AASHTOWare BrDR 7.5.0

Truss Tutorial

T7 – Truss LRFD Net Area Deduction In LRFR Truss Rating Example

# **BrDR** Tutorial

This example discusses the truss Net deduction area use in LRFD 6.8.2 to compute the tensile capacity added to input the Net deduction area to be considered for a Load and Resistance Factor Rating (LRFR) rating of trusses.

## **Topics** Covered

- Truss command line input for LRFD Truss Net area deduction
- LRFR analysis

From the **Bridge Explorer** import the bridge given with this tutorial. The partially expanded **Bridge Workspace** tree is shown below.



### Truss command line input for LRFD Truss Net area deduction

Navigate to the TRUSSES node and double click on Truss 1 to open the Truss window as shown below.

l Iruss					-		×
Name: Truss 1	Link with:	None		$\sim$			
Description Gusset plates Specs Factors							
Default rating method: LFR $\checkmark$							
Truss "Left Truss" Unit Length ft Properties in DefaultSysUnitType US DefaultChardConnection Riveted MaterialType Steel = "1905 to 1936 Steel" MemberCrossSection ChannelBox = Section1 TopFlangePlate 22.0.0.5 Channels "C 15x33.9" Outward 13.125 Connection Riveted 1.0.0.0 Lacing Bottom ChannelBox = Section2 Channels "C 15x33.9" Outward 13.125 Connection Riveted 1.5.2.5 Channels "C 15x33.9" Outward 13.125 Connection Riveted 1.5.2.5 ChannelBox = Section3 LeftWebPlate 12.0.0.375 RightWebPlate 12.0.0.375 RightWebPlate 12.0.0.55 Line number: 1 View member cross section Verify							•
			OK	An	ply	Cano	el

A description of the command language and its syntax is available by opening the AASHTOWare BrDR Help for

the **Truss** window (F1) and accessing the file – **Truss Input Command Language** as shown below.



It is also available from the **Bridge Workspace** as shown below.

$ \leftarrow $	Bridge Workspace - T7 TrussTrainingExample
🚽 Print	Help Topics     Getting help using the software
<ul><li>Help</li><li>Close</li></ul>	Frequently Asked Questions Find questions that are frequently asked
	<b>Support</b> Find more information on technical support
	Engine
	Engine Help Engine Help Configuration
	AASHTO Metal Culvert LFR
	AASHTO Metal Culvert LRFR Truss Method of Solution
	AASHTO Timber ASR
	AASHTO Timber LRFR
	AASHTO Truss LFR
	AASHTO Truss LRFR
	Madero ASR Default Engine Help
	Set As Main Engine Help

This document describes all the input command used in defining a truss. Section 6.9 of the Truss Input Command Language manual provides the option to describe the cross section of the truss members. This option is available for all cross section types (rolled, built-up, channel box, angle box and non-detailed). Member cross section command has a set of sub commands specific to each cross section. Rolled, built-up, channel box and angle box section types provide an option to enter connection details as one of its sub commands. The detailed description of this sub command for a channel box section is shown below.

<u>Subcommand</u>	Connection <member_connection_type> <lfd_effective_area_deduction><lrfd_net_area_deduction‡></lrfd_net_area_deduction‡></lfd_effective_area_deduction></member_connection_type>
<u>Description</u>	<pre><member_connection_type> = Riveted   Bolted   Welded &lt; LFD_effective_area_deduction&gt; = Enter LFD effective area deduction. <lrfd_net_area_deduction> = Enter LRFD net area deduction.  Note: 1. Sub-command name and data entries are in the same line. 2. Sub-command is optional. 3. ‡ Indicates the data entry is optional.</lrfd_net_area_deduction></member_connection_type></pre>

Figure 1 - Connection Subcommand (from Truss Input Command Language)

The Connection sub command is an optional command. As shown in the Figure above, this sub command consists of two mandatory entries and one optional data entry. When the Connection sub command is used, the member connection type and LFD Effective area deduction are required to be entered. However, the LRFD Net area deduction is an optional data entry. As the name suggests, the LFD Effective area deduction is used while running an LFR analysis and similarly, the LRFD Net area deduction is used for an LRFR analysis. Some points to keep in mind with these area reduction entries are as follows:

- LRFD Net area deduction being an optional entry, when not entered the LFD Effective area deduction will be used during an LRFR analysis.
- When LRFD Net area deduction is entered, even if the entered value is 0.0, this value will be used during an LRFR analysis.

To illustrate the connection details, the following cross section definitions have been modified as shown below.

1. Section 1

The LFD Effective area deduction is set to 1.0 and LRFD Net area deduction is set to 0.0 (see image below).

<u> </u>			
me: Truss 1			
Description	Gusset plates	Specs Fa	ctors
Default ratin	g method: LFR		$\sim$
DefaultStru	ctSteel "1905 to 1936		
DefaultEndi Riveted MaterialTyp Steel = "19 MemberCro ChannelBoy TopFlangeP 22.0 0.5	Connection 05 to 1936 Steel" ossSection x = Section1 Plate	Steel"	
DefaultEndi Riveted MaterialTyp Steel = "19 MemberCro ChannelBoy TopFlangeP 22.0 0.5 Channels "C	Connection 05 to 1936 Steel" 05sSection x = Section1 Plate C 15x33.9" Outward 1 0 Riveted 1.0.00	13.125	

2. Section 2

The LFD Effective area deduction is set to 1.5 and LRFD Net area deduction is set to 2.5 (see image below).

me: Truss	1					Link with
Description	Gusset pl	lates	Specs	Facto	rs	
Default rati	ng method:	LFR			$\sim$	
Truss "Left	Truss"					
Length ft						
Properties	in					
DefaultSy:	UnitType US					
DefaultStr	uctSteel 190	J5 to 19	36 Steel"			
Detautten	Connection					
Riveted	dConnection					
Riveted MaterialTy	dConnection					
Riveted MaterialTy Steel = "1	pe 905 to 1936 s	Steel"				
Riveted MaterialTy Steel = "1 MemberC	dConnection pe 905 to 1936 S rossSection ax = Section1	Steel"				
Riveted MaterialTy Steel = "1 MemberC ChannelBe TopFlange	dConnection pe 905 to 1936 S rossSection x = Section1 Plate	Steel" 1				
Riveted MaterialTy Steel = "1 MemberC ChannelBe TopFlange 22.0 0.5	dConnection pe 905 to 1936 s rossSection xx = Section1 Plate	Steel" 1				
Riveted MaterialTy Steel = "1 MemberC ChannelBa TopFlange 22.0 0.5 Channels	dConnection pe 905 to 1936 S rossSection x = Section1 Plate 'C 15x33.9" (	Steel" 1 Outward	13.125			
Riveted MaterialTy Steel = "1 MemberC ChannelBe Z2.0 0.5 Channels Connectio	dConnection pe 905 to 1936 S rossSection xx = Section1 Plate 'C 15x33.9" ( n Riveted 0.0	Steel" 1 Outward )	13.125			
Riveted MaterialTy Steel = "1 MemberC ChannelBe 22.0 0.5 Channels Connectio Lacing Bo	dConnection pe 905 to 1936 s rossSection px = Section1 Plate 'C 15x33.9" ( n Riveted 0.0 ttom w = Section2	Steel" 1 Outward	13.125			
Riveted MaterialTy Steel = "1 MemberC ChannelB Z2.0 0.5 Channels Connectic Lacing Bo ChannelB ChannelS	dConnection pe 905 to 1936 s rossSection x = Section1 Plate 'C 15x33.9" ( n Riveted 0.0 tom x = Section2 (C 15x33.9")	Steel" 1 Outward ) 2 Outward	± 13.125			

3. Section 3

The LFD Effective area deduction is set to 3.0 and LRFD Net area deduction is not defined (see image below).

🕰 Truss	s
Name:	Truss 1
Desc	cription Gusset plates Specs Factors
Def	fault rating method: LFR 🗸 🗸
Cł	hannelBox = Section3
Le	eftWebPlate
Ri	ightWebPlate
12	2.0 0.375
Cl	hannels "C 15x40" Outward 13.125
Co	onnection Riveted 3.0
Land and	hannelBox = Section

## 4. Section 4

The LFD Effective area deduction is set to 0.0 and LRFD Net area deduction is not defined (see image below).



These cross section definitions are assigned to each member of this truss in the "Member" command as shown below.

ame: Truss 1			
Description Gusset	plates	Specs	Factors
Default rating method:	LFR		```
Member			
LOL1 L0 L1 Section2			
L1L2 L1 L2 Section2			
L2L3 L2 L3 Section3			
L3L4 L3 L4 Section3			
L4L5 L4 L5 Section4			
L5L6 L5 L6 Section4			
L6L7 L6 L7 Section3			
L7L8 L7 L8 Section3			
L8L9 L8 L9 Section2			
L9L10 L9 L10 Section	2		
LOU1 LO U1 Section1			
U1L2 U1 L2 Section6			
U3L2 U3 L2 Section6			
U3L4 U3 L4 Section7			
U5L4 U5 L4 Section8			
U5L6 U5 L6 Section8			
U7L6 U7 L6 Section7			
U7L8 U7 L8 Section6			
U9L8 U9 L8 Section6			
L10U9 L10 U9 Section	11		
U1L1 U1 L1 Section9			
U3L3 U3 L3 Section IC	)		
USLS US LS Section II			
Unio unio in Casting	1		
nara na ra zectiona	0		
112115 112 115 Section9			
115117 115 117 Section			
117110 117 110 Section			
Support			

In this example, the LRFD Net area deduction has been defined for Section1 and Section2. Members using these cross section definitions are shown below.



Members L2L3, L3L4, L6L7 and L7L8 use Section3 and members L4L5 and L5L6 use Section4. These sections have connection details defined as Riveted with the LFD Effective area deduction entered and LRFD Net area deduction not entered. (see image below).



# LRFR Analysis

Perform an LRFR rating on **Truss 1** using the analysis settings shown below.

Design review O Ra	ating		Rating meth	nod:	LRFR	~		
nalysis type: Lir ane / Impact loading type: As Vehicles Output Engir	ne Girder Requested ne Description	× ×	Apply prefe	rence setting	None	~		
Traffic direction: Both direct Vehicle selection	ions v		Ve	Refresh hicle summa	Temporary vehicles	Advanced	]	
<ul> <li>venicies</li> <li>Standard</li> <li>EV2</li> <li>EV3</li> <li>H 15-44</li> <li>H 20-44</li> <li>HL-93 (SI)</li> <li>HL-93 (SI)</li> <li>HS 15-44</li> <li>HS 20 (SI)</li> <li>HS 20 (SI)</li> <li>HS 20-44</li> <li>LRFD Fatigue Tru</li> <li>LRFD Fatigue Tru</li> <li>LRFD Fatigue Tru</li> <li>NRL</li> <li>SU4</li> <li>SU4</li> <li>SU5</li> <li>SU6</li> <li>SU7</li> <li>Type 3-3</li> <li>Type 3-3</li> <li>Type 3-3</li> <li>Type 3-3</li> <li>Type 3-3</li> <li>Type 3-3</li> <li></li></ul>	Load ck (SI) ck (US)		Add to >> Remove from <<	→ rating ven → LRFR → Des → Leg → Leg → Leg	ign load rating Inventory IHL-93 (US) Operating IHL-93 (US) Fatigue ILRED Fatigue Truck (US) al load rating Routine Specialized hauling mit load rating	)		

During the analysis, the Analysis window displays the ongoing analysis events, error messages (if any) and warning messages (if any). It is to be noted that during an LRFR analysis, for members whose cross section with connection details defined, LRFD Net area deduction not entered, and only the LFD Effective area deduction entered, a warning message is shown (see image below) to let users know that the LFD Effective area will be used instead.

Analysis	
Analysis - Truss 1	
Analysis Event       Image: Constraint of the second s	<ul> <li>Info - Axial compression built-up section phi used = 0.90! Initializing LRFR specification checking</li> <li>Building Spec Check Domain objects. Truss 1 - Stage 3</li> <li>Warning - L2L3 - LRFR net area deduction is not entered. LFR effective area deduction will be used for net area deduction! Warning - L3L4 - LRFR net area deduction! Warning - L4L5 - LRFR net area deduction! Warning - L4L5 - LRFR net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction is not entered. LFR effective area deduction will be used for net area deduction? Warning - L7L8 - LRFR net area deduction! Warning - L7L8 - LRFR net area deduction! Performing Specification Check.</li> </ul>
	S Errors 🛆 Warnings
	Type Description
	Warning - LRFR truss analysis does not support analysis v
	Warning - Vehicle LRFD Fatigue Truck (US) for fatigue cat
	Warning - L2L3 - LRFR net area deduction is not entered.
	Warning - 1314 - LRER net area deduction is not entered

### Specification Check Detail

When the Rating analysis is completed, specification check detail can be reviewed by selecting the **Truss 1** member in the **Bridge Workspace** tree and clicking the **Specification Check Detail** button from the **Results** group of the ribbon.



In the Specification check detail window, click on member L0L1 and from the list of specification articles for this member, double click on article 6.8.2 Tensile Resistance. The Net area deduction used for this member is 2.5  $in^2$  i.e., the LRFD Net area deduction entered for Section2.

```
📴 Spec Check Detail for 6.8.2 Tensile Resistance
 6 Steel Structures
 6.8 Tension Members
 6.8.2 Tensile Resistance
 (AASHTO LRFD Bridge Design Specifications, Ninth Edition)
 Steel Channel Box - Truss Member LOL1 (Section:Section2) - Start
                                                                        Stage 3
 BOX MEMBER
                                     b
                                               t
                                                       Fv
                                                                 Fu
  Element
                                    (in)
                                              (in)
                                                      (ksi)
                                                                (ksi)
           _____
                                                                ____
  Left Channel Flange 1 3.400
                                             0.650
                                                       30.0
                                                                60.0
  Left Channel Flange 2
                                    3.400
                                             0.650
                                                       30.0
                                                                60.0
  Left Channel Web
                                  12.140
                                             0.400
                                                       30.0
                                                                60.0
                                  3.400
  Right Channel Flange 1
                                             0.650
                                                       30.0
                                                                60.0
  Right Channel Flange 2
                                             0.650
                                                       30.0
                                                                60.0
  Right Channel Web
                                  12.140
                                             0.400
                                                       30.0
                                                                60.0
                                                       No
0.95
0.80
 Punched Holes
                                                   :
 Phiy
Phiu
                                                   =
                                                   =
                                                       1.00
 Rp
                                                   = 60.00 (ksi)
 Fu
 Fy
                                                       30.00 (ksi)
                                                   =
                                                      19.92 (in^2)
                                                   =
 Ag
 Net area deduction
                                                   = 2.50 (in^2)
= 17.42 (in^2)
 Net Area, An = Ag - Net area deduction
 Connected Element
                                                   = Channel Webs
 A_connected
U_table
U_min
                                                   = 10.96 (in^2)
                                                   = 0.7000
                                                                (Table 6.8.2.2-1 Case 7)
                                                       0.5502
                                                   =
                                                     0.7000
 U = max(U_table, U_min)
                                                   =
                                      -_{1}
         Phiy*Pny = Phiy*Fy*Ag
                                              (6.8.2.1-1)
 Pr = min| Phiu*Pnu = Phiu*Fu*An*Rp*U |
                                               (6.8.2.1-2)
        |_ Rr
                                      _1
                                               (6.13.4 - 1)
 Phiy*Pny = 567.72 (kip)
Phiu*Pnu = 585.31 (kip)
 Pr = 567.72 (kip)
 Load Combination Legend:
  Code
            Vehicle
 ____
         HL-93 (US) - Truck + Lane
HL-93 (US) - Tandem + Lane
     1
     2
```

Similarly, for member L0U1 using Section1, the Net area deduction value is  $0.0 in^2$  as this is the entered

LRFD Net area deduction value (see image below).

```
B Spec Check Detail for 6.8.2 Tensile Resistance
  6 Steel Structures
  6.8 Tension Members
  6.8.2 Tensile Resistance
   (AASHTO LRFD Bridge Design Specifications, Ninth Edition)
  Steel Channel Box - Truss Member LOU1 (Section:Section1) - Start Stage 3
  BOX MEMBER
                                                         b t Fy Fu
(in) (in) (ksi) (ksi)
   Element

        Left Channel Flange 1
        3.400
        0.650
        30.0
        60.0

        Left Channel Flange 2
        3.400
        0.650
        30.0
        60.0

        Left Channel Flange 2
        3.400
        0.650
        30.0
        60.0

        Right Channel Flange 1
        3.400
        0.650
        30.0
        60.0

        Right Channel Flange 1
        3.400
        0.650
        30.0
        60.0

        Right Channel Flange 2
        3.400
        0.650
        30.0
        60.0

        Right Channel Flange 2
        3.400
        0.650
        30.0
        60.0

        Right Channel Web
        12.140
        0.400
        30.0
        60.0

        Top Flange Pl
        22.000
        0.500
        30.0
        60.0

   _____
  Punched Holes
                                                                                        : No
                                                                                               0.95
  Phiv
                                                                                         =
                                                                                        = 0.80
  Phiu
  Rp
                                                                                              1.00
                                                                                        = 60.00 (ksi)
  Fu
  Fy
                                                                                        = 30.00 (ksi)
 Net area deduction= 30.92 (in^2)Net Area, An = Ag - Net area deduction= 0.00 (in^2)Connected Element= 30.92 (in^2)Connected I= Charge I
                                                                                        = 10.96 (in^2)
  A connected
  U_table
                                                                                        =
                                                                                              0.7000 (Table 6.8.2.2-1 Case 7)
  Umin
                                                                                        = 0.3545
  U = max(U_table, U_min)
                                                                                        = 0.7000
  | Phiy*Pny = Phiy*Fy*Ag | (6.8.2.1-1)

Pr = min| Phiu*Pnu = Phiu*Fu*An*Rp*U | (6.8.2.1-2)

| Rr | (6.13.4-1)
            |_ Rr
  Phiy*Pny = 881.22 (kip)
  Phiu*Pnu = 1038.91 (kip)
  Pr = 881.22 (kip)
  Load Combination Legend:
   Code Vehicle
   _____
       1 HL-93 (US) - Truck + Lane
2 HL-93 (US) - Tandem + Lane
       _____
```

Shown below are examples of members using Section3 and Section4, where the LRFD Net area deduction was not entered, resulting in applying the LFD Effective area deduction.

5 Steel Structures 5.8 Tension Members 5.8.2 Tensile Resistance (AASHTO LRFD Bridge Design S	pecifications	s, Ninth H	Edition)		1	6 Steel Structures 6.8 Tension Members 6.8.2 Tensile Resistance (AASHTO LRFD Bridge Design	1 Specifications	s, Ninth H	Edition)		
Steel Channel Box - Truss Me	mber L2L3 (Se	ection:Sec	ction3) -	Start Sta	3	Steel Channel Box - Truss	Member L4L5 (Se	ection:Sec	ction4) -	Start	Stage 3
BOX MEMBER	b (in)	t (in)	Fy (ksi)	Fu (ksi)	3	BOX MEMBER	b (in)	t (in)	Fy (ksi)	Fu (ksi)	
Left Channel Flange 1 Left Channel Flange 2 Left Channel Heb Right Channel Flange 1 Right Channel Flange 2 Right Channel Web Left Web Pl Left Web Pl	3.520 3.520 12.140 3.520 3.520 12.140 12.000 12.000	0.650 0.650 0.520 0.650 0.650 0.520 0.520 0.375 0.375	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	60.0 60.0 60.0 60.0 60.0 60.0 60.0 60.0		Left Channel Flange 1 Left Channel Flange 2 Left Channel Heb Right Channel Flange 1 Right Channel Flange 2 Right Channel Web Left Web Fl Right Web Fl	3.520 3.520 12.140 3.520 3.520 12.140 12.000 12.000	0.650 0.650 0.520 0.650 0.650 0.520 0.563 0.563	30.0 30.0 30.0 30.0 30.0 30.0 30.0 30.0	60.0 60.0 60.0 60.0 60.0 60.0 60.0 60.0	
unched Holes hiy biu g get area deduction et Area, An = Ag - Net area oonnected Itement connected _table min = max(U_table, U_min)	deduction		: No 0.95 0.80 1.00 0.00 30.00 32.60 29.60 Channe 23.25 0.700 0.713	(ksi) (ksi) (in^2) (in^2) 1 Webs (in^2) 0 (Table 6.8 1	2-1 Case 7)	Punched Holes Phiy Rpu Rpu Fu Fy Ag Net area deduction Net Area, An = Ag - Net a: Connected Element A_connected Element U_table U_table U_min U = max(U_table, U_min)	rea deduction		: No 0.95 0.80 1.00 60.00 37.10 0.00 37.10 Channe 27.75 0.700 0.747	(ksi) (ksi) (in^2) (in^2) 1 Webs (in^2) 1 Webs (in^2) 0 (Table 9	e 6.8.2.2-1 (
Phiy*Pny = Phiy*F 'r = min  Phiu*Pnu = Phiu*F  _ Rr Phiy*Pny = 929.10 (kip) Phiu*Pnu = 1013.21 (kip)	y*Ag   u*An*Rp*U   _	(6.8 (6.8 (6.1)	.2.1-1) .2.1-2) 3.4-1)		5	Phiy*Pny = Phiy Pr = min  Phiu*Pnu = Phiu  _ Rr Phiy*Pny = 1057.35 (kip) Phiu*Pny = 1331.90 (kip)	/*Fy*Ag    *Fu*An*Rp*U   _	(6.8 (6.8 (6.1)	.2.1-1) .2.1-2) 3.4-1)		

Section 3 - LFD Net area deduction = 3.0, Section 4 - LFD Effective area deduction = 0.0.

## **Engine Outputs**

After the analysis, the output files can be viewed by clicking the Engine Outputs button from the Results group of

the ribbon.



The Truss Member Section Property Report contains data related to the computed and user input truss member

section properties. (see image below).



The summary table displays the gross area (compression and tension) and Net area (tension) for each member. The Net area displayed is calculated based on the area deduction values entered in the connection details for each member. Highlighted below are some examples of the computed Net area deduction value.

#### 🕰 Truss Member Section Property Report

Member	Gross Area Comp. (in <sup>2</sup> )	Gross Area Tens. (in <sup>2</sup> )	Net Area Tens. (in <sup>2</sup> )	Izz (in <sup>4</sup> )	Cy (in)	Rz (in)	Iyy (in <sup>4</sup> )	Cz (in)	Ry (in)	Actual Length (ft)	Unbraced Length z (ft)	Unbraced Length y (ft)	Fy (ksi)	
L0L1	19.92	19.92	17.42	630.00	7.50	5.62	1092.24	6.56	7.40	11.00	11.00	11.00	30.00	Section2
L1L2	19.92	19.92	17.42	630.00	7.50	5.62	1092.24	6.56	7.40	11.00	11.00	11.00	30.00	LFD = 1.5 LRFD = 2.5
L2L3	32.60	32.60	29.60	806.00	7.50	<b>4.9</b> 7	1655.62	6.56	7.13	11.00	11.00	11.00	30.00	Section3
L3L4	32.60	32.60	29.60	806.00	7.50	<b>4.9</b> 7	1655.62	6.56	7.13	11.00	11.00	11.00	30.00	LFD = 3.0 LRFD = no entry
L4L5	37.10	37.10	37.10	860.00	7.50	4.81	1822.74	6.56	7.01	11.00	11.00	11.00	30.00	Section4
L5L6	37.10	37.10	37.10	860.00	7.50	4.81	1822.74	6.56	7.01	11.00	11.00	11.00	30.00	LFD = 0.0 LRFD = no entry
L6L7	32.60	32.60	29.60	806.00	7.50	4.97	1655.62	6.56	7.13	11.00	11.00	11.00	30.00	
L7L8	32.60	32.60	29.60	806.00	7.50	4.97	1655.62	6.56	7.13	11.00	11.00	11.00	30.00	]
L8L9	19.92	19.92	17.42	630.00	7.50	5.62	1092.24	6.56	7.40	11.00	11.00	11.00	30.00	
L9L10	19.92	19.92	17.42	630.00	7.50	5.62	1092.24	6.56	7.40	11.00	11.00	11.00	30.00	1
U1U3	19.10	19.10	19.10	533.00	6.06	5.28	174.00	0.00	3.02	22.20	22.20	22.20	30.00	1
U3U5	19.10	19.10	19.10	533.00	6.06	5.28	174.00	0.00	3.02	22.02	22.02	22.02	30.00	1
U5U7	19.10	19.10	19.10	533.00	6.06	5.28	174.00	0.00	3.02	22.02	22.02	22.02	30.00	1
U7U9	19.10	19.10	19.10	533.00	6.06	5.28	174.00	0.00	3.02	22.20	22.20	22.20	30.00	1
U1L1	19.10	19.10	19.10	533.00	6.06	5.28	174.00	0.00	3.02	11.00	11.00	11.00	30.00	1
U3L3	20.58	20.58	20.58	539.00	6.00	5.12	180.70	0.00	2.96	14.00	14.00	14.00	30.00	1
U5L5	22.35	22.35	22.35	560.20	6.00	5.01	187.50	0.00	2.90	15.00	15.00	15.00	30.00	1
U7L7	20.58	20.58	20.58	539.00	6.00	5.12	180.70	0.00	2.96	14.00	14.00	14.00	30.00	1
U9L9	19.10	19.10	19.10	533.00	6.06	5.28	174.00	0.00	3.02	11.00	11.00	11.00	30.00	1
L0U1	30.92	30.92	30.92	1055.87	10.26	5.84	1535.91	6.56	7.05	15.56	15.56	15.56	30.00	Section1
U1L2	16.18	16.18	16.18	432.50	6.00	5.17	84.30	0.00	2.28	15.56	15.56	15.56	30.00	LFD = 1.0 LRFD = 0.0
U3L2	16.18	16.18	16.18	432.50	6.00	5.17	84.30	0.00	2.28	17.80	17.80	17.80	30.00	1
U3L4	9.99	9.99	9.99	238.10	6.01	4.88	21.00	0.00	1.45	17.80	17.80	17.80	30.00	1
U5L4	11.80	11.80	11.80	310.00	5.97	5.13	44.10	0.00	1.93	18.60	18.60	18.60	30.00	1
U5L6	11.80	11.80	11.80	310.00	5.97	5.13	44.10	0.00	1.93	18.60	18.60	18.60	30.00	1
U7L6	9.99	9.99	9.99	238.10	6.01	4.88	21.00	0.00	1.45	17.80	17.80	17.80	30.00	
U7L8	16.18	16.18	16.18	432.50	6.00	5.17	84.30	0.00	2.28	17.80	17.80	17.80	30.00	]
U9L8	16.18	16.18	16.18	432.50	6.00	5.17	84.30	0.00	2.28	15.56	15.56	15.56	30.00	]
L10U9	30.92	30.92	30.92	1055.87	10.26	5.84	1535.91	6.56	7.05	15.56	15.56	15.56	30.00	