GIVEN:

					First	Roof
Number of Floors:	2	**Number of Bays/Row:**	3	**Number of Rows:**	2	3

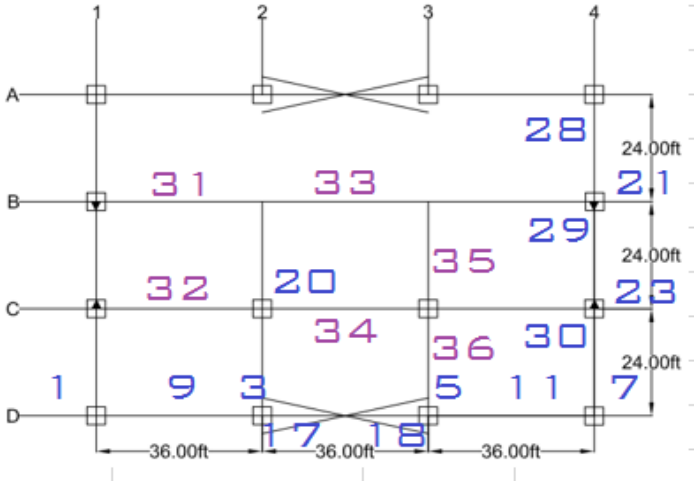


Figure 1 - First Floor Plan

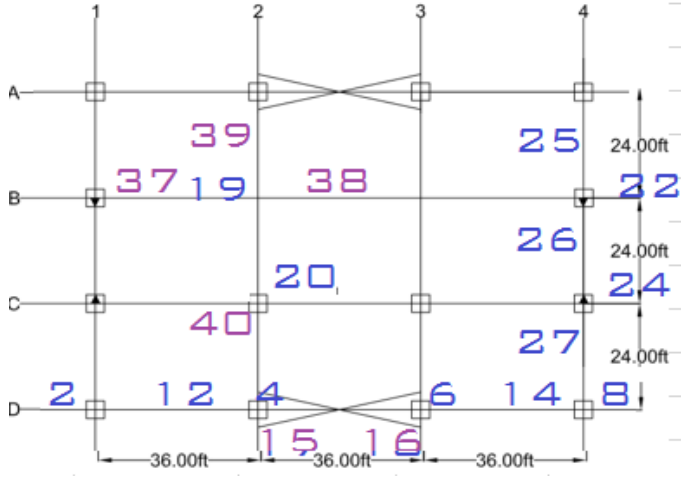


Figure 2 - Roof Floor Plan

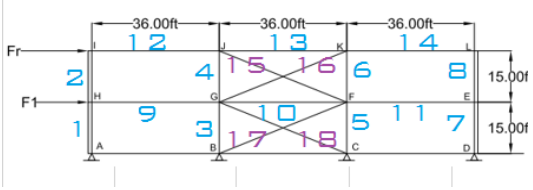


Figure 3 - Braced-Elevation

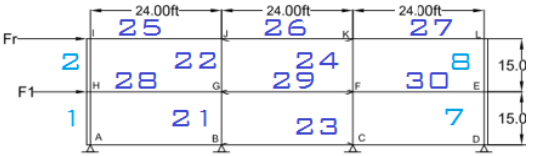


Figure 4 - Moment Frame - Elevation

Member Ref.	**Frame**	**Floor**	**Member**	**Section**	**Length**	**Unit Weight**	**Spacing O.C.**	**Qty of Members**	**Amount of Steel**	DCR Moment	DCR Shear	**Type of Support**	**Load Condition**
(#)	*(type)*	*(Units)*		*(Shape)*	*(ft)*	*(plf)*	*(ft)*	*(Units)*	*(kips)*	*(ratio)*	*(ratio)*		
1	Braced	First	Column	W8X40	15	40	12	2.00	1.20			Simply	Uniform
2	Braced	Roof	Column	W8X40	15	40		0.00	0.00			Simply	Uniform
3	Braced	First	Column	W8X40	15	40		3.00	1.80			Simply	Uniform
4	Braced	Roof	Column	W8X40	15	40		2.00	1.20			Simply	Uniform
5	Braced	First	Column	W8X40	15	40		2.00	1.20			Moment	Uniform
6	Braced	Roof	Column	W8X40	15	40		0.00	1.20			Simply	Uniform
7	Moment	First	Column	W8X40	15	40		0.00	2.40			Simply	Uniform

8	Moment	Roof	Column	W8X40	15	40	0.00	0.77	Simply	2-Point
9	Braced	First	Girder	W21X55	36	55	0.00	1.68	Simply	Uniform
10	Braced	First	Interior Girder	W21X55	36	55	0.00	1.54	Simply	Uniform
11	Braced	First	Beam	W21X55	36	55	0.00	2.11	Simply	Uniform
12	Braced	Roof	Girder	W14X34	36	34	0.00	4.22	Simply	Uniform
13	Braced	Roof	Interior Girder	W14X34	36	34	0.00	2.11	Simply	Uniform
14	Braced	Roof	Girder	W14X34	36	34	0.00	#N/A	Simply	Uniform
15	Braced	Roof	Braces	WT9X48.5	39	48.5	0.00	#N/A	Simply	2-Point
16	Braced	Roof	Braces	WT9X48.5	39	48.5	0.00	#N/A	Moment	Uniform
17	Braced	‡Design!D4‚	Braces	WT9X48.5	39	48.5	0.00	#N/A	Simply	Uniform
18	Braced	First	Braces	WT9X48.5	39	48.5	0.00	3.36	Simply	2-Point
19	Interior	Roof	Roof Column	0	15	55	0.00	1.68	Simply	Uniform
20	Interior	First	Interior Column	0	30	55	0.00	#N/A	Simply	Uniform
21	Moment	First	Column	W8X40	15	40	0.00	#N/A	Simply	Axial
22	Moment	Roof	Column	W8X40	15	40	0.00	#N/A	Simply	Uniform
23	Moment	First	Column	W8X40	15	40	2.00	#N/A	Simply	Uniform
24	Moment	Roof	Column	W8X40	15	40	4.00	#N/A	0	0.00
25	Moment	Roof	Beam	W12X16	24	16	2.00	0.00	0	0.00
26	Moment	Roof	Interior Beam	W18X35	24	35	2.00	0.00	0	0.00
27	Moment	Roof	Beam	W12X16	24	16	4.00	0.00	0	0.00
28	Moment	First	Beam	W14X22	24	22	4.00	0.00	0	0.00
29	Moment	First	Interior Beam	W21X44	24	44	4.00	0.00	0	0.00
30	Moment	First	Beam	W14X22	24	22	4.00	0.00	0	0.00
31	Interior	First	Girder		36		24.00	0.00	0	0.00
32	Interior	First	Girder	0	36		6.00	0.00	0	0.00
33	Interior	First	Interior Girder		36		2.00	0.00	0	0.00
34	Interior	First	Interior Girder	0	36		4.00	0.00	0	0.00
35	Interior	First	Beam	W18X35	24	35	4.00	0.00	0	0.00
36	Interior	First	Beam	W18X35	24	35	2.00	0.00	0	0.00
37	Interior	Roof	Girder		36		2.00	0.00	0	0.00
38	Interior	Roof	Interior Girder	0	36		2.00	0.00	0	0.00
39	Interior	Roof	Beam	W12X19	48		2.00	0.00	0	0.00
40	Interior	Roof	Beam	W12X19	24		2.00	0.00	0	0.00

TOTAL	#N/A

GIVEN:

Number of Floors: 2

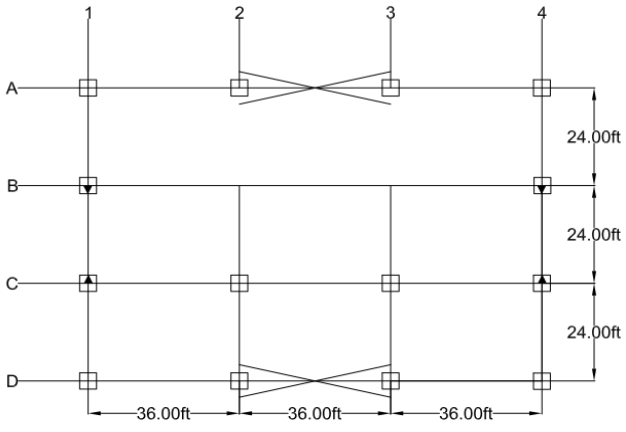


Figure 1 - First Floor Plan

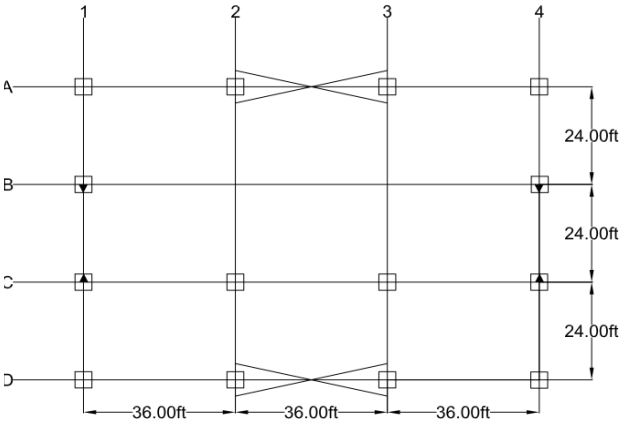


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Beams running parallel to moment frame for both levels

					Reference: Section	Excel *Eq/Fig/Table/Notes*	
1. FIRST FLOOR					Information		
Member Ref:		36			*From Summary Sheet*		
Frame:		Interior					
Floor:		First					
Beam Length	L =	24	ft		*Project Information*		
Beam Spacing	s =	8	ft	O.C.	*Enter chosen spacing for beams*		
Support Condition		Simply					
Load Condition		Uniform			*AISC 14th*	Table	3-23
Case		1			*AISC 14th*	Table	3-24

Loads:

Dead Load	DL =	128	psf	*Project Loads*
Steel Selected	w =	35	psf	*Project Loads*
Total Dead Load	TDL =	163	psf	*Per Beam Selection Below*
Live Load	LL =	100	psf	
Snow Load	S =	0.0	psf	
Wind Load	W =	0.0	psf	
Seismic Load	E =	0.0	psf	

LRFD:	**1st Floor**	
1. 1.4D	228.2	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	355.6	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5W	295.6	psf

4. 1.2D + 1.0W + L + .5(Lr or S or R)	195.6	psf
5. 1.2D + 1.0E + L + .2S	295.6	psf
6. 0.9D + 1.0W	146.7	psf
7. 0.9D + 1.0E	146.7	psf

Controlling Load: 355.6 psf
Equivalent Linear Load: 2844.8 plf *Given spacing chosen above*

Demand Values:
Ultimate Moment, M_u = **204.8** kip.ft *Given load and support conditions above*
Ultimate Shear, V_u = **34.1** kip *Given load and support conditions above*

Beam Selection, **W:** **W18X35**
ϕM_n **249.0** kip.ft AISC Table 3-2
ϕV_n **159.0** kip AISC Table 3-2
Beam Depth: d **17.7** in

Design Check: $\phi M_n > M_u$? **YES**
$\phi V_n > V_u$? **YES**
Depth Clearance: **OK**

DCR **Moment** 0.82 OK *Demand Capacity Ratio*
Shear 0.21 OK

MOMENT FRAME

CASE 1: GIRDER CD/AB ALONG COLUMN LINES 1 AND 4

Number of Floors: 2

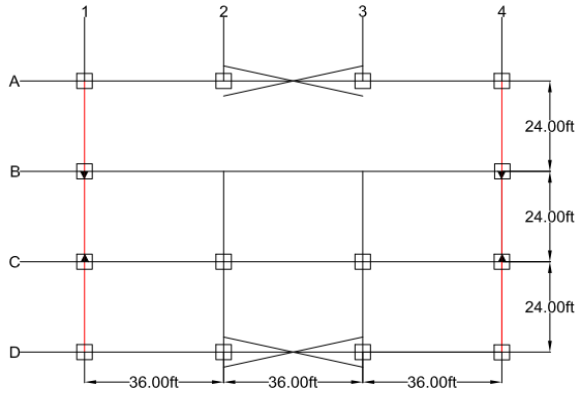


Figure 1 - First Floor Plan

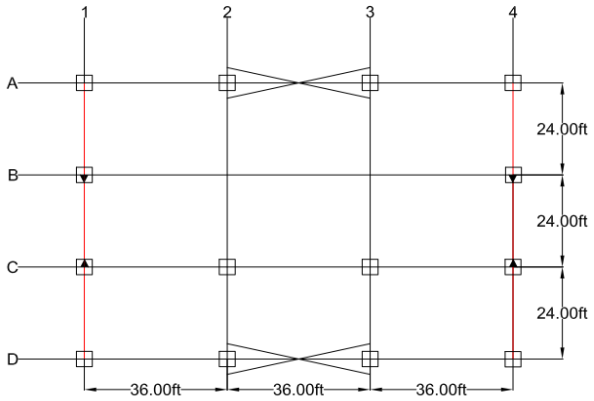


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Section
5/25

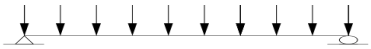


Figure 3 - Girder Loads Level 1 and Roof

				Reference:	Excel	
				Section	*Eq/Fig/Table/Notes*	
1. FIRST FLOOR				Information		
Member Ref:		28		*From Summary Sheet*		
Frame:		Moment				
Floor:		First				
Beam Length	L =	24	ft	*Project Information*		
Distance a	a =	0	ft	*AISC 14th*	Table	3-23
Support Condition		Simply				
Load Condition		Uniform		*AISC 14th*	Table	3-23
Case		1		*AISC 14th*	Table	3-24
Beam Tributary Area	A	288	ft^2	*Enter chosen spacing for beams*		
Loads:						
Dead Load	DL =	128	psf	*Project Loads*		
Steel Selected	w =	22	psf			
Total Dead Load	TDL =	150	psf			
Live Load	LL =	100	psf			
Snow Load	S =	0.0	psf			
Wind Load	W =	0.0	psf			
Seismic Load	E =	0.0	psf			

LRFD:	**1st Floor**	
1. 1.4D	210.0	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	340.0	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5W	280.0	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	180.0	psf
5. 1.2D + 1.0E + L + .2S	280.0	psf
6. 0.9D + 1.0W	135.0	psf
7. 0.9D + 1.0E	135.0	psf

Controlling Load:		340.0	psf	*Given spacing chosen above*		
Equivalent Linear 1/2 Load:		1360	plf			
Demand Values:						
Ultimate Moment,	M_u =	**97.9**	kip.ft	*Given load condition specified above*		
Ultimate Shear,	V_u =	**16.3**	kip	*Given load condition specified above*		
Beam Selection,	**W:**	**W14X22**				
	ϕM_n	**125.0**	kip.ft	AISC	Table	3-2
	ϕV_n	**94.5**	kip	AISC	Table	3-2
Beam Depth:	d	**13.7**	in			

Design Check:	$\phi M_n > M_u$?	**YES**
	$\phi V_n > V_u$?	**YES**
Depth Clearance:		**OK**

DCR	**Moment**	0.78	OK	*Demand Capacity Ratio*
	Shear	0.17	OK	

CASE 2: BRACED GIRDER BC ALONG COLUMN LINES 1 AND 4

Number of Floors: 2

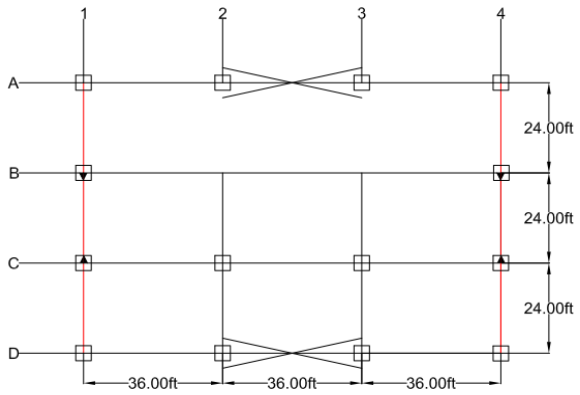


Figure 1 - First Floor Plan

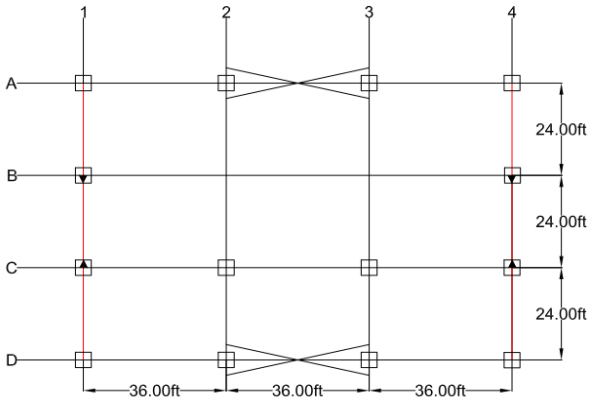


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

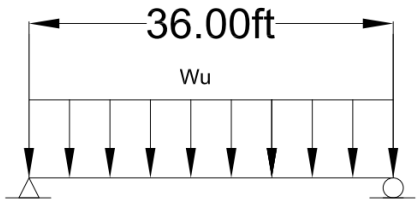


Figure 3 - Girder Loads Level 1 and Roof

				Reference:	Excel
				Section	*Eq/Fig/Table/Notes*
1. FIRST FLOOR				Information	
Member Ref:		29		*From Summary Sheet*	
Frame:		Moment			
Floor:		First			
Beam Length	L =	24	ft	*Project Information*	
Distance a	a =	8	ft	*AISC 14th*	Table 3-23
Support Condition		Simply			
Load Condition		Uniform		*AISC 14th*	Table 3-23
Case		1		*AISC 14th*	Table 3-24

Beam Tributary Area	A	288	ft^2	*Enter chosen spacing for beams*

Loads:

Dead Load	DL =	128	psf	*Project Loads*
Steel Selected	w =	44	psf	
Total Dead Load	TDL =	172	psf	
Live Load	LL =	100	psf	*Project Loads*
Snow Load	S =	31.5	psf	*Project Loads*
Wind Load	W =	-23.5	psf	*Project Loads*
Seismic Load	E =		psf	

End Moments per Load:

Dead Load	M_{DL} =	99.1	kip.ft	
Live Load	M_{LL} =	57.6	kip.ft	
Snow Load	M_{SNOW} =	18.1	kip.ft	
Wind Load	M_{WIND} =	146.8	kip.ft	*From Moment Frame-Wind Calculations*
Seismic Load	$M_{seismic}$ =	125.3	kip.ft	*From Moment Frame-Seismic Calculations*

LRFD:	**1st Floor**	
1. 1.4D	138.7	kip.ft
2. 1.2D + 1.6L + .5(Lr or S or R)	220.1	kip.ft
3. 1.2D + 1.6(Lr or S or R) + (L or .5V	221.3	kip.ft
4. 1.2D + 1.0W + L + .5(Lr or S or R)	274.7	kip.ft
5. 1.2D + 1.0E + L + .2S	305.4	kip.ft
6. 0.9D + 1.0W	235.9	kip.ft
7. 0.9D + 1.0E	214.4	kip.ft

Controlling Moment:		**305.4**	kip.ft	
Ultimate Shear,	V_u =	**50.9**	kip	*Given load and support conditions above*

Beam Selection,	**W:**	**W21X44**				
	ϕM_n	**358.0**	kip.ft	AISC	Table	3-2
	ϕV_n	**217.0**	kip	AISC	Table	3-2
Beam Depth:	d	**20.7**	in			

Design Check:	$\phi M_n > M_u$?	**YES**	
	$\phi V_n > V_u$?	**YES**	
Depth Clearance:		**OK**	

DCR	**Moment**	0.85	OK	*Demand Capacity Ratio*
	Shear	0.23	OK	

MOMENT-FRAME EDGE COLUMNS SOUTH SIDE:

Number of Floors:	2

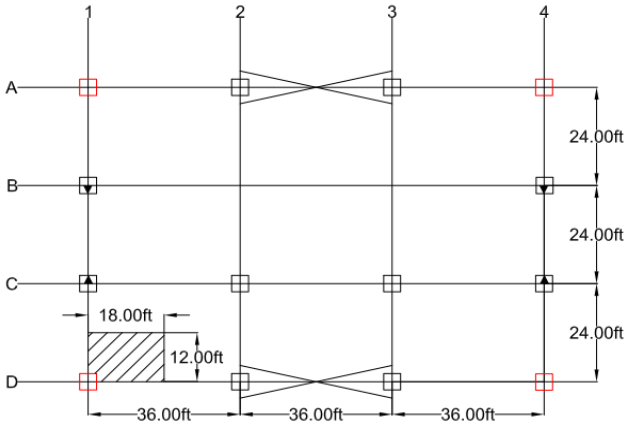


Figure 1 - First Floor Plan

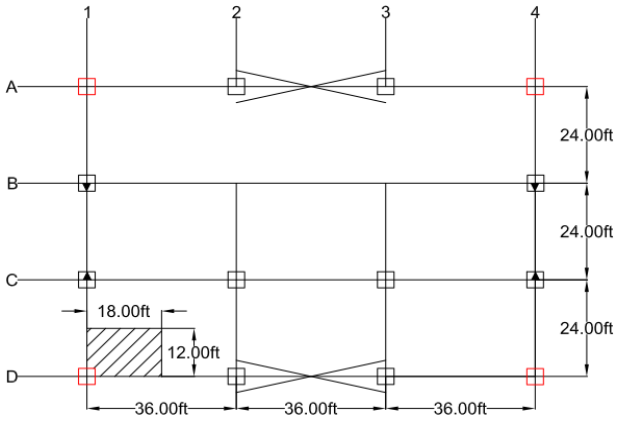


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Cummulative loads control design
South Side controls design for symmetrical frame design

				Reference: Section Information		Excel /Fig/Table/Not
1. FIRST FLOOR						
Member Ref:		7		19 *From Summary Sheet*		
Frame:		Moment				
Floor:		First				
Beam Length	L =	15	ft	*Project Information*		
Distance a	a =	0	ft	*AISC 14th*	Table	3-23
Support Condition		Simply				
Load Condition		Uniform		*AISC 14th*	Table	3-23
Case		1		*AISC 14th*	Table	3-24
Tributary Area	A =	216	ft^2	*Per figure 1 and 2*		

Loads:

Dead Load	DL =	154	psf
Live Load	LL =	120	psf
Snow Load	S =	31.5	psf
Wind Load	W =	-23.5	psf
Seismic Load	E =		psf

LRFD:	**1st Floor**	
1. 1.4D	215.6	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	392.6	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5W)	355.2	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	177.1	psf
5. 1.2D + 1.0E + L + .2S	311.1	psf
6. 0.9D + 1.0W	115.1	psf

7. 0.9D + 1.0E		138.6	psf			
Controlling Load:		392.6	psf			
Control:	P_u	84.8	kip			
Buckling Analysis:						
	K =	1		AISC 14th	Table	C-A-7.1
	KL =	15	ft			
	KL/r =	60	ft	*Assumed*		
	ϕF_{cr} =	34.6	ksi	AISC 14th	Table	4-22
Demand Value:	A_{reqd} =	2.45	in^2			
Beam Selection, **W:**		**W8X40**				
	r_y =	2.04	in^3			
	A =	11.7	in^2			
	KL/r =	88.24				
	ϕF_{cr} =	25.2	ksi	AISC 14th	Table	4-22
	ϕP_n =	294.84	kips			
Design Check:	$\phi P_n > P_u$?	**YES**				
DCR **Compressive**		0.29	OK	*Demand Capacity Ratio*		

MOMENT-FRAME INTERIOR COLUMNS WEST/EAST SIDE:

Number of Floors: 2

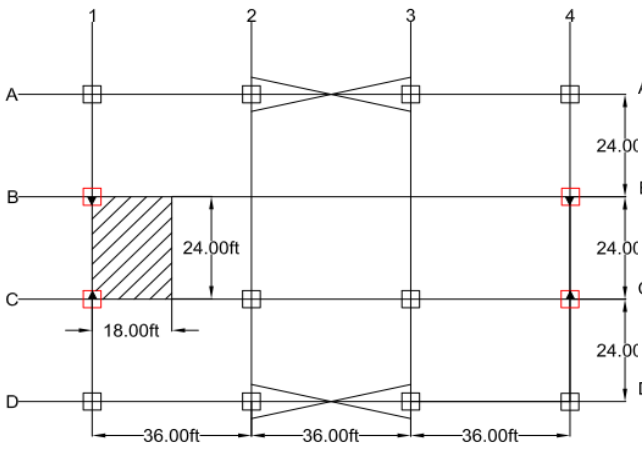


Figure 1 - First Floor Plan

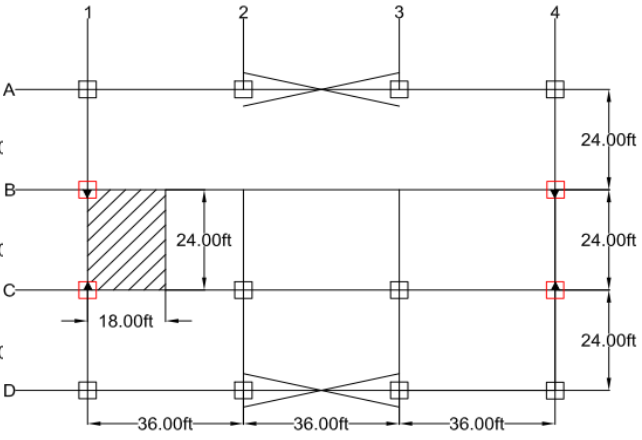


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Cummulative loads control design
South Side controls design for symmetrical frame design

				Reference: Section Information		
1. FIRST FLOOR					Excel /Fig/Table/Not	
Member Ref:		23		19 *From Summary Sheet*		
Frame:		Moment				
Floor:		First				
Beam Length	L =	15	ft	*Project Information*		
Distance a	a =	0	ft	*AISC 14th*	Table	3-23
Support Condition		Simply				
Load Condition		Uniform		*AISC 14th*	Table	3-23
Case		1		*AISC 14th*	Table	3-24
Tributary Area	A =	432	ft^2	*Per figure 1 and 2*		
Loads:						
Dead Load	DL =	154	psf			
Live Load	LL =	120	psf			
Snow Load	S =	31.5	psf			
Wind Load	W =	-23.5	psf			
Seismic Load	E =		psf			
LRFD:		**1st Floor**				
1. 1.4D		215.6	psf			
2. 1.2D + 1.6L + .5(Lr or S or R)		392.6	psf			
3. 1.2D + 1.6(Lr or S or R) + (L or .5W)		355.2	psf			
4. 1.2D + 1.0W + L + .5(Lr or S or R)		177.1	psf			
5. 1.2D + 1.0E + L + .2S		311.1	psf			
6. 0.9D + 1.0W		115.1	psf			
7. 0.9D + 1.0E		138.6	psf			
Controlling Load:		392.6	psf			
Control:	**P_u**	169.6	kip			
Buckling Analysis:						
	K =	1		AISC 14th	Table	C-A-7.1
	KL =	15	ft			
	KL/r =	60	ft	*Assumed*		
	ϕF_{cr} =	34.6	ksi	AISC 14th	Table	4-22
Demand Value:	A_{reqd} =	4.90	in^2			
Beam Selection, **W:**		**W8X40**				
	r_y =	2.04	in^3			
	A =	11.7	in^2			
	KL/r =	88.24				
	ϕF_{cr} =	25.2	ksi	AISC 14th	Table	4-22
	ϕP_n =	294.84	kips			
Design Check:	$\phi P_n > P_u$?	**YES**				

DCR	**Compressive**	0.58	OK	*Demand Capacity Ratio*

BRACED FRAME

GIVEN:

Number of Floors: 2

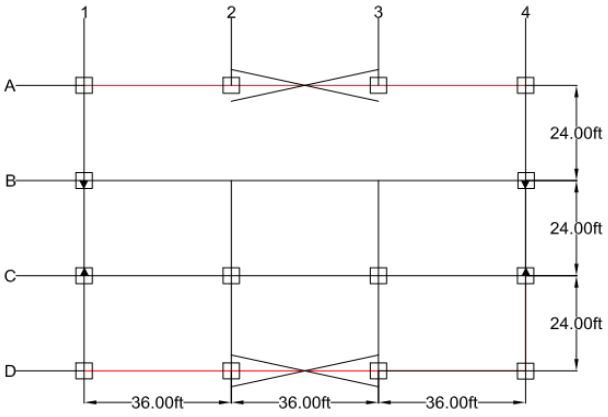


Figure 1 - First Floor Plan

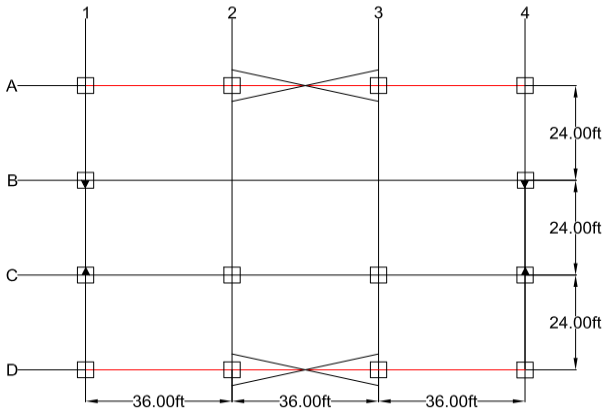


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

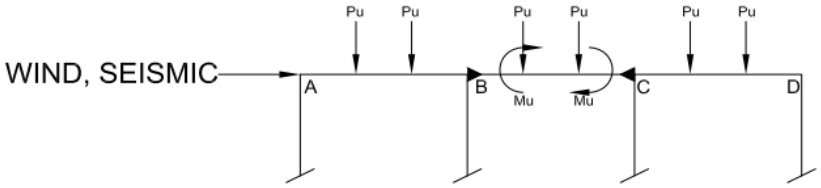


Figure 3 - Girder Loads Level 1 and Roof

					Reference:	Excel	
					Section	*Eq/Fig/Table/Notes*	
1. FIRST FLOOR					Information		
Member Ref:		9		8	*From Summary Sheet*		
Frame:		Braced					
Floor:		First					
Beam Length	L =	36	ft		*Project Information*		
Distance a	a =	12	ft		*AISC 14th*	Table	3-23
Support Condition		Simply					
Load Condition		2-Point			*AISC 14th*	Table	3-23
Case		9			*AISC 14th*	Table	3-24
Beam Tributary Area	A	432	ft^2		*Enter chosen spacing for beams*		
Loads:							
Dead Load	DL =	128	psf		*Project Loads*		

Steel Selected	w =	55	psf	*Project Loads*
Total Dead Load	TDL =	183	psf	*Per Beam Selection Below*
Live Load	LL =	100	psf	
Snow Load	S =	0.0	psf	
Wind Load	W =	0.0	psf	
Seismic Load	E =	0.0	psf	

LRFD:	**1st Floor**	
1. 1.4D	256.2	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	379.6	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5V	319.6	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	219.6	psf
5. 1.2D + 1.0E + L + .2S	319.6	psf
6. 0.9D + 1.0W	164.7	psf
7. 0.9D + 1.0E	164.7	psf

Controlling Load:		379.6	psf	
Equivalent Linear Load:		3.04	klf	*Given spacing chosen above*
Half Point Load:		36.44	kip	

Ultimate Moment,	M_u =	**437.3**	kip.ft	*Given uniform distribued factored load*
Ultimate Shear,	V_u =	**36.4**	kip	*Given uniform distribued factored load*

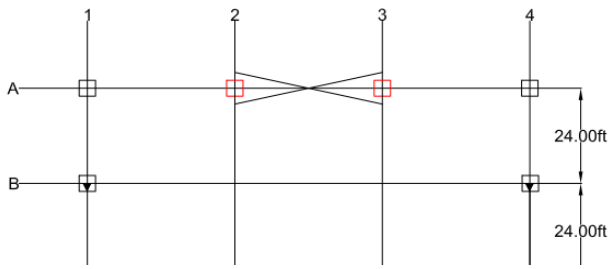
Beam Selection,	**W:**	**W21X55**				
	ϕM_n	**473.0**	kip.ft	AISC	Table	3-2
	ϕV_n	**234.0**	kip	AISC	Table	3-2
Beam Depth:	d	**20.8**	in			

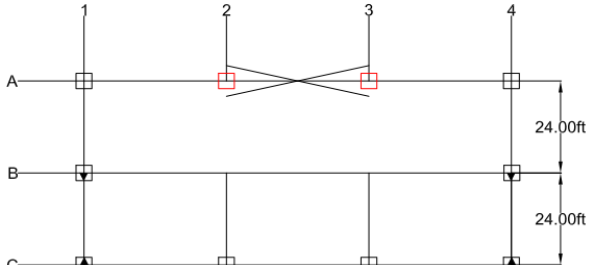
Design Check:	$\phi M_n > M_u$?	**YES**	
	$\phi V_n > V_u$?	**YES**	
Depth Clearance:		**OK**	

DCR	**Moment**	0.92	OK	*Demand Capacity Ratio*
	Shear	0.16	OK	

BRACED-FRAME INTERIOR COLUMN SOUTH SIDE:

Number of Floors: 2





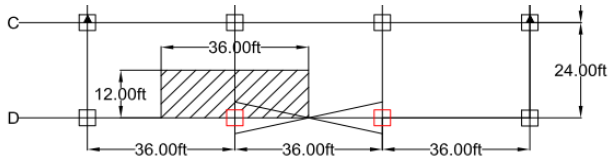


Figure 1 - First Floor Plan

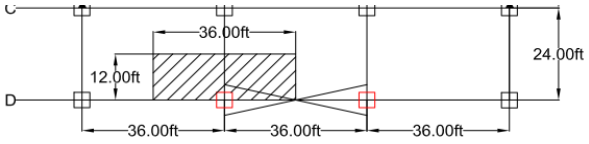


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Cummulative loads control design
South Side controls design for symmetrical frame design

					Reference: Section Information		Excel */Fig/Table/Not*
1. FIRST FLOOR							
Member Ref:		3		19	*From Summary Sheet*		
Frame:		Braced					
Floor:		First					
Member Length	L =	15	ft		*Project Information*		
Distance a	a =	5	ft		*AISC 14th*	Table	3-23
Support Condition		Simply					
Load Condition		Uniform			*AISC 14th*	Table	3-23
Case		1			*AISC 14th*	Table	3-24
Tributary Area	A =	432	ft^2		*Per figure 1 and 2*		

Loads:

Dead Load	DL =	154	psf
Live Load	LL =	120	psf
Snow Load	S =	31.5	psf
Wind Load	W =	-23.5	psf
Seismic Load	E =		psf

LRFD:	**1st Floor**	
1. 1.4D	215.6	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	392.6	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5W)	355.2	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	177.1	psf
5. 1.2D + 1.0E + L + .2S	311.1	psf
6. 0.9D + 1.0W	115.1	psf
7. 0.9D + 1.0E	138.6	psf

Controlling Load:		392.6	psf
Control:	P_u	169.6	kip

Buckling Analysis:

	K =	1			AISC 14th	Table	C-A-7.1
	KL =	15	ft				

	KL/r =	60	ft	*Assumed*		
	ϕF_{cr} =	34.6	ksi	AISC 14th	Table	4-22
Demand Value:	A_{reqd} =	4.90	in^2			
Beam Selection, **W:**		**W8X40**				
	r_y =	2.04	in^3			
	A =	11.7	in^2			
	KL/r =	88.24				
	ϕF_{cr} =	25.2	ksi	AISC 14th	Table	4-22
	ϕP_n =	294.84	kips			
Design Check:	$\phi P_n > P_{u?}$	**YES**				
DCR **Compressive**	0.58	OK		*Demand Capacity Ratio*		

BRACED-FRAME EDGE COLUMNS SOUTH SIDE:

Number of Floors: 2

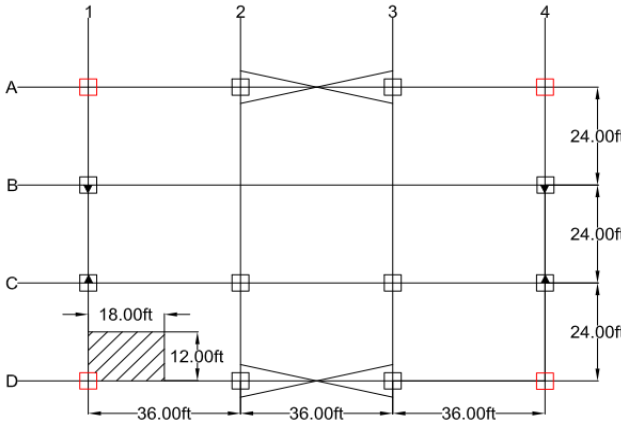


Figure 1 - First Floor Plan

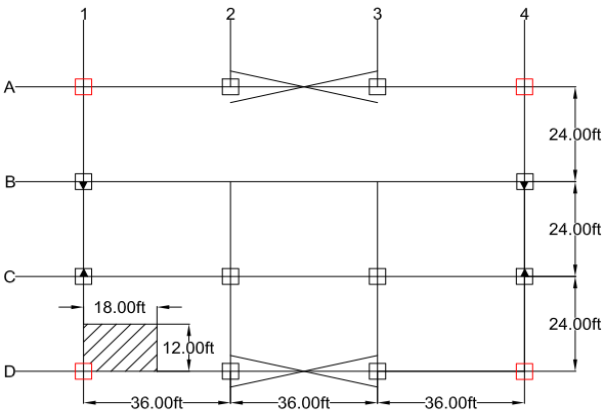


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Cummulative loads control design
South Side controls design for symmetrical frame design

				Reference:	Excel
				Section	*/Fig/Table/Not*
1. FIRST FLOOR				Information	
Member Ref:		1		19 *From Summary Sheet*	
Frame:		Braced			
Floor:		First			
Beam Length	L =	15	ft	*Project Information*	
Distance a	a =	12	ft	*AISC 14th*	Table 3-23

Support Condition		Simply				
Load Condition		Uniform		*AISC 14th*	Table	3-23
Case		1		*AISC 14th*	Table	3-24
Tributary Area	A =	216	ft^2	*Per figure 1 and 2*		

Loads:

Dead Load	DL =	154	psf
Live Load	LL =	120	psf
Snow Load	S =	31.5	psf
Wind Load	W =	-23.5	psf
Seismic Load	E =		psf

LRFD:	**1st Floor**	
1. 1.4D	215.6	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	392.6	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5W)	355.2	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	177.1	psf
5. 1.2D + 1.0E + L + .2S	311.1	psf
6. 0.9D + 1.0W	115.1	psf
7. 0.9D + 1.0E	138.6	psf

Controlling Load:		392.6	psf			
Control:	**P_u**	84.8	kip			

Buckling Analysis:

	K =	1		AISC 14th	Table	C-A-7.1
	KL =	15	ft			
	KL/r =	60	ft	*Assumed*		
	ϕF_{cr} =	34.6	ksi	AISC 14th	Table	4-22
Demand Value:	A_{reqd} =	2.45	in^2			

Beam Selection,	**W:**	**W8X40**				
	r_y =	2.04	in^3			
	A =	11.7	in^2			
	KL/r =	88.24				
	ϕF_{cr} =	25.2	ksi	AISC 14th	Table	4-22
	ϕP_n =	294.84	kips			

Design Check:	$\phi P_n > P_u$?	**YES**		
DCR	**Compressive**	0.29	OK	*Demand Capacity Ratio*

GIVEN:

Number of Floors: 2

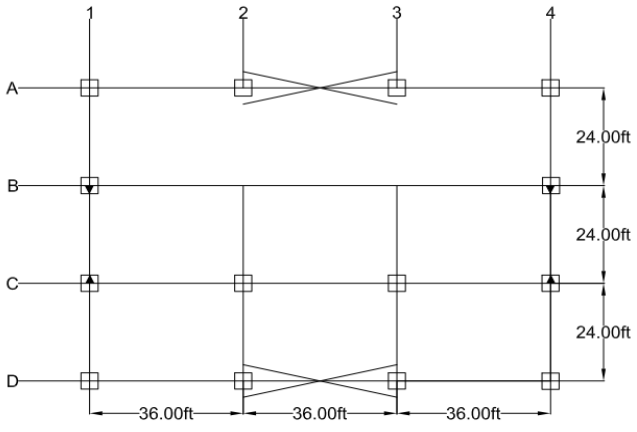


Figure 1 - First Floor Plan

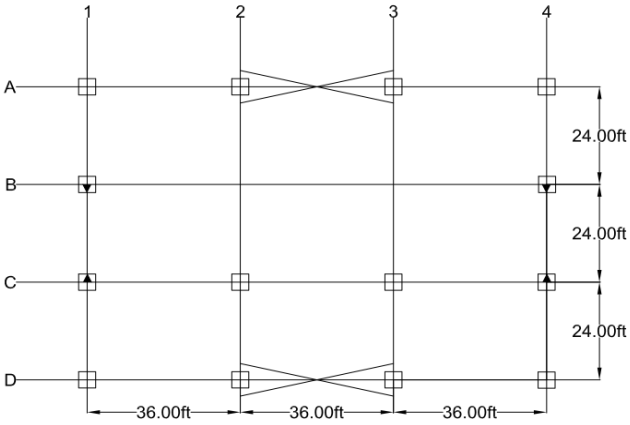


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

Beams running parallel to moment frame for both levels

					Reference: Section Information	Excel *Eq/Fig/Table/Notes*	
2. ROOF							
Member Ref:		40			*From Summary Sheet*		
Frame:		Interior					
Floor:		Roof					
Beam Length	L =	24	ft		*Project Information*		
Beam Spacing	s =	0	ft	O.C.	*Enter chosen spacing for beams*		
Support Condition		Simply					
Load Condition		Uniform			*AISC 14th*	Table	3-23
Case		1			*AISC 14th*	Table	3-24
Loads:							
Dead Load	DL =	26	psf		*Project Loads*		
Steel Selected	w =	19	psf		*Project Loads*		
Total Dead Load	TDL =	45	psf		*Per Beam Selection Below*		
Live Load	LL =	20	psf		*Project Loads*		
Snow Load	S =	31.5	psf		*Project Loads*		
Wind Load	W =	-23.0	psf		*Project Loads*		
Seismic Load	E =	0.0	psf				

LRFD:	**1st Floor**	
1. 1.4D	63.0	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	101.8	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5V	124.4	psf

4. 1.2D + 1.0W + L + .5(Lr or S or R)	46.8	psf
5. 1.2D + 1.0E + L + .2S	80.3	psf
6. 0.9D + 1.0W	17.5	psf
7. 0.9D + 1.0E	40.5	psf

Controlling Load: 124.4 psf
Equivalent Linear Load: 0.0 plf *Given spacing chosen above*

Demand Values:
Ultimate Moment, M_u = **0.0** kip.ft *Given uniform distribued factored load*
Ultimate Shear, V_u = **0.0** kip.ft *Given uniform distribued factored load*

3-2

Beam Selection, **W:** **W12X19** 3-2

ϕM_n	**92.6**	kip.ft	AISC	Table
ϕV_n	**86.0**	kip	AISC	Table
Beam Depth: d	**12.2**	in		

Design Check: $\phi M_n > M_u$? **YES**
$\phi V_n > V_u$? **YES**
Depth Clearance: **OK**

DCR	**Moment**	0.00	OK	*Demand Capacity Ratio*
	Shear	0.00	OK	

MOMENT FRAME

CASE 1: GIRDER CD/AB ALONG COLUMN LINES 1 AND 4

Number of Floors: 2

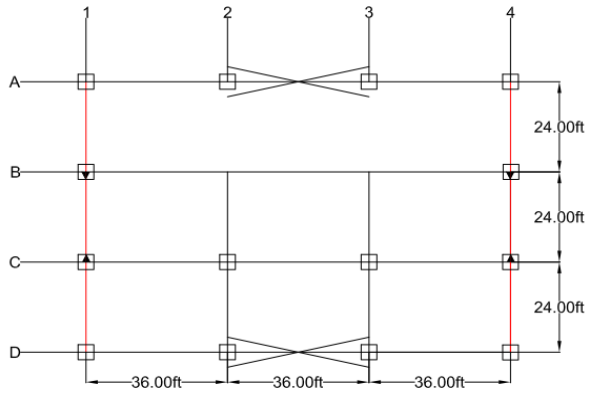


Figure 1 - First Floor Plan

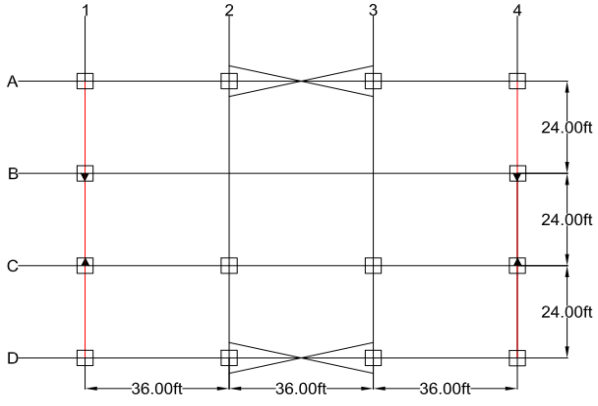


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

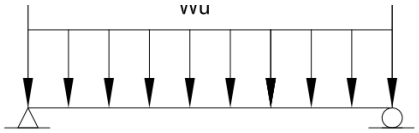


Figure 3 - Girder Loads Level 1 and Roof

				Reference:	Excel	
				Section	*Eq/Fig/Table/Notes*	
1. FIRST FLOOR				Information		
Member Ref:		27		*From Summary Sheet*		
Frame:		Moment				
Floor:		Roof				
Beam Length	L =	24	ft	*Project Information*		
Distance a	a =	8	ft	*AISC 14th*	Table	3-23
Support Condition		Simply				
Load Condition		Uniform		*AISC 14th*	Table	3-23
Case		1		*AISC 14th*	Table	3-24
Beam Tributary Area	A	288	ft^2	*Enter chosen spacing for beams*		
Loads:						
Dead Load	DL =	26	psf	*Project Loads*		
Steel Selected	w =	16	psf			
Total Dead Load	TDL =	42	psf			
Live Load	LL =	20	psf			
Snow Load	S =	31.5	psf			
Wind Load	W =	-23.0	psf			
Seismic Load	E =	0.0	psf			

LRFD:	**1st Floor**	
1. 1.4D	58.8	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	98.2	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5V	120.8	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	43.2	psf
5. 1.2D + 1.0E + L + .2S	76.7	psf
6. 0.9D + 1.0W	14.8	psf
7. 0.9D + 1.0E	37.8	psf

Controlling Load:		120.8	psf	*Given spacing chosen above*		
Equivalent Linear 1/2 Load:		483.2	plf			
Demand Values:						
Ultimate Moment,	M_u =	**34.8**	kip.ft	*Given load condition specified above*		
Ultimate Shear,	V_u =	**5.8**	kip	*Given load condition specified above*		
Beam Selection,	**W:**	**W12X16**				
	ϕM_n	**75.4**	kip.ft	AISC	Table	3-2
	ϕV_n	**79.2**	kip	AISC	Table	3-2
Beam Depth:	d	**12.0**	in			

Design Check:	$\phi M_n > M_u$?	**YES**
	$\phi V_n > V_u$?	**YES**
Depth Clearance:		**OK**

DCR	**Moment**	0.46	OK	*Demand Capacity Ratio*
	Shear	0.07	OK	

CASE 2: BRACED GIRDER BC ALONG COLUMN LINES 1 AND 4

Number of Floors: 2

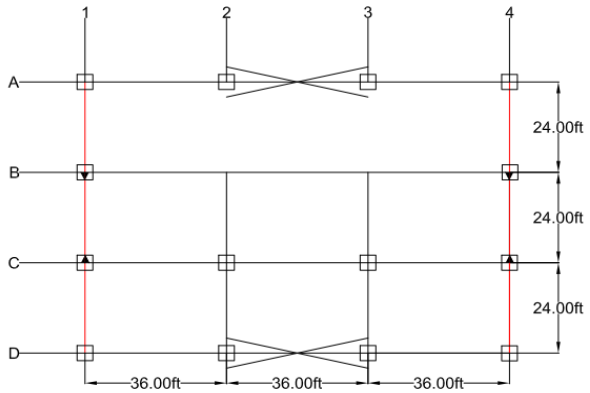


Figure 1 - First Floor Plan

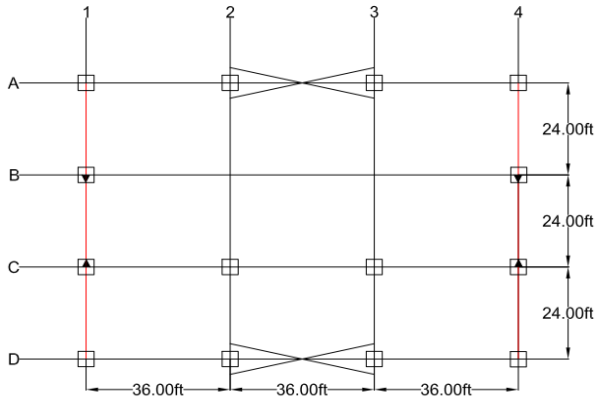


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

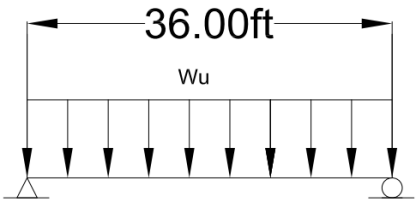


Figure 3 - Girder Loads Level 1 and Roof

				Reference:	Excel	
				Section		*Eq/Fig/Table/Notes*
1. FIRST FLOOR				Information		
Member Ref:		26		*From Summary Sheet*		
Frame:		Moment				
Floor:		Roof				
Beam Length	L =	24	ft	*Project Information*		
Distance a	a =	8	ft	*AISC 14th*	Table	3-23
Support Condition		Simply				
Load Condition		Uniform		*AISC 14th*	Table	3-23

Case		1		*AISC 14th*	Table	3-24
Beam Tributary Area	A	288	ft^2	*Enter chosen spacing for beams*		

Loads:

Dead Load	DL =	26	psf	*Project Loads*
Steel Selected	w =	35	psf	
Total Dead Load	TDL =	61	psf	
Live Load	LL =	20	psf	*Project Loads*
Snow Load	S =	31.5	psf	*Project Loads*
Wind Load	W =	-23.0	psf	*Project Loads*
Seismic Load	E =		psf	

End Moments per Load:

Dead Load	M_{DL} =	35.1	kip.ft	
Live Load	M_{LL} =	11.5	kip.ft	
Snow Load	M_{SNOW} =	18.1	kip.ft	
Wind Load	M_{WIND} =	146.8	kip.ft	*From Moment Frame-Wind Calculations*
Seismic Load	$M_{seismic}$ =	125.3	kip.ft	*From Moment Frame-Seismic Calculations*

LRFD:	**1st Floor**	
1. 1.4D	49.2	kip.ft
2. 1.2D + 1.6L + .5(Lr or S or R)	69.7	kip.ft
3. 1.2D + 1.6(Lr or S or R) + (L or .5V	144.6	kip.ft
4. 1.2D + 1.0W + L + .5(Lr or S or R)	198.0	kip.ft
5. 1.2D + 1.0E + L + .2S	182.6	kip.ft
6. 0.9D + 1.0W	178.4	kip.ft
7. 0.9D + 1.0E	156.9	kip.ft

Controlling Moment:		**198.0**	kip.ft			
Ultimate Shear,	V_u =	**33.0**	kip	*Given load and support conditions above*		
Beam Selection,	**W:**	**W18X35**				
	ϕM_n	**249.0**	kip.ft	AISC	Table	3-2
	ϕV_n	**159.0**	kip	AISC	Table	3-2
Beam Depth:	d	**17.7**	in			

Design Check:	$\phi M_n > M_u$?	**YES**		
	$\phi V_n > V_u$?	**YES**		
Depth Clearance:		**OK**		

DCR	**Moment**	0.80	OK	*Demand Capacity Ratio*
	Shear	0.21	OK	

BRACED FRAME

GIVEN:

Number of Floors: 2

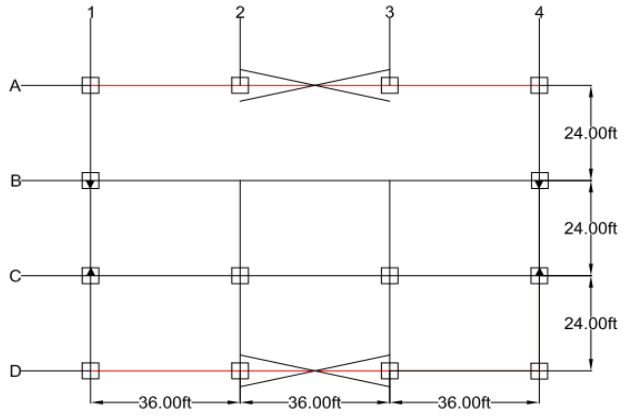


Figure 1 - First Floor Plan

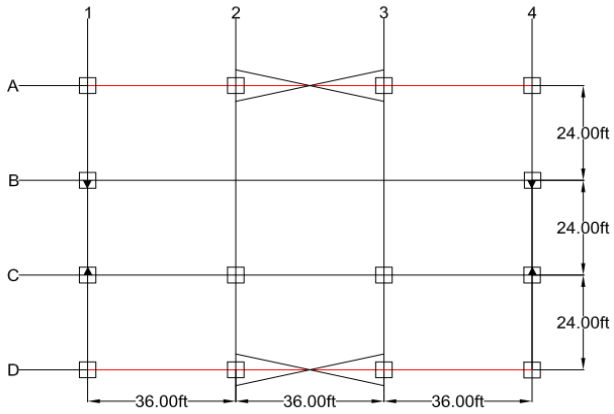


Figure 2 - Roof Floor Plan

ASSUMPTIONS:

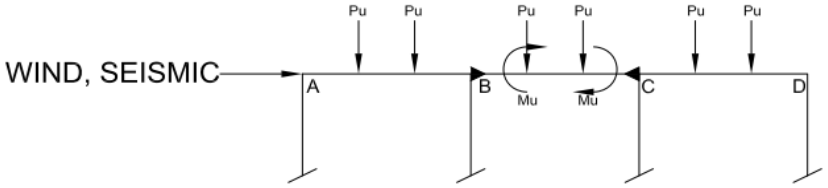


Figure 3 - Girder Loads Level 1 and Roof

				Reference:	Excel	
				Section	*Eq/Fig/Table/Notes*	
1. FIRST FLOOR				Information		
Member Ref:		13		8 *From Summary Sheet*		
Frame:		Braced				
Floor:		Roof				
Beam Length	L =	36	ft	*Project Information*		
Distance a	a =	12	ft	*AISC 14th*	Table	3-23
Support Condition		Simply				
Load Condition		2-Point		*AISC 14th*	Table	3-23
Case		9		*AISC 14th*	Table	3-24
Beam Tributary Area	A	432	ft^2	*Enter chosen spacing for beams*		
Loads:						
Dead Load	DL =	26	psf	*Project Loads*		
Steel Selected	w =	34	psf	*Project Loads*		
Total Dead Load	TDL =	60	psf	*Per Beam Selection Below*		
Live Load	LL =	20	psf			
Snow Load	S =	31.5	psf			
Wind Load	W =	-23.0	psf			
Seismic Load	E =	0.0	psf			

LRFD:	**1st Floor**	
1. 1.4D	84.0	psf
2. 1.2D + 1.6L + .5(Lr or S or R)	119.8	psf
3. 1.2D + 1.6(Lr or S or R) + (L or .5V	142.4	psf
4. 1.2D + 1.0W + L + .5(Lr or S or R)	64.8	psf
5. 1.2D + 1.0E + L + .2S	98.3	psf
6. 0.9D + 1.0W	31.0	psf
7. 0.9D + 1.0E	54.0	psf

Controlling Load:	142.4	psf	
Equivalent Linear Load:	1.14	klf	*Given spacing chosen above*
Half Point Load:	13.67	kip	

Ultimate Moment,	M_u =	**164.0**	kip.ft	*Given uniform distribued factored load*
Ultimate Shear,	V_u =	**13.7**	kip	*Given uniform distribued factored load*

Beam Selection,	**W:**	**W14X34**				
	ϕM_n	**205.0**	kip.ft	AISC	Table	3-2
	ϕV_n	**120.0**	kip	AISC	Table	3-2
Beam Depth:	d	**14.0**	in			

Design Check:	$\phi M_n > M_u$?	**YES**	
	$\phi V_n > V_u$?	**YES**	
Depth Clearance:		**OK**	

DCR	**Moment**	0.80	OK	*Demand Capacity Ratio*
	Shear	0.11	OK	

INTERIOR COLUMNS:

Number of Floors: 2

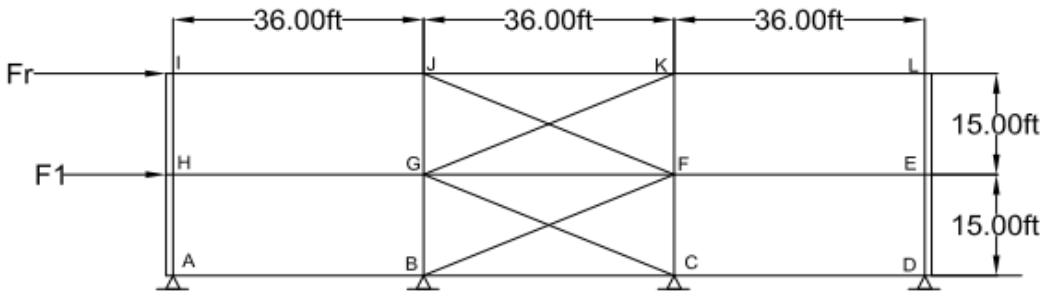


Figure 1 - Braced-Frame Elevation

ASSUMPTIONS:

2. LOADS

				Reference: Section Information	Excel *Eq/Fig/Table/Notes*	
Column Length	L =	15	ft	*Project Information*		
Beam Length	L_{beam} =	36	ft			
Bracing Length	L_{brace} =	39	ft			
Support Condition		Pinned Both Ends				
Load Condition		Case 9		*AISC 14th*	Table	3-23
Member Condition		Compression				

2. LOADS

Floor	Member	Wind Load	Seismic Load		Reference: Section Information	Excel *Eq/Fig/Table/Notes*
Roof	GK (C/T)	4.00	0.40	kip	*Project Information*	
Roof	FJ (C)	14.4	4.27	kip		
Level 1	BF (T)	15.60	11.50	kip		
Level 1	CG (C)	15.60	11.50	kip		

Controlling Load: 15.6 kip

Buckling Analysis:

K =	1		AISC 14th	Table	C-A-7.1
KL =	39	ft			
KL/r =	80	ft	*Assumed*		
ϕF_{cr} =	28.2	ksi	AISC 14th	Table	4-22

Demand Value:	A_{reqd} =	0.55	in^2			
Beam Selection,	**WT:**	**WT9X48.5**				
	r_y =	2.65	in^3			
	A =	14.3	in^2			
	KL/r =	176.60	in^{-2}			
	ϕF_{cr} =	6.75	ksi	AISC 14th	Table	4-22
	ϕP_n =	96.53	kips			
Design Check:	$\phi P_n > P_u$?	**YES**				