Default wind pressure:	
For STR III Wind pressure for superstructure: Pz = 44.010 psf Overturning 20.000 psf	Wind pressure for substructure: Pz = 54.170 psf
For SER IV Wind pressure for superstructure: Pz = 24.760 psf Overturning not considered	Wind pressure for substructure: Pz = 30.470 psf
For STR V Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Loadcase ID: WS4 Name: STR III-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-3.41 kips	0.50		
UDL	Z		-0.09 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.130 klf	0.22		0.93
3	UDL	Z	-0.138 klf	0.22		0.93
2	UDL	X	-0.130 klf	0.22		0.93
2	UDL	Z	-0.138 klf	0.22		0.93
1	UDL	X	-0.130 klf	0.22		0.93
1	UDL	Z	-0.138 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-6.63
1	1	Y	-6.15
1	1	Z	-5.49
1	2	X	-6.63
1	2	Y	-0.00
1	2	Z	-5.49
1	3	X	-6.63
1	3	Y	-0.00
1	3	Z	-5.49
1	4	X	-6.63
1	4	Y	-0.00
1	4	Z	-5.49
1	5	X	-6.63
1	5	Y	6.15
1	5	Z	-5.49

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS5 Name: STR III-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-3.24 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.161 klf	0.22		0.93
3	UDL	Z	-0.100 klf	0.22		0.93
2	UDL	X	-0.161 klf	0.22		0.93
2	UDL	Z	-0.100 klf	0.22		0.93
1	UDL	X	-0.161 klf	0.22		0.93
1	UDL	Z	-0.100 klf	0.22		0.93



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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-8.23
1	1	Y	-11.30
1	1	Z	-5.12
1	2	X	-8.23
1	2	Y	12.32
1	2	Z	-5.12
1	3	X	-8.23
1	3	Y	12.32
1	3	Z	-5.12
1	4	X	-8.23
1	4	Y	12.32
1	4	Z	-5.12
1	5	X	-8.23
1	5	Y	35.94
1	5	Z	-5.12

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS6 Name: STR III-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-2.27 kips	0.50		
UDL	Z		-0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.181 klf	0.22		0.93
3	UDL	Z	-0.055 klf	0.22		0.93
2	UDL	X	-0.181 klf	0.22		0.93
2	UDL	Z	-0.055 klf	0.22		0.93
1	UDL	X	-0.181 klf	0.22		0.93
1	UDL	Z	-0.055 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-7.86
1	1	Y	-7.29
1	1	Z	-3.52
1	2	X	-7.86
1	2	Y	-0.00
1	2	Z	-3.52
1	3	X	-7.86
1	3	Y	-0.00
1	3	Z	-3.52
1	4	X	-7.86
1	4	Y	-0.00
1	4	Z	-3.52
1	5	X	-7.86
1	5	Y	7.29
1	5	Z	-3.52

Auto generation details:

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS7 Name: STR III-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.78 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.189 klf	0.22		0.93
3	UDL	Z	-0.006 klf	0.22		0.93
2	UDL	X	-0.189 klf	0.22		0.93
2	UDL	Z	-0.006 klf	0.22		0.93
1	UDL	X	-0.189 klf	0.22		0.93
1	UDL	Z	-0.006 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-7.98
1	1	Y	-7.40
1	1	Z	-2.22
1	2	X	-7.98
1	2	Y	-0.00
1	2	Z	-2.22
1	3	X	-7.98
1	3	Y	-0.00
1	3	Z	-2.22
1	4	X	-7.98
1	4	Y	-0.00
1	4	Z	-2.22
1	5	X	-7.98
1	5	Y	7.40
1	5	Z	-2.22

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	
Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf



Sheet #	49
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS8 Name: STR III-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.93 kips	0.50		
UDL	Z		0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.185 klf	0.22		0.93
3	UDL	Z	0.043 klf	0.22		0.93
2	UDL	X	-0.185 klf	0.22		0.93
2	UDL	Z	0.043 klf	0.22		0.93
1	UDL	X	-0.185 klf	0.22		0.93
1	UDL	Z	0.043 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-7.07
1	1	Y	-6.56
1	1	Z	-0.74
1	2	X	-7.07
1	2	Y	-0.00
1	2	Z	-0.74
1	3	X	-7.07
1	3	Y	-0.00
1	3	Z	-0.74
1	4	X	-7.07
1	4	Y	-0.00
1	4	Z	-0.74
1	5	X	-7.07
1	5	Y	6.56
1	5	Z	-0.74

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS9 Name: STR III-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-3.07 kips	0.50		
UDL	Z		0.04 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.167 klf	0.22		0.93
3	UDL	Z	0.089 klf	0.22		0.93
2	UDL	X	-0.167 klf	0.22		0.93
2	UDL	Z	0.089 klf	0.22		0.93
1	UDL	X	-0.167 klf	0.22		0.93
1	UDL	Z	0.089 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.74
1	1	Y	-4.40
1	1	Z	1.39
1	2	X	-4.74
1	2	Y	-0.00
1	2	Z	1.39
1	3	X	-4.74
1	3	Y	-0.00
1	3	Z	1.39
1	4	X	-4.74
1	4	Y	-0.00
1	4	Z	1.39
1	5	X	-4.74
1	5	Y	4.40
1	5	Z	1.39

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	52
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program: LEAP® Bridge Concrete CONNECT Edition

CHA Consulting, Inc. - NY

Module: Substructure

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Loadcase ID: WS10 Name: SER IV-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.12 kips	0.50		
UDL	Z		-0.09 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.003 klf	0.22		0.93
3	UDL	Z	-0.107 klf	0.22		0.93
2	UDL	X	0.003 klf	0.22		0.93
2	UDL	Z	-0.107 klf	0.22		0.93
1	UDL	X	0.003 klf	0.22		0.93
1	UDL	Z	-0.107 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.48
1	1	Y	-0.45
1	1	Z	-2.74
1	2	X	-0.48
1	2	Y	-0.00
1	2	Z	-2.74
1	3	X	-0.48
1	3	Y	-0.00
1	3	Z	-2.74
1	4	X	-0.48
1	4	Y	-0.00
1	4	Z	-2.74
1	5	X	-0.48
1	5	Y	0.45
1	5	Z	-2.74

Auto generation details:

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 5.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

Loadcase ID: WS11 Name: SER IV-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.80 kips	0.50		
UDL	Z		-0.09 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.024 klf	0.22		0.93
3	UDL	Z	-0.104 klf	0.22		0.93
2	UDL	X	-0.024 klf	0.22		0.93
2	UDL	Z	-0.104 klf	0.22		0.93
1	UDL	X	-0.024 klf	0.22		0.93
1	UDL	Z	-0.104 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.13
1	1	Y	-1.98
1	1	Z	-3.38
1	2	X	-2.13
1	2	Y	-0.00
1	2	Z	-3.38
1	3	X	-2.13
1	3	Y	-0.00
1	3	Z	-3.38
1	4	X	-2.13
1	4	Y	-0.00
1	4	Z	-3.38
1	5	X	-2.13
1	5	Y	1.98
1	5	Z	-3.38

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 5.00 ft Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf



Sheet #	55
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS12 Name: SER IV-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.55 kips	0.50		
UDL	Z		-0.07 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.050 klf	0.22		0.93
3	UDL	Z	-0.094 klf	0.22		0.93
2	UDL	X	-0.050 klf	0.22		0.93
2	UDL	Z	-0.094 klf	0.22		0.93
1	UDL	X	-0.050 klf	0.22		0.93
1	UDL	Z	-0.094 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.11
1	1	Y	-2.88
1	1	Z	-3.47
1	2	X	-3.11
1	2	Y	-0.00
1	2	Z	-3.47
1	3	X	-3.11
1	3	Y	-0.00
1	3	Z	-3.47
1	4	X	-3.11
1	4	Y	-0.00
1	4	Z	-3.47
1	5	X	-3.11
1	5	Y	2.88
1	5	Z	-3.47

Auto generation details:



Sheet #	56
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program: LEAP® Bridge Concrete CONNECT Edition

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Module: Substructure

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Version: 21.01.00.22

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Phone: 1-800-778-4277

File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 5.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS13 Name: SER IV-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.92 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.073 klf	0.22		0.93
3	UDL	Z	-0.078 klf	0.22		0.93
2	UDL	X	-0.073 klf	0.22		0.93
2	UDL	Z	-0.078 klf	0.22		0.93
1	UDL	X	-0.073 klf	0.22		0.93
1	UDL	Z	-0.078 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.73
1	1	Y	-3.46
1	1	Z	-3.09
1	2	X	-3.73
1	2	Y	-0.00
1	2	Z	-3.09
1	3	X	-3.73
1	3	Y	-0.00
1	3	Z	-3.09
1	4	X	-3.73
1	4	Y	-0.00
1	4	Z	-3.09
1	5	X	-3.73
1	5	Y	3.46
1	5	Z	-3.09

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	58
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS14 Name: SER IV-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.82 kips	0.50		
UDL	Z		-0.03 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.091 klf	0.22		0.93
3	UDL	Z	-0.056 klf	0.22		0.93
2	UDL	X	-0.091 klf	0.22		0.93
2	UDL	Z	-0.056 klf	0.22		0.93
1	UDL	X	-0.091 klf	0.22		0.93
1	UDL	Z	-0.056 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.63
1	1	Y	-4.30
1	1	Z	-2.88
1	2	X	-4.63
1	2	Y	-0.00
1	2	Z	-2.88
1	3	X	-4.63
1	3	Y	-0.00
1	3	Z	-2.88
1	4	X	-4.63
1	4	Y	-0.00
1	4	Z	-2.88
1	5	X	-4.63
1	5	Y	4.30
1	5	Z	-2.88

Auto generation details:



Sheet #	59
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program: LEAP® Bridge Concrete CONNECT Edition

CHA Consulting, Inc. - NY

Module: Substructure

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Version: 21.01.00.22

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Phone: 1-800-778-4277

File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 5.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS15 Name: SER IV-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.28 kips	0.50		
UDL	Z		-0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.102 klf	0.22		0.93
3	UDL	Z	-0.031 klf	0.22		0.93
2	UDL	X	-0.102 klf	0.22		0.93
2	UDL	Z	-0.031 klf	0.22		0.93
1	UDL	X	-0.102 klf	0.22		0.93
1	UDL	Z	-0.031 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.42
1	1	Y	-4.10
1	1	Z	-1.98
1	2	X	-4.42
1	2	Y	-0.00
1	2	Z	-1.98
1	3	X	-4.42
1	3	Y	-0.00
1	3	Z	-1.98
1	4	X	-4.42
1	4	Y	-0.00
1	4	Z	-1.98
1	5	X	-4.42
1	5	Y	4.10
1	5	Z	-1.98

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	61
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS16 Name: SER IV-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.44 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.107 klf	0.22		0.93
3	UDL	Z	-0.003 klf	0.22		0.93
2	UDL	X	-0.107 klf	0.22		0.93
2	UDL	Z	-0.003 klf	0.22		0.93
1	UDL	X	-0.107 klf	0.22		0.93
1	UDL	Z	-0.003 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-4.49
1	1	Y	-4.16
1	1	Z	-1.25
1	2	X	-4.49
1	2	Y	-0.00
1	2	Z	-1.25
1	3	X	-4.49
1	3	Y	-0.00
1	3	Z	-1.25
1	4	X	-4.49
1	4	Y	-0.00
1	4	Z	-1.25
1	5	X	-4.49
1	5	Y	4.16
1	5	Z	-1.25

Auto generation details:



Sheet #	62
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS17 Name: SER IV-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.09 kips	0.50		
UDL	Z		0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.104 klf	0.22		0.93
3	UDL	Z	0.024 klf	0.22		0.93
2	UDL	X	-0.104 klf	0.22		0.93
2	UDL	Z	0.024 klf	0.22		0.93
1	UDL	X	-0.104 klf	0.22		0.93
1	UDL	Z	0.024 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.98
1	1	Y	-3.69
1	1	Z	-0.42
1	2	X	-3.98
1	2	Y	-0.00
1	2	Z	-0.42
1	3	X	-3.98
1	3	Y	-0.00
1	3	Z	-0.42
1	4	X	-3.98
1	4	Y	-0.00
1	4	Z	-0.42
1	5	X	-3.98
1	5	Y	3.69
1	5	Z	-0.42

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	64
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS18 Name: SER IV-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.72 kips	0.50		
UDL	Z		0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.094 klf	0.22		0.93
3	UDL	Z	0.050 klf	0.22		0.93
2	UDL	X	-0.094 klf	0.22		0.93
2	UDL	Z	0.050 klf	0.22		0.93
1	UDL	X	-0.094 klf	0.22		0.93
1	UDL	Z	0.050 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.67
1	1	Y	-2.48
1	1	Z	0.78
1	2	X	-2.67
1	2	Y	-0.00
1	2	Z	0.78
1	3	X	-2.67
1	3	Y	-0.00
1	3	Z	0.78
1	4	X	-2.67
1	4	Y	-0.00
1	4	Z	0.78
1	5	X	-2.67
1	5	Y	2.48
1	5	Z	0.78

Auto generation details:



Sheet #	65
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program: LEAP® Bridge Concrete CONNECT Edition

CHA Consulting, Inc. - NY

Module: Substructure

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Version: 21.01.00.22

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Phone: 1-800-778-4277

File Name: LAK-6 42 in Dia Fixed Pier Analysis.Ibcx

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 5.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS19 Name: STR V-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.10 kips	0.50		
UDL	Z		-0.08 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.003 klf	0.22		0.93
3	UDL	Z	-0.091 klf	0.22		0.93
2	UDL	X	0.003 klf	0.22		0.93
2	UDL	Z	-0.091 klf	0.22		0.93
1	UDL	X	0.003 klf	0.22		0.93
1	UDL	Z	-0.091 klf	0.22		0.93

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.41
1	1	Y	-0.38
1	1	Z	-2.34
1	2	X	-0.41
1	2	Y	-0.00
1	2	Z	-2.34
1	3	X	-0.41
1	3	Y	-0.00
1	3	Z	-2.34
1	4	X	-0.41
1	4	Y	-0.00
1	4	Z	-2.34
1	5	X	-0.41
1	5	Y	0.38
1	5	Z	-2.34

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	67
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS20 Name: STR V-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.69 kips	0.50		
UDL	Z		-0.08 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.021 klf	0.22		0.93
3	UDL	Z	-0.089 klf	0.22		0.93
2	UDL	X	-0.021 klf	0.22		0.93
2	UDL	Z	-0.089 klf	0.22		0.93
1	UDL	X	-0.021 klf	0.22		0.93
1	UDL	Z	-0.089 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.83
1	1	Y	-1.69
1	1	Z	-2.90
1	2	X	-1.83
1	2	Y	-0.00
1	2	Z	-2.90
1	3	X	-1.83
1	3	Y	-0.00
1	3	Z	-2.90
1	4	X	-1.83
1	4	Y	-0.00
1	4	Z	-2.90
1	5	X	-1.83
1	5	Y	1.69
1	5	Z	-2.90

Auto generation details:

Sheet #	68
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx	

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 5.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

Loadcase ID: WS21 Name: STR V-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.32 kips	0.50		
UDL	Z		-0.06 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.043 klf	0.22		0.93
3	UDL	Z	-0.081 klf	0.22		0.93
2	UDL	X	-0.043 klf	0.22		0.93
2	UDL	Z	-0.081 klf	0.22		0.93
1	UDL	X	-0.043 klf	0.22		0.93
1	UDL	Z	-0.081 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.66
1	1	Y	-2.47
1	1	Z	-2.97
1	2	X	-2.66
1	2	Y	-0.00
1	2	Z	-2.97
1	3	X	-2.66
1	3	Y	-0.00
1	3	Z	-2.97
1	4	X	-2.66
1	4	Y	-0.00
1	4	Z	-2.97
1	5	X	-2.66
1	5	Y	2.47
1	5	Z	-2.97

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 5.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf



Sheet #	70
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS22 Name: STR V-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.64 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.062 klf	0.22		0.93
3	UDL	Z	-0.067 klf	0.22		0.93
2	UDL	X	-0.062 klf	0.22		0.93
2	UDL	Z	-0.067 klf	0.22		0.93
1	UDL	X	-0.062 klf	0.22		0.93
1	UDL	Z	-0.067 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.19
1	1	Y	-2.96
1	1	Z	-2.64
1	2	X	-3.19
1	2	Y	-0.00
1	2	Z	-2.64
1	3	X	-3.19
1	3	Y	-0.00
1	3	Z	-2.64
1	4	X	-3.19
1	4	Y	-0.00
1	4	Z	-2.64
1	5	X	-3.19
1	5	Y	2.96
1	5	Z	-2.64

Auto generation details:

Sheet #	71
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 5.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

Loadcase ID: WS23 Name: STR V-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.56 kips	0.50		
UDL	Z		-0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.078 klf	0.22		0.93
3	UDL	Z	-0.048 klf	0.22		0.93
2	UDL	X	-0.078 klf	0.22		0.93
2	UDL	Z	-0.048 klf	0.22		0.93
1	UDL	X	-0.078 klf	0.22		0.93
1	UDL	Z	-0.048 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.96
1	1	Y	-3.68
1	1	Z	-2.47
1	2	X	-3.96
1	2	Y	-0.00
1	2	Z	-2.47
1	3	X	-3.96
1	3	Y	-0.00
1	3	Z	-2.47
1	4	X	-3.96
1	4	Y	-0.00
1	4	Z	-2.47
1	5	X	-3.96
1	5	Y	3.68
1	5	Z	-2.47

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	73
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS24 Name: STR V-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.09 kips	0.50		
UDL	Z		-0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.087 klf	0.22		0.93
3	UDL	Z	-0.027 klf	0.22		0.93
2	UDL	X	-0.087 klf	0.22		0.93
2	UDL	Z	-0.027 klf	0.22		0.93
1	UDL	X	-0.087 klf	0.22		0.93
1	UDL	Z	-0.027 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.78
1	1	Y	-3.51
1	1	Z	-1.69
1	2	X	-3.78
1	2	Y	-0.00
1	2	Z	-1.69
1	3	X	-3.78
1	3	Y	-0.00
1	3	Z	-1.69
1	4	X	-3.78
1	4	Y	-0.00
1	4	Z	-1.69
1	5	X	-3.78
1	5	Y	3.51
1	5	Z	-1.69

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS25 Name: STR V-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.37 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.091 klf	0.22		0.93
3	UDL	Z	-0.003 klf	0.22		0.93
2	UDL	X	-0.091 klf	0.22		0.93
2	UDL	Z	-0.003 klf	0.22		0.93
1	UDL	X	-0.091 klf	0.22		0.93
1	UDL	Z	-0.003 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.84
1	1	Y	-3.56
1	1	Z	-1.07
1	2	X	-3.84
1	2	Y	-0.00
1	2	Z	-1.07
1	3	X	-3.84
1	3	Y	-0.00
1	3	Z	-1.07
1	4	X	-3.84
1	4	Y	-0.00
1	4	Z	-1.07
1	5	X	-3.84
1	5	Y	3.56
1	5	Z	-1.07

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Sheet #	76
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS26 Name: STR V-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.93 kips	0.50		
UDL	Z		0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.089 klf	0.22		0.93
3	UDL	Z	0.021 klf	0.22		0.93
2	UDL	X	-0.089 klf	0.22		0.93
2	UDL	Z	0.021 klf	0.22		0.93
1	UDL	X	-0.089 klf	0.22		0.93
1	UDL	Z	0.021 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.40
1	1	Y	-3.16
1	1	Z	-0.36
1	2	X	-3.40
1	2	Y	-0.00
1	2	Z	-0.36
1	3	X	-3.40
1	3	Y	-0.00
1	3	Z	-0.36
1	4	X	-3.40
1	4	Y	-0.00
1	4	Z	-0.36
1	5	X	-3.40
1	5	Y	3.16
1	5	Z	-0.36

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS27 Name: STR V-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.48 kips	0.50		
UDL	Z		0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.081 klf	0.22		0.93
3	UDL	Z	0.043 klf	0.22		0.93
2	UDL	X	-0.081 klf	0.22		0.93
2	UDL	Z	0.043 klf	0.22		0.93
1	UDL	X	-0.081 klf	0.22		0.93
1	UDL	Z	0.043 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.28
1	1	Y	-2.12
1	1	Z	0.67
1	2	X	-2.28
1	2	Y	-0.00
1	2	Z	0.67
1	3	X	-2.28
1	3	Y	-0.00
1	3	Z	0.67
1	4	X	-2.28
1	4	Y	-0.00
1	4	Z	0.67
1	5	X	-2.28
1	5	Y	2.12
1	5	Z	0.67

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	79
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS28 Name: SER I-Angle: -60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	0.08 kips	0.50		
UDL	Z		-0.06 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	0.002 klf	0.22		0.93
3	UDL	Z	-0.070 klf	0.22		0.93
2	UDL	X	0.002 klf	0.22		0.93
2	UDL	Z	-0.070 klf	0.22		0.93
1	UDL	X	0.002 klf	0.22		0.93
1	UDL	Z	-0.070 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-0.32
1	1	Y	-0.29
1	1	Z	-1.80
1	2	X	-0.32
1	2	Y	-0.00
1	2	Z	-1.80
1	3	X	-0.32
1	3	Y	-0.00
1	3	Z	-1.80
1	4	X	-0.32
1	4	Y	-0.00
1	4	Z	-1.80
1	5	X	-0.32
1	5	Y	0.29
1	5	Z	-1.80

Auto generation details:

Sheet #	80
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = -60.00 deg Elevation above which wind load acts = 5.00 ft		
Default wind pressure:		
For STR III	Wind pressure for superstructure: Pz = 44.010 psf	Wind pressure for substructure: Pz = 54.170 psf
Overturning 20.000 psf		
For SER IV	Wind pressure for superstructure: Pz = 24.760 psf	Wind pressure for substructure: Pz = 30.470 psf
Overturning not considered		
For STR V	Wind pressure for superstructure: Pz = 21.190 psf	Wind pressure for substructure: Pz = 26.080 psf
For SER I	Wind pressure for superstructure: Pz = 16.250 psf	Wind pressure for substructure: Pz = 20.000 psf

Loadcase ID: WS29 Name: SER I-Angle: -45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.53 kips	0.50		
UDL	Z		-0.06 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.016 klf	0.22		0.93
3	UDL	Z	-0.068 klf	0.22		0.93
2	UDL	X	-0.016 klf	0.22		0.93
2	UDL	Z	-0.068 klf	0.22		0.93
1	UDL	X	-0.016 klf	0.22		0.93
1	UDL	Z	-0.068 klf	0.22		0.93



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Module: Substructure

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.40
1	1	Y	-1.30
1	1	Z	-2.22
1	2	X	-1.40
1	2	Y	-0.00
1	2	Z	-2.22
1	3	X	-1.40
1	3	Y	-0.00
1	3	Z	-2.22
1	4	X	-1.40
1	4	Y	-0.00
1	4	Z	-2.22
1	5	X	-1.40
1	5	Y	1.30
1	5	Z	-2.22

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -45.00 deg Elevation above which wind load acts = 5.00 ft
Default wind pressure:

For STR III

Wind pressure for superstructure:
Pz = 44.010 psf

Wind pressure for substructure:
Pz = 54.170 psf

Overturning 20.000 psf

For SER IV

Wind pressure for superstructure:
Pz = 24.760 psf

Wind pressure for substructure:
Pz = 30.470 psf

Overturning not considered

For STR V

Wind pressure for superstructure:
Pz = 21.190 psf

Wind pressure for substructure:
Pz = 26.080 psf

For SER I

Wind pressure for superstructure:
Pz = 16.250 psf

Wind pressure for substructure:
Pz = 20.000 psf



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Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS30 Name: SER I-Angle: -30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.02 kips	0.50		
UDL	Z		-0.05 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.033 klf	0.22		0.93
3	UDL	Z	-0.062 klf	0.22		0.93
2	UDL	X	-0.033 klf	0.22		0.93
2	UDL	Z	-0.062 klf	0.22		0.93
1	UDL	X	-0.033 klf	0.22		0.93
1	UDL	Z	-0.062 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.04
1	1	Y	-1.89
1	1	Z	-2.28
1	2	X	-2.04
1	2	Y	-0.00
1	2	Z	-2.28
1	3	X	-2.04
1	3	Y	-0.00
1	3	Z	-2.28
1	4	X	-2.04
1	4	Y	-0.00
1	4	Z	-2.28
1	5	X	-2.04
1	5	Y	1.89
1	5	Z	-2.28

Auto generation details:



Sheet #	83
Job #	
Designed	CAE
Date	05/01/2024
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Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = -30.00 deg Elevation above which wind load acts = 5.00 ft

Default wind pressure:

For STR III

Wind pressure for superstructure:

Pz = 44.010 psf

Overturning 20.000 psf

Wind pressure for substructure:

Pz = 54.170 psf

For SER IV

Wind pressure for superstructure:

Pz = 24.760 psf

Overturning not considered

Wind pressure for substructure:

Pz = 30.470 psf

For STR V

Wind pressure for superstructure:

Pz = 21.190 psf

Wind pressure for substructure:

Pz = 26.080 psf

For SER I

Wind pressure for superstructure:

Pz = 16.250 psf

Wind pressure for substructure:

Pz = 20.000 psf

Loadcase ID: WS31 Name: SER I-Angle: -15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.26 kips	0.50		
UDL	Z		-0.03 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.048 klf	0.22		0.93
3	UDL	Z	-0.051 klf	0.22		0.93
2	UDL	X	-0.048 klf	0.22		0.93
2	UDL	Z	-0.051 klf	0.22		0.93
1	UDL	X	-0.048 klf	0.22		0.93
1	UDL	Z	-0.051 klf	0.22		0.93



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Module: Substructure

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.45
1	1	Y	-2.27
1	1	Z	-2.03
1	2	X	-2.45
1	2	Y	-0.00
1	2	Z	-2.03
1	3	X	-2.45
1	3	Y	-0.00
1	3	Z	-2.03
1	4	X	-2.45
1	4	Y	-0.00
1	4	Z	-2.03
1	5	X	-2.45
1	5	Y	2.27
1	5	Z	-2.03

Auto generation details:

Generated Wind Load on Structure

Angle of wind = -15.00 deg Elevation above which wind load acts = 5.00 ft
Default wind pressure:

For STR III

Wind pressure for superstructure:
Pz = 44.010 psf

Wind pressure for substructure:
Pz = 54.170 psf

Overturning 20.000 psf

For SER IV

Wind pressure for superstructure:
Pz = 24.760 psf

Wind pressure for substructure:
Pz = 30.470 psf

Overturning not considered

For STR V

Wind pressure for superstructure:
Pz = 21.190 psf

Wind pressure for substructure:
Pz = 26.080 psf

For SER I

Wind pressure for superstructure:
Pz = 16.250 psf

Wind pressure for substructure:
Pz = 20.000 psf



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Module: Substructure

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File Name: LAK-6 42 in Dia Fixed Pier Analysis.lbcx

Loadcase ID: WS32 Name: SER I-Angle: 0

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.20 kips	0.50		
UDL	Z		-0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.059 klf	0.22		0.93
3	UDL	Z	-0.037 klf	0.22		0.93
2	UDL	X	-0.059 klf	0.22		0.93
2	UDL	Z	-0.037 klf	0.22		0.93
1	UDL	X	-0.059 klf	0.22		0.93
1	UDL	Z	-0.037 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-3.04
1	1	Y	-2.82
1	1	Z	-1.89
1	2	X	-3.04
1	2	Y	-0.00
1	2	Z	-1.89
1	3	X	-3.04
1	3	Y	-0.00
1	3	Z	-1.89
1	4	X	-3.04
1	4	Y	-0.00
1	4	Z	-1.89
1	5	X	-3.04
1	5	Y	2.82
1	5	Z	-1.89

Auto generation details:



Sheet #	86
Job #	
Designed	CAE
Date	05/01/2024
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Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = 0.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS33 Name: SER I-Angle: 15

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.84 kips	0.50		
UDL	Z		-0.01 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.067 klf	0.22		0.93
3	UDL	Z	-0.020 klf	0.22		0.93
2	UDL	X	-0.067 klf	0.22		0.93
2	UDL	Z	-0.020 klf	0.22		0.93
1	UDL	X	-0.067 klf	0.22		0.93
1	UDL	Z	-0.020 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.90
1	1	Y	-2.69
1	1	Z	-1.30
1	2	X	-2.90
1	2	Y	-0.00
1	2	Z	-1.30
1	3	X	-2.90
1	3	Y	-0.00
1	3	Z	-1.30
1	4	X	-2.90
1	4	Y	-0.00
1	4	Z	-1.30
1	5	X	-2.90
1	5	Y	2.69
1	5	Z	-1.30

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 15.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



Sheet #	88
Job #	
Designed	CAE
Date	05/01/2024
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Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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Loadcase ID: WS34 Name: SER I-Angle: 30

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.29 kips	0.50		
UDL	Z		-0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.070 klf	0.22		0.93
3	UDL	Z	-0.002 klf	0.22		0.93
2	UDL	X	-0.070 klf	0.22		0.93
2	UDL	Z	-0.002 klf	0.22		0.93
1	UDL	X	-0.070 klf	0.22		0.93
1	UDL	Z	-0.002 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.95
1	1	Y	-2.73
1	1	Z	-0.82
1	2	X	-2.95
1	2	Y	-0.00
1	2	Z	-0.82
1	3	X	-2.95
1	3	Y	-0.00
1	3	Z	-0.82
1	4	X	-2.95
1	4	Y	-0.00
1	4	Z	-0.82
1	5	X	-2.95
1	5	Y	2.73
1	5	Z	-0.82

Auto generation details:



Sheet #	89
Job #	
Designed	CAE
Date	05/01/2024
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Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = 30.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Loadcase ID: WS35 Name: SER I-Angle: 45

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-0.71 kips	0.50		
UDL	Z		0.00 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.068 klf	0.22		0.93
3	UDL	Z	0.016 klf	0.22		0.93
2	UDL	X	-0.068 klf	0.22		0.93
2	UDL	Z	0.016 klf	0.22		0.93
1	UDL	X	-0.068 klf	0.22		0.93
1	UDL	Z	0.016 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-2.61
1	1	Y	-2.42
1	1	Z	-0.28
1	2	X	-2.61
1	2	Y	-0.00
1	2	Z	-0.28
1	3	X	-2.61
1	3	Y	-0.00
1	3	Z	-0.28
1	4	X	-2.61
1	4	Y	-0.00
1	4	Z	-0.28
1	5	X	-2.61
1	5	Y	2.42
1	5	Z	-0.28

Auto generation details:

Generated Wind Load on Structure

Angle of wind = 45.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf



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Job #	
Designed	CAE
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Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition
Module:	Substructure
Version:	21.01.00.22
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx

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www.bentley.com Phone: 1-800-778-4277

Loadcase ID: WS36 Name: SER I-Angle: 60

Multiplier = 1.000

Cap loads

Type	Dir	Arm ft	Mag1	x1/L	Mag2	x2/L
Force	X	0.00	-1.13 kips	0.50		
UDL	Z		0.02 klf	0.00		1.00

Column loads

Col #	Type	Dir	Mag1	y1/L	Mag2	y2/L
3	UDL	X	-0.062 klf	0.22		0.93
3	UDL	Z	0.033 klf	0.22		0.93
2	UDL	X	-0.062 klf	0.22		0.93
2	UDL	Z	0.033 klf	0.22		0.93
1	UDL	X	-0.062 klf	0.22		0.93
1	UDL	Z	0.033 klf	0.22		0.93

Bearing loads

Line #	Bearing #	Dir	Load kips
1	1	X	-1.75
1	1	Y	-1.62
1	1	Z	0.51
1	2	X	-1.75
1	2	Y	-0.00
1	2	Z	0.51
1	3	X	-1.75
1	3	Y	-0.00
1	3	Z	0.51
1	4	X	-1.75
1	4	Y	-0.00
1	4	Z	0.51
1	5	X	-1.75
1	5	Y	1.62
1	5	Z	0.51

Auto generation details:



Sheet #	92
Job #	
Designed	CAE
Date	05/01/2024
Checked	DOR
Date	05/08/2024

Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016
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File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx	

Generated Wind Load on Structure

Angle of wind = 60.00 deg Elevation above which wind load acts = 5.00 ft	
Default wind pressure:	
For STR III	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 44.010 psf	Pz = 54.170 psf
Overturning 20.000 psf	
For SER IV	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 24.760 psf	Pz = 30.470 psf
Overturning not considered	
For STR V	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 21.190 psf	Pz = 26.080 psf
For SER I	
Wind pressure for superstructure:	Wind pressure for substructure:
Pz = 16.250 psf	Pz = 20.000 psf

Selected load groups

STRENGTH GROUP I
STRENGTH GROUP III
STRENGTH GROUP V
SERVICE GROUP I

				Sheet #	1
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/21/2024

CAP DESIGN

CAP DESIGN

Code: AASHTO LRFD 9
Units: US
Pier View: Upstation.

DESIGN PARAMETERS

$f_c = 4000.0$ psi F_y flex = 60000.0 psi ϕ tens = 0.90 ϕ comp = 0.75 Tens above = 0.005 $E_c = 3986.6$ ksi Crack check as per current LRFD Crack control Exposure = 1.00 Concrete Type : Normal Weight. Design of cap at centerline of column.	F_y shear = 60000.0 psi ϕ shear = 0.90 Comp below = 0.002 $E_s = 29000.0$ ksi

CAP GEOMETRY

Straight Cap : Length(X) = 38.83 ft Depth(Z) = 42.00 in

Cap Section Properties

Sec.	Area ft ^2	Iz in ^4	Iy in ^4
1	10.50	163296.00	222264.00

MAIN REINFORCEMENT

	Bar size	Quantity	Bar dist. in	As total in^2	From ft	To ft	Hook
TOP							
BOTTOM	US#10[M32]	7	3.13	8.890	1.75	37.08	Both 90
	US#10[M32]	7	3.13	8.890	1.75	37.08	Both 180



Bentley				Sheet #	2
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/21/2024

STIRRUPS

From ft	To ft	Stirrup Size	n legs	Spacing in	Aprv/s in ² / ft	Bar Type
1.75	10.00	US#5[M16]	2	12.00	0.62	Stirrup
10.00	28.83	US#5[M16]	2	8.00	0.93	Stirrup
28.83	38.83	US#5[M16]	2	12.00	0.62	Stirrup

Clear Cover on Sides = 2.00 in

FLEXURE DESIGN

See Span 1 info, page 463

Span 1: From 0.00 ft To 1.75 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips-ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb-req in ²	Asb-prv in ²	Asb-eff in ²	Ast-req in ²	Ast-prv in ²	Ast-eff in ²
0.2	0.2	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			-0.0	-0.0	2	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
0.9	0.9	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			-0.2	-0.2	1	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*

Span 2: From 1.75 ft To 19.42 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips-ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb- req in ²	Asb- prv in ²	Asb- eff in ²	Ast- req in ²	Ast- prv in ²	Ast- eff in ²
0.9	2.6	36	193.5	1242.3	148330	T	3.57	32.87	0.025	0.90	1.76	8.89	8.89	0.73	8.89	8.89
			-296.9	1242.3	10555	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	2.68	8.89	8.89
1.6	3.3	36	202.3	1242.3	148330	T	3.57	32.87	0.025	0.90	1.84	8.89	8.89	0.73	8.89	8.89
			-197.9	1242.3	10555	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	1.80	8.89	8.89
8.8	10.6	36	1050.9	1242.3	30	T	3.57	32.87	0.025	0.90	7.46	8.89	8.89	0.73	8.89	8.89
			0.0	1242.3	0	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	0.73	8.89	8.89
16.1	17.9	36	0.0	1242.3	0	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	0.73	8.89	8.89
			-660.5	1242.3	36	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	4.60	8.89	8.89
16.8	18.5	36	0.0	1242.3	0	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	0.73	8.89	8.89
			-807.3	1242.3	36	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	5.66	8.89	8.89



Bentley				Sheet #	3
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/21/2024

Span 3: From 19.42 ft To 37.08 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips-ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb- req in^2	Asb- prv in^2	Asb- eff in^2	Ast- req in^2	Ast- prv in^2	Ast- eff in^2
0.9	20.3	36	0.0	1242.3	0	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	0.73	8.89	8.89
			-807.2	1242.3	117	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	5.66	8.89	8.89
1.6	21.0	36	0.0	1242.3	0	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	0.73	8.89	8.89
			-660.4	1242.3	117	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	4.60	8.89	8.89
8.8	28.2	36	1050.8	1242.3	114	T	3.57	32.87	0.025	0.90	7.46	8.89	8.89	0.73	8.89	8.89
			0.0	1242.3	0	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	0.73	8.89	8.89
16.1	35.5	36	202.3	1242.3	115526	T	3.57	32.87	0.025	0.90	1.84	8.89	8.89	0.73	8.89	8.89
			-197.9	1242.3	43357	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	1.80	8.89	8.89
16.8	36.2	36	193.5	1242.3	115526	T	3.57	32.87	0.025	0.90	1.76	8.89	8.89	0.73	8.89	8.89
			-296.8	1242.3	43357	T	3.57	32.87	0.025	0.90	0.73	8.89	8.89	2.68	8.89	8.89

Span 4: From 37.08 ft To 38.83 ft

Loc ft	AbsLoc ft	H in	Mmax Mmin kips-ft	Mr kips-ft	Comb	CL	c	dt in	eps_t	Phi	Asb-req in^2	Asb-prv in^2	Asb-eff in^2	Ast-req in^2	Ast-prv in^2	Ast-eff in^2
0.9	38.0	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			-0.2	-0.2	1	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
1.6	38.6	36	0.0	0.0	0	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*
			-0.0	-0.0	28	T	0.00	0.00	-0.003	0.00	0.73	0.00*	0.00*	0.73	0.00*	0.00*

[See Span 1 info, page 463](#)**Flexure Design : Notes**

CL: Section classification as per LRFD 2006 interims for provided reinforcement.

C = Compression controlled, I = In-Transition, T = Tension controlled.

* The provided reinforcement is not adequate, either less than required or larger than maximum allowed.

SHEAR AND TORSION DESIGN:

				Sheet #	4
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/21/2024

Span 1: From 0.00 ft To 1.75 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	Theta deg
0.20	0.20	L	0.0	1	0.0	0	165.2	69.2	0.00	0.00	0.00	0.00	0.00	183.60	0.00	1.92	36.00

Span 2: From 1.75 ft To 19.42 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	T (deg)
1.55	3.30	R	168.3	116	115.3	35	273.7	71.0	0.33	0.10	0.53	0.62	0.00	204.89	99.23	2.46	3
8.83	10.58	L	153.9	116	115.3	116	273.6	71.0	0.31	0.11	0.53	0.93	0.56	154.35	149.65	1.85	3
		R	214.6	35	99.2	35	262.4	68.4	0.47	0.10	0.67	0.93	2.09	142.40	149.17	1.71	3
16.12	17.87	L	228.9	35	99.2	116	295.1	68.4	0.41	0.09	0.59	0.93	0.00	165.58	162.36	1.99	3

Span 3: From 19.42 ft To 37.08 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	T (deg)
1.55	20.97	R	229.0	113	99.2	113	299.0	71.0	0.39	0.09	0.58	0.93	0.00	168.41	163.78	2.02	3
8.83	28.25	L	214.6	113	99.2	32	265.5	71.0	0.46	0.10	0.66	0.93	1.84	144.49	150.48	1.73	3
		R	153.9	32	115.3	113	270.1	68.4	0.30	0.11	0.53	0.93	0.82	151.87	148.23	1.82	3
16.12	35.53	L	168.3	32	115.3	32	268.8	68.4	0.33	0.10	0.53	0.62	0.00	200.55	98.13	2.41	3

Span 4: From 37.08 ft To 38.83 ft

Loc ft	AbsLoc ft	Pos	Vu kips	Comb	Tu kips- ft	Comb	phi*Vn kips	T- lim kips- ft	Avs/s in^2/ft	Ats/s in^2/ft	Av/s in^2/ft	Aprv/s in^2/ft	Alx in^2	Vc kips	Vs kips	Beta	Thet deg
1.55	38.63	R	0.0	1	0.0	0	303.5	69.2	0.00	0.00	0.00	0.62	0.00	183.60	153.60	1.92	36.0

Bentley				Sheet #	5
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/21/2024

Shear and Torsion Design : Notes

- Pos is the design position. L suggests the calculation is done at immediate left of "Loc" and R suggests at immediate right of it.
- T-lim is the limiting value of torsion for the concrete section. If actual torsion is higher than this value, torsional steel has to be provided.
- Avs/s is the required area of steel per unit length for shear force.
- Ats/s is the required area of steel per unit length for one leg of torsional reinforcement.
- Av/s is the total required area of steel per unit length due to shear plus torsion.
- Aprvs/s is the total provided area of transverse steel reinforcement.
- Alx is the EFFECTIVE longitudinal steel required in addition to the PROVIDED EFFECTIVE flexural steel.
- Vc is the nominal shear resistance of concrete.
- Vs is the nominal shear resistance of transverse reinforcement.
- Beta is the factor indicating ability of diagonally cracked concrete to transmit tension and shear.
- Theta is the angle of inclination of diagonal compressive stress.
- # Vu is greater than ϕV_n .

CRACKING/FATIGUE CHECK

Fatigue Design Not Needed for Concrete Structure

Span 1: From 0.00 ft To 1.75 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.20	0.2	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
0.88	0.9	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
1.75	1.8	36.0	0	0.0	2.6	5.0	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00

				Sheet #	6
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/21/2024

Span 2: From 1.75 ft To 19.42 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	1.8	36.0	0	0.0	2.6	5.0	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00
0.88	2.6	36.0	220507	3.6	2.6	42.0	5.9	0.00	0.00
			253306	7.4	2.6	42.0	5.9	0.00	0.00
1.55	3.3	36.0	220507	2.2	2.6	42.0	5.9	0.00	0.00
			253306	11.2	2.6	42.0	5.9	0.00	0.00
8.83	10.6	36.0	0	0.0	2.6	5.0	5.9	0.00	0.00
			253308	32.9	2.6	13.8	5.9	0.00	0.00
16.12	17.9	36.0	253314	23.5	2.6	21.5	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00
16.79	18.5	36.0	253314	28.5	2.6	16.8	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00
17.67	19.4	36.0	253314	35.0	2.6	12.7	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00

Span 3: From 19.42 ft To 37.08 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	19.4	36.0	220509	35.0	2.6	12.7	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00
0.88	20.3	36.0	220509	28.5	2.6	16.8	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00
1.55	21.0	36.0	220509	23.5	2.6	21.5	5.9	0.00	0.00
			0	0.0	2.6	5.0	5.9	0.00	0.00
8.83	28.2	36.0	0	0.0	2.6	5.0	5.9	0.00	0.00
			220506	32.3	2.6	14.2	5.9	0.00	0.00
16.12	35.5	36.0	253309	2.2	2.6	42.0	5.9	0.00	0.00
			220502	11.2	2.6	42.0	5.9	0.00	0.00
16.79	36.2	36.0	253309	3.6	2.6	42.0	5.9	0.00	0.00
			220502	7.4	2.6	42.0	5.9	0.00	0.00
17.67	37.1	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00

Span 4: From 37.08 ft To 38.83 ft

Loc ft	AbsLoc ft	H in	Cracking Comb	Cracking fs-t fs-b ksi	Cracking dc in	Cracking Srqt Srqb in	Cracking Sprt Sprb in	Fatigue stress range fs-t fs-b ksi	Fatigue threshold FTH-t FTH-b ksi
0.00	37.1	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
0.88	38.0	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00
1.55	38.6	36.0	0	0.0	0.0	42.0	0.0	0.00	0.00
			0	0.0	0.0	42.0	0.0	0.00	0.00

				Sheet #	7
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/21/2024

Cracking and fatigue Check : Notes

* Cracking / fatigue checking failed.
Required bar spacing, Sreq, should not be less than 5 in per Art. 5.7.3.4.

		Sheet # 8			
		Job #			
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/21/2024

COLUMN DESIGN

COLUMN DESIGN - Column: 1

Code: AASHTO LRFD 9
Units: US
Pier View: Upstation.
Design/Analysis Method: Moment Magnification - Unbraced Column.

Column Type: Round D = 42.00 in

Column Section Properties

Sec.	Area ft^2	Ix in^4	Iz in^4
1	9.62	152745.02	152745.02

DESIGN PARAMETERS

f'c = 4000.0 psi	fy = 60000.0 psi
phi tens = 0.90	phi comp = 0.75
Tens above = 0.005	Comp below = 0.002
phi shear = 0.90	fy shear = 60000.00 psi
Ec = 3986.6 ksi	Es = 29000 ksi
Concrete Type : Normal Weight.	

Reinforcement

Rebar Pattern: Circular
Rebar Orientation: Face Parallel

				Sheet #	9
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx			Date	05/21/2024

Main Reinforcement Schedule

Layer	Size	No. bars	Bar Dist. in	From ft	To ft	Hook
1	US#11[M36]	9	6.20	0.00	22.82	None

Note:

Bar Dist refers to the distance between center of reinforcement and concrete surface.

Lateral Reinforcement Schedule

Layer	Size	Type	Pitch in	From ft	To ft
1	US#4[M13]	Spiral	3.00	0.00	22.82

Moment Magnification calculation - Mx (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	10555	1.0000	1.0000	0.1087	----	1.0207	21685.64
22.82	10555	1.0000	1.0000	0.3399	----	1.0212	17944.12
0.00	110908	1.0000	1.0000	0.0387	----	1.0128	23147.44
22.82	110908	1.0000	1.0000	0.1974	----	1.0130	20079.27

Moment Magnification calculation - Mz (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	10555	1.2000	1.0000	0.3020	----	1.0343	12823.92
22.82	10555	1.2000	1.0000	0.3796	----	1.0368	12102.48
0.00	110908	1.2000	1.0000	0.4209	----	1.0300	11750.37
22.82	110908	1.2000	1.0000	1.0000	----	1.0273	8348.32

Design values used after Moment Magnification (e-min effect included).

Loc ft	Comb	Fx kips	Fy kips	Fz kips	Mx kips-ft	My kips-ft	Mz kips-ft
0.00	10555	29.8	390.1	-10.6	-347.6	14.8	-264.8
22.82	10555	-28.5	351.6	11.4	93.3	14.8	-426.3
0.00	110908	-7.3	147.7	25.8	697.7	-23.2	136.2
22.82	110908	7.7	120.0	-24.4	-114.8	-23.2	39.0

COLUMN DESIGN

Bot/Top Elev. ft	Comb	Pu kips	Mux kips-ft	Muz kips-ft	pMn kips-ft	Incl deg	pPn/Pu	pMn/Mu
0.00	110908	147.7	697.7	136.2	1105.7	11.05	1.00	1.55554
22.82	10555	351.6	93.3	426.3	1302.7	77.65	1.00	2.98508

COLUMN DESIGN

Bot/Top Elev. ft	As_min in^2	As_max in^2	As_prov in^2
0.00	12.47	110.84	14.04
22.82	12.47	110.84	14.04

SHEAR DESIGN:

Loc ft	Pos	Vu kips	Comb	phi*Vn kips	Av/s in^2/ft	Aprv/s in^2/ft	Vc kips	Vs kips	Beta	Theta deg	b in	dv in	Eps_s	Smax in	Sprv in
0.00	L	34.2	323	622.9	0.00	1.60	307.11	384.98	4.22	29.64	42.00	27.38	0.0002	21.90	3.00
22.82	R	34.2	323	676.5	0.00	1.60	355.18	396.46	4.88	28.92	42.00	27.38	-0.0000	21.90	3.00

Slenderness ratio kL/r

Column	L ft	r	k	kL/r
1	22.82	0.88	1.20	31.30

K values for all columns used in unbraced moment magnification

Column	Kx	Kz
1	1.00	1.20
2	1.00	1.20
3	1.00	1.20

Column Design : Notes

Min reinforcement = 0.9000 % of Ag.

---- Values do not exist at that location as computation is done at the top and bottom of clear length of column.

Shear Design : Notes

- Pos is the design position. L suggests the calculation is done at immediate left of "Loc" and R suggests at immediate right of it.
- Av/s is the total required area of steel per unit length due to shear plus torsion.
- Aprv/s is the total provided area of transverse steel reinforcement.
- Vc is the nominal shear resistance of concrete.
- Vs is the nominal shear resistance of transverse reinforcement.
- Beta is the factor indicating ability of diagonally cracked concrete to transmit tension and shear.
- Theta is the angle of inclination of diagonal compressive stress.
- # Vu is greater tha phi*Vn.

		Sheet # 11	
		Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Date 05/17/2024
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Checked DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx		Date 05/21/2024

COLUMN DESIGN - Column: 2

Code: AASHTO LRFD 9
Units: US
Pier View: Upstation.
Design/Analysis Method: Moment Magnification - Unbraced Column.

Column Type: Round D = 42.00 in

Column Section Properties

Sec.	Area ft^2	Ix in^4	Iz in^4
1	9.62	152745.02	152745.02

DESIGN PARAMETERS

f'c = 4000.0 psi phi tens = 0.90 Tens above = 0.005 phi shear = 0.90 Ec = 3986.6 ksi Concrete Type : Normal Weight.	fy = 60000.0 psi phi comp = 0.75 Comp below = 0.002 fy shear = 60000.00 psi Es = 29000 ksi

Reinforcement

Rebar Pattern: Circular
Rebar Orientation: Face Parallel

Main Reinforcement Schedule

Layer	Size	No. bars	Bar Dist. in	From ft	To ft	Hook
1	US#11[M36]	9	6.20	0.00	22.82	None

Note:

Bar Dist refers to the distance between center of reinforcement and concrete surface.

				Sheet #	12
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/21/2024

Lateral Reinforcement Schedule

Layer	Size	Type	Pitch in	From ft	To ft
1	US#4[M13]	Spiral	3.00	0.00	22.82

Moment Magnification calculation - Mx (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	354	1.0000	1.0000	0.0699	----	1.0141	22472.21
22.82	354	1.0000	1.0000	0.0988	----	1.0140	21882.06
0.00	110180	1.0000	1.0000	0.0613	----	1.0128	22654.51
22.82	110180	1.0000	1.0000	0.1255	----	1.0130	21362.82

Moment Magnification calculation - Mz (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	354	1.2000	1.0000	0.1412	----	1.0286	14631.05
22.82	354	1.2000	1.0000	0.0964	----	1.0268	15228.28
0.00	110180	1.2000	1.0000	0.3427	----	1.0299	12435.45
22.82	110180	1.2000	1.0000	0.2063	----	1.0265	13841.56

Design values used after Moment Magnification (e-min effect included).

Loc ft	Comb	Fx kips	Fy kips	Fz kips	Mx kips-ft	My kips-ft	Mz kips-ft
0.00	354	-28.4	448.3	9.2	575.8	0.0	289.2
22.82	354	28.4	420.6	-9.2	-363.5	0.0	377.0
0.00	110180	-12.5	346.8	16.6	655.9	0.0	119.3
22.82	110180	12.8	319.1	-15.2	-285.8	0.0	176.2

COLUMN DESIGN

Bot/Top Elev. ft	Comb	Pu kips	Mux kips-ft	Muz kips-ft	pMn kips-ft	Incl deg	pPn/Pu	pMn/Mu
0.00	110180	346.8	655.9	119.3	1289.1	10.31	1.00	1.93378
22.82	354	420.6	363.5	377.0	1360.3	46.05	1.00	2.59754

COLUMN DESIGN

Bot/Top Elev. ft	As_min in^2	As_max in^2	As_prov in^2
0.00	12.47	110.84	14.04
22.82	12.47	110.84	14.04

		Sheet # 13	
		Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Date 05/17/2024
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Checked DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx		Date 05/21/2024

SHEAR DESIGN:

Loc ft	Pos	Vu kips	Comb	phi*Vn kips	Av/s in^2/ft	Aprv/s in^2/ft	Vc kips	Vs kips	Beta	Theta deg	b in	dv in	Eps_s	Smax in	Sprv in
0.00	L	34.5	168063	646.7	0.00	1.60	328.23	390.37	4.51	29.30	42.00	27.38	0.0001	21.90	3.00
22.82	R	33.2	168063	629.0	0.00	1.60	312.45	386.40	4.30	29.55	42.00	27.38	0.0002	21.90	3.00

Slenderness ratio kL/r

Column	L ft	r	k	kL/r
2	22.82	0.88	1.20	31.30

K values for all columns used in unbraced moment magnification

Column	Kx	Kz
1	1.00	1.20
2	1.00	1.20
3	1.00	1.20

Column Design : Notes

Min reinforcement = 0.9000 % of Ag.
---- Values do not exist at that location as computation is done at the top and bottom of clear length of column.

Shear Design : Notes

- Pos is the design position. L suggests the calculation is done at immediate left of "Loc" and R suggests at immediate right of it.
- Av/s is the total required area of steel per unit length due to shear plus torsion.
- Aprv/s is the total provided area of transverse steel reinforcement.
- Vc is the nominal shear resistance of concrete.
- Vs is the nominal shear resistance of transverse reinforcement.
- Beta is the factor indicating ability of diagonally cracked concrete to transmit tension and shear.
- Theta is the angle of inclination of diagonal compressive stress.
- # Vu is greater tha phi*Vn.

		Sheet # 14	
		Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY	
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016	Date 05/17/2024
Version:	21.01.00.22	www.bentley.com Phone: 1-800-778-4277	Checked DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.Ibcx		Date 05/21/2024

COLUMN DESIGN - Column: 3

Code: AASHTO LRFD 9
Units: US
Pier View: Upstation.
Design/Analysis Method: Moment Magnification - Unbraced Column.

Column Type: Round D = 42.00 in

Column Section Properties

Sec.	Area ft^2	Ix in^4	Iz in^4
1	9.62	152745.02	152745.02

DESIGN PARAMETERS

f'c = 4000.0 psi phi tens = 0.90 Tens above = 0.005 phi shear = 0.90 Ec = 3986.6 ksi Concrete Type : Normal Weight.	fy = 60000.0 psi phi comp = 0.75 Comp below = 0.002 fy shear = 60000.00 psi Es = 29000 ksi

Reinforcement

Rebar Pattern: Circular
Rebar Orientation: Face Parallel

Main Reinforcement Schedule

Layer	Size	No. bars	Bar Dist. in	From ft	To ft	Hook
1	US#11[M36]	9	6.20	0.00	22.82	None

Note:

Bar Dist refers to the distance between center of reinforcement and concrete surface.

				Sheet #	15
				Job #	
Program:	LEAP® Bridge Concrete CONNECT Edition	CHA Consulting, Inc. - NY		Designed	CAE
Module:	Substructure	Copyright © Bentley Systems, Inc. 2016		Date	05/17/2024
Version:	21.01.00.22	www.bentley.com	Phone: 1-800-778-4277	Checked	DOR
File Name:	LAK-6 42 in Dia Fixed Pier Analysis.lbcx			Date	05/21/2024

Lateral Reinforcement Schedule

Layer	Size	Type	Pitch in	From ft	To ft
1	US#4[M13]	Spiral	3.00	0.00	22.82

Moment Magnification calculation - Mx (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	43357	1.0000	1.0000	0.1087	----	1.0207	21685.77
22.82	43357	1.0000	1.0000	0.3399	----	1.0212	17944.55
0.00	156836	1.0000	1.0000	0.0387	----	1.0128	23147.48
22.82	156836	1.0000	1.0000	0.1974	----	1.0130	20079.68

Moment Magnification calculation - Mz (global)

Loc ft	Comb	K	Cm	Beta	Delta B	Delta S	pPc kips
0.00	43357	1.2000	1.0000	0.3020	----	1.0343	12823.83
22.82	43357	1.2000	1.0000	0.3796	----	1.0368	12102.40
0.00	156836	1.2000	1.0000	0.4210	----	1.0300	11750.25
22.82	156836	1.2000	1.0000	1.0000	----	1.0273	8348.32

Design values used after Moment Magnification (e-min effect included).

Loc ft	Comb	Fx kips	Fy kips	Fz kips	Mx kips-ft	My kips-ft	Mz kips-ft
0.00	43357	-29.8	390.0	10.6	347.6	14.8	264.8
22.82	43357	28.5	351.5	-11.4	-93.3	14.8	426.3
0.00	156836	7.3	147.7	-25.8	-697.7	-23.2	-136.2
22.82	156836	-7.7	120.0	24.4	114.8	-23.2	-39.0

COLUMN DESIGN

Bot/Top Elev. ft	Comb	Pu kips	Mux kips-ft	Muz kips-ft	pMn kips-ft	Incl deg	pPn/Pu	pMn/Mu
0.00	156836	147.7	697.7	136.2	1105.7	11.05	1.00	1.55556
22.82	43357	351.5	93.3	426.3	1302.6	77.65	1.00	2.98515

COLUMN DESIGN

Bot/Top Elev. ft	As_min in^2	As_max in^2	As_prov in^2
0.00	12.47	110.84	14.04
22.82	12.47	110.84	14.04

SHEAR DESIGN:

Loc ft	Pos	Vu kips	Comb	phi*Vn kips	Av/s in^2/ft	Aprv/s in^2/ft	Vc kips	Vs kips	Beta	Theta deg	b in	dv in	Eps_s	Smax in	Sprv in
0.00	L	34.2	239	622.9	0.00	1.60	307.08	384.97	4.22	29.64	42.00	27.38	0.0002	21.90	3.00
22.82	R	34.2	239	676.4	0.00	1.60	355.13	396.45	4.88	28.92	42.00	27.38	-0.0000	21.90	3.00

Slenderness ratio kL/r

Column	L ft	r	k	kL/r
3	22.82	0.88	1.20	31.30

K values for all columns used in unbraced moment magnification

Column	Kx	Kz
1	1.00	1.20
2	1.00	1.20
3	1.00	1.20

Column Design : Notes

Min reinforcement = 0.9000 % of Ag.
 ---- Values do not exist at that location as computation is done at the top and bottom of clear length of column.

Shear Design : Notes

- Pos is the design position. L suggests the calculation is done at immediate left of "Loc" and R suggests at immediate right of it.
- Av/s is the total required area of steel per unit length due to shear plus torsion.
- Aprv/s is the total provided area of transverse steel reinforcement.
- Vc is the nominal shear resistance of concrete.
- Vs is the nominal shear resistance of transverse reinforcement.
- Beta is the factor indicating ability of diagonally cracked concrete to transmit tension and shear.
- Theta is the angle of inclination of diagonal compressive stress.
- # Vu is greater than phi*Vn.



471 E Broad St, Suite 2010
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Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:			
Project No:	075926.001		
Calc By:	CAE	Date:	03/12/24
Check By:	DOR	Date:	05/22/24

Dowel Strength and Concrete Breakout Strength

Purpose:

This calculation is done to figure out the strength of a group of adhesive dowels and the concrete that they are being doweled into. Using the equations and guidance of AASHTO LRFD Bridge Design Specifications, 9th Edition, the ODOT Bridge Design Manual 2020 Edition dated January 19, 2024, and ACI 318-14.

Assumptions:

RC Pier was used for the design of the steel in the column, as such, the strength checks related to steel yield strength have already been checked in that. See the Pier Design Computations.

Applicable Equations and Sections

Inputs for General Design	
Single Anchor or Anchor Group?	Anchor Group
Type of Anchor Dowel System	Adhesive
Adequate Anchor Reinforcement per ACI 318-14 Chapter 25?	Not Present
Seismic Design Category	B
Sustained Tension?	No
Shear and Tension Both Present?	Yes
Cast-in or Post-Installed?	Post-Installed

Figure 1: ACI 318-14 Table 17.3.1.1

Table 17.3.1.1—Required strength of anchors, except as noted in 17.2.3

Failure mode	Single anchor	Anchor group ⁽¹⁾	
		Individual anchor in a group	Anchors as a group
Steel strength in tension (17.4.1)	$\phi N_{sa} \geq N_{sa}$	$\phi N_{sa} \geq N_{sa,i}$	
Concrete breakout strength in tension (17.4.2)	$\phi N_{cb} \geq N_{sa}$		$\phi N_{cbg} \geq N_{sa,g}$
Pullout strength in tension (17.4.3)	$\phi N_{po} \geq N_{sa}$	$\phi N_{po} \geq N_{sa,i}$	
Concrete side-face blowout strength in tension (17.4.4)	$\phi N_{sf} \geq N_{sa}$		$\phi N_{sf} \geq N_{sa,g}$
Bond strength of adhesive anchor in tension (17.4.5)	$\phi N_b \geq N_{sa}$		$\phi N_{bg} \geq N_{sa,g}$
Steel strength in shear (17.5.1)	$\phi V_{sa} \geq V_{sa}$	$\phi V_{sa} \geq V_{sa,i}$	
Concrete breakout strength in shear (17.5.2)	$\phi V_{cb} \geq V_{sa}$		$\phi V_{cbg} \geq V_{sa,g}$
Concrete pryout strength in shear (17.5.3)	$\phi V_{cp} \geq V_{sa}$		$\phi V_{cpg} \geq V_{sa,g}$

⁽¹⁾Required strengths for steel and pullout failure modes shall be calculated for the most highly stressed anchor in the group.

Sections to Follow Depending on Figure 1			
Failure Mode	Applicable?	Equations to Use	Considered by RC Pier?
17.4.1	Yes	$\phi N_{sa} \geq N_{sa,i}$	Yes
17.4.2	Yes	$\phi N_{cbg} \geq N_{sa,g}$	No
17.4.3	No		
17.4.4	No		
17.4.5	Yes	$\phi N_{bg} \geq N_{sa,g}$	No
17.5.1	Yes	$\phi V_{sa} \geq V_{sa,i}$	Yes
17.5.2	Yes	$\phi V_{cbg} \geq V_{sa,g}$	No
17.5.3	Yes	$\phi V_{cpg} \geq V_{sa,g}$	No

Additional Sections to Look at:

17.6 - Interaction of tensile and shear forces
17.3.2.3 - Limits of Embedment Depths of Adhesive Anchors

Reduction Factors and General Inputs

Selection of Strength Reduction Factors from 17.3.3:

ϕ , Tension =
 ϕ , Shear =

Moment at Base of Column around X-Axis, M_{ux} = kip-ft From RC Pier, Max Resulting Value
 Moment at Base of Column around Z-Axis, M_{uz} = kip-ft From RC Pier, Max Resulting Value
 Resultant Moment, M_u = 606.22 kip-ft

Shear at Base of Column, V_u = kip From RC Pier, Max Value

Strength of Concrete, f'_c = 3400 psi (From Development Length)
 Effective Height, h_{ef} = in (From Development Length)
 Angle of Failure Cone = 35 deg
 Diameter of Dowel, d_a = in (From Lap Splice Length)
 Critical Edge Distance, c_{ac} = in ACI 318-14 (17.7.6)
 Modification factor for Lightweight Concrete, λ_a = ACI 318-14 (17.2.6)
 Coefficient for Concrete Breakout Strength, k_c = 17 ACI 318-14 (17.4.2.2)

Geometry of Dowels

Distance from main edge, c_{a1} = in (Smallest Distance to Edge, Main)
 Distance from secondary edge, c_{a2} = in (Smallest Distance to Edge, Second)
 Main spacing between dowels, s_1 = in (From Lap Splice Length)
 Secondary spacing between dowels, s_2 = in (None for this config)
 Length of Center of Vertical Bar to Center of Column = 13.795 in

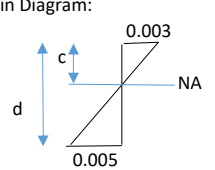
Adhesive Anchor Inputs

Rectilinear Projection Distance, c_{Na} = 16.83 in ACI 318-14 (17.4.5.1d)
 Characteristic Bond Stress, τ_{cr} = psi ICC-ES ESR-4057, Table 6
 Characteristic Bond Stress with No Cracking, τ_{uncr} = psi ICC-ES ESR-4057, Table 6

Moment Capacity of Column and Eccentricities

Diameter of Column = 36.00 in
 Column Cover to Outer Vertical Bar = 3.50 in (From Lap Splice Length)
 Concrete Strain Limit = 0.003
 Steel Strain Limit = 0.005
 Distance from top to Extreme Tension Strand, d = 32.500 in
 Distance from top to NA, c = 12.188 in

Strain Diagram:



Distance of NA to Center Axis = -5.81 in (*-1 to make other formulas work)
 Length of Chord = 34.07 in
 Angle of Segment = 2.48 radians
 Area of Segment = 303.38 in²

Distance from max compressive strand to NA, c = 12.19 in
 Modification for concrete stress range, B = 0.85
 Modified distance from max compressive strand to NA, a = 10.36 in

Distance of Compression segment to center of Circle = 7.64 in
 Length of Mod Chord = 32.60 in
 Angle of Mod Segment = 2.26 radians
 Area of Mod Segment, A_c = 242.37 in²

Centroid of Mod Compression Segment = 4.27 in
 Distance of Conc Centroid to NA = 6.09 in

Number of Bars resisting Tension = 11
 Area of Tension Steel, A_s = 17.18 in²

Number of Bars resisting Compression = 7
 Area of Compression Steel, A_{sc} = 10.93 in²

Reduction Factors and General Inputs Continued...

Figure 2: Steel Reinforcement Layout

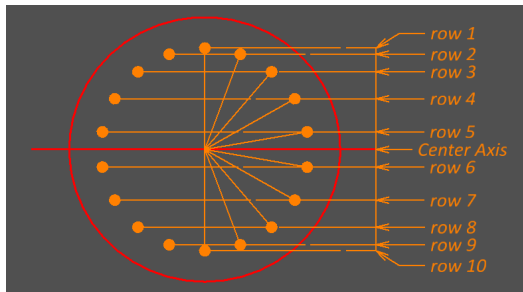


Table 1: Steel Reinforcement Geometry

Row	# of Dowels	Degrees from Center Axis	Distance from Center (in)
1	1	-90	-13.80
2	2	-70	-12.96
3	2	-50	-10.57
4	2	-30	-6.90
5	2	-10	-2.40
6	2	10	2.40
7	2	30	6.90
8	2	50	10.57
9	2	70	12.96
10	1	90	13.80

Table 2: Calculation of Steel Centroids

Number of Dowels under Force	Centroid to Center (in)	Tension Bars From NA (in)	Compress Bars From NA (in)
1	13.795	19.61	7.98
3	13.240	19.05	7.43
5	12.171	17.98	6.36
7	10.664	16.48	4.85
9	8.827	14.64	3.01
11	6.786	12.60	0.97
13	4.681	10.49	-1.13
15	2.648	8.46	-3.16
17	0.811	6.62	-5.00
18	0.000	5.81	-5.81

Centroid of Tension Steel around NA = 12.599 in (Drawn from Table 2)
 Centroid of Compression Steel around NA = 4.852 in (Drawn from Table 2)

Modulus of Elasticity of Steel, E = 29000 ksi
 Slope of Strain Diagram = 4062.5

Table 3: Strain in Tension Reinforcement

Row	# of Dowels	Distance from Center (in)	Distance from NA (in)	Compress. or Tension?	Strain	Stress (ksi)	Axial Load in Bars (kips)
1	1	-13.80	-7.98	Compress.	-0.0020	-56.98	-88.98
2	2	-12.96	-7.15	Compress.	-0.0018	-51.04	-159.41
3	2	-10.57	-4.76	Compress.	-0.0012	-33.94	-106.00
4	2	-6.90	-1.09	Compress.	-0.0003	-7.75	-24.19
5	2	-2.40	3.42	Tension	0.0008	24.39	76.17
6	2	2.40	8.21	Tension	0.0020	58.59	182.98
7	2	6.90	12.71	Tension	0.0031	60.00	187.37
8	2	10.57	16.38	Tension	0.0040	60.00	187.37
9	2	12.96	18.78	Tension	0.0046	60.00	187.37
10	1	13.80	19.61	Tension	0.0048	60.00	93.69

Location of Tension Force from NA = 13.736 in
 Eccentricity of Load, e'N = 1.137 in

Strength of Concrete, f'c = 3.4 ksi (From Development Length)
 Strength of Steel, fy = 60 ksi (From Development Length)

Compression from Steel = -378.57 kip (Sum of Axial Forces in Compress.)
 Compression from Concrete = -1031.50 kip (Ac * f'c)
 Compression Forces = -1410.08 kip (Compress Steel + Conc Strength)
 Tension from Steel = 914.96 kip (Sum of Axial Forces in Tension)

Moment Reduction Factor, ϕ = 0.9
 $\phi * Mn$ = 17686.13 kip-in
 = 1473.84 kip-ft

Comparing $\phi * Mn$ vs Mu 1473.84 kip-ft vs 606.22 kip-ft

PASS

17.2.1.1 - Anchor Group Effects

		Critical spacing (in)	Group or Single?
Concrete breakout in tension	=	72.00	Group
Bond strength in tension	=	33.66	Group
Concrete breakout in shear	=	138.62	Group

Section 17.4.1

This design calculation is covered by RC Pier, as explained in the assumptions.

Section 17.4.2

Equation to Use	$\phi N_{cbg} \geq N_{ua,g}$	17.4.2.1b	Notes:
$N_{cb} = \frac{A_{Nc}}{A_{Nco}} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b$ (17.4.2.1a)	=	0 lbs	ACI 318-14 (17.4.2.1a)
$N_{cbg} = \frac{A_{Nc}}{A_{Nco}} \psi_{ec,N} \psi_{ed,N} \psi_{c,N} \psi_{cp,N} N_b$ (17.4.2.1b)	=	167249 lbs	ACI 318-14 (17.4.2.1a)
Modification Factors:			
$\psi_{ec,N} = \frac{1}{\left(1 + \frac{2e'_N}{3h_{ef}}\right)}$ (17.4.2.4)	$2 * e'_N$ = 2.274 in $3 * h_{ef}$ = 72 in	$\psi_{ec,N}$ = 0.969	ACI 318-14 (17.4.2.4)
If $c_{a,min} \geq 1.5h_{ef}$, then $\psi_{ed,N} = 1.0$ (17.4.2.5a)	$c_{a,min}$ = 46.205 in $1.5 * h_{ef}$ = 36 in		
If $c_{a,min} < 1.5h_{ef}$, then $\psi_{ed,N} = 0.7 + 0.3 \frac{c_{a,min}}{1.5h_{ef}}$ (17.4.2.5b)	$\psi_{ed,N}$ = 1		ACI 318-14 (17.4.2.5)
(a) $\psi_{c,N} = 1.25$ for cast-in anchors (b) $\psi_{c,N} = 1.4$ for post-installed anchors, where the value of k_c used in Eq. (17.4.2.2a) is 17	$\psi_{c,N}$ = 1.4		ACI 318-14 (17.4.2.6)
If $c_{a,min} \geq c_{acs}$, then $\psi_{cp,N} = 1.0$ (17.4.2.7a)	$c_{a,min}$ = 46.205 in c_{ac} = 48 in		
If $c_{a,min} < c_{acs}$, then $\psi_{cp,N} = \frac{c_{a,min}}{c_{ac}}$ (17.4.2.7b)	$\psi_{cp,N}$ = 0.963		ACI 318-14 (17.4.2.7)
Basic concrete breakout strength:			
$N_b = k_c \lambda_a \sqrt{f'_c} h_{ef}^{1.5}$ (17.4.2.2a)			
$N_b = 16 \lambda_a \sqrt{f'_c} h_{ef}^{5/3}$ (17.4.2.2b)	Nb = 116548 lbs		ACI 318-14 (17.4.2.2)

Section 17.4.2 continued...

Finding Anc and Anco:

Comparing s1 and s2 with 3*hef:

s1	s2	<	3*hef	
4.791	0	<	72	PASS

Comparing hef with Ca1 and Ca2:

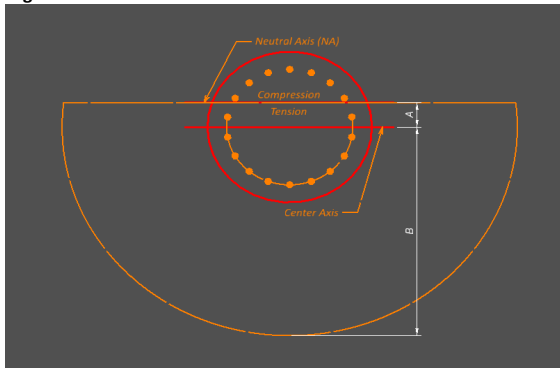
1.5*hef = 36 in

Main	Secondary
Use hef	Use hef

Description of area:

The area is formed from an offset of 1.5*hef from the line running through the adjacent bars and then truncated at the NA because the bars are spaced too close together.

Figure 3: Area of Anc



Distances Measured in CAD			
Distance from Center to NA, A	=	5.81	in
Radius of Semi Circle, B	=	49.80	in
Length of Chord	=	98.91	in
Angle of Segment	=	2.91	radians
Area of Segment	=	3317.31	in^2
Area of Section	=	577.55	in^2
Area of Semi Circle	=	3894.86	in^2
Anc	=	4472.41	in^2
ACI 318-14; Cone of a single Anchor			
Anco	=	4071.50	in^2

Section 17.4.3

This section is not applicable as detailed in Applicable Equations and Sections.

Section 17.4.4

This section is not applicable as detailed in Applicable Equations and Sections.

Section 17.4.5

Notes:

Equation to Use

$\phi N_{ag} \geq N_{ua,g}$

17.4.5.1b

$$N_a = \frac{A_{Na}}{A_{Na0}} \psi_{ed,Na} \psi_{cp,Na} N_{ba} \quad (17.4.5.1a)$$

= 0 lbs

ACI 318-14 (17.4.5.1a)

$$N_{ag} = \frac{A_{Na}}{A_{Na0}} \psi_{ec,Na} \psi_{ed,Na} \psi_{cp,Na} N_{ba} \quad (17.4.5.1b)$$

= 239756 lbs

ACI 318-14 (17.4.5.1b)

Modification Factors:

$$\psi_{ec,Na} = \frac{1}{\left(1 + \frac{e'_N}{c_{Na}}\right)} \quad (17.4.5.3)$$

e'N

=

1.137 in

cNa

=

16.83 in

$\psi_{ec,Na}$

=

0.937

ACI 318-14 (17.4.5.3)

If $c_{a,min} \geq c_{Na}$, then $\psi_{ed,Na} = 1.0$

(17.4.5.4a)

ca, min

=

46.205 in

cNa

=

16.83 in

If $c_{a,min} < c_{Na}$, then $\psi_{ed,Na} = 0.7 + 0.3 \frac{c_{a,min}}{c_{Na}}$

(17.4.5.4b)

$\psi_{ed,Na}$

=

1

ACI 318-14 (17.4.5.4)

If $c_{a,min} \geq c_{acs}$, then $\psi_{cp,Na} = 1.0$

(17.4.5.5a)

ca, min

=

46.205 in

cac

=

48 in

If $c_{a,min} < c_{acs}$, then $\psi_{cp,Na} = \frac{c_{a,min}}{c_{ac}}$

(17.4.5.5b)

$\psi_{cp,Na}$

=

0.963

ACI 318-14 (17.4.5.5)

Basic Bond Strength of an Adhesive Dowel:

$$N_{ba} = \lambda_a \tau_{cr} \pi d_a h_{ef} \quad (17.4.5.2)$$

= 129501 lbs

ACI 318-14 (17.4.5.2)

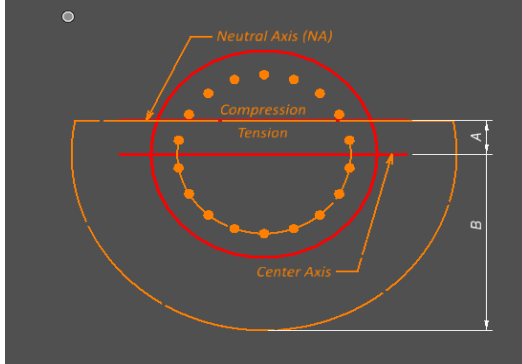
Section 17.4.5 continued...

Finding Ana and Anao:

Description of area:

The area is formed from an offset of cNa from the line running through the adjacent bars and then truncated at the NA because the bars are spaced too close together.

Figure 4: Area of Ana



Distances Measured in CAD		
Distance from Center to NA, A	=	5.81 in
Radius of Semi Circle, B	=	30.63 in
Length of Chord	=	60.14 in
Angle of Segment	=	2.76 radians
Area of Segment	=	1119.38 in ²
Area of Section	=	353.87 in ²
Area of Semi Circle	=	1473.25 in ²
Anc	=	1827.12 in ²
ACI 318-14; Cone of a single Anchor		
Anco	=	889.87 in ²

Notes and Conclusion

Unfactored Tensile resistance provided by Eq. 17.4.2.1b	=	167.25 kip	(Factor will Reduce)
Unfactored Tensile resistance provided by Eq. 17.4.5.1b	=	239.76 kip	(Factor will Reduce)
Tensile Force in the Bars	=	914.96 kip	
Are the dowels sufficient?	=	NO	

Looking at both tension checks, it can be seen that the dowels are not sufficient enough to resist the force from the moment acting on them. This means that both the concrete and the adhesive fails. It should also be noted that these resistances are not factored yet, so the ratio would be even worse.



471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:			
Project No:	075926.001		
Calc By:	CAE	Date:	03/12/24
Check By:	DOR	Date:	05/13/24

Mechanical Connector Strength Calculation

Purpose:

This calculation is done to figure out how if the reinforcement between the pier column and footing can work if it is connected to the existing reinforcing. Using the equations and guidance of AASHTO LRFD Bridge Design Specifications, 9th Edition and the ODOT Bridge Design Manual 2020 Edition.

Inputs

Strength of Proposed Steel, f_y	=	60	ksi	Notes:
Strength of Existing Steel, f_{yex}	=	40	ksi	
Proposed Reinforcement Size	=	11		(Select)
Proposed Reinforcement Bar Area	=	1.56	in ²	
Existing Reinforcement Size	=	11		(Select)
Existing reinforcement Bar Area	=	1.56	in ²	
Number of Bars Used	=	9		
Area of Steel Required	=	9.16	in ²	(From RC Pier, Proposed Steel)

Calculations

Total Proposed Reinforcement Area	=	14.04	in ²	Notes: (Bar Area*Number of Bars) (f_y *Total Area)
Total Strength of Proposed Reinforcement	=	842.4	kips	
Total Existing Reinforcement Area	=	14.04	in ²	(Bar Area*Number of Bars) (f_{yex} *Total Area)
Total Strength of Existing Reinforcement	=	561.6	kips	
Required Strength of Steel	=	549.6	kips	(Required Area* f_y)
Weakest Link	=	Existing		(Existing vs Proposed)
Weakest Link vs Required	=	PASS		(Comparing Strengths)
Strength Required for Mechanical Connectors	=	75	ksi	(Article 5.10.8.4.2b)

3.1 Screed and Beam Elevations



Department of
Transportation



Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

METHODOLOGY

- 1

Use the Proposed Profile Grade to determine Final Deck Surface Elevations
- 2

Final Deck Surface Elevations to be provided at bearing points, 1/4 points, mid-span points, and splice points. No additional points required since max spacing is less than 25'-0".

- Final Deck Surface Elevations represent the deck surface after all anticipated dead load deflections have occurred.
- 3

Determine Screed Elevations - theoretical deck surface location prior to deflections caused by deck placement and other anticipated dead loads.
- 4

Determine Top of Haunch Elevations - theoretical location of the bottom of deck above the girder haunch prior to deflections caused by deck placement and other anticipated dead loads.

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

FINAL DECK SURFACE ELEVATIONS

LOCATION			CL Brg. RA	1/4 Span 1	1/2 Span 1	3/4 Span 1	CL Brg. Pier 1	F.S. 1	1/4 Span 2	1/2 Span 2	3/4 Span 2	CL Brg. Pier 2	1/4 Span 3	F.S. 2	1/2 Span 3	3/4 Span 3	CL Brg. Pier 3
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LT. EDGE OF DECK	A	STATION	16+41.35	16+57.65	16+73.94	16+90.24	17+06.53	17+29.36	17+29.53	17+52.53	17+75.53	17+98.53	18+19.53	18+28.11	18+40.53	18+61.53	18+82.53
		TOP OF DECK	885.72	885.64	885.55	885.45	885.34	885.17	885.17	884.98	884.76	884.53	884.30	884.20	884.06	883.79	883.51
BEAM 1	B	STATION	16+39.28	16+55.57	16+71.87	16+88.16	17+04.46	17+27.29	17+27.46	17+50.46	17+73.46	17+96.46	18+17.46	18+26.04	18+38.46	18+59.46	18+80.46
		TOP OF DECK	885.79	885.71	885.62	885.52	885.41	885.24	885.24	885.05	884.84	884.61	884.38	884.28	884.13	883.87	883.60
BEAM 2	C	STATION	16+34.61	16+50.91	16+67.20	16+83.50	16+99.79	17+22.63	17+22.79	17+45.79	17+68.79	17+91.79	18+12.79	18+21.38	18+33.79	18+54.79	18+75.79
		TOP OF DECK	885.93	885.85	885.76	885.67	885.56	885.40	885.40	885.21	885.00	884.78	884.55	884.45	884.31	884.05	883.78
BEAM 3 & PROFILE	D	STATION	16+29.95	16+46.24	16+62.54	16+78.83	16+95.13	17+17.96	17+18.13	17+41.13	17+64.13	17+87.13	18+08.13	18+16.71	18+29.13	18+50.13	18+71.13
		TOP OF DECK	886.07	885.99	885.91	885.82	885.71	885.55	885.55	885.37	885.17	884.94	884.72	884.63	884.49	884.23	883.96
BEAM 4	E	STATION	16+25.29	16+41.58	16+57.87	16+74.17	16+90.46	17+13.30	17+13.46	17+36.46	17+59.46	17+82.46	18+03.46	18+12.05	18+24.46	18+45.46	18+66.46
		TOP OF DECK	885.97	885.90	885.82	885.72	885.62	885.47	885.47	885.29	885.09	884.87	884.65	884.56	884.42	884.17	883.90
BEAM 5	F	STATION	16+20.62	16+36.91	16+53.21	16+69.50	16+85.80	17+08.63	17+08.80	17+31.80	17+54.80	17+77.80	17+98.80	18+07.38	18+19.80	18+40.80	18+61.80
		TOP OF DECK	885.87	885.80	885.72	885.63	885.53	885.38	885.38	885.20	885.01	884.80	884.58	884.49	884.35	884.11	883.84
RT. EDGE OF DECK	G	STATION	16+18.55	16+34.84	16+51.14	16+67.43	16+83.72	17+06.56	17+06.72	17+29.72	17+52.72	17+75.72	17+96.72	18+05.31	18+17.72	18+38.72	18+59.72
		TOP OF DECK	885.82	885.75	885.68	885.59	885.49	885.34	885.34	885.17	884.97	884.76	884.55	884.46	884.32	884.08	883.82

LOCATION			F.S. 3	1/4 Span 4	1/2 Span 4	3/4 Span 4	CL Brg. Pier 4	1/4 Span 5	F.S. 4	1/2 Span 5	F.S. 5	3/4 Span 5	CL Brg. Pier 5	1/4 Span 6	1/2 Span 6	3/4 Span 6	CL Brg. FA	
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
LT. EDGE OF DECK	A	STATION	19+01.29	19+03.53	19+24.53	19+45.53	19+66.53	19+90.34	19+93.95	20+14.15	20+37.95	20+37.97	20+61.78	20+78.82	20+95.87	21+12.91	21+29.96	LEOD
		TOP OF DECK	883.25	883.22	882.91	882.58	882.23	881.82	881.76	881.39	880.94	880.93	880.46	880.11	879.74	879.37	878.98	
BEAM 1	B	STATION	18+99.22	19+01.46	19+22.46	19+43.46	19+64.46	19+88.27	19+91.87	20+12.08	20+35.87	20+35.89	20+59.71	20+76.75	20+93.80	21+10.84	21+27.88	1
		TOP OF DECK	883.33	883.30	882.99	882.66	882.32	881.91	881.85	881.48	881.03	881.03	880.56	880.20	879.84	879.47	879.08	
BEAM 2	C	STATION	18+94.55	18+96.79	19+17.79	19+38.79	19+59.79	19+83.60	19+87.21	20+07.42	20+31.21	20+31.23	20+55.04	20+72.09	20+89.13	21+06.17	21+23.22	2
		TOP OF DECK	883.52	883.49	883.18	882.86	882.52	882.11	882.05	881.69	881.24	881.24	880.77	880.42	880.06	879.69	879.31	
BEAM 3 & PROFILE	D	STATION	18+89.89	18+92.13	19+13.13	19+34.13	19+55.13	19+78.94	19+82.54	20+02.75	20+26.54	20+26.56	20+50.38	20+67.42	20+84.47	21+01.51	21+18.55	3
		TOP OF DECK	883.71	883.67	883.37	883.05	882.72	882.31	882.25	881.89	881.45	881.45	880.98	880.64	880.28	879.91	879.53	
BEAM 4	E	STATION	18+85.22	18+87.46	19+08.46	19+29.46	19+50.46	19+74.27	19+77.88	19+98.09	20+21.88	20+21.90	20+45.71	20+62.76	20+79.80	20+96.85	21+13.89	4
		TOP OF DECK	883.65	883.62	883.32	883.00	882.67	882.27	882.21	881.86	881.42	881.42	880.96	880.61	880.26	879.89	879.52	
BEAM 5	F	STATION	18+80.56	18+82.80	19+03.80	19+24.80	19+45.80	19+69.61	19+73.21	19+93.42	20+17.21	20+17.23	20+41.05	20+58.09	20+75.14	20+92.18	21+09.22	5
		TOP OF DECK	883.59	883.56	883.27	882.96	882.63	882.23	882.17	881.82	881.39	881.38	880.93	880.59	880.24	879.88	879.50	
RT. EDGE OF DECK	G	STATION	18+78.48	18+80.72	19+01.72	19+22.72	19+43.72	19+67.54	19+71.14	19+91.35	20+15.14	20+15.16	20+38.97	20+56.02	20+73.06	20+90.11	21+07.15	REOD
		TOP OF DECK	883.57	883.54	883.25	882.93	882.61	882.22	882.16	881.80	881.37	881.37	880.92	880.58	880.23	879.87	879.50	

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

SCREED ELEVATIONS																		
LOCATION			CL Brg. RA	1/4 Span 1	1/2 Span 1	3/4 Span 1	CL Brg. Pier 1	F.S. 1	1/4 Span 2	1/2 Span 2	3/4 Span 2	CL Brg. Pier 2	1/4 Span 3	F.S. 2	1/2 Span 3	3/4 Span 3	CL Brg. Pier 3	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
LT. EDGE OF DECK	A	STATION	16+41.35	16+57.65	16+73.94	16+90.24	17+06.53	17+29.36	17+29.53	17+52.53	17+75.53	17+98.53	18+19.53	18+28.11	18+40.53	18+61.53	18+82.53	LEOD
		TOP OF DECK	885.72	885.66	885.58	885.46	885.34	885.22	885.22	885.06	884.81	884.53	884.32	884.23	884.10	883.82	883.51	
PROFILE GRADE	D	STATION	16+29.95	16+46.24	16+62.54	16+78.83	16+95.13	17+17.96	17+18.13	17+41.13	17+64.13	17+87.13	18+08.13	18+16.71	18+29.13	18+50.13	18+71.13	3
		TOP OF DECK	886.07	886.02	885.93	885.82	885.71	885.60	885.60	885.45	885.21	884.94	884.74	884.66	884.52	884.26	883.96	
RT. EDGE OF DECK	G	STATION	16+18.55	16+34.84	16+51.14	16+67.43	16+83.72	17+06.56	17+06.72	17+29.72	17+52.72	17+75.72	17+96.72	18+05.31	18+17.72	18+38.72	18+59.72	REOD
		TOP OF DECK	885.82	885.77	885.70	885.60	885.49	885.39	885.39	885.25	885.02	884.76	884.57	884.49	884.36	884.10	883.82	

LOCATION			F.S. 3	1/4 Span 4	1/2 Span 4	3/4 Span 4	CL Brg. Pier 4	1/4 Span 5	F.S. 4	1/2 Span 5	F.S. 5	3/4 Span 5	CL Brg. Pier 5	1/4 Span 6	1/2 Span 6	3/4 Span 6	CL Brg. FA	
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
LT. EDGE OF DECK	A	STATION	19+01.29	19+03.53	19+24.53	19+45.53	19+66.53	19+90.34	19+93.95	20+14.15	20+37.95	20+37.97	20+61.78	20+78.82	20+95.87	21+12.91	21+29.96	LEOD
		TOP OF DECK	883.27	883.24	882.94	882.59	882.23	881.88	881.83	881.49	880.99	880.99	880.46	880.12	879.77	879.39	878.98	
PROFILE GRADE	D	STATION	18+89.89	18+92.13	19+13.13	19+34.13	19+55.13	19+78.94	19+82.54	20+02.75	20+26.54	20+26.56	20+50.38	20+67.42	20+84.47	21+01.51	21+18.55	3
		TOP OF DECK	883.73	883.70	883.41	883.07	882.72	882.37	882.32	881.99	881.51	881.51	880.98	880.65	880.31	879.94	879.53	
RT. EDGE OF DECK	G	STATION	18+78.48	18+80.72	19+01.72	19+22.72	19+43.72	19+67.54	19+71.14	19+91.35	20+15.14	20+15.16	20+38.97	20+56.02	20+73.06	20+90.11	21+07.15	REOD
		TOP OF DECK	883.59	883.56	883.28	882.95	882.61	882.27	882.22	881.90	881.43	881.43	880.92	880.59	880.25	879.89	879.50	

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

Proposed Deck Thickness = 0.7083 ft

TOP OF HAUNCH ELEVATIONS																		
LOCATION			CL Brg. RA	1/4 Span 1	1/2 Span 1	3/4 Span 1	CL Brg. Pier 1	F.S. 1	1/4 Span 2	1/2 Span 2	3/4 Span 2	CL Brg. Pier 2	1/4 Span 3	F.S. 2	1/2 Span 3	3/4 Span 3	CL Brg. Pier 3	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
BEAM 1	B	STATION	16+39.28	16+55.57	16+71.87	16+88.16	17+04.46	17+27.29	17+27.46	17+50.46	17+73.46	17+96.46	18+17.46	18+26.04	18+38.46	18+59.46	18+80.46	1
		TOP OF HAUNCH	885.08	885.02	884.93	884.82	884.70	884.58	884.58	884.42	884.18	883.90	883.69	883.60	883.47	883.19	882.89	
BEAM 2	C	STATION	16+34.61	16+50.91	16+67.20	16+83.50	16+99.79	17+22.63	17+22.79	17+45.79	17+68.79	17+91.79	18+12.79	18+21.38	18+33.79	18+54.79	18+75.79	2
		TOP OF HAUNCH	885.22	885.16	885.08	884.97	884.85	884.74	884.74	884.58	884.34	884.07	883.86	883.78	883.64	883.37	883.07	
BEAM 3	D	STATION	16+29.95	16+46.24	16+62.54	16+78.83	16+95.13	17+17.96	17+18.13	17+41.13	17+64.13	17+87.13	18+08.13	18+16.71	18+29.13	18+50.13	18+71.13	3
		TOP OF HAUNCH	885.36	885.31	885.23	885.12	885.01	884.89	884.89	884.74	884.51	884.23	884.03	883.95	883.82	883.55	883.25	
BEAM 4	E	STATION	16+25.29	16+41.58	16+57.87	16+74.17	16+90.46	17+13.30	17+13.46	17+36.46	17+59.46	17+82.46	18+03.46	18+12.05	18+24.46	18+45.46	18+66.46	4
		TOP OF HAUNCH	885.26	885.21	885.13	885.02	884.92	884.81	884.81	884.66	884.43	884.16	883.96	883.88	883.75	883.48	883.19	
BEAM 5	F	STATION	16+20.62	16+36.91	16+53.21	16+69.50	16+85.80	17+08.63	17+08.80	17+31.80	17+54.80	17+77.80	17+98.80	18+07.38	18+19.80	18+40.80	18+61.80	5
		TOP OF HAUNCH	885.16	885.11	885.03	884.93	884.83	884.72	884.72	884.58	884.35	884.09	883.89	883.81	883.68	883.42	883.14	

LOCATION			F.S. 3	1/4 Span 4	1/2 Span 4	3/4 Span 4	CL Brg. Pier 4	1/4 Span 5	F.S. 4	1/2 Span 5	F.S. 5	3/4 Span 5	CL Brg. Pier 5	1/4 Span 6	1/2 Span 6	3/4 Span 6	CL Brg. FA	
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
BEAM 1	B	STATION	18+99.22	19+01.46	19+22.46	19+43.46	19+64.46	19+88.27	19+91.87	20+12.08	20+35.87	20+35.89	20+59.71	20+76.75	20+93.80	21+10.84	21+27.88	1
		TOP OF HAUNCH	882.65	882.62	882.32	881.97	881.61	881.26	881.21	880.87	880.38	880.38	879.85	879.50	879.16	878.78	878.37	
BEAM 2	C	STATION	18+94.55	18+96.79	19+17.79	19+38.79	19+59.79	19+83.60	19+87.21	20+07.42	20+31.21	20+31.23	20+55.04	20+72.09	20+89.13	21+06.17	21+23.22	2
		TOP OF HAUNCH	882.83	882.80	882.51	882.17	881.81	881.46	881.41	881.07	880.59	880.59	880.06	879.72	879.38	879.01	878.60	
BEAM 3	D	STATION	18+89.89	18+92.13	19+13.13	19+34.13	19+55.13	19+78.94	19+82.54	20+02.75	20+26.54	20+26.56	20+50.38	20+67.42	20+84.47	21+01.51	21+18.55	3
		TOP OF HAUNCH	883.02	882.99	882.70	882.36	882.01	881.66	881.61	881.28	880.80	880.80	880.27	879.94	879.60	879.23	878.83	
BEAM 4	E	STATION	18+85.22	18+87.46	19+08.46	19+29.46	19+50.46	19+74.27	19+77.88	19+98.09	20+21.88	20+21.90	20+45.71	20+62.76	20+79.80	20+96.85	21+13.89	4
		TOP OF HAUNCH	882.96	882.93	882.65	882.31	881.96	881.62	881.57	881.24	880.77	880.77	880.25	879.91	879.58	879.21	878.81	
BEAM 5	F	STATION	18+80.56	18+82.80	19+03.80	19+24.80	19+45.80	19+69.61	19+73.21	19+93.42	20+17.21	20+17.23	20+41.05	20+58.09	20+75.14	20+92.18	21+09.22	5
		TOP OF HAUNCH	882.91	882.88	882.60	882.26	881.92	881.58	881.53	881.21	880.74	880.73	880.22	879.89	879.56	879.19	878.79	

Project:	LAK-6-2.06		
Description:	Deck Elevation		
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Check By:	DOR	Date:	01/28/25

FINISHED DECK ELEVATIONS

LOCATION			CL Brg. RA 1	1/4 Span 1 2	1/2 Span 1 3	3/4 Span 1 4	CL Brg. Pier 1 5	F.S. 1 6	1/4 Span 2 7	1/2 Span 2 8	3/4 Span 2 9	CL Brg. Pier 2 10	1/4 Span 3 11	F.S. 2 12	1/2 Span 3 13	3/4 Span 3 14	CL Brg. Pier 3 15
LT. EDGE OF DECK	A	STATION TOP OF DECK	16+41.35	16+57.65	16+73.94	16+90.24	17+06.53	17+29.36	17+29.53	17+52.53	17+75.53	17+98.53	18+19.53	18+28.11	18+40.53	18+61.53	18+82.53
			885.72	885.64	885.55	885.45	885.34	885.17	885.17	884.98	884.76	884.53	884.30	884.20	884.06	883.79	883.51
BEAM 1	B	STATION TOP OF DECK	16+39.28	16+55.57	16+71.87	16+88.16	17+04.46	17+27.29	17+27.46	17+50.46	17+73.46	17+96.46	18+17.46	18+26.04	18+38.46	18+59.46	18+80.46
			885.79	885.71	885.62	885.52	885.41	885.24	885.24	885.05	884.84	884.61	884.38	884.28	884.13	883.87	883.60
BEAM 2	C	STATION TOP OF DECK	16+34.61	16+50.91	16+67.20	16+83.50	16+99.79	17+22.63	17+22.79	17+45.79	17+68.79	17+91.79	18+12.79	18+21.38	18+33.79	18+54.79	18+75.79
			885.93	885.85	885.76	885.67	885.56	885.40	885.40	885.21	885.00	884.78	884.55	884.45	884.31	884.05	883.78
Beam 3 & PG	D	STATION TOP OF DECK	16+29.95	16+46.24	16+62.54	16+78.83	16+95.13	17+17.96	17+18.13	17+41.13	17+64.13	17+87.13	18+08.13	18+16.71	18+29.13	18+50.13	18+71.13
			886.07	885.99	885.91	885.82	885.71	885.55	885.55	885.37	885.17	884.94	884.72	884.63	884.49	884.23	883.96
BEAM 4	E	STATION TOP OF DECK	16+25.29	16+41.58	16+57.87	16+74.17	16+90.46	17+13.30	17+13.46	17+36.46	17+59.46	17+82.46	18+03.46	18+12.05	18+24.46	18+45.46	18+66.46
			885.97	885.90	885.82	885.72	885.62	885.47	885.47	885.29	885.09	884.87	884.65	884.56	884.42	884.17	883.90
BEAM 5	F	STATION TOP OF DECK	16+20.62	16+36.91	16+53.21	16+69.50	16+85.80	17+08.63	17+08.80	17+31.80	17+54.80	17+77.80	17+98.80	18+07.38	18+19.80	18+40.80	18+61.80
			885.87	885.80	885.72	885.63	885.53	885.38	885.38	885.20	885.01	884.80	884.58	884.49	884.35	884.11	883.84
RT. EDGE OF DECK	G	STATION TOP OF DECK	16+18.55	16+34.84	16+51.14	16+67.43	16+83.72	17+06.56	17+06.72	17+29.72	17+52.72	17+75.72	17+96.72	18+05.31	18+17.72	18+38.72	18+59.72
			885.82	885.75	885.68	885.59	885.49	885.34	885.34	885.17	884.97	884.76	884.55	884.46	884.32	884.08	883.82

LOCATION			F.S. 3 16	1/4 Span 4 17	1/2 Span 4 18	3/4 Span 4 19	CL Brg. Pier 4 20	1/4 Span 5 21	F.S. 4 22	1/2 Span 5 23	F.S. 5 24	3/4 Span 5 25	CL Brg. Pier 5 26	1/4 Span 6 27	1/2 Span 6 28	3/4 Span 6 29	CL Brg. FA 30
LT. EDGE OF DECK	A	STATION TOP OF DECK	19+01.29	19+03.53	19+24.53	19+45.53	19+66.53	19+90.34	19+93.95	20+14.15	20+37.95	20+37.97	20+61.78	20+78.82	20+95.87	21+12.91	21+29.96
			883.25	883.22	882.91	882.58	882.23	881.82	881.76	881.39	880.94	880.93	880.46	880.11	879.74	879.37	878.98
BEAM 1	B	STATION TOP OF DECK	18+99.22	19+01.46	19+22.46	19+43.46	19+64.46	19+88.27	19+91.87	20+12.08	20+35.87	20+35.89	20+59.71	20+76.75	20+93.80	21+10.84	21+27.88
			883.33	883.30	882.99	882.66	882.32	881.91	881.85	881.48	881.03	881.03	880.56	880.20	879.84	879.47	879.08
BEAM 2	C	STATION TOP OF DECK	18+94.55	18+96.79	19+17.79	19+38.79	19+59.79	19+83.60	19+87.21	20+07.42	20+31.21	20+31.23	20+55.04	20+72.09	20+89.13	21+06.17	21+23.22
			883.52	883.49	883.18	882.86	882.52	882.11	882.05	881.69	881.24	881.24	880.77	880.42	880.06	879.69	879.31
Beam 3 & PG	D	STATION TOP OF DECK	18+89.89	18+92.13	19+13.13	19+34.13	19+55.13	19+78.94	19+82.54	20+02.75	20+26.54	20+26.56	20+50.38	20+67.42	20+84.47	21+01.51	21+18.55
			883.71	883.67	883.37	883.05	882.72	882.31	882.25	881.89	881.45	880.98	880.64	880.28	879.91	879.53	
BEAM 4	E	STATION TOP OF DECK	18+85.22	18+87.46	19+08.46	19+29.46	19+50.46	19+74.27	19+77.88	19+98.09	20+21.88	20+21.90	20+45.71	20+62.76	20+79.80	20+96.85	21+13.89
			883.65	883.62	883.32	883.00	882.67	882.27	882.21	881.86	881.42	881.42	880.96	880.61	880.26	879.89	879.52
BEAM 5	F	STATION TOP OF DECK	18+80.56	18+82.80	19+03.80	19+24.80	19+45.80	19+69.61	19+73.21	19+93.42	20+17.21	20+17.23	20+41.05	20+58.09	20+75.14	20+92.18	21+09.22
			883.59	883.56	883.27	882.96	882.63	882.23	882.17	881.82	881.39	881.38	880.93	880.59	880.24	879.88	879.50
RT. EDGE OF DECK	G	STATION TOP OF DECK	18+78.48	18+80.72	19+01.72	19+22.72	19+43.72	19+67.54	19+71.14	19+91.35	20+15.14	20+15.16	20+38.97	20+56.02	20+73.06	20+90.11	21+07.15
			883.57	883.54	883.25	882.93	882.61	882.22	882.16	881.80	881.37	881.37	880.92	880.58	880.23	879.87	879.50

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Description:	Deck Elevation		
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SCREED ELEVATIONS

LOCATION			CL Brg. RA	1/4 Span 1	1/2 Span 1	3/4 Span 1	CL Brg. Pier 1	F.S. 1	1/4 Span 2	1/2 Span 2	3/4 Span 2	CL Brg. Pier 2	1/4 Span 3	F.S. 2	1/2 Span 3	3/4 Span 3	CL Brg. Pier 3
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LT. EDGE OF DECK	A	STATION TOP OF DECK	16+41.35	16+57.65	16+73.94	16+90.24	17+06.53	17+29.36	17+29.53	17+52.53	17+75.53	17+98.53	18+19.53	18+28.11	18+40.53	18+61.53	18+82.53
			885.72	885.66	885.58	885.46	885.34	885.22	885.22	885.06	884.81	884.53	884.32	884.23	884.10	883.82	883.51
BEAM 1	B	STATION TOP OF DECK	16+39.28	16+55.57	16+71.87	16+88.16	17+04.46	17+27.29	17+27.46	17+50.46	17+73.46	17+96.46	18+17.46	18+26.04	18+38.46	18+59.46	18+80.46
			885.79	885.73	885.64	885.53	885.41	885.29	885.29	885.13	884.89	884.61	884.40	884.31	884.17	883.90	883.60
BEAM 2	C	STATION TOP OF DECK	16+34.61	16+50.91	16+67.20	16+83.50	16+99.79	17+22.63	17+22.79	17+45.79	17+68.79	17+91.79	18+12.79	18+21.38	18+33.79	18+54.79	18+75.79
			885.93	885.87	885.79	885.68	885.56	885.45	885.45	885.29	885.05	884.78	884.57	884.48	884.35	884.08	883.78
Beam 3 & PG	D	STATION TOP OF DECK	16+29.95	16+46.24	16+62.54	16+78.83	16+95.13	17+17.96	17+18.13	17+41.13	17+64.13	17+87.13	18+08.13	18+16.71	18+29.13	18+50.13	18+71.13
			886.07	886.02	885.93	885.82	885.71	885.60	885.60	885.45	885.21	884.94	884.74	884.66	884.52	884.26	883.96
BEAM 4	E	STATION TOP OF DECK	16+25.29	16+41.58	16+57.87	16+74.17	16+90.46	17+13.30	17+13.46	17+36.46	17+59.46	17+82.46	18+03.46	18+12.05	18+24.46	18+45.46	18+66.46
			885.97	885.92	885.84	885.73	885.62	885.52	885.52	885.37	885.14	884.87	884.67	884.59	884.46	884.19	883.90
BEAM 5	F	STATION TOP OF DECK	16+20.62	16+36.91	16+53.21	16+69.50	16+85.80	17+08.63	17+08.80	17+31.80	17+54.80	17+77.80	17+98.80	18+07.38	18+19.80	18+40.80	18+61.80
			885.87	885.82	885.74	885.64	885.53	885.43	885.43	885.29	885.06	884.80	884.60	884.52	884.39	884.13	883.84
RT. EDGE OF DECK	G	STATION TOP OF DECK	16+18.55	16+34.84	16+51.14	16+67.43	16+83.72	17+06.56	17+06.72	17+29.72	17+52.72	17+75.72	17+96.72	18+05.31	18+17.72	18+38.72	18+59.72
			885.82	885.77	885.70	885.60	885.49	885.39	885.39	885.25	885.02	884.76	884.57	884.49	884.36	884.10	883.82

LOCATION			F.S. 3	1/4 Span 4	1/2 Span 4	3/4 Span 4	CL Brg. Pier 4	1/4 Span 5	F.S. 4	1/2 Span 5	F.S. 5	3/4 Span 5	CL Brg. Pier 5	1/4 Span 6	1/2 Span 6	3/4 Span 6	CL Brg. FA
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
LT. EDGE OF DECK	A	STATION TOP OF DECK	19+01.29	19+03.53	19+24.53	19+45.53	19+66.53	19+90.34	19+93.95	20+14.15	20+37.95	20+37.97	20+61.78	20+78.82	20+95.87	21+12.91	21+29.96
			883.27	883.24	882.94	882.59	882.23	881.88	881.83	881.49	880.99	880.99	880.46	880.12	879.77	879.39	878.98
BEAM 1	B	STATION TOP OF DECK	18+99.22	19+01.46	19+22.46	19+43.46	19+64.46	19+88.27	19+91.87	20+12.08	20+35.87	20+35.89	20+59.71	20+76.75	20+93.80	21+10.84	21+27.88
			883.35	883.32	883.03	882.68	882.32	881.97	881.92	881.58	881.09	881.09	880.56	880.21	879.87	879.49	879.08
BEAM 2	C	STATION TOP OF DECK	18+94.55	18+96.79	19+17.79	19+38.79	19+59.79	19+83.60	19+87.21	20+07.42	20+31.21	20+31.23	20+55.04	20+72.09	20+89.13	21+06.17	21+23.22
			883.54	883.51	883.22	882.87	882.52	882.17	882.12	881.78	881.30	881.30	880.77	880.43	880.09	879.72	879.31
Beam 3 & PG	D	STATION TOP OF DECK	18+89.89	18+92.13	19+13.13	19+34.13	19+55.13	19+78.94	19+82.54	20+02.75	20+26.54	20+26.56	20+50.38	20+67.42	20+84.47	21+01.51	21+18.55
			883.73	883.70	883.41	883.07	882.72	882.37	882.32	881.99	881.51	881.51	880.98	880.65	880.31	879.94	879.53
BEAM 4	E	STATION TOP OF DECK	18+85.22	18+87.46	19+08.46	19+29.46	19+50.46	19+74.27	19+77.88	19+98.09	20+21.88	20+21.90	20+45.71	20+62.76	20+79.80	20+96.85	21+13.89
			883.67	883.64	883.36	883.02	882.67	882.33	882.28	881.95	881.48	881.48	880.96	880.62	880.29	879.92	879.52
BEAM 5	F	STATION TOP OF DECK	18+80.56	18+82.80	19+03.80	19+24.80	19+45.80	19+69.61	19+73.21	19+93.42	20+17.21	20+17.23	20+41.05	20+58.09	20+75.14	20+92.18	21+09.22
			883.61	883.59	883.31	882.97	882.63	882.29	882.24	881.92	881.44	881.44	880.93	880.60	880.27	879.90	879.50
RT. EDGE OF DECK	G	STATION TOP OF DECK	18+78.48	18+80.72	19+01.72	19+22.72	19+43.72	19+67.54	19+71.14	19+91.35	20+15.14	20+15.16	20+38.97	20+56.02	20+73.06	20+90.11	21+07.15
			883.59	883.56	883.28	882.95	882.61	882.27	882.22	881.90	881.43	881.43	880.92	880.59	880.25	879.89	879.50

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
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Check By:	DOR	Date:	01/28/25

TOP OF HAUNCH ELEVATIONS

Proposed Deck Thickness = 0.7083 ft

LOCATION			CL Brg. RA	1/4 Span 1	1/2 Span 1	3/4 Span 1	CL Brg. Pier 1	F.S. 1	1/4 Span 2	1/2 Span 2	3/4 Span 2	CL Brg. Pier 2	1/4 Span 3	F.S. 2	1/2 Span 3	3/4 Span 3	CL Brg. Pier 3
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LT. EDGE OF DECK	A	STATION TOP OF DECK	16+41.35	16+57.65	16+73.94	16+90.24	17+06.53	17+29.36	17+29.53	17+52.53	17+75.53	17+98.53	18+19.53	18+28.11	18+40.53	18+61.53	18+82.53
			885.02	884.96	884.87	884.75	884.63	884.51	884.51	884.35	884.10	883.82	883.61	883.53	883.39	883.11	882.81
BEAM 1	B	STATION TOP OF DECK	16+39.28	16+55.57	16+71.87	16+88.16	17+04.46	17+27.29	17+27.46	17+50.46	17+73.46	17+96.46	18+17.46	18+26.04	18+38.46	18+59.46	18+80.46
			885.08	885.02	884.93	884.82	884.70	884.58	884.58	884.42	884.18	883.90	883.69	883.60	883.47	883.19	882.89
BEAM 2	C	STATION TOP OF DECK	16+34.61	16+50.91	16+67.20	16+83.50	16+99.79	17+22.63	17+22.79	17+45.79	17+68.79	17+91.79	18+12.79	18+21.38	18+33.79	18+54.79	18+75.79
			885.22	885.16	885.08	884.97	884.85	884.74	884.74	884.58	884.34	884.07	883.86	883.78	883.64	883.37	883.07
Beam 3 & PG	D	STATION TOP OF DECK	16+29.95	16+46.24	16+62.54	16+78.83	16+95.13	17+17.96	17+18.13	17+41.13	17+64.13	17+87.13	18+08.13	18+16.71	18+29.13	18+50.13	18+71.13
			885.36	885.31	885.23	885.12	885.01	884.89	884.89	884.74	884.51	884.23	884.03	883.95	883.82	883.55	883.25
BEAM 4	E	STATION TOP OF DECK	16+25.29	16+41.58	16+57.87	16+74.17	16+90.46	17+13.30	17+13.46	17+36.46	17+59.46	17+82.46	18+03.46	18+12.05	18+24.46	18+45.46	18+66.46
			885.26	885.21	885.13	885.02	884.92	884.81	884.81	884.66	884.43	884.16	883.96	883.88	883.75	883.48	883.19
BEAM 5	F	STATION TOP OF DECK	16+20.62	16+36.91	16+53.21	16+69.50	16+85.80	17+08.63	17+08.80	17+31.80	17+54.80	17+77.80	17+98.80	18+07.38	18+19.80	18+40.80	18+61.80
			885.16	885.11	885.03	884.93	884.83	884.72	884.72	884.58	884.35	884.09	883.89	883.81	883.68	883.42	883.14
RT. EDGE OF DECK	G	STATION TOP OF DECK	16+18.55	16+34.84	16+51.14	16+67.43	16+83.72	17+06.56	17+06.72	17+29.72	17+52.72	17+75.72	17+96.72	18+05.31	18+17.72	18+38.72	18+59.72
			885.11	885.07	884.99	884.89	884.79	884.68	884.68	884.54	884.32	884.05	883.86	883.78	883.65	883.39	883.11

LOCATION			F.S. 3	1/4 Span 4	1/2 Span 4	3/4 Span 4	CL Brg. Pier 4	1/4 Span 5	F.S. 4	1/2 Span 5	F.S. 5	3/4 Span 5	CL Brg. Pier 5	1/4 Span 6	1/2 Span 6	3/4 Span 6	CL Brg. FA
			16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
LT. EDGE OF DECK	A	STATION TOP OF DECK	19+01.29	19+03.53	19+24.53	19+45.53	19+66.53	19+90.34	19+93.95	20+14.15	20+37.95	20+37.97	20+61.78	20+78.82	20+95.87	21+12.91	21+29.96
			882.56	882.53	882.24	881.89	881.52	881.17	881.12	880.78	880.29	880.29	879.75	879.41	879.06	878.68	878.27
BEAM 1	B	STATION TOP OF DECK	18+99.22	19+01.46	19+22.46	19+43.46	19+64.46	19+88.27	19+91.87	20+12.08	20+35.87	20+35.89	20+59.71	20+76.75	20+93.80	21+10.84	21+27.88
			882.65	882.62	882.32	881.97	881.61	881.26	881.21	880.87	880.38	880.38	879.85	879.50	879.16	878.78	878.37
BEAM 2	C	STATION TOP OF DECK	18+94.55	18+96.79	19+17.79	19+38.79	19+59.79	19+83.60	19+87.21	20+07.42	20+31.21	20+31.23	20+55.04	20+72.09	20+89.13	21+06.17	21+23.22
			882.83	882.80	882.51	882.17	881.81	881.46	881.41	881.07	880.59	880.59	880.06	879.72	879.38	879.01	878.60
Beam 3 & PG	D	STATION TOP OF DECK	18+89.89	18+92.13	19+13.13	19+34.13	19+55.13	19+78.94	19+82.54	20+02.75	20+26.54	20+26.56	20+50.38	20+67.42	20+84.47	21+01.51	21+18.55
			883.02	882.99	882.70	882.36	882.01	881.66	881.61	881.28	880.80	880.80	880.27	879.94	879.60	879.23	878.83
BEAM 4	E	STATION TOP OF DECK	18+85.22	18+87.46	19+08.46	19+29.46	19+50.46	19+74.27	19+77.88	19+98.09	20+21.88	20+21.90	20+45.71	20+62.76	20+79.80	20+96.85	21+13.89
			882.96	882.93	882.65	882.31	881.96	881.62	881.57	881.24	880.77	880.77	880.25	879.91	879.58	879.21	878.81
BEAM 5	F	STATION TOP OF DECK	18+80.56	18+82.80	19+03.80	19+24.80	19+45.80	19+69.61	19+73.21	19+93.42	20+17.21	20+17.23	20+41.05	20+58.09	20+75.14	20+92.18	21+09.22
			882.91	882.88	882.60	882.26	881.92	881.58	881.53	881.21	880.74	880.73	880.22	879.89	879.56	879.19	878.79
RT. EDGE OF DECK	G	STATION TOP OF DECK	18+78.48	18+80.72	19+01.72	19+22.72	19+43.72	19+67.54	19+71.14	19+91.35	20+15.14	20+15.16	20+38.97	20+56.02	20+73.06	20+90.11	21+07.15
			882.88	882.85	882.57	882.24	881.90	881.57	881.51	881.19	880.72	880.72	880.21	879.88	879.55	879.18	878.79

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

Deflection and Camber Table

LOCATION		DEFLECTION AND CAMBER (IN)														
		CL Brg. RA	1/4 Span 1	1/2 Span 1	3/4 Span 1	CL Brg. Pier 1	F.S. 1	1/4 Span 2	1/2 Span 2	3/4 Span 2	CL Brg. Pier 2	1/4 Span 3	F.S. 2	1/2 Span 3	3/4 Span 3	CL Brg. Pier 3
BEAM 1 & 5	DEFLECTION DUE TO WEIGHT OF STEEL	0	1/16	1/16	0	0	2/16	2/16	3/16	2/16	0	1/16	1/16	1/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	0	1/4	1/4	1/16	0	5/8	5/8	1	9/16	0	1/4	3/8	7/16	1/4	0
	VERTICAL CURVE CORRECTION	0	3/16	1/4	3/16	0	3/8	3/8	1/2	3/8	0	5/16	3/8	3/8	5/16	0
	REQUIRED SHOP CAMBER	0	1/2	9/16	5/16	0	1 1/16	1 1/16	1 11/16	1 1/16	0	9/16	13/16	15/16	5/8	0
BEAM 2, 3 & 4	DEFLECTION DUE TO WEIGHT OF STEEL	0	1/16	1/16	0	0	1/8	1/8	3/16	1/8	0	1/16	1/16	1/8	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	0	1/4	1/4	1/16	0	9/16	9/16	15/16	9/16	0	3/16	3/8	7/16	1/4	0
	VERTICAL CURVE CORRECTION	0	3/16	1/4	3/16	0	3/8	3/8	1/2	3/8	0	5/16	3/8	3/8	5/16	0
	REQUIRED SHOP CAMBER	0	1/2	9/16	1/4	0	1 1/16	1 1/16	1 5/8	1 1/16	0	9/16	13/16	15/16	5/8	0
BEAM 3	DEFLECTION DUE TO WEIGHT OF STEEL	0	1/16	1/16	0	0	2/16	2/16	3/16	2/16	0	1/16	1/16	2/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	0	4/16	4/16	1/16	0	9/16	9/16	15/16	9/16	0	3/16	6/16	7/16	4/16	0
	VERTICAL CURVE CORRECTION	0	3/16	4/16	3/16	0	6/16	6/16	8/16	6/16	0	5/16	6/16	6/16	5/16	0
	REQUIRED SHOP CAMBER	0	8/16	9/16	4/16	0	1 1/16	1 1/16	1 10/16	1 1/16	0	9/16	13/16	15/16	10/16	0
BEAM 4	DEFLECTION DUE TO WEIGHT OF STEEL	0	1/16	1/16	0	0	2/16	2/16	3/16	2/16	0	1/16	1/16	2/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	0	4/16	4/16	1/16	0	9/16	9/16	15/16	9/16	0	3/16	6/16	7/16	4/16	0
	VERTICAL CURVE CORRECTION	0	3/16	4/16	3/16	0	6/16	6/16	8/16	6/16	0	5/16	6/16	6/16	5/16	0
	REQUIRED SHOP CAMBER	0	8/16	9/16	4/16	0	1 1/16	1 1/16	1 10/16	1 1/16	0	9/16	13/16	15/16	10/16	0
BEAM 5	DEFLECTION DUE TO WEIGHT OF STEEL	0	1/16	1/16	0	0	2/16	2/16	3/16	2/16	0	1/16	1/16	2/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	0	4/16	4/16	1/16	0	10/16	10/16	1	9/16	0	4/16	6/16	7/16	4/16	0
	VERTICAL CURVE CORRECTION	0	3/16	4/16	3/16	0	6/16	6/16	8/16	6/16	0	5/16	6/16	6/16	5/16	0
	REQUIRED SHOP CAMBER	0	8/16	9/16	5/16	0	1 1/16	1 1/16	1 11/16	1 1/16	0	9/16	13/16	15/16	10/16	0

LOCATION		F.S. 3	1/4 Span 4	1/2 Span 4	3/4 Span 4	CL Brg. Pier 4	1/4 Span 5	F.S. 4	1/2 Span 5	F.S. 5	3/4 Span 5	CL Brg. Pier 5	1/4 Span 6	1/2 Span 6	3/4 Span 6	CL Brg. FA
BEAM 1 & 5	DEFLECTION DUE TO WEIGHT OF STEEL	1/16	1/16	1/16	1/16	0	1/8	1/4	2/8	1/8	2/16	0	0	1/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	1/4	4/16	7/16	3/16	0	11/16	6/8	1 1/8	11/16	11/16	0	2/16	5/16	5/16	0
	VERTICAL CURVE CORRECTION	4/16	2/8	3/8	5/16	0	3/8	1/2	4/8	3/8	6/16	0	1/4	4/16	3/16	0
	REQUIRED SHOP CAMBER	4/8	10/16	1	1/2	0	1 3/16	1 3/8	1 7/8	1 1/4	1 4/16	0	5/16	11/16	9/16	0
BEAM 2, 3 & 4	DEFLECTION DUE TO WEIGHT OF STEEL	1/16	1/16	1/16	1/16	0	1/8	1/4	2/8	1/8	2/16	0	0	1/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	1/4	4/16	7/16	3/16	0	11/16	6/8	1 2/16	11/16	11/16	0	2/16	5/16	5/16	0
	VERTICAL CURVE CORRECTION	4/16	2/8	3/8	5/16	0	3/8	1/2	4/8	3/8	6/16	0	1/4	4/16	3/16	0
	REQUIRED SHOP CAMBER	4/8	10/16	1	1/2	0	1 3/16	1 3/8	1 14/16	1 3/16	1 3/16	0	3/8	10/16	9/16	0
BEAM 3	DEFLECTION DUE TO WEIGHT OF STEEL	1/16	1/16	1/16	1/16	0	2/16	3/16	4/16	2/16	2/16	0	0	1/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	4/16	4/16	7/16	3/16	0	11/16	12/16	1 2/16	11/16	11/16	0	2/16	5/16	5/16	0
	VERTICAL CURVE CORRECTION	4/16	5/16	6/16	5/16	0	6/16	7/16	8/16	6/16	6/16	0	3/16	4/16	3/16	0
	REQUIRED SHOP CAMBER	9/16	10/16	15/16	8/16	0	1 3/16	1 6/16	1 14/16	1 3/16	1 3/16	0	5/16	10/16	9/16	0
BEAM 4	DEFLECTION DUE TO WEIGHT OF STEEL	1/16	1/16	1/16	1/16	0	2/16	3/16	4/16	2/16	2/16	0	0	1/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	4/16	4/16	7/16	3/16	0	11/16	12/16	1 2/16	11/16	11/16	0	2/16	5/16	5/16	0
	VERTICAL CURVE CORRECTION	4/16	5/16	6/16	5/16	0	6/16	7/16	8/16	6/16	6/16	0	3/16	4/16	3/16	0
	REQUIRED SHOP CAMBER	9/16	10/16	14/16	8/16	0	1 3/16	1 6/16	1 14/16	1 3/16	1 3/16	0	5/16	10/16	9/16	0
BEAM 5	DEFLECTION DUE TO WEIGHT OF STEEL	1/16	1/16	1/16	1/16	0	2/16	3/16	4/16	2/16	2/16	0	0	1/16	1/16	0
	DEFLECTION DUE TO REMAINING DEAD LOAD	4/16	4/16	7/16	3/16	0	11/16	13/16	1 2/16	11/16	11/16	0	2/16	5/16	5/16	0
	VERTICAL CURVE CORRECTION	4/16	5/16	6/16	5/16	0	6/16	7/16	8/16	6/16	6/16	0	3/16	4/16	3/16	0
	REQUIRED SHOP CAMBER	9/16	10/16	15/16	8/16	0	1 4/16	1 6/16	1 14/16	1 4/16	1 4/16	0	5/16	11/16	9/16	0



471 E Broad St, Suite 2010

Columbus, OH 43215

Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

BEAM SEAT ELEVATIONS					
LOCATION	B1	B2	B3	B4	B5
REAR ABUT.	881.23	881.37	881.51	881.41	881.30
PIER 1	880.90	881.05	881.21	881.12	881.03
PIER 2	880.09	880.26	880.43	880.36	880.28
PIER 3	879.19	879.38	879.56	879.50	879.44
PIER 4	877.80	878.00	878.20	878.15	878.11
PIER 5	876.50	876.71	876.92	876.89	876.86
FWD. ABUT.	874.89	875.11	875.34	875.32	875.30

BOTTOM OF BEAM ELEVATION					
LOCATION	B1	B2	B3	B4	B5
REAR ABUT.	881.68	881.82	881.96	881.86	881.75
PIER 1	881.30	881.45	881.60	881.51	881.42
PIER 2	880.50	880.66	880.83	880.76	880.68
PIER 3	879.49	879.67	879.85	879.79	879.73
PIER 4	878.21	878.41	878.61	878.56	878.52
PIER 5	876.92	877.13	877.34	877.31	877.27
FWD. ABUT.	875.36	875.58	875.80	875.78	875.76

BLOCKING					
LOCATION	B1	B2	B3	B4	B5
REAR ABUT.	0' - 0"	0' - 0"	0' - 0"	0' - 0"	0' - 0"
PIER 1	0' - 5 5/8"	0' - 5 5/8"	0' - 5 5/8"	0' - 5 5/8"	0' - 5 5/8"
PIER 2	0' - 10 1/4"	0' - 10 1/4"	0' - 10 1/4"	0' - 10 1/4"	0' - 10 5/16"
PIER 3	0' - 11 1/8"	0' - 11 3/16"	0' - 11 3/16"	0' - 11 3/16"	0' - 11 1/4"
PIER 4	0' - 8 7/8"	0' - 8 15/16"	0' - 8 15/16"	0' - 8 15/16"	0' - 9"
PIER 5	0' - 8 3/16"	0' - 8 1/8"	0' - 8 1/8"	0' - 8 1/8"	0' - 8 1/16"
FWD. ABUT.	0' - 0"	0' - 0"	0' - 0"	0' - 0"	0' - 0"

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

VERTICAL PROFILE DATA

PVI STA.	PVI Elev.	Back Slope	Front Slope	LVC
14+75.00	886.27		0.16%	0.00
18+75.00	886.91	0.16%	-2.84%	800.00
22+75.00	875.55	-2.84%		

Adjustment Profile to Account for Change in Cross Slopes

Clr. Rdway / 2 x (.02 - .015) =

(feet)

(inches)

0.000

in

Change In Cross Slope across Clear Roadway =

Use =

0.000

in

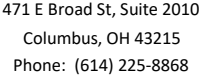
Station Equation	N/A	ahead		back		ahead

GEOMETRIC DATA

CL Brq. Rear Abutment	16+29.95	
Skew	31.88	degrees Left Forward
Beam Spacing	7.50	ft
		ft
Rt. Overhang	3.33	ft
Lt. Overhang	3.33	ft
Sidewalk Width	0.00	ft
CL Beam to PG (Pos. Indicates Right of CL)	0.00	ft
Left Cross Slope	1.6%	
Right Cross Slope	-1.6%	

Offset from PG

Location	Offset (ft)	
LEOD	-18.33	
1	-15.00	
2	-7.50	
3	0.00	
4	7.50	
5	15.00	
REOD	18.33	



Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
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Span Length

Span 1	65.18	ft
Span 2	92.00	ft
Span 3	84.00	ft
Span 4	84.00	ft
Span 5	95.25	ft
Span 6	68.18	ft

Distance from Pier to Splice

F.S.1	22.83	fit
F.S.2	29.58	fit
F.S.3	18.76	fit
F.S.4	27.42	fit
F.S.5	71.42	fit
		fit

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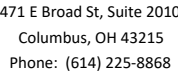
Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA											
CL Brg. Rear Abutment	16+29.95										
Skew	31.88	degrees	=	0.556	radians	Span Length			Splice Distance from Pier		
Beam Spacing	7.50	ft				Span 1	65.1771	ft	F.S. 1	22.83	ft
	0.00	ft				Span 2	92.0000	ft	F.S. 2	29.58	ft
Rt. Overhang	3.33	ft				Span 3	84.0000	ft	F.S. 3	18.76	ft
Lt. Overhang	3.333	ft				Span 4	84.0000	ft	F.S. 4	27.42	ft
Sidewalk Width	0.000	ft				Span 5	95.2500	ft	F.S. 5	71.42	ft
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft				Span 6	68.1771	ft	F.S. 6	0.00	ft
Left Cross Slope	1.6%										

Girder ID

LEOD

Index	1	2	3	4	5	6	7	8	9	10	11	12				
	Location	Spacing ft	Distance Along Girder ft	PGL Station ft	Station Adjustment ft	Actual Staton ft	PGL Elevation ft	Girder Offset from PG ft	Cross-Drop ft	Finished Deck Elevation	Beam DL Deflection in	Deck DL Deflection in	DC2 DL Deflection in	10+11 DL Deflection in	Screed Elevation (Including DL Deflection)	Cross-Slope %
	CL Brg. RA		0.00	16+29.95	11.40	16+41.35	886.017	-18.33	-0.29333	885.72	0	0	0	0	885.72	1.60%
	1/4 Span 1	16.29	16.29	16+46.24	11.40	16+57.65	885.937	-18.33	-0.29333	885.64	-0.0518	-0.2220	-0.0339	-0.2559	885.66	1.60%
	1/2 Span 1	16.29	32.59	16+62.54	11.40	16+73.94	885.846	-18.33	-0.29333	885.55	-0.0564	-0.2394	-0.0366	-0.2760	885.58	1.60%
	3/4 Span 1	16.29	48.88	16+78.83	11.40	16+90.24	885.746	-18.33	-0.29333	885.45	-0.0179	-0.0729	-0.0112	-0.0841	885.46	1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	11.40	17+06.53	885.635	-18.33	-0.29333	885.34	0.0000	0.0000	0.0000	0.0000	885.34	1.60%
	F.S. 1	22.83	88.01	17+17.96	11.40	17+29.36	885.464	-18.33	-0.29333	885.17	-0.1191	-0.5223	-0.0797	-0.6020	885.22	1.60%
	1/4 Span 2	0.17	88.18	17+18.13	11.40	17+29.53	885.463	-18.33	-0.29333	885.17	-0.1201	-0.5266	-0.0803	-0.6069	885.22	1.60%
	1/2 Span 2	23.00	111.18	17+41.13	11.40	17+52.53	885.270	-18.33	-0.29333	884.98	-0.1967	-0.8570	-0.1306	-0.9876	885.06	1.60%
	3/4 Span 2	23.00	134.18	17+64.13	11.40	17+75.53	885.057	-18.33	-0.29333	884.76	-0.1177	-0.5087	-0.0776	-0.5863	884.81	1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	11.40	17+98.53	884.825	-18.33	-0.29333	884.53	0.0000	0.0000	0.0000	0.0000	884.53	1.60%
	1/4 Span 3	21.00	178.18	18+08.13	11.40	18+19.53	884.596	-18.33	-0.29333	884.30	-0.0433	-0.1916	-0.0293	-0.2210	884.32	1.60%
	F.S. 2	8.58	186.76	18+16.71	11.40	18+28.11	884.497	-18.33	-0.29333	884.20	-0.0715	-0.3146	-0.0481	-0.3627	884.23	1.60%
	1/2 Span 3	12.42	199.18	18+29.13	11.40	18+40.53	884.350	-18.33	-0.29333	884.06	-0.0927	-0.4056	-0.0619	-0.4676	884.10	1.60%
	3/4 Span 3	21.00	220.18	18+50.13	11.40	18+61.53	884.087	-18.33	-0.29333	883.79	-0.0561	-0.2435	-0.0372	-0.2807	883.82	1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	11.40	18+82.53	883.808	-18.33	-0.29333	883.51	0.0000	0.0000	0.0000	0.0000	883.51	1.60%
	F.S. 3	18.76	259.94	18+89.89	11.40	19+01.29	883.545	-18.33	-0.29333	883.25	-0.0464	-0.2010	-0.0307	-0.2317	883.27	1.60%
	1/4 Span 4	2.24	262.18	18+92.13	11.40	19+03.53	883.512	-18.33	-0.29333	883.22	-0.0537	-0.2321	-0.0355	-0.2676	883.24	1.60%
	1/2 Span 4	21.00	283.18	19+13.13	11.40	19+24.53	883.200	-18.33	-0.29333	882.91	-0.0890	-0.3818	-0.0583	-0.4401	882.94	1.60%
	3/4 Span 4	21.00	304.18	19+34.13	11.40	19+45.53	882.872	-18.33	-0.29333	882.58	-0.0395	-0.1649	-0.0253	-0.1902	882.59	1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	11.40	19+66.53	882.526	-18.33	-0.29333	882.23	0.0000	0.0000	0.0000	0.0000	882.23	1.60%
	1/4 Span 5	23.81	348.99	19+78.94	11.40	19+90.34	882.115	-18.33	-0.29333	881.82	-0.1362	-0.6013	-0.0917	-0.6930	881.88	1.60%
	F.S. 4	3.60	352.59	19+82.54	11.40	19+93.95	882.051	-18.33	-0.29333	881.76	-0.1598	-0.7048	-0.1075	-0.8123	881.83	1.60%
	1/2 Span 5	20.21	372.80	20+02.75	11.40	20+14.15	881.682	-18.33	-0.29333	881.39	-0.2277	-1.0009	-0.1525	-1.1534	881.49	1.60%
	F.S. 5	23.79	396.59	20+26.54	11.40	20+37.95	881.229	-18.33	-0.29333	880.94	-0.1392	-0.6108	-0.0931	-0.7039	880.99	1.60%
	3/4 Span 5	0.02	396.61	20+26.56	11.40	20+37.97	881.228	-18.33	-0.29333	880.93	-0.1391	-0.6102	-0.0930	-0.7032	880.99	1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	11.40	20+61.78	880.753	-18.33	-0.29333	880.46	0.0000	0.0000	0.0000	0.0000	880.46	1.60%
	1/4 Span 6	17.04	437.47	20+67.42	11.40	20+78.82	880.400	-18.33	-0.29333	880.11	-0.0217	-0.0904	-0.0139	-0.1043	880.12	1.60%
	1/2 Span 6	17.04	454.52	20+84.47	11.40	20+95.87	880.036	-18.33	-0.29333	879.74	-0.0684	-0.2900	-0.0443	-0.3343	879.77	1.60%
	3/4 Span 6	17.04	471.56	21+01.51	11.40	21+12.91	879.661	-18.33	-0.29333	879.37	-0.0637	-0.2697	-0.0412	-0.3109	879.39	1.60%
	CL Brg. FA	17.04	488.60	21+18.55	11.40	21+29.96	879.275	-18.33	-0.29333	878.98	0.0000	0.0000	0.0000	0.0000	878.98	1.60%



Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA					
CL Brg. Rear Abutment	16+29.95				
Skew	31.88	degrees	=	0.556	radians
Beam Spacing	7.50	ft			
	0.00	ft			
Rt. Overhang	3.33	ft			
Lt. Overhang	3.333	ft			
Sidewalk Width	0.000	ft			
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft			
Left Cross Slope	1.6%				

Girder ID	1

Index

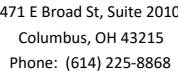
Index	1	2	3	4	5	6	7	8	9	10	11	12	Screed Elevation (Including DL Deflection)	Cross-Slope %		
	Location	Spacing	Distance Along Girder	PGL Station	Station Adjustment	Actual Station	PGL Elevation	Girder Offset from PG	Cross-Drop	Finished Deck Elevation	Beam DL Deflection in	Deck DL Deflection in			DC2 DL Deflection in	10+11 DL Deflection in
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft			ft	
	CL Brg. RA		0.00	16+29.95	9.33	16+39.28	886.027	-15.00	-0.24000	885.79	0	0	0	0	885.79	1.60%
	1/4 Span 1	16.29	16.29	16+46.24	9.33	16+55.57	885.948	-15.00	-0.24000	885.71	-0.0518	-0.2220	-0.0339	-0.2559	885.73	1.60%
	1/2 Span 1	16.29	32.59	16+62.54	9.33	16+71.87	885.858	-15.00	-0.24000	885.62	-0.0564	-0.2394	-0.0366	-0.2760	885.64	1.60%
	3/4 Span 1	16.29	48.88	16+78.83	9.33	16+88.16	885.759	-15.00	-0.24000	885.52	-0.0179	-0.0729	-0.0112	-0.0841	885.53	1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	9.33	17+04.46	885.650	-15.00	-0.24000	885.41	0.0000	0.0000	0.0000	0.0000	885.41	1.60%
	F.S. 1	22.83	88.01	17+17.96	9.33	17+27.29	885.480	-15.00	-0.24000	885.24	-0.1191	-0.5223	-0.0797	-0.6020	885.29	1.60%
	1/4 Span 2	0.17	88.18	17+18.13	9.33	17+27.46	885.479	-15.00	-0.24000	885.24	-0.1201	-0.5266	-0.0803	-0.6069	885.29	1.60%
	1/2 Span 2	23.00	111.18	17+41.13	9.33	17+50.46	885.288	-15.00	-0.24000	885.05	-0.1967	-0.8570	-0.1306	-0.9876	885.13	1.60%
	3/4 Span 2	23.00	134.18	17+64.13	9.33	17+73.46	885.077	-15.00	-0.24000	884.84	-0.1177	-0.5087	-0.0776	-0.5863	884.89	1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	9.33	17+96.46	884.847	-15.00	-0.24000	884.61	0.0000	0.0000	0.0000	0.0000	884.61	1.60%
	1/4 Span 3	21.00	178.18	18+08.13	9.33	18+17.46	884.619	-15.00	-0.24000	884.38	-0.0433	-0.1916	-0.0293	-0.2210	884.40	1.60%
	F.S. 2	8.58	186.76	18+16.71	9.33	18+26.04	884.521	-15.00	-0.24000	884.28	-0.0715	-0.3146	-0.0481	-0.3627	884.31	1.60%
	1/2 Span 3	12.42	199.18	18+29.13	9.33	18+38.46	884.375	-15.00	-0.24000	884.13	-0.0927	-0.4056	-0.0619	-0.4676	884.17	1.60%
	3/4 Span 3	21.00	220.18	18+50.13	9.33	18+59.46	884.114	-15.00	-0.24000	883.87	-0.0561	-0.2435	-0.0372	-0.2807	883.90	1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	9.33	18+80.46	883.836	-15.00	-0.24000	883.60	0.0000	0.0000	0.0000	0.0000	883.60	1.60%
	F.S. 3	18.76	259.94	18+89.89	9.33	18+99.22	883.574	-15.00	-0.24000	883.33	-0.0464	-0.2010	-0.0307	-0.2317	883.35	1.60%
	1/4 Span 4	2.24	262.18	18+92.13	9.33	19+01.46	883.542	-15.00	-0.24000	883.30	-0.0537	-0.2321	-0.0355	-0.2676	883.32	1.60%
	1/2 Span 4	21.00	283.18	19+13.13	9.33	19+22.46	883.232	-15.00	-0.24000	882.99	-0.0890	-0.3818	-0.0583	-0.4401	883.03	1.60%
	3/4 Span 4	21.00	304.18	19+34.13	9.33	19+43.46	882.905	-15.00	-0.24000	882.66	-0.0395	-0.1649	-0.0253	-0.1902	882.68	1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	9.33	19+64.46	882.561	-15.00	-0.24000	882.32	0.0000	0.0000	0.0000	0.0000	882.32	1.60%
	1/4 Span 5	23.81	348.99	19+78.94	9.33	19+88.27	882.152	-15.00	-0.24000	881.91	-0.1362	-0.6013	-0.0917	-0.6930	881.97	1.60%
	F.S. 4	3.60	352.59	19+82.54	9.33	19+91.87	882.088	-15.00	-0.24000	881.85	-0.1598	-0.7048	-0.1075	-0.8123	881.92	1.60%
	1/2 Span 5	20.21	372.80	20+02.75	9.33	20+12.08	881.721	-15.00	-0.24000	881.48	-0.2277	-1.0009	-0.1525	-1.1534	881.58	1.60%
	F.S. 5	23.79	396.59	20+26.54	9.33	20+35.87	881.269	-15.00	-0.24000	881.03	-0.1392	-0.6108	-0.0931	-0.7039	881.09	1.60%
	3/4 Span 5	0.02	396.61	20+26.56	9.33	20+35.89	881.269	-15.00	-0.24000	881.03	-0.1391	-0.6102	-0.0930	-0.7032	881.09	1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	9.33	20+59.71	880.795	-15.00	-0.24000	880.56	0.0000	0.0000	0.0000	0.0000	880.56	1.60%
	1/4 Span 6	17.04	437.47	20+67.42	9.33	20+76.75	880.443	-15.00	-0.24000	880.20	-0.0217	-0.0904	-0.0139	-0.1043	880.21	1.60%
	1/2 Span 6	17.04	454.52	20+84.47	9.33	20+93.80	880.081	-15.00	-0.24000	879.84	-0.0684	-0.2900	-0.0443	-0.3343	879.87	1.60%
3/4 Span 6	17.04	471.56	21+01.51	9.33	21+10.84	879.707	-15.00	-0.24000	879.47	-0.0637	-0.2697	-0.0412	-0.3109	879.49	1.60%	
CL Brg. FA	17.04	488.60	21+18.55	9.33	21+27.88	879.322	-15.00	-0.24000	879.08	0.0000	0.0000	0.0000	0.0000	879.08	1.60%	

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA									
CL Brg. Rear Abutment	16+29.95								
Skew	31.88	degrees	=	0.556	radians	Span Length		Splice Distance from Pier	
Beam Spacing	7.50	ft				Span 1	65.1771	F.S. 1	22.83
	0.00	ft				Span 2	92.0000	F.S. 2	29.58
Rt. Overhang	3.33	ft				Span 3	84.0000	F.S. 3	18.76
Lt. Overhang	3.333	ft				Span 4	84.0000	F.S. 4	27.42
Sidewalk Width	0.000	ft				Span 5	95.2500	F.S. 5	71.42
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft				Span 6	68.1771	F.S. 6	0.00
Left Cross Slope	1.6%								

Girder ID 2

Index	1	2	3	4	5	6	7	8	9	10	11	12	Screed Elevation (Including DL Deflection)	Cross-Slope %		
	Location	Spacing	Distance Along Girder	PGL Station	Station Adjustment	Actual Staton	PGL Elevation	Girder Offset from PG	Cross-Drop	Finished Deck Elevation	Beam DL Deflection in	Deck DL Deflection in			DC2 DL Deflection in	10+11 DL Deflection in
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft			ft	
	CL Brg. RA		0.00	16+29.95	4.66	16+34.61	886.048	-7.50	-0.12000	885.93	0	0	0	0	885.93	1.60%
	1/4 Span 1	16.29	16.29	16+46.24	4.66	16+50.91	885.971	-7.50	-0.12000	885.85	-0.0518	-0.2220	-0.0339	-0.2559	885.87	1.60%
	1/2 Span 1	16.29	32.59	16+62.54	4.66	16+67.20	885.885	-7.50	-0.12000	885.76	-0.0564	-0.2394	-0.0366	-0.2760	885.79	1.60%
	3/4 Span 1	16.29	48.88	16+78.83	4.66	16+83.50	885.789	-7.50	-0.12000	885.67	-0.0179	-0.0729	-0.0112	-0.0841	885.68	1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	4.66	16+99.79	885.682	-7.50	-0.12000	885.56	0.0000	0.0000	0.0000	0.0000	885.56	1.60%
	F.S. 1	22.83	88.01	17+17.96	4.66	17+22.63	885.516	-7.50	-0.12000	885.40	-0.1191	-0.5223	-0.0797	-0.6020	885.45	1.60%
	1/4 Span 2	0.17	88.18	17+18.13	4.66	17+22.79	885.515	-7.50	-0.12000	885.40	-0.1201	-0.5266	-0.0803	-0.6069	885.45	1.60%
	1/2 Span 2	23.00	111.18	17+41.13	4.66	17+45.79	885.328	-7.50	-0.12000	885.21	-0.1967	-0.8570	-0.1306	-0.9876	885.29	1.60%
	3/4 Span 2	23.00	134.18	17+64.13	4.66	17+68.79	885.122	-7.50	-0.12000	885.00	-0.1177	-0.5087	-0.0776	-0.5863	885.05	1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	4.66	17+91.79	884.895	-7.50	-0.12000	884.78	0.0000	0.0000	0.0000	0.0000	884.78	1.60%
	1/4 Span 3	21.00	178.18	18+08.13	4.66	18+12.79	884.671	-7.50	-0.12000	884.55	-0.0433	-0.1916	-0.0293	-0.2210	884.57	1.60%
	F.S. 2	8.58	186.76	18+16.71	4.66	18+21.38	884.575	-7.50	-0.12000	884.45	-0.0715	-0.3146	-0.0481	-0.3627	884.48	1.60%
	1/2 Span 3	12.42	199.18	18+29.13	4.66	18+33.79	884.430	-7.50	-0.12000	884.31	-0.0927	-0.4056	-0.0619	-0.4676	884.35	1.60%
	3/4 Span 3	21.00	220.18	18+50.13	4.66	18+54.79	884.173	-7.50	-0.12000	884.05	-0.0561	-0.2435	-0.0372	-0.2807	884.08	1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	4.66	18+75.79	883.899	-7.50	-0.12000	883.78	0.0000	0.0000	0.0000	0.0000	883.78	1.60%
	F.S. 3	18.76	259.94	18+89.89	4.66	18+94.55	883.641	-7.50	-0.12000	883.52	-0.0464	-0.2010	-0.0307	-0.2317	883.54	1.60%
	1/4 Span 4	2.24	262.18	18+92.13	4.66	18+96.79	883.609	-7.50	-0.12000	883.49	-0.0537	-0.2321	-0.0355	-0.2676	883.51	1.60%
	1/2 Span 4	21.00	283.18	19+13.13	4.66	19+17.79	883.302	-7.50	-0.12000	883.18	-0.0890	-0.3818	-0.0583	-0.4401	883.22	1.60%
	3/4 Span 4	21.00	304.18	19+34.13	4.66	19+38.79	882.979	-7.50	-0.12000	882.86	-0.0395	-0.1649	-0.0253	-0.1902	882.87	1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	4.66	19+59.79	882.639	-7.50	-0.12000	882.52	0.0000	0.0000	0.0000	0.0000	882.52	1.60%
	1/4 Span 5	23.81	348.99	19+78.94	4.66	19+83.60	882.234	-7.50	-0.12000	882.11	-0.1362	-0.6013	-0.0917	-0.6930	882.17	1.60%
	F.S. 4	3.60	352.59	19+82.54	4.66	19+87.21	882.170	-7.50	-0.12000	882.05	-0.1598	-0.7048	-0.1075	-0.8123	882.12	1.60%
	1/2 Span 5	20.21	372.80	20+02.75	4.66	20+07.42	881.807	-7.50	-0.12000	881.69	-0.2277	-1.0009	-0.1525	-1.1534	881.78	1.60%
	F.S. 5	23.79	396.59	20+26.54	4.66	20+31.21	881.359	-7.50	-0.12000	881.24	-0.1392	-0.6108	-0.0931	-0.7039	881.30	1.60%
	3/4 Span 5	0.02	396.61	20+26.56	4.66	20+31.23	881.359	-7.50	-0.12000	881.24	-0.1391	-0.6102	-0.0930	-0.7032	881.30	1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	4.66	20+55.04	880.890	-7.50	-0.12000	880.77	0.0000	0.0000	0.0000	0.0000	880.77	1.60%
	1/4 Span 6	17.04	437.47	20+67.42	4.66	20+72.09	880.541	-7.50	-0.12000	880.42	-0.0217	-0.0904	-0.0139	-0.1043	880.43	1.60%
	1/2 Span 6	17.04	454.52	20+84.47	4.66	20+89.13	880.181	-7.50	-0.12000	880.06	-0.0684	-0.2900	-0.0443	-0.3343	880.09	1.60%
	3/4 Span 6	17.04	471.56	21+01.51	4.66	21+06.17	879.810	-7.50	-0.12000	879.69	-0.0637	-0.2697	-0.0412	-0.3109	879.72	1.60%
	CL Brg. FA	17.04	488.60	21+18.55	4.66	21+23.22	879.429	-7.50	-0.12000	879.31	0.0000	0.0000	0.0000	0.0000	879.31	1.60%



Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA					
CL Brg. Rear Abutment	16+29.95				
Skew	31.88	degrees	=	0.556	radians
Beam Spacing	7.50	ft			
	0.00	ft			
Rt. Overhang	3.33	ft			
Lt. Overhang	3.333	ft			
Sidewalk Width	0.000	ft			
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft			
Left Cross Slope	1.6%				

Girder ID	3

Index

Index	1	2	3	4	5	6	7	8	9	10	11	12				
	Location	Spacing	Distance Along Girder	PGL Station	Station Adjustment	Actual Station	PGL Elevation	Girder Offset from PG	Cross-Drop	Finished Deck Elevation	Beam DL Deflection in	Deck DL Deflection in	DC2 DL Deflection in	10+11 DL Deflection in	Screed Elevation (Including DL Deflection)	Cross-Slope %
		ft	ft	ft	ft	ft	ft	ft	ft							
	CL Brg. RA		0.00	16+29.95	0.00	16+29.95	886.068	0.00	0.00000	886.07	0	0	0	0	886.07	1.60%
	1/4 Span 1	16.29	16.29	16+46.24	0.00	16+46.24	885.994	0.00	0.00000	885.99	-0.0518	-0.2220	-0.0339	-0.2559	886.02	1.60%
	1/2 Span 1	16.29	32.59	16+62.54	0.00	16+62.54	885.911	0.00	0.00000	885.91	-0.0564	-0.2394	-0.0366	-0.2760	885.93	1.60%
	3/4 Span 1	16.29	48.88	16+78.83	0.00	16+78.83	885.817	0.00	0.00000	885.82	-0.0179	-0.0729	-0.0112	-0.0841	885.82	1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	0.00	16+95.13	885.714	0.00	0.00000	885.71	0.0000	0.0000	0.0000	0.0000	885.71	1.60%
	F.S. 1	22.83	88.01	17+17.96	0.00	17+17.96	885.552	0.00	0.00000	885.55	-0.1191	-0.5223	-0.0797	-0.6020	885.60	1.60%
	1/4 Span 2	0.17	88.18	17+18.13	0.00	17+18.13	885.551	0.00	0.00000	885.55	-0.1201	-0.5266	-0.0803	-0.6069	885.60	1.60%
	1/2 Span 2	23.00	111.18	17+41.13	0.00	17+41.13	885.368	0.00	0.00000	885.37	-0.1967	-0.8570	-0.1306	-0.9876	885.45	1.60%
	3/4 Span 2	23.00	134.18	17+64.13	0.00	17+64.13	885.165	0.00	0.00000	885.17	-0.1177	-0.5087	-0.0776	-0.5863	885.21	1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	0.00	17+87.13	884.943	0.00	0.00000	884.94	0.0000	0.0000	0.0000	0.0000	884.94	1.60%
	1/4 Span 3	21.00	178.18	18+08.13	0.00	18+08.13	884.722	0.00	0.00000	884.72	-0.0433	-0.1916	-0.0293	-0.2210	884.74	1.60%
	F.S. 2	8.58	186.76	18+16.71	0.00	18+16.71	884.627	0.00	0.00000	884.63	-0.0715	-0.3146	-0.0481	-0.3627	884.66	1.60%
	1/2 Span 3	12.42	199.18	18+29.13	0.00	18+29.13	884.485	0.00	0.00000	884.49	-0.0927	-0.4056	-0.0619	-0.4676	884.52	1.60%
	3/4 Span 3	21.00	220.18	18+50.13	0.00	18+50.13	884.232	0.00	0.00000	884.23	-0.0561	-0.2435	-0.0372	-0.2807	884.26	1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	0.00	18+71.13	883.962	0.00	0.00000	883.96	0.0000	0.0000	0.0000	0.0000	883.96	1.60%
	F.S. 3	18.76	259.94	18+89.89	0.00	18+89.89	883.706	0.00	0.00000	883.71	-0.0464	-0.2010	-0.0307	-0.2317	883.73	1.60%
	1/4 Span 4	2.24	262.18	18+92.13	0.00	18+92.13	883.675	0.00	0.00000	883.67	-0.0537	-0.2321	-0.0355	-0.2676	883.70	1.60%
	1/2 Span 4	21.00	283.18	19+13.13	0.00	19+13.13	883.372	0.00	0.00000	883.37	-0.0890	-0.3818	-0.0583	-0.4401	883.41	1.60%
	3/4 Span 4	21.00	304.18	19+34.13	0.00	19+34.13	883.052	0.00	0.00000	883.05	-0.0395	-0.1649	-0.0253	-0.1902	883.07	1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	0.00	19+55.13	882.716	0.00	0.00000	882.72	0.0000	0.0000	0.0000	0.0000	882.72	1.60%
	1/4 Span 5	23.81	348.99	19+78.94	0.00	19+78.94	882.315	0.00	0.00000	882.31	-0.1362	-0.6013	-0.0917	-0.6930	882.37	1.60%
	F.S. 4	3.60	352.59	19+82.54	0.00	19+82.54	882.252	0.00	0.00000	882.25	-0.1598	-0.7048	-0.1075	-0.8123	882.32	1.60%
	1/2 Span 5	20.21	372.80	20+02.75	0.00	20+02.75	881.892	0.00	0.00000	881.89	-0.2277	-1.0009	-0.1525	-1.1534	881.99	1.60%
	F.S. 5	23.79	396.59	20+26.54	0.00	20+26.54	881.449	0.00	0.00000	881.45	-0.1392	-0.6108	-0.0931	-0.7039	881.51	1.60%
	3/4 Span 5	0.02	396.61	20+26.56	0.00	20+26.56	881.448	0.00	0.00000	881.45	-0.1391	-0.6102	-0.0930	-0.7032	881.51	1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	0.00	20+50.38	880.983	0.00	0.00000	880.98	0.0000	0.0000	0.0000	0.0000	880.98	1.60%
	1/4 Span 6	17.04	437.47	20+67.42	0.00	20+67.42	880.637	0.00	0.00000	880.64	-0.0217	-0.0904	-0.0139	-0.1043	880.65	1.60%
	1/2 Span 6	17.04	454.52	20+84.47	0.00	20+84.47	880.280	0.00	0.00000	880.28	-0.0684	-0.2900	-0.0443	-0.3343	880.31	1.60%
	3/4 Span 6	17.04	471.56	21+01.51	0.00	21+01.51	879.913	0.00	0.00000	879.91	-0.0637	-0.2697	-0.0412	-0.3109	879.94	1.60%
	CL Brg. FA	17.04	488.60	21+18.55	0.00	21+18.55	879.534	0.00	0.00000	879.53	0.0000	0.0000	0.0000	0.0000	879.53	1.60%

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA									
CL Brg. Rear Abutment	16+29.95								
Skew	31.88	degrees	=	0.556	radians	Span Length		Splice Distance from Pier	
Beam Spacing	7.50	ft				Span 1	65.1771	F.S. 1	22.83
	0.00	ft				Span 2	92.0000	F.S. 2	29.58
Rt. Overhang	3.33	ft				Span 3	84.0000	F.S. 3	18.76
Lt. Overhang	3.333	ft				Span 4	84.0000	F.S. 4	27.42
Sidewalk Width	0.000	ft				Span 5	95.2500	F.S. 5	71.42
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft				Span 6	68.1771	F.S. 6	0.00
Right Cross Slope	-1.6%								

Girder ID 4

Index	1	2	3	4	5	6	7	8	9	10	11	12				
	Location	Spacing	Distance	PGL	Station	Actual Station	PGL	Girder Offset		Finished	Beam DL	Deck DL	DC2 DL	10+11	Screed	
		ft	Along Girder	Station	Adjustment		Elevation	from PG	Cross-Drop	Deck	Deflection	Deflection	Deflection	DL Deflection	Elevation	Cross-Slope
			ft	ft	ft	ft	ft	ft	ft	Elevation	in	in	in	in	(Including DL Deflection)	%
	CL Brg. RA		0.00	16+29.95	-4.66	16+25.29	886.087	7.50	-0.12000	885.97	0	0	0	0	885.97	-1.60%
	1/4 Span 1	16.29	16.29	16+46.24	-4.66	16+41.58	886.016	7.50	-0.12000	885.90	-0.0518	-0.2220	-0.0339	-0.2559	885.92	-1.60%
	1/2 Span 1	16.29	32.59	16+62.54	-4.66	16+57.87	885.936	7.50	-0.12000	885.82	-0.0564	-0.2394	-0.0366	-0.2760	885.84	-1.60%
	3/4 Span 1	16.29	48.88	16+78.83	-4.66	16+74.17	885.845	7.50	-0.12000	885.72	-0.0179	-0.0729	-0.0112	-0.0841	885.73	-1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	-4.66	16+90.46	885.744	7.50	-0.12000	885.62	0.0000	0.0000	0.0000	0.0000	885.62	-1.60%
	F.S. 1	22.83	88.01	17+17.96	-4.66	17+13.30	885.587	7.50	-0.12000	885.47	-0.1191	-0.5223	-0.0797	-0.6020	885.52	-1.60%
	1/4 Span 2	0.17	88.18	17+18.13	-4.66	17+13.46	885.585	7.50	-0.12000	885.47	-0.1201	-0.5266	-0.0803	-0.6069	885.52	-1.60%
	1/2 Span 2	23.00	111.18	17+41.13	-4.66	17+36.46	885.407	7.50	-0.12000	885.29	-0.1967	-0.8570	-0.1306	-0.9876	885.37	-1.60%
	3/4 Span 2	23.00	134.18	17+64.13	-4.66	17+59.46	885.208	7.50	-0.12000	885.09	-0.1177	-0.5087	-0.0776	-0.5863	885.14	-1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	-4.66	17+82.46	884.989	7.50	-0.12000	884.87	0.0000	0.0000	0.0000	0.0000	884.87	-1.60%
	1/4 Span 3	21.00	178.18	18+08.13	-4.66	18+03.46	884.773	7.50	-0.12000	884.65	-0.0433	-0.1916	-0.0293	-0.2210	884.67	-1.60%
	F.S. 2	8.58	186.76	18+16.71	-4.66	18+12.05	884.679	7.50	-0.12000	884.56	-0.0715	-0.3146	-0.0481	-0.3627	884.59	-1.60%
	1/2 Span 3	12.42	199.18	18+29.13	-4.66	18+24.46	884.539	7.50	-0.12000	884.42	-0.0927	-0.4056	-0.0619	-0.4676	884.46	-1.60%
	3/4 Span 3	21.00	220.18	18+50.13	-4.66	18+45.46	884.289	7.50	-0.12000	884.17	-0.0561	-0.2435	-0.0372	-0.2807	884.19	-1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	-4.66	18+66.46	884.023	7.50	-0.12000	883.90	0.0000	0.0000	0.0000	0.0000	883.90	-1.60%
	F.S. 3	18.76	259.94	18+89.89	-4.66	18+85.22	883.771	7.50	-0.12000	883.65	-0.0464	-0.2010	-0.0307	-0.2317	883.67	-1.60%
	1/4 Span 4	2.24	262.18	18+92.13	-4.66	18+87.46	883.740	7.50	-0.12000	883.62	-0.0537	-0.2321	-0.0355	-0.2676	883.64	-1.60%
	1/2 Span 4	21.00	283.18	19+13.13	-4.66	19+08.46	883.441	7.50	-0.12000	883.32	-0.0890	-0.3818	-0.0583	-0.4401	883.36	-1.60%
	3/4 Span 4	21.00	304.18	19+34.13	-4.66	19+29.46	883.125	7.50	-0.12000	883.00	-0.0395	-0.1649	-0.0253	-0.1902	883.02	-1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	-4.66	19+50.46	882.792	7.50	-0.12000	882.67	0.0000	0.0000	0.0000	0.0000	882.67	-1.60%
	1/4 Span 5	23.81	348.99	19+78.94	-4.66	19+74.27	882.395	7.50	-0.12000	882.27	-0.1362	-0.6013	-0.0917	-0.6930	882.33	-1.60%
	F.S. 4	3.60	352.59	19+82.54	-4.66	19+77.88	882.333	7.50	-0.12000	882.21	-0.1598	-0.7048	-0.1075	-0.8123	882.28	-1.60%
	1/2 Span 5	20.21	372.80	20+02.75	-4.66	19+98.09	881.977	7.50	-0.12000	881.86	-0.2277	-1.0009	-0.1525	-1.1534	881.95	-1.60%
	F.S. 5	23.79	396.59	20+26.54	-4.66	20+21.88	881.537	7.50	-0.12000	881.42	-0.1392	-0.6108	-0.0931	-0.7039	881.48	-1.60%
	3/4 Span 5	0.02	396.61	20+26.56	-4.66	20+21.90	881.537	7.50	-0.12000	881.42	-0.1391	-0.6102	-0.0930	-0.7032	881.48	-1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	-4.66	20+45.71	881.076	7.50	-0.12000	880.96	0.0000	0.0000	0.0000	0.0000	880.96	-1.60%
	1/4 Span 6	17.04	437.47	20+67.42	-4.66	20+62.76	880.733	7.50	-0.12000	880.61	-0.0217	-0.0904	-0.0139	-0.1043	880.62	-1.60%
	1/2 Span 6	17.04	454.52	20+84.47	-4.66	20+79.80	880.379	7.50	-0.12000	880.26	-0.0684	-0.2900	-0.0443	-0.3343	880.29	-1.60%
	3/4 Span 6	17.04	471.56	21+01.51	-4.66	20+96.85	880.014	7.50	-0.12000	879.89	-0.0637	-0.2697	-0.0412	-0.3109	879.92	-1.60%
	CL Brg. FA	17.04	488.60	21+18.55	-4.66	21+13.89	879.639	7.50	-0.12000	879.52	0.0000	0.0000	0.0000	0.0000	879.52	-1.60%

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA									
CL Brg. Rear Abutment	16+29.95								
Skew	31.88	degrees	=	0.556	radians	Span Length		Splice Distance from Pier	
Beam Spacing	7.50	ft				Span 1	65.1771	F.S. 1	22.83
	0.00	ft				Span 2	92.0000	F.S. 2	29.58
Rt. Overhang	3.33	ft				Span 3	84.0000	F.S. 3	18.76
Lt. Overhang	3.333	ft				Span 4	84.0000	F.S. 4	27.42
Sidewalk Width	0.000	ft				Span 5	95.2500	F.S. 5	71.42
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft				Span 6	68.1771	F.S. 6	0.00
Right Cross Slope	-1.6%								

Girder ID 5

Index	1	2	3	4	5	6	7	8	9	10	11	12				
	Location	Spacing	Distance	PGL	Station	Actual Staton	PGL	Girder Offset		Finished	Beam DL	Deck DL	DC2 DL	10+11	Screed	
		ft	Along Girder	Station	Adjustment	ft	Elevation	from PG	Cross-Drop	Deck	Deflection	Deflection	Deflection	DL Deflection	Elevation	Cross-Slope
			ft	ft	ft	ft	ft	ft	ft	Elevation	in	in	in	in	(Including DL Deflection)	%
	CL Brg. RA		0.00	16+29.95	-9.33	16+20.62	886.105	15.00	-0.24000	885.87	0	0	0	0	885.87	-1.60%
	1/4 Span 1	16.29	16.29	16+46.24	-9.33	16+36.91	886.038	15.00	-0.24000	885.80	-0.0518	-0.2220	-0.0339	-0.2559	885.82	-1.60%
	1/2 Span 1	16.29	32.59	16+62.54	-9.33	16+53.21	885.960	15.00	-0.24000	885.72	-0.0564	-0.2394	-0.0366	-0.2760	885.74	-1.60%
	3/4 Span 1	16.29	48.88	16+78.83	-9.33	16+69.50	885.872	15.00	-0.24000	885.63	-0.0179	-0.0729	-0.0112	-0.0841	885.64	-1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	-9.33	16+85.80	885.774	15.00	-0.24000	885.53	0.0000	0.0000	0.0000	0.0000	885.53	-1.60%
	F.S. 1	22.83	88.01	17+17.96	-9.33	17+08.63	885.620	15.00	-0.24000	885.38	-0.1191	-0.5223	-0.0797	-0.6020	885.43	-1.60%
	1/4 Span 2	0.17	88.18	17+18.13	-9.33	17+08.80	885.619	15.00	-0.24000	885.38	-0.1201	-0.5266	-0.0803	-0.6069	885.43	-1.60%
	1/2 Span 2	23.00	111.18	17+41.13	-9.33	17+31.80	885.444	15.00	-0.24000	885.20	-0.1967	-0.8570	-0.1306	-0.9876	885.29	-1.60%
	3/4 Span 2	23.00	134.18	17+64.13	-9.33	17+54.80	885.250	15.00	-0.24000	885.01	-0.1177	-0.5087	-0.0776	-0.5863	885.06	-1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	-9.33	17+77.80	885.035	15.00	-0.24000	884.80	0.0000	0.0000	0.0000	0.0000	884.80	-1.60%
	1/4 Span 3	21.00	178.18	18+08.13	-9.33	17+98.80	884.822	15.00	-0.24000	884.58	-0.0433	-0.1916	-0.0293	-0.2210	884.60	-1.60%
	F.S. 2	8.58	186.76	18+16.71	-9.33	18+07.38	884.730	15.00	-0.24000	884.49	-0.0715	-0.3146	-0.0481	-0.3627	884.52	-1.60%
	1/2 Span 3	12.42	199.18	18+29.13	-9.33	18+19.80	884.593	15.00	-0.24000	884.35	-0.0927	-0.4056	-0.0619	-0.4676	884.39	-1.60%
	3/4 Span 3	21.00	220.18	18+50.13	-9.33	18+40.80	884.346	15.00	-0.24000	884.11	-0.0561	-0.2435	-0.0372	-0.2807	884.13	-1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	-9.33	18+61.80	884.084	15.00	-0.24000	883.84	0.0000	0.0000	0.0000	0.0000	883.84	-1.60%
	F.S. 3	18.76	259.94	18+89.89	-9.33	18+80.56	883.835	15.00	-0.24000	883.59	-0.0464	-0.2010	-0.0307	-0.2317	883.61	-1.60%
	1/4 Span 4	2.24	262.18	18+92.13	-9.33	18+82.80	883.804	15.00	-0.24000	883.56	-0.0537	-0.2321	-0.0355	-0.2676	883.59	-1.60%
	1/2 Span 4	21.00	283.18	19+13.13	-9.33	19+03.80	883.509	15.00	-0.24000	883.27	-0.0890	-0.3818	-0.0583	-0.4401	883.31	-1.60%
	3/4 Span 4	21.00	304.18	19+34.13	-9.33	19+24.80	883.196	15.00	-0.24000	882.96	-0.0395	-0.1649	-0.0253	-0.1902	882.97	-1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	-9.33	19+45.80	882.867	15.00	-0.24000	882.63	0.0000	0.0000	0.0000	0.0000	882.63	-1.60%
	1/4 Span 5	23.81	348.99	19+78.94	-9.33	19+69.61	882.474	15.00	-0.24000	882.23	-0.1362	-0.6013	-0.0917	-0.6930	882.29	-1.60%
	F.S. 4	3.60	352.59	19+82.54	-9.33	19+73.21	882.413	15.00	-0.24000	882.17	-0.1598	-0.7048	-0.1075	-0.8123	882.24	-1.60%
	1/2 Span 5	20.21	372.80	20+02.75	-9.33	19+93.42	882.060	15.00	-0.24000	881.82	-0.2277	-1.0009	-0.1525	-1.1534	881.92	-1.60%
	F.S. 5	23.79	396.59	20+26.54	-9.33	20+17.21	881.625	15.00	-0.24000	881.39	-0.1392	-0.6108	-0.0931	-0.7039	881.44	-1.60%
	3/4 Span 5	0.02	396.61	20+26.56	-9.33	20+17.23	881.625	15.00	-0.24000	881.38	-0.1391	-0.6102	-0.0930	-0.7032	881.44	-1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	-9.33	20+41.05	881.168	15.00	-0.24000	880.93	0.0000	0.0000	0.0000	0.0000	880.93	-1.60%
	1/4 Span 6	17.04	437.47	20+67.42	-9.33	20+58.09	880.828	15.00	-0.24000	880.59	-0.0217	-0.0904	-0.0139	-0.1043	880.60	-1.60%
	1/2 Span 6	17.04	454.52	20+84.47	-9.33	20+75.14	880.477	15.00	-0.24000	880.24	-0.0684	-0.2900	-0.0443	-0.3343	880.27	-1.60%
	3/4 Span 6	17.04	471.56	21+01.51	-9.33	20+92.18	880.115	15.00	-0.24000	879.88	-0.0637	-0.2697	-0.0412	-0.3109	879.90	-1.60%
	CL Brg. FA	17.04	488.60	21+18.55	-9.33	21+09.22	879.743	15.00	-0.24000	879.50	0.0000	0.0000	0.0000	0.0000	879.50	-1.60%

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	1/28/2025

GEOMETRIC DATA									
CL Brg. Rear Abutment	16+29.95								
Skew	31.88	degrees	=	0.556	radians	Span Length		Splice Distance from Pier	
Beam Spacing	7.50	ft				Span 1	65.1771	F.S. 1	22.83
	0.00	ft				Span 2	92.0000	F.S. 2	29.58
Rt. Overhang	3.33	ft				Span 3	84.0000	F.S. 3	18.76
Lt. Overhang	3.333	ft				Span 4	84.0000	F.S. 4	27.42
Sidewalk Width	0.000	ft				Span 5	95.2500	F.S. 5	71.42
CL Beam to PG (Pos. Indicates Right of CL)	0.0	ft				Span 6	68.1771	F.S. 6	0.00
Right Cross Slope	-1.6%								

Girder ID

READ

Index

	1	2	3	4	5	6	7	8	9	10	11	12				
	Location	Spacing	Distance	PGL	Station	Actual Staton	PGL	Girder Offset		Finished	Beam DL	Deck DL	DC2 DL	10+11	Screed	
		ft	Along Girder	Station	Adjustment	ft	Elevation	from PG	Cross-Drop	Deck	Deflection	Deflection	Deflection	DL Deflection	Elevation	Cross-Slope
			ft	ft	ft	ft	ft	ft	ft	Elevation	in	in	in	in	(Including DL Deflection)	%
	CL Brg. RA		0.00	16+29.95	-11.40	16+18.55	886.113	18.33	-0.29333	885.82	0	0	0	0	885.82	-1.60%
	1/4 Span 1	16.29	16.29	16+46.24	-11.40	16+34.84	886.047	18.33	-0.29333	885.75	-0.0518	-0.2220	-0.0339	-0.2559	885.77	-1.60%
	1/2 Span 1	16.29	32.59	16+62.54	-11.40	16+51.14	885.970	18.33	-0.29333	885.68	-0.0564	-0.2394	-0.0366	-0.2760	885.70	-1.60%
	3/4 Span 1	16.29	48.88	16+78.83	-11.40	16+67.43	885.884	18.33	-0.29333	885.59	-0.0179	-0.0729	-0.0112	-0.0841	885.60	-1.60%
	CL Brg. Pier 1	16.29	65.18	16+95.13	-11.40	16+83.72	885.787	18.33	-0.29333	885.49	0.0000	0.0000	0.0000	0.0000	885.49	-1.60%
	F.S. 1	22.83	88.01	17+17.96	-11.40	17+06.56	885.635	18.33	-0.29333	885.34	-0.1191	-0.5223	-0.0797	-0.6020	885.39	-1.60%
	1/4 Span 2	0.17	88.18	17+18.13	-11.40	17+06.72	885.634	18.33	-0.29333	885.34	-0.1201	-0.5266	-0.0803	-0.6069	885.39	-1.60%
	1/2 Span 2	23.00	111.18	17+41.13	-11.40	17+29.72	885.461	18.33	-0.29333	885.17	-0.1967	-0.8570	-0.1306	-0.9876	885.25	-1.60%
	3/4 Span 2	23.00	134.18	17+64.13	-11.40	17+52.72	885.268	18.33	-0.29333	884.97	-0.1177	-0.5087	-0.0776	-0.5863	885.02	-1.60%
	CL Brg. Pier 2	23.00	157.18	17+87.13	-11.40	17+75.72	885.056	18.33	-0.29333	884.76	0.0000	0.0000	0.0000	0.0000	884.76	-1.60%
	1/4 Span 3	21.00	178.18	18+08.13	-11.40	17+96.72	884.844	18.33	-0.29333	884.55	-0.0433	-0.1916	-0.0293	-0.2210	884.57	-1.60%
	F.S. 2	8.58	186.76	18+16.71	-11.40	18+05.31	884.753	18.33	-0.29333	884.46	-0.0715	-0.3146	-0.0481	-0.3627	884.49	-1.60%
	1/2 Span 3	12.42	199.18	18+29.13	-11.40	18+17.72	884.616	18.33	-0.29333	884.32	-0.0927	-0.4056	-0.0619	-0.4676	884.36	-1.60%
	3/4 Span 3	21.00	220.18	18+50.13	-11.40	18+38.72	884.371	18.33	-0.29333	884.08	-0.0561	-0.2435	-0.0372	-0.2807	884.10	-1.60%
	CL Brg. Pier 3	21.00	241.18	18+71.13	-11.40	18+59.72	884.110	18.33	-0.29333	883.82	0.0000	0.0000	0.0000	0.0000	883.82	-1.60%
	F.S. 3	18.76	259.94	18+89.89	-11.40	18+78.48	883.863	18.33	-0.29333	883.57	-0.0464	-0.2010	-0.0307	-0.2317	883.59	-1.60%
	1/4 Span 4	2.24	262.18	18+92.13	-11.40	18+80.72	883.833	18.33	-0.29333	883.54	-0.0537	-0.2321	-0.0355	-0.2676	883.56	-1.60%
	1/2 Span 4	21.00	283.18	19+13.13	-11.40	19+01.72	883.539	18.33	-0.29333	883.25	-0.0890	-0.3818	-0.0583	-0.4401	883.28	-1.60%
	3/4 Span 4	21.00	304.18	19+34.13	-11.40	19+22.72	883.228	18.33	-0.29333	882.93	-0.0395	-0.1649	-0.0253	-0.1902	882.95	-1.60%
	CL Brg. Pier 4	21.00	325.18	19+55.13	-11.40	19+43.72	882.901	18.33	-0.29333	882.61	0.0000	0.0000	0.0000	0.0000	882.61	-1.60%
	1/4 Span 5	23.81	348.99	19+78.94	-11.40	19+67.54	882.509	18.33	-0.29333	882.22	-0.1362	-0.6013	-0.0917	-0.6930	882.27	-1.60%
	F.S. 4	3.60	352.59	19+82.54	-11.40	19+71.14	882.448	18.33	-0.29333	882.16	-0.1598	-0.7048	-0.1075	-0.8123	882.22	-1.60%
	1/2 Span 5	20.21	372.80	20+02.75	-11.40	19+91.35	882.097	18.33	-0.29333	881.80	-0.2277	-1.0009	-0.1525	-1.1534	881.90	-1.60%
	F.S. 5	23.79	396.59	20+26.54	-11.40	20+15.14	881.664	18.33	-0.29333	881.37	-0.1392	-0.6108	-0.0931	-0.7039	881.43	-1.60%
	3/4 Span 5	0.02	396.61	20+26.56	-11.40	20+15.16	881.663	18.33	-0.29333	881.37	-0.1391	-0.6102	-0.0930	-0.7032	881.43	-1.60%
	CL Brg. Pier 5	23.81	420.43	20+50.38	-11.40	20+38.97	881.209	18.33	-0.29333	880.92	0.0000	0.0000	0.0000	0.0000	880.92	-1.60%
	1/4 Span 6	17.04	437.47	20+67.42	-11.40	20+56.02	880.870	18.33	-0.29333	880.58	-0.0217	-0.0904	-0.0139	-0.1043	880.59	-1.60%
	1/2 Span 6	17.04	454.52	20+84.47	-11.40	20+73.06	880.520	18.33	-0.29333	880.23	-0.0684	-0.2900	-0.0443	-0.3343	880.25	-1.60%
	3/4 Span 6	17.04	471.56	21+01.51	-11.40	20+90.11	880.160	18.33	-0.29333	879.87	-0.0637	-0.2697	-0.0412	-0.3109	879.89	-1.60%
	CL Brg. FA	17.04	488.60	21+18.55	-11.40	21+07.15	879.789	18.33	-0.29333	879.50	0.0000	0.0000	0.0000	0.0000	879.50	-1.60%

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

Structure Depth - W 40x199

Deck	=	8.5	in
Fillet	=	2.13	in
Beam	=	38.7	in
Total	=	49.33	in
Total	=	4.11	ft

* Beam Section Properties from AISC Manual, 13th Edition

W 40x199	d =	38.7
	bf =	15.8

BEAM SEAT ELEVATIONS

		C.L. Brg RA				
		Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Beam Seat Elev.
BEAM	1	885.79	4.11	881.68	0.3249	881.23
BEAM	2	885.93	4.11	881.82	0.3249	881.37
BEAM	3	886.07	4.11	881.96	0.3249	881.51
BEAM	4	885.97	4.11	881.86	0.3249	881.41
BEAM	5	885.87	4.11	881.75	0.3249	881.30

		Pier No. 1				
		Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Beam Seat Elev.
BEAM	1	885.41	4.11	881.30	0.2728	880.90
BEAM	2	885.56	4.11	881.45	0.2728	881.05
BEAM	3	885.71	4.11	881.60	0.2728	881.21
BEAM	4	885.62	4.11	881.51	0.2728	881.12
BEAM	5	885.53	4.11	881.42	0.2728	881.03

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

Pier No. 2						
	Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Load Plate (ft)	Beam Seat Elev.
BEAM 1	884.61	4.11	880.50	0.2728	0.130	880.09
BEAM 2	884.78	4.11	880.66	0.2728	0.130	880.26
BEAM 3	884.94	4.11	880.83	0.2728	0.130	880.43
BEAM 4	884.87	4.11	880.76	0.2728	0.130	880.36
BEAM 5	884.80	4.11	880.68	0.2728	0.130	880.28

Pier No. 3						
	Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Load Plate (ft)	Beam Seat Elev.
BEAM 1	883.60	4.11	879.49	0.1578	0.135	879.19
BEAM 2	883.78	4.11	879.67	0.1578	0.135	879.38
BEAM 3	883.96	4.11	879.85	0.1578	0.135	879.56
BEAM 4	883.90	4.11	879.79	0.1578	0.135	879.50
BEAM 5	883.84	4.11	879.73	0.1578	0.135	879.44

Pier No. 4						
	Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Load Plate (ft)	Beam Seat Elev.
BEAM 1	882.32	4.11	878.21	0.2728	0.135	877.80
BEAM 2	882.52	4.11	878.41	0.2728	0.135	878.00
BEAM 3	882.72	4.11	878.61	0.2728	0.135	878.20
BEAM 4	882.67	4.11	878.56	0.2728	0.135	878.15
BEAM 5	882.63	4.11	878.52	0.2728	0.135	878.11

Pier No. 5						
	Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Load Plate (ft)	Beam Seat Elev.
BEAM 1	881.03	4.11	876.92	0.2728	0.141	876.50
BEAM 2	881.24	4.11	877.13	0.2728	0.141	876.71
BEAM 3	881.45	4.11	877.34	0.2728	0.141	876.92
BEAM 4	881.42	4.11	877.31	0.2728	0.141	876.89
BEAM 5	881.38	4.11	877.27	0.2728	0.141	876.86

CHIA

471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-6-2.06		
Description:	Deck Elevation		
Project No:	075926.000	PID:	112996
Calc By:	UL	Date:	02/06/24
Check By:	DOR	Date:	01/28/25

C.L. Brg FA						
	Top of Deck Elev. ft	Structure Depth ft	Bottom of Beam ft	Bearing Depth ft	Load Plate (ft)	Beam Seat Elev.
BEAM 1	879.47	4.11	875.36	0.3249	0.141	874.89
BEAM 2	879.69	4.11	875.58	0.3249	0.141	875.11
BEAM 3	879.91	4.11	875.80	0.3249	0.141	875.34
BEAM 4	879.89	4.11	875.78	0.3249	0.141	875.32
BEAM 5	879.88	4.11	875.76	0.3249	0.141	875.30

3.2 Vertical Clearance Check



Department of
Transportation





471 E Broad St, Suite 2010
Columbus, OH 43215
Phone: (614) 225-8868

Project:	LAK-06-2.06		
Description:	U.S. over I-271		
Project No:	075926.001		
Calc By:	CAE	Date:	05/16/24
Check By:	DOR	Date:	01/26/25

Vertical Clearance Check

Location of Minimum Vertical Clearance	=	19+80.91	along U.S. 6
Width of Flange	=	15.8 in	(W40x199)
Depth of Beam	=	38.7 in	(W40x199)
Haunch Thickness	=	2.1264 in	
Deck Thickness	=	8.5 in	
Thickness of Field Splice	=	1.5 in	(Plate Thick + Bolt Height)
Depth Below Deck Height	=	50.8264 in	(Beam+Haunch+Deck)

The field splice is not at that location, but it is conservative to show the additional depth, just in case.

Finished Beam Elevations from LAK-6_Geometry_Elevation Calculation_Autotable_UL.xlsx
Linear interpolation between the two points.

Beam 5	1/4 Span 5	Min Vert	1/2 Span 5
Station	1969.61	1980.91	1993.42
Top of Deck Elevation	882.23	882.04	881.82

Road Elevation at Lowest Point = 860.84 ft

Minimum Vertical Clearance Check = 16.962 ft (Top of Deck-Depth-Road Elev)