CANNONDESIGN

SUBMITTAL IDENTIFICATION SHEET

To be completed by Contractor/CM

WEBSTER UNIVERSITY ISB
PROJECT NAME

8274 BIG BEND BLVD
ADDRESS

NUMBER

WEBSTER UNIVERSITY
OWNER

CANNON DESIGN
ARCHITECT / ENGINEER

DEVIN D GATES
SUBMITTED BY

057100-009
CONTRACTOR / CM SUBMITTAL NO.

CANNON DESIGN SUBMITTAL NO.

DRAWING / DETAIL REFERENCE

057100
SPECIFICATION SECTION / PARAGRAPH

MANUFACTURER / SUPPLIER

ITEM / PRODUCT ID

REQUIRED DATE

PRIORITY

◯ CRITICAL

ITEM BEING SUBMITTED (check only one)

- ◯ Shop Drawings
- ◯ Samples (_____ copies)
- ◯ LEED Submittal
- ◯ Certification / Qualifications
- ◯ Record Documents
- ◯ Product Data
- ◯ Coordination Drawing
- ◉ Calculations
- ◯ Schedules
- ◯ O&M Manuals
- ◯ Other _____

ITEM BEING SUBMITTED FOR (check only one)

◉ Action ◯ Information Only ◯ Record

REMARKS OR DEVIATIONS

CONTRACTOR / CM CERTIFICATION
(SUBMITTALS NOT CERTIFIED WILL BE RETURNED WITHOUT REVIEW)

PARIC

PARIC CORPORATION
SUBMITTAL STAMP

THIS SHOP DRAWING HAS BEEN REVIEWED BY PARIC CORPORATION

Subcontractor remains responsible for dimensions, quantities, coordination with other trades and compliance with contract documents.

By:
Devin D. Gates

DEVIN D GATES
REVIEWED BY

1/16/16
DATE

To be completed by Reviewer

05 7100-009
CANNON DESIGN SUBMITTAL NUMBER

1/16/17
RECEIVED DATE

- ◯ A. No Exceptions Taken
  No further review of submittal is required.
- ◯ B. Make Corrections Noted
  Incorporate corrections in work; resubmission is not required.
- ◯ C. Revise and Resubmit
  Revise as noted, and resubmit for review.
- ◯ D. Rejected
  Submittal is not in compliance with Contract Documents; provide new submittal.
- ◯ E. For Record / Information Only
  Submittal was reviewed for Record / Information purposes only.
- ◯ F. Not Required for Review
  Submittal is not required by Contract Documents and has not been reviewed.

Review is for conformance with the design concept of this project and for general compliance with contract documents. Contractor is responsible for quantities, dimensions and compliance with contract documents and for information that pertains to fabrication processes, construction techniques and coordination of this work with all trades which will be affected thereby. This review is null and void if submittal deviates from contract documents and does not indicate or note deviations.

A/E COMMENTS ◯ See attached sheet(s) for additional comments

SHOP DRAWING / SUBMITTAL REVIEW

- ☐ NO EXCEPTION TAKEN
- ☒ EXCEPTIONS NOTED, ~~RESUBMITTAL NOT REQUIRED~~ SUBMIT RECORD COPY
- ☐ REJECTED
- ☒ REVIEWED FOR INFORMATION ONLY
- ☐ REVISE AND RESUBMIT AS NOTED

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Dimensions which shall be confirmed and correlated at the job site, fabrication processes and techniques of the construction, coordination of his work with that of all other trades and the satisfactory performance of his work.

DAVID MASON & ASSOCIATES, INC.

REVIEW BY: JYW DATE: 01.03.2017

VERIFY WEIGHT OF TERRAZZO TOPPING AND TREADS/RISERS ARE INCLUDED AS PART DESIGN LOADS.

JILL WALKER / DMA
REVIEWED BY

02.03.2017
DATE

LaSalle Iron Works, Inc.
Steel Fabricators
3110 LaSalle Street 314-771-5350 fax 314-771-5352 St. Louis, MO 63104

To: Atlas Iron Works

Date: December 19, 2016

Attn: Guy Don Carlos

Contract #27072
Job: Webster U ISB

Subject: Stair 1 Submittal

Sheet #	No. of Prints	For	Description
E100 – E102	pdf	Review & Approval	Erection
100 – 106	pdf	Review & Approval	Details
	pdf	Review	Signed and sealed Calculations
D1	pdf	Review & Approval	Load & Deflection Criteria

Remarks: Please note and respond to all questions and verifies. Failure to respond will delay fabrication.

NOTE: Present details for A103 (2), A104 (1), & A102 (2) limit the deflection to l/360. To decrease the center point deflection to 3/8",
ADD: $8,305.00.

NOTE: Rail suppliers, verify the supports meet their code requirements for loading. Our engineering applies only to dead loads!

DMA - please verify both items!

LaSalle Iron Works

By: Jim Randant

Structural Engineering Calculations

Project:

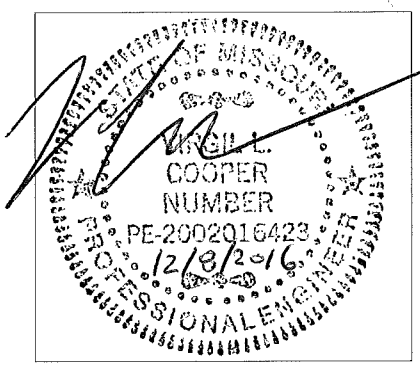
Interdisciplinary Science Building
Webster University, St. Louis, Missouri

Stair #1

Prepared By:

ASDG, LLC
1009 Lincoln Highway
Fairview Heights, IL 62208
Ph: 618.628.0887 Fx: 618.628.0889

ASDG Project Number: 16103.01
Date: December 6, 2016



V. Lee Cooper

JOB NO. 16103.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLC DATE 12/6/2016 SHEET NO.

- STAIR #1 DESIGN CRITERIA ;

DEAD LOADS ;

PLATE STAIRS ;

3/16" PLATE TREADS/RISERS	15	PSF
MISC	10	PSF
	25	PSF

LANDINGS ;

2 1/2" CONC ON 1 1/2	40	PSF
x 22 GA COMP DECK		
MISC	10	PSF
	50	PSF

GLASS RAIL DL = 85 PLF

LIVE LOADS ; 100 PSF UNIFORM

300 # CONCENTRATED ON 4" x 4" AREA

MAX MEMBER DEFLECTION ;

BASE BID = L/360

ALTERNATE = 0.375"

a Structural Design Group

JOB NO. 16103.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLC DATE 12/6/2016 SHEET NO.

- CHECK LANDING SLAB

MAX SPAN = 4.5'

DL = 50 PSF
LL = 100 PSF

* USE 2½" CONC ($f'_c \geq 3000$ psi)
ON 1½" x 22 GA G60 COMP DECK

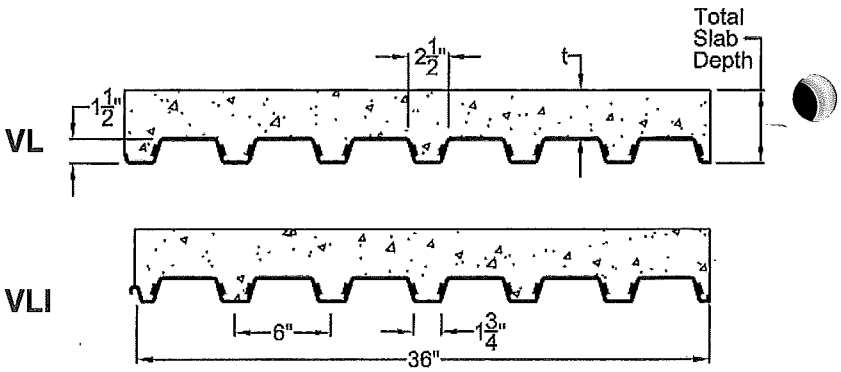
MAX UNSHORED SPAN = 5'-6"

ALLOW LL = 366 PSF @ SPAN = 5'-0"

OK BY INSPECTION

1.5 VL, VLI

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
ICBO Approved (N0. 3415)



Interlocking side lap is not drawn to show actual detail.

STEEL SECTION PROPERTIES

Deck Type	Design Thickness in	Deck Weight psf	Section Properties I_p in^4/ft	S_p in^3/ft	I_n in^4/ft	S_n in^3/ft	V_a lbs/ft	F_y ksi
1.5VL22	0.0295	1.78	0.143	0.169	0.177	0.179	2754	50
1.5VL20	0.0358	2.14	0.186	0.224	0.222	0.231	3322	50
1.5VL19	0.0418	2.49	0.230	0.271	0.260	0.282	3857	50
1.5VL18	0.0474	2.82	0.272	0.311	0.295	0.324	4350	50
1.5VL16	0.0598	3.54	0.373	0.404	0.373	0.411	4336	40

(N=9.35) NORMAL WEIGHT CONCRETE (145 PCF)

TOTAL SLAB DEPTH	DECK TYPE	SDI Max. Unshored Clear Span 1 SPAN	2 SPAN	3 SPAN	Superimposed Live Load, PSF Clear Span (ft.-in.) 5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0	10'-6	11'-0	11'-6	12'-0
	1.5VL22	5'-10	7'-10	7'-10	314	279	230	206	186	169	154	141	130	120	111	100	87	76	67
3.50	1.5VL20	7'-0	9'-4	9'-6	345	306	275	249	227	187	171	157	144	133	124	108	94	82	73
(t=2.00)	1.5VL19	7'-11	10'-3	10'-8	372	330	296	268	244	224	186	171	157	145	134	116	101	88	78
33 PSF	1.5VL18	8'-8	11'-0	11'-2	395	351	315	285	260	238	220	204	168	156	142	123	107	94	82
	1.5VL16	8'-10	11'-0	11'-4	397	353	316	286	261	239	221	205	169	156	145	135	119	105	92
	1.5VL22	5'-6	7'-5	7'-5	366	325	267	239	216	196	179	164	151	139	129	119	111	103	96
4.00	1.5VL20	6'-7	8'-10	8'-11	400	356	319	289	239	217	198	182	167	155	143	133	124	115	108
(t=2.50)	1.5VL19	7'-5	9'-9	10'-1	400	383	344	311	283	235	215	197	182	168	156	145	135	126	115
39 PSF	1.5VL18	8'-1	10'-5	10'-7	400	400	365	330	301	276	254	211	194	180	167	156	145	136	122
	1.5VL16	8'-3	10'-5	10'-9	400	400	365	330	301	276	255	211	194	180	167	155	145	136	127
	1.5VL22	5'-3	7'-1	7'-1	400	345	307	275	248	225	205	188	173	159	147	136	127	118	109
4.50	1.5VL20	6'-3	8'-5	8'-6	400	400	366	303	274	249	227	208	192	177	164	152	142	132	123
(t=3.00)	1.5VL19	7'-1	9'-3	9'-7	400	400	393	356	325	269	246	226	208	192	179	166	155	144	135
45 PSF	1.5VL18	7'-8	9'-11	10'-1	400	400	400	378	344	316	262	241	222	206	191	178	166	155	145
	1.5VL16	7'-10	9'-11	10'-3	400	400	400	377	344	315	262	240	222	205	190	177	165	155	145
	1.5VL22	5'-0	6'-9	6'-9	400	391	347	311	280	254	232	213	195	180	167	154	143	133	124
5.00	1.5VL20	6'-0	8'-1	8'-2	400	400	400	343	310	281	257	236	217	200	186	172	160	149	139
(t=3.50)	1.5VL19	6'-9	8'-11	9'-2	400	400	400	400	335	304	278	255	235	218	202	188	175	163	153
51 PSF	1.5VL18	7'-3	9'-6	9'-8	400	400	400	400	389	324	297	272	251	233	216	201	187	175	164
	1.5VL16	7'-5	9'-6	9'-10	400	400	400	400	388	323	295	271	250	232	215	200	187	175	164
	1.5VL22	4'-10	6'-6	6'-6	400	400	388	348	314	285	260	238	219	202	186	173	160	149	138
5.50	1.5VL20	5'-9	7'-9	7'-10	400	400	400	383	346	314	287	263	243	224	208	193	179	167	156
(t=4.00)	1.5VL19	6'-5	8'-6	8'-9	400	400	400	400	374	340	311	286	263	243	226	210	196	183	171
57 PSF	1.5VL18	7'-0	9'-1	9'-4	400	400	400	400	400	363	331	305	281	260	241	225	210	196	183
	1.5VL16	7'-1	9'-2	9'-5	400	400	400	400	400	361	330	303	279	259	240	224	209	195	183
	1.5VL22	4'-8	6'-4	6'-4	400	400	400	385	347	315	288	263	242	223	206	191	178	165	153
6.00	1.5VL20	5'-6	7'-5	7'-6	400	400	400	400	383	348	318	292	269	248	230	213	199	185	173
(t=4.50)	1.5VL19	6'-2	8'-2	8'-5	400	400	400	400	400	377	344	316	291	270	250	232	217	202	189
63 PSF	1.5VL18	6'-8	8'-9	9'-0	400	400	400	400	400	400	367	337	311	288	267	249	232	217	203
	1.5VL16	6'-10	8'-10	9'-1	400	400	400	400	400	399	365	335	309	286	266	248	231	216	202

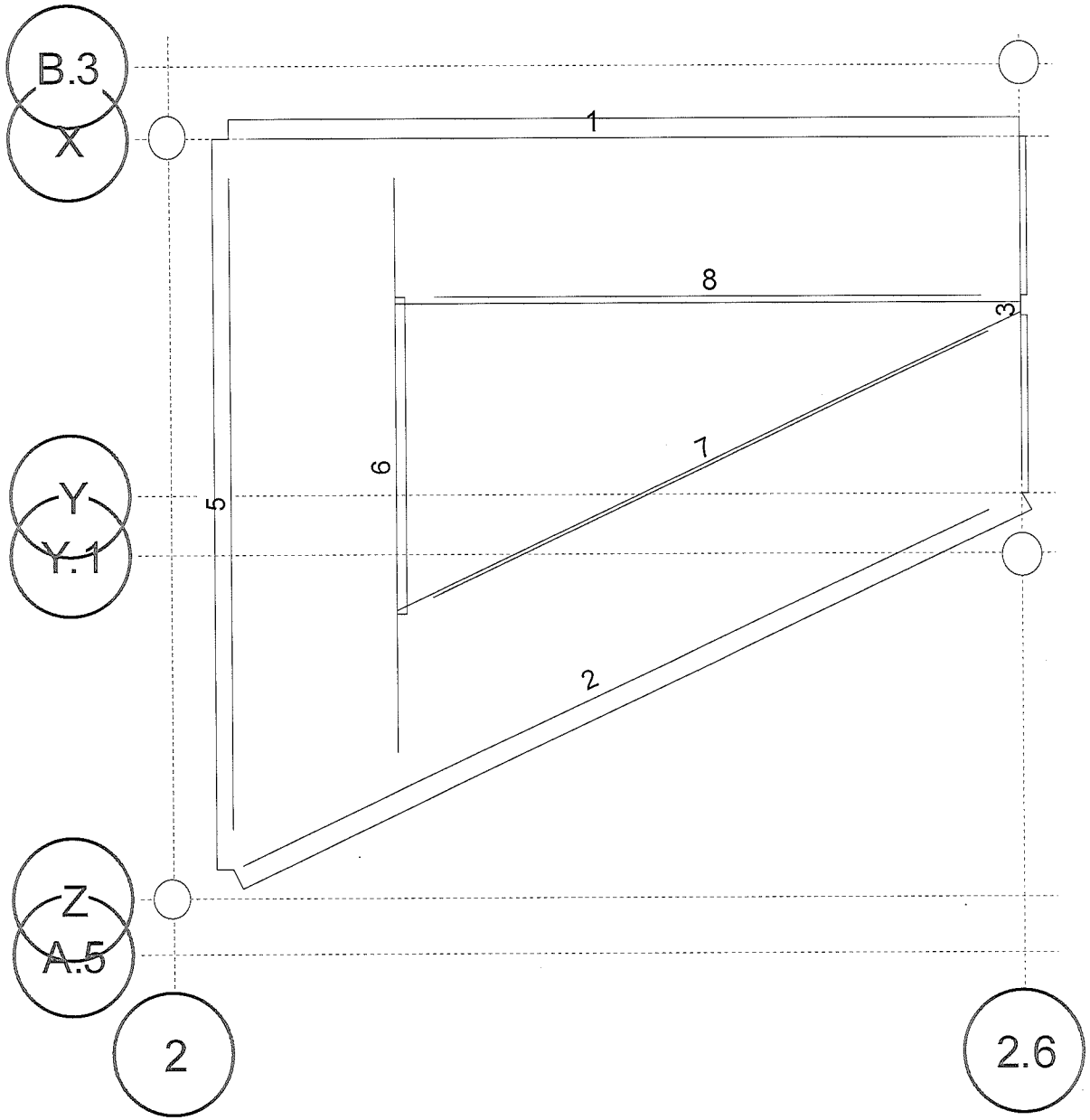
otes: 1. Minimum exterior bearing length required is 1.50 inches. Minimum interior bearing length required is 3.00 inches. If these minimum lengths are not provided, web crippling must be checked.
2. Always contact Vulcraft when using loads in excess of 200 psf. Such loads often result from concentrated, dynamic, or long term load cases for which reductions due to bond breakage, concrete creep, etc. should be evaluated.
3. All fire rated assemblies are subject to an upper live load limit of 250 psf.

Flo Map

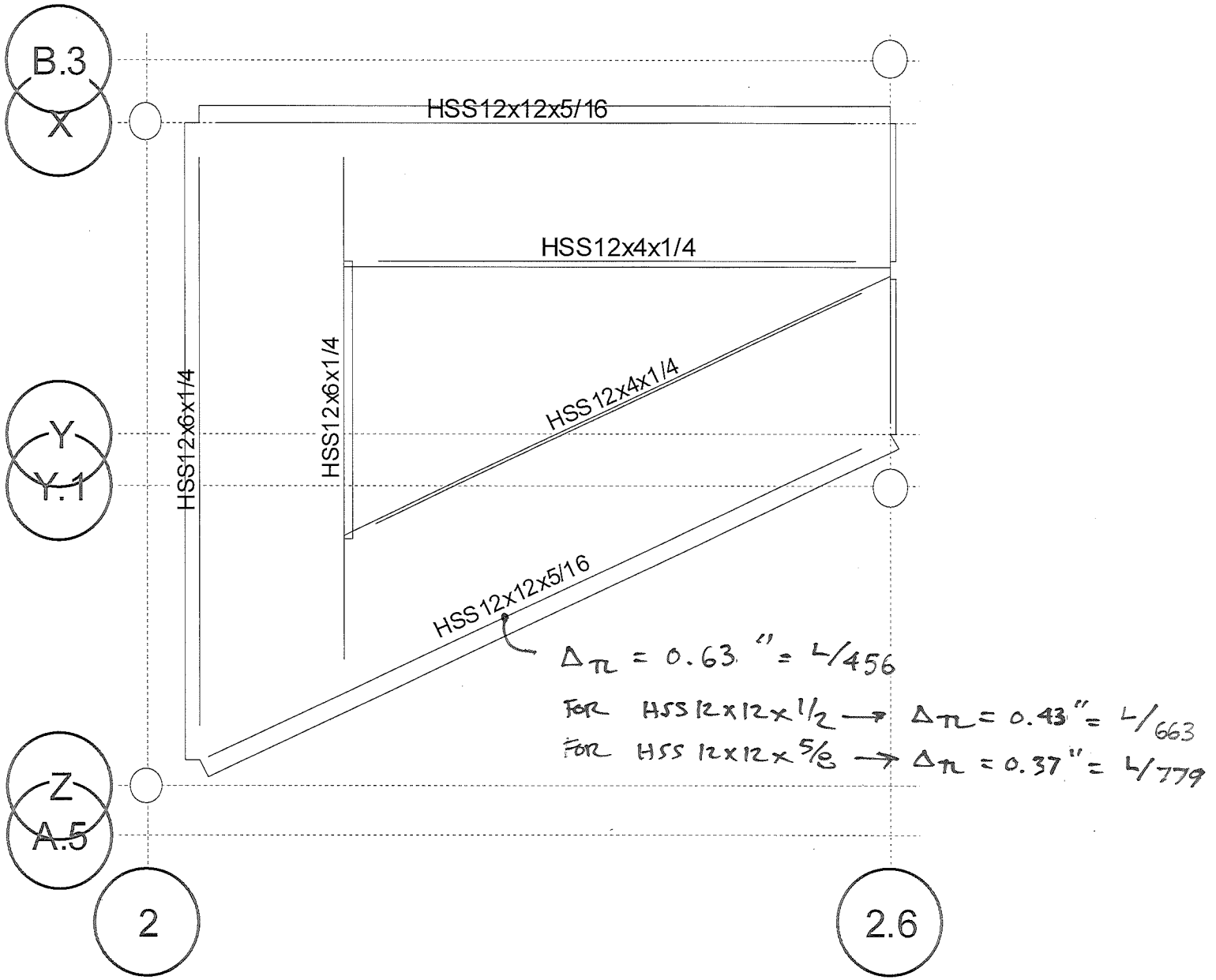
RAM Steel 15.03.00.000
DataBase: Webster U Stair 1
Building Code: IBC

12/06/16 16:21:56
Steel Code: AISC 360-10 LRFD

Floor Type: Stair Plan



Floor Type: Stair Plan



Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1
Building Code: IBC

12/15/16 15:13:36
Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 1**

SPAN INFORMATION (ft): I-End (0.00,19.25) J-End (21.50,19.25)

Beam Size (User Selected) = HSS12X12X5/16 Fy = 46.0 ksi
Total Beam Length (ft) = 21.50
Mp (kip-ft) = 224.63

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
1.580	1.41	0.00	0.0	2.31	0.00	0.0	0.00	0.0	0.00
5.750	2.99	0.00	0.0	3.66	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	1.580	0.020	0.000	---	NonR	0.000
	5.750	0.020	0.000			0.000
2	1.580	0.005	0.051	---	NonR	0.000
	21.500	0.005	0.051			0.000
3	5.750	0.008	0.000	---	NonR	0.000
	21.500	0.008	0.000			0.000
4	5.750	0.030	0.000	---	NonR	0.000
	21.500	0.030	0.000			0.000
5	5.750	0.020	0.200	---	NonR	0.000
	21.500	0.020	0.200			0.000
6	0.000	0.046	0.000	---	NonR	0.000
	21.500	0.046	0.000			0.000

SHEAR: Max Va (DL+LL) = 10.89 kips Vn/1.67 = 107.03 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	45.6	5.8	4.2	1.33	1.67	111.73
Controlling		DL+LL	45.6	5.8	4.2	1.33	1.67	111.73

REACTIONS (kips):

	Left	**Right**
DL reaction	4.44	2.04
Max +LL reaction	6.45	3.69
Max +total reaction	10.89	5.73

DEFLECTIONS:

Dead load (in)	at	10.00 ft	=	-0.157	L/D =	1642
Live load (in)	at	10.11 ft	=	-0.248	L/D =	1041
Net Total load (in)	at	10.11 ft	=	-0.405	L/D =	637

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1
Building Code: IBC

12/15/16 15:13:36
Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 1**

SPAN INFORMATION (ft): I-End (0.00,19.25) J-End (21.50,19.25)

Beam Size (User Selected) = HSS12X12X3/8 Fy = 46.0 ksi
Total Beam Length (ft) = 21.50
Mp (kip-ft) = 265.27

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
1.580	1.41	0.00	0.0	2.31	0.00	0.0	0.00	0.0	0.00
5.750	2.99	0.00	0.0	3.66	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	1.580	0.020	0.000	---	NonR	0.000
	5.750	0.020	0.000			0.000
2	1.580	0.005	0.051	---	NonR	0.000
	21.500	0.005	0.051			0.000
3	5.750	0.008	0.000	---	NonR	0.000
	21.500	0.008	0.000			0.000
4	5.750	0.030	0.000	---	NonR	0.000
	21.500	0.030	0.000			0.000
5	5.750	0.020	0.200	---	NonR	0.000
	21.500	0.020	0.200			0.000
6	0.000	0.054	0.000	---	NonR	0.000
	21.500	0.054	0.000			0.000

SHEAR: Max Va (DL+LL) = 10.98 kips Vn/1.67 = 126.35 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	46.0	5.8	4.2	1.33	1.67	148.55
Controlling		DL+LL	46.0	5.8	4.2	1.33	1.67	148.55

REACTIONS (kips):

	Left	**Right**
DL reaction	4.53	2.13
Max +LL reaction	6.45	3.69
Max +total reaction	10.98	5.82

DEFLECTIONS:

Dead load (in)	at	10.00 ft =	-0.138	L/D =	1871
Live load (in)	at	10.11 ft =	-0.211	L/D =	1223
Net Total load (in)	at	10.11 ft =	-0.349	L/D =	740

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1 — 12/15/16 15:13:36
Building Code: IBC — Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 2**

SPAN INFORMATION (ft): I-End (0.00,0.00) J-End (21.50,10.25)

Beam Size (User Selected) = HSS12X12X5/16 Fy = 46.0 ksi
Total Beam Length (ft) = 23.82
Mp (kip-ft) = 224.63

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
1.750	1.31	0.00	0.0	2.12	0.00	0.0	0.00	0.0	0.00
6.370	3.25	0.00	0.0	3.77	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.036	0.000			0.000
2	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.009	0.090			0.000
3	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.080	0.000			0.000
4	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.020	0.200			0.000
5	8.277	0.080	0.000	---	NonR	0.000
	23.818	0.080	0.000			0.000
6	8.277	0.020	0.200	---	NonR	0.000
	23.818	0.020	0.200			0.000
7	1.751	0.020	0.000	---	NonR	0.000
	23.769	0.020	0.000			0.000
8	1.751	0.005	0.051	---	NonR	0.000
	23.769	0.005	0.051			0.000
9	23.770	0.020	0.000	---	NonR	0.000
	23.818	0.016	0.000			0.000
10	23.770	0.005	0.051	---	NonR	0.000
	23.818	0.004	0.041			0.000
11	0.000	0.046	0.000	---	NonR	0.000
	23.818	0.046	0.000			0.000

SHEAR: Max Va (DL+LL) = 11.61 kips Vn/1.67 = 107.03 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	56.0	7.4	0.0	1.00	1.67	111.73
Controlling		DL+LL	56.0	7.4	0.0	1.00	1.67	111.73

REACTIONS (kips):

	Left	**Right**
DL reaction	5.05	2.91
Max +LL reaction	6.56	3.96

	Left	Right
Max +total reaction	11.61	6.87

DEFLECTIONS:

Dead load (in)	at	11.19 ft	=	-0.273	L/D	= 1048
Live load (in)	at	11.31 ft	=	-0.355	L/D	= 806
Net Total load (in)	at	11.31 ft	=	-0.627	L/D	= 456

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1
Building Code: IBC

12/15/16 15:13:36
Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 2**

SPAN INFORMATION (ft): I-End (0.00,0.00) J-End (21.50,10.25)

Beam Size (User Selected) = HSS12X12X3/8 Fy = 46.0 ksi
Total Beam Length (ft) = 23.82
Mp (kip-ft) = 265.27

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
1.750	1.31	0.00	0.0	2.12	0.00	0.0	0.00	0.0	0.00
6.370	3.25	0.00	0.0	3.77	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.036	0.000			0.000
2	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.009	0.090			0.000
3	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.080	0.000			0.000
4	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.020	0.200			0.000
5	8.277	0.080	0.000	---	NonR	0.000
	23.818	0.080	0.000			0.000
6	8.277	0.020	0.200	---	NonR	0.000
	23.818	0.020	0.200			0.000
7	1.751	0.020	0.000	---	NonR	0.000
	23.769	0.020	0.000			0.000
8	1.751	0.005	0.051	---	NonR	0.000
	23.769	0.005	0.051			0.000
9	23.770	0.020	0.000	---	NonR	0.000
	23.818	0.016	0.000			0.000
10	23.770	0.005	0.051	---	NonR	0.000
	23.818	0.004	0.041			0.000
11	0.000	0.054	0.000	---	NonR	0.000
	23.818	0.054	0.000			0.000

SHEAR: Max Va (DL+LL) = 11.71 kips Vn/1.67 = 126.35 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	56.5	7.5	0.0	1.00	1.67	148.55
Controlling		DL+LL	56.5	7.5	0.0	1.00	1.67	148.55

REACTIONS (kips):

	Left	**Right**
DL reaction	5.16	3.01
Max +LL reaction	6.56	3.96

	Left	Right
Max +total reaction	11.71	6.98

DEFLECTIONS:

Dead load (in)	at	11.31 ft	=	-0.238	L/D	= 1199
Live load (in)	at	11.31 ft	=	-0.302	L/D	= 947
Net Total load (in)	at	11.31 ft	=	-0.540	L/D	= 529

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1
Building Code: IBC

12/15/16 15:13:36
Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 2**

SPAN INFORMATION (ft): I-End (0.00,0.00) J-End (21.50,10.25)

Beam Size (User Selected) = HSS12X12X1/2 Fy = 46.0 ksi
Total Beam Length (ft) = 23.82
Mp (kip-ft) = 343.47

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
1.750	1.31	0.00	0.0	2.12	0.00	0.0	0.00	0.0	0.00
6.370	3.25	0.00	0.0	3.77	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.036	0.000			0.000
2	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.009	0.090			0.000
3	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.080	0.000			0.000
4	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.020	0.200			0.000
5	8.277	0.080	0.000	---	NonR	0.000
	23.818	0.080	0.000			0.000
6	8.277	0.020	0.200	---	NonR	0.000
	23.818	0.020	0.200			0.000
7	1.751	0.020	0.000	---	NonR	0.000
	23.769	0.020	0.000			0.000
8	1.751	0.005	0.051	---	NonR	0.000
	23.769	0.005	0.051			0.000
9	23.770	0.020	0.000	---	NonR	0.000
	23.818	0.016	0.000			0.000
10	23.770	0.005	0.051	---	NonR	0.000
	23.818	0.004	0.041			0.000
11	0.000	0.071	0.000	---	NonR	0.000
	23.818	0.071	0.000			0.000

SHEAR: Max Va (DL+LL) = 11.91 kips Vn/1.67 = 163.00 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	57.5	7.7	0.0	1.00	1.67	205.67
Controlling		DL+LL	57.5	7.7	0.0	1.00	1.67	205.67

REACTIONS (kips):

	Left	**Right**
DL reaction	5.36	3.21
Max +LL reaction	6.56	3.96

	Left	Right
Max +total reaction	11.91	7.17

DEFLECTIONS:

Dead load (in)	at	11.31 ft	=	-0.195	L/D	= 1463
Live load (in)	at	11.31 ft	=	-0.236	L/D	= 1212
Net Total load (in)	at	11.31 ft	=	-0.431	L/D	= 663

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1 — 12/15/16 15:13:36
Building Code: IBC — Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 2**

SPAN INFORMATION (ft): I-End (0.00,0.00) J-End (21.50,10.25)

Beam Size (User Selected) = HSS12X12X5/8 Fy = 46.0 ksi
Total Beam Length (ft) = 23.82
Mp (kip-ft) = 417.83

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
1.750	1.31	0.00	0.0	2.12	0.00	0.0	0.00	0.0	0.00
6.370	3.25	0.00	0.0	3.77	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.036	0.000			0.000
2	1.751	0.000	0.000	---	NonR	0.000
	6.370	0.009	0.090			0.000
3	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.080	0.000			0.000
4	6.370	0.000	0.000	---	NonR	0.000
	8.277	0.020	0.200			0.000
5	8.277	0.080	0.000	---	NonR	0.000
	23.818	0.080	0.000			0.000
6	8.277	0.020	0.200	---	NonR	0.000
	23.818	0.020	0.200			0.000
7	1.751	0.020	0.000	---	NonR	0.000
	23.769	0.020	0.000			0.000
8	1.751	0.005	0.051	---	NonR	0.000
	23.769	0.005	0.051			0.000
9	23.770	0.020	0.000	---	NonR	0.000
	23.818	0.016	0.000			0.000
10	23.770	0.005	0.051	---	NonR	0.000
	23.818	0.004	0.041			0.000
11	0.000	0.087	0.000	---	NonR	0.000
	23.818	0.087	0.000			0.000

SHEAR: Max Va (DL+LL) = 12.11 kips Vn/1.67 = 196.98 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	58.6	7.9	0.0	1.00	1.67	250.20
Controlling		DL+LL	58.6	7.9	0.0	1.00	1.67	250.20

REACTIONS (kips):

	Left	**Right**
DL reaction	5.55	3.41
Max +LL reaction	6.56	3.96

	Left	Right
Max +total reaction	12.11	7.37

DEFLECTIONS:

Dead load (in)	at	11.31 ft	=	-0.170	L/D	= 1678
Live load (in)	at	11.31 ft	=	-0.197	L/D	= 1453
Net Total load (in)	at	11.31 ft	=	-0.367	L/D	= 779

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1
Building Code: IBC

12/15/16 15:13:36
Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 5**

SPAN INFORMATION (ft): I-End (1.58,0.75) J-End (1.58,19.25)

Beam Size (User Selected) = HSS12X6X1/4 Fy = 46.0 ksi
Total Beam Length (ft) = 18.50
Mp (kip-ft) = 119.22

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	0.000	0.017	0.000	---	NonR	0.000
	18.496	0.017	0.000			0.000
2	0.000	0.004	0.042	---	NonR	0.000
	18.496	0.004	0.042			0.000
3	0.000	0.000	0.000	---	NonR	0.000
	1.988	0.083	0.000			0.000
4	0.000	0.000	0.000	---	NonR	0.000
	1.988	0.021	0.208			0.000
5	1.988	0.083	0.000	---	NonR	0.000
	18.496	0.083	0.000			0.000
6	1.988	0.021	0.208	---	NonR	0.000
	18.496	0.021	0.208			0.000
7	0.000	0.027	0.000	---	NonR	0.000
	18.496	0.027	0.000			0.000

SHEAR: Max Va (DL+LL) = 3.72 kips Vn/1.67 = 87.04 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	17.2	9.3	0.0	1.00	1.67	71.39
Controlling		DL+LL	17.2	9.3	0.0	1.00	1.67	71.39

REACTIONS (kips):

	Left	**Right**
DL reaction	1.31	1.41
Max +LL reaction	2.12	2.31
Max +total reaction	3.43	3.72

DEFLECTIONS:

Dead load (in)	at	9.25 ft	=	-0.091	L/D =	2430
Live load (in)	at	9.25 ft	=	-0.150	L/D =	1482
Net Total load (in)	at	9.25 ft	=	-0.241	L/D =	920

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1 — 12/15/16 15:13:36
Building Code: IBC — Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 6**

SPAN INFORMATION (ft): I-End (5.75,2.74) J-End (5.75,19.25)

Beam Size (User Selected) = HSS12X6X1/4 Fy = 46.0 ksi
Total Beam Length (ft) = 16.51
Mp (kip-ft) = 119.22

POINT LOADS (kips):

Dist	DL	RedLL	Red%	NonRLL	StorLL	Red%	RoofLL	Red%	PartL
4.431	1.90	0.00	0.0	1.89	0.00	0.0	0.00	0.0	0.00
12.509	1.29	0.00	0.0	1.71	0.00	0.0	0.00	0.0	0.00

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	4.432	0.085	0.000	0.0%	Red	0.000
	12.508	0.085	0.000			0.000
2	0.000	0.083	0.000	---	NonR	0.000
	16.508	0.083	0.000			0.000
3	0.000	0.021	0.208	---	NonR	0.000
	16.508	0.021	0.208			0.000
4	4.432	0.000	0.000	---	NonR	0.000
	4.840	0.010	0.000			0.000
5	4.432	0.000	0.000	---	NonR	0.000
	4.840	0.003	0.026			0.000
6	4.841	0.010	0.000	---	NonR	0.000
	12.250	0.010	0.000			0.000
7	4.841	0.003	0.026	---	NonR	0.000
	12.250	0.003	0.026			0.000
8	12.251	0.010	0.000	---	NonR	0.000
	12.508	0.000	0.000			0.000
9	12.251	0.003	0.026	---	NonR	0.000
	12.508	0.000	0.000			0.000
10	0.000	0.000	0.000	---	NonR	0.000
	4.431	0.034	0.000			0.000
11	0.000	0.000	0.000	---	NonR	0.000
	4.431	0.009	0.086			0.000
12	0.000	0.027	0.000	---	NonR	0.000
	16.508	0.027	0.000			0.000

SHEAR: Max Va (DL+LL) = 7.02 kips Vn/1.67 = 87.04 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	29.6	7.6	0.0	1.00	1.67	71.39
Controlling		DL+LL	29.6	7.6	0.0	1.00	1.67	71.39

REACTIONS (kips):

	Left	Right
DL reaction	3.25	2.99
Max +LL reaction	3.77	3.66
Max +total reaction	7.02	6.65

DEFLECTIONS:

Dead load (in)	at	8.17 ft	=	-0.161	L/D	= 1230
Live load (in)	at	8.17 ft	=	-0.183	L/D	= 1082
Net Total load (in)	at	8.17 ft	=	-0.344	L/D	= 576

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1 — 12/15/16 15:13:36
Building Code: IBC — Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 7**

SPAN INFORMATION (ft): I-End (5.75,7.17) J-End (21.50,14.68)

Beam Size (User Selected) = HSS12X4X1/4 Fy = 46.0 ksi
Total Beam Length (ft) = 17.45
Mp (kip-ft) = 98.13

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	0.000	0.085	0.000	0.0%	Red	0.000
	17.448	0.085	0.000			0.000
2	0.000	0.000	0.000	---	NonR	0.000
	0.369	0.009	0.000			0.000
3	0.000	0.000	0.000	---	NonR	0.000
	0.369	0.002	0.023			0.000
4	0.370	0.007	0.000	---	NonR	0.000
	17.448	0.007	0.000			0.000
5	0.370	0.002	0.017	---	NonR	0.000
	17.448	0.002	0.018			0.000
6	0.000	0.080	0.000	---	NonR	0.000
	15.541	0.080	0.000			0.000
7	0.000	0.020	0.200	---	NonR	0.000
	15.541	0.020	0.200			0.000
8	15.542	0.080	0.000	---	NonR	0.000
	17.448	0.000	0.000			0.000
9	15.542	0.020	0.200	---	NonR	0.000
	17.448	0.000	0.000			0.000
10	0.000	0.024	0.000	---	NonR	0.000
	17.448	0.024	0.000			0.000

SHEAR: Max Va (DL+LL) = 3.78 kips Vn/1.67 = 87.04 kips

MOMENTS:

Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	16.5	8.7	0.0	1.00	1.67	58.76
Controlling		DL+LL	16.5	8.7	0.0	1.00	1.67	58.76

REACTIONS (kips):

	Left	**Right**
DL reaction	1.90	1.81
Max +LL reaction	1.89	1.71
Max +total reaction	3.78	3.52

DEFLECTIONS:

Dead load (in)	at	8.72 ft	=	-0.131	L/D =	1597
Live load (in)	at	8.72 ft	=	-0.130	L/D =	1607
Net Total load (in)	at	8.72 ft	=	-0.261	L/D =	801

Gravity Beam Design

RAM Steel 15.03.00.000
DataBase: Webster U Stair 1 — 12/15/16 15:13:36
Building Code: IBC — Steel Code: AISC 360-10 ASD

Floor Type: Stair Plan **Beam Number = 8**

SPAN INFORMATION (ft): I-End (5.75,15.25) J-End (21.50,15.25)

Beam Size (User Selected) = HSS12X4X1/4 Fy = 46.0 ksi
Total Beam Length (ft) = 15.75
Mp (kip-ft) = 98.13

LINE LOADS (k/ft):

Load	Dist	DL	LL	Red%	Type	PartL
1	0.000	0.085	0.000	0.0%	Red	0.000
	15.750	0.085	0.000			0.000
2	0.000	0.030	0.000	---	NonR	0.000
	15.750	0.030	0.000			0.000
3	0.000	0.020	0.200	---	NonR	0.000
	15.750	0.020	0.200			0.000
4	0.000	0.000	0.000	---	NonR	0.000
	0.258	0.004	0.000			0.000
5	0.000	0.000	0.000	---	NonR	0.000
	0.258	0.003	0.026			0.000
6	0.259	0.003	0.000	---	NonR	0.000
	15.750	0.003	0.000			0.000
7	0.259	0.002	0.017	---	NonR	0.000
	15.750	0.002	0.018			0.000
8	0.000	0.024	0.000	---	NonR	0.000
	15.750	0.024	0.000			0.000

SHEAR: Max Va (DL+LL) = 3.00 kips Vn/1.67 = 87.04 kips

MOMENTS:

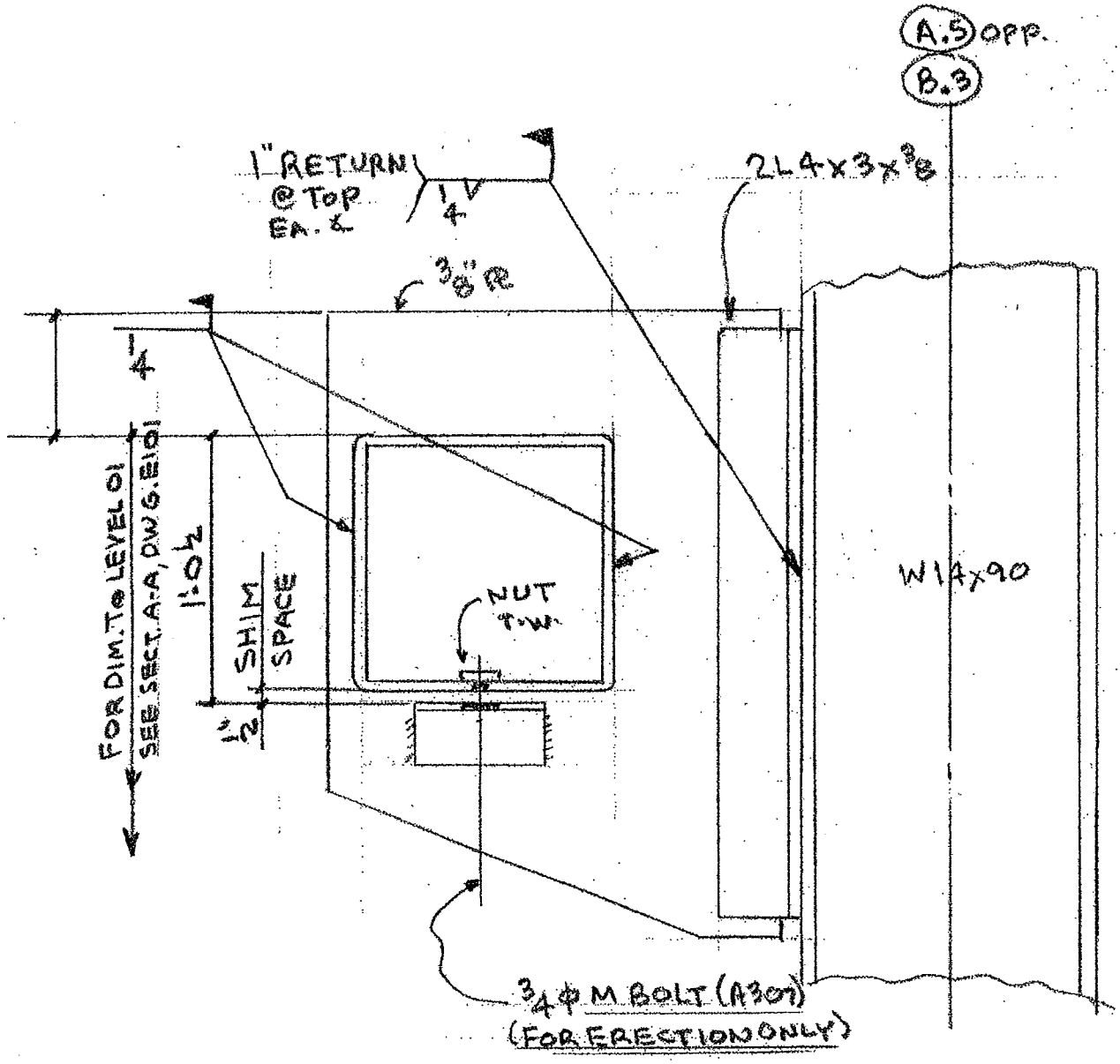
Span	Cond	LoadCombo	Ma kip-ft	@ ft	Lb ft	Cb	Ω	Mn / Ω kip-ft
Center	Max +	DL+LL	11.8	7.9	0.0	1.00	1.67	58.76
Controlling		DL+LL	11.8	7.9	0.0	1.00	1.67	58.76

REACTIONS (kips):

	Left	**Right**
DL reaction	1.29	1.29
Max +LL reaction	1.71	1.71
Max +total reaction	3.00	3.00

DEFLECTIONS:

Dead load (in)	at	7.87 ft	=	-0.066	L/D =	2881
Live load (in)	at	7.87 ft	=	-0.087	L/D =	2166
Net Total load (in)	at	7.87 ft	=	-0.153	L/D =	1236



DETAIL "N"

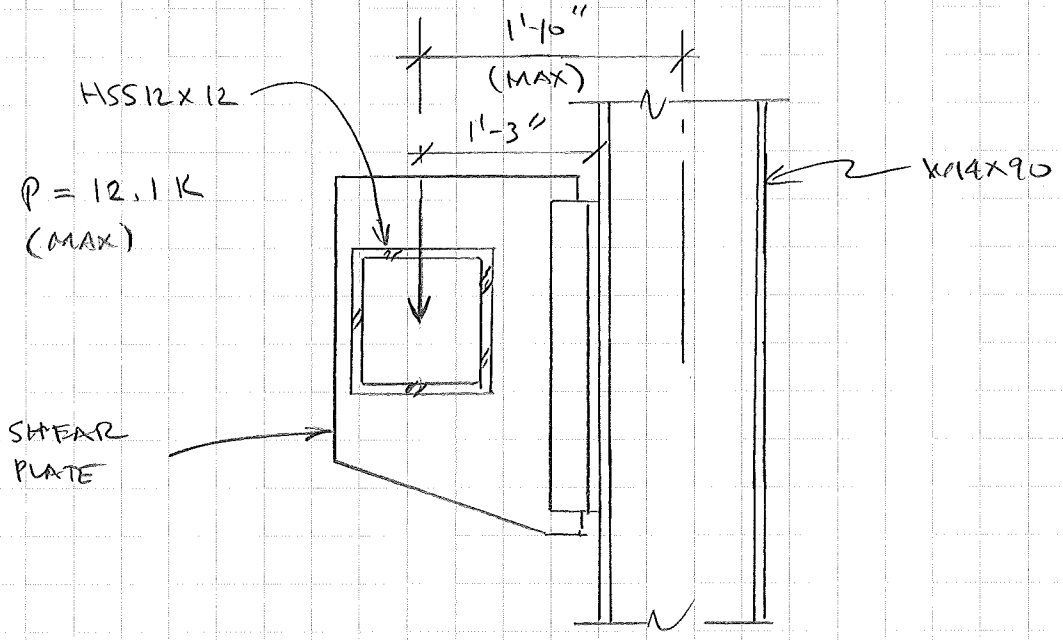
DWG'S. E100, E101

JOB NO. 16130.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLC DATE 12/6/2016 SHEET NO.

- DESIGN HSS 12X12 STRINGER TO COLUMN CONNECTION;



- CHECK WELD HSS TO SHEAR PLATE;

TRY 1/4" FILLET EACH SIDE OF HSS

$P_{ALLOW} = CC_1 Dl$

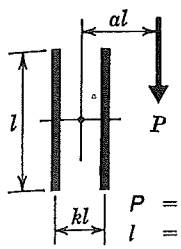
$l = 12''$
$Kl = 12''$
$al = 15''$
$K = 1.0$
$a = 1.25$
$C_1 = 1.0$ (E70 ELECTRODE)
$C = 0.629$ (TABLE X1X - AISC 9TH)

$P_{ALLOW} = 0.629(1.0)(4)(12'') = 30.2\,K > 12.1\,K$ OK

USE 1/4" FILLET EA. SIDE

ECCENTRIC LOADS ON WELD GROUPS

TABLE XIX Coefficients *C*



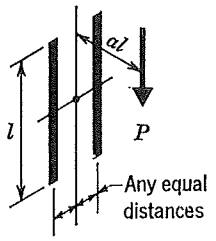
Required Minimum $C = \frac{P}{C_1 Dl}$

" " $D = \frac{P}{CC_1 l}$

" " $l = \frac{P}{CC_1 D}$

P = Allowable eccentric load in kips
l = Length of each weld in in.
D = Number of sixteenths of an in. in fillet weld size
C = Coefficients tabulated below
C_1 = Coefficient for electrode used (see Table on p. 4-72).
= 1.0 for E70XX electrodes.

$P = CC_1 Dl$



SPECIAL CASE*
(Load not in plane of weld group)
Use C-values given in column headed $k = 0$

a	k															
	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.2	1.4	1.6	1.8	2.0
.06	1.67	1.67	1.68	1.68	1.68	1.69	1.69	1.69	1.69	1.70	1.70	1.70	1.71	1.71	1.71	1.71
.08	1.64	1.65	1.65	1.65	1.66	1.66	1.66	1.66	1.67	1.67	1.67	1.67	1.68	1.68	1.69	1.69
.10	1.61	1.61	1.62	1.62	1.62	1.63	1.63	1.63	1.63	1.64	1.64	1.65	1.65	1.66	1.66	1.67
.15	1.51	1.51	1.52	1.52	1.53	1.53	1.54	1.54	1.55	1.56	1.56	1.57	1.58	1.59	1.60	1.61
.20	1.39	1.39	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.50	1.52	1.53	1.54	1.56
.25	1.26	1.27	1.28	1.30	1.31	1.33	1.35	1.36	1.38	1.39	1.41	1.43	1.45	1.47	1.49	1.50
.30	1.14	1.15	1.17	1.19	1.21	1.24	1.26	1.28	1.30	1.32	1.33	1.36	1.39	1.41	1.43	1.45
.40	.939	.951	.976	1.01	1.04	1.07	1.10	1.13	1.16	1.18	1.20	1.24	1.28	1.31	1.33	1.36
.50	.787	.792	.813	.865	.903	.941	.976	1.01	1.04	1.07	1.09	1.14	1.18	1.21	1.25	1.27
.60	.673	.679	.701	.734	.795	.834	.872	.907	.940	.970	.998	1.05	1.09	1.13	1.17	1.20
.70	.585	.592	.615	.647	.708	.748	.787	.823	.857	.888	.918	.971	1.02	1.06	1.10	1.13
.80	.517	.524	.546	.579	.636	.676	.714	.751	.786	.818	.848	.903	.952	.995	1.03	1.07
.90	.463	.469	.491	.524	.576	.615	.654	.690	.725	.757	.788	.844	.893	.938	.978	1.02
1.00	.419	.425	.446	.478	.527	.565	.602	.638	.672	.704	.735	.791	.842	.887	.928	.965
1.20	.351	.357	.377	.406	.448	.484	.519	.553	.586	.617	.647	.702	.752	.798	.840	.878
1.40	.302	.307	.326	.352	.390	.423	.455	.488	.519	.548	.577	.631	.680	.725	.766	.805
1.60	.265	.270	.287	.311	.344	.375	.405	.435	.465	.493	.520	.572	.619	.664	.704	.743
1.80	.236	.241	.256	.278	.308	.336	.365	.393	.421	.448	.474	.523	.569	.612	.652	.689
2.00	.213	.217	.231	.251	.279	.305	.331	.358	.384	.410	.434	.481	.526	.567	.606	.642
2.20	.193	.198	.211	.229	.254	.279	.303	.328	.353	.377	.401	.446	.488	.528	.566	.602
2.40	.177	.181	.194	.211	.234	.256	.280	.303	.327	.350	.372	.415	.456	.495	.531	.566
2.60	.164	.168	.179	.195	.216	.237	.259	.282	.304	.326	.347	.388	.428	.465	.500	.534
2.80	.152	.156	.166	.181	.201	.221	.242	.263	.284	.305	.325	.365	.402	.438	.472	.505
3.00	.142	.145	.155	.169	.188	.207	.226	.246	.266	.286	.306	.344	.380	.415	.448	.479

*Valid only when the connection material between the welds is solid and does not bend in the plane of the welds.

JOB NO. 16130.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLL DATE 12/6/2016 SHEET NO.

- CHECK SHEAR PLATE THICKNESS

$V = P = 12.1$ K

TRY 3/8" A36 PLATE

$f_v = \frac{12.1}{0.375(22")} < 1.5$ KSI $< 0.4(36) = 14.4$ KSI

OK

USE 3/8" PLATE

- DOUBLE ANGLES:

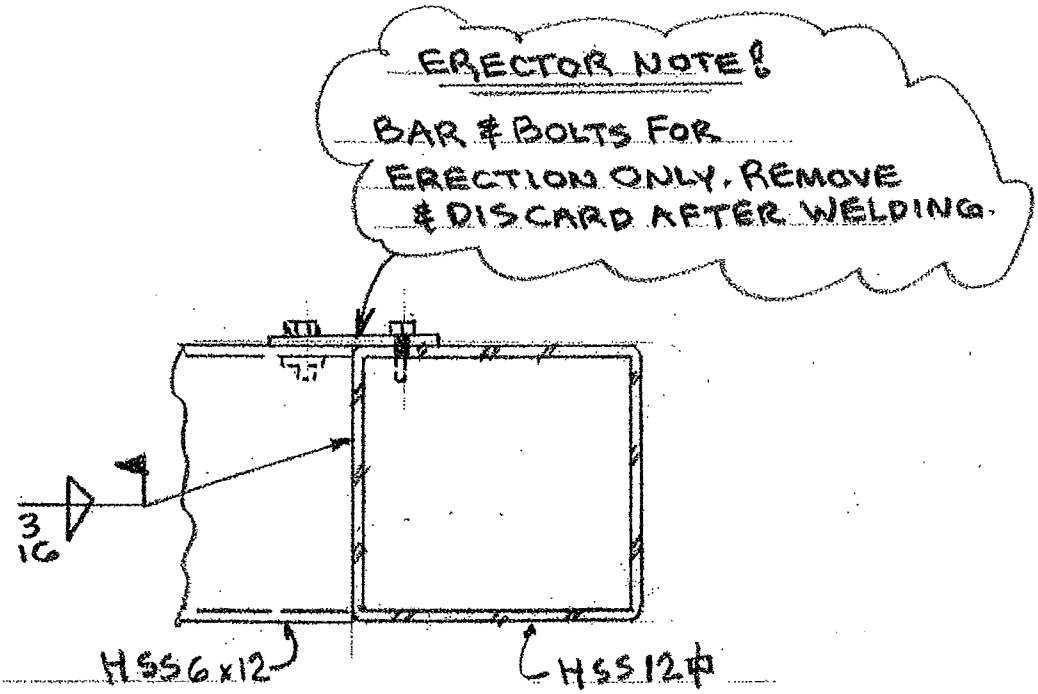
USE (2) L 4x3x 3/8 - OK BY INSPECTION

- WELDS @ TO (2)L & (2)L TO COLUMN:

USE 1/4" FILLET

WELD LENGTH $\ell = \frac{12.1 \text{ K}}{3.71 \text{ K/in}} = 3.3"$

OK BY INSPECTION



TYP. CONN. HSS6x12 TO HSS12#

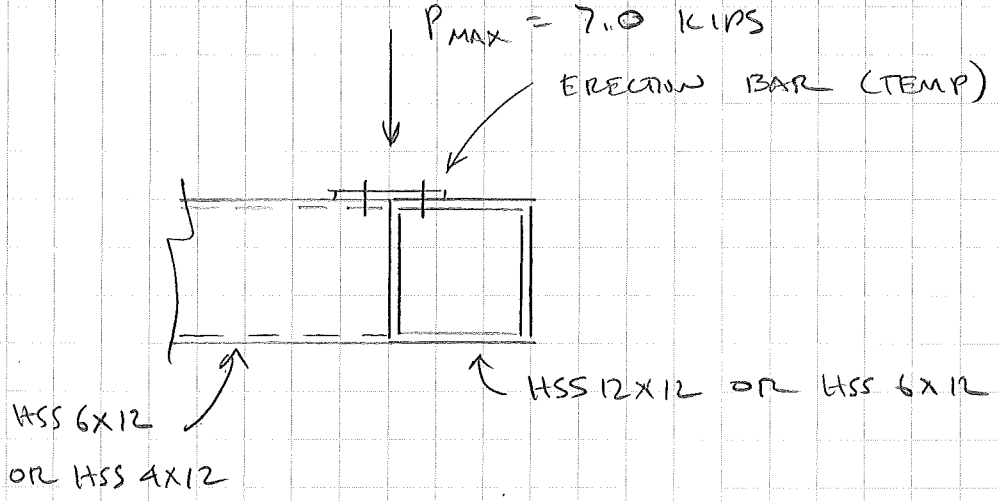
HSS 4X12 TO HSS 6X12 SIMILIAR

JOB NO. L6130.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLC DATE 12/6/2016 SHEET NO.

- DESIGN TYPICAL CONNECTION HSS TO HSS



TRY 3/16" FILLET EA. SIDE

WELD LENGTH, $\ell = \frac{7.0 \text{ KIPS}}{2.78 \text{ K/IN}} = 2.5''$

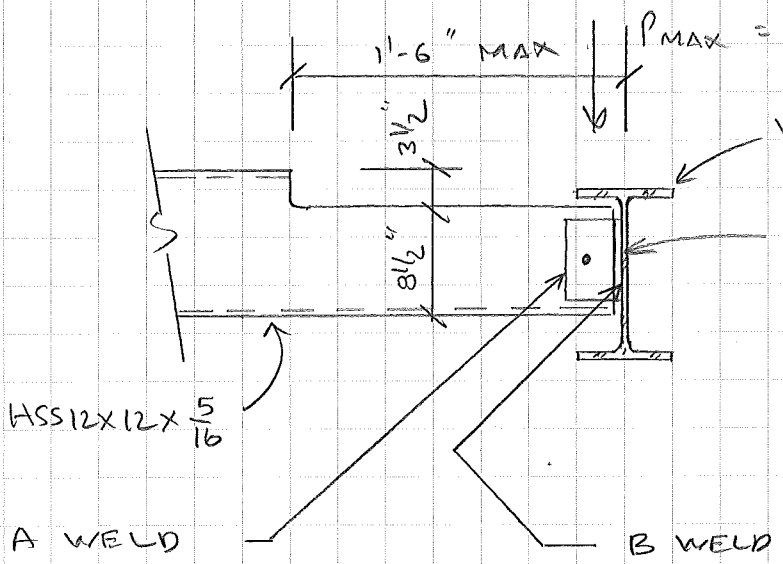
USE FULL LENGTH WELD EA. SIDE

JOB NO. 16130.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLC DATE 12/6/2016 SHEET NO.

- DESIGN CONNECTION HSS 12X12 TO (E) W14X26



A WELD ; USE 3/16" WELD 3-SIDES

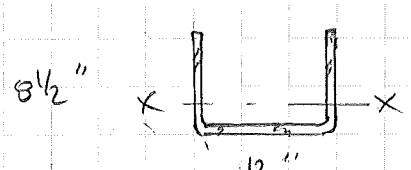
V_{ALLOW} = 38.9K > 7.4K OK

B WELD ; USE 1/4" SIDE W/ ½" RETURN @ TOP

V_{ALLOW} = 21.7K > 7.4K OK

- CHECK MOMENT ON HSS 12X12, COPE ;

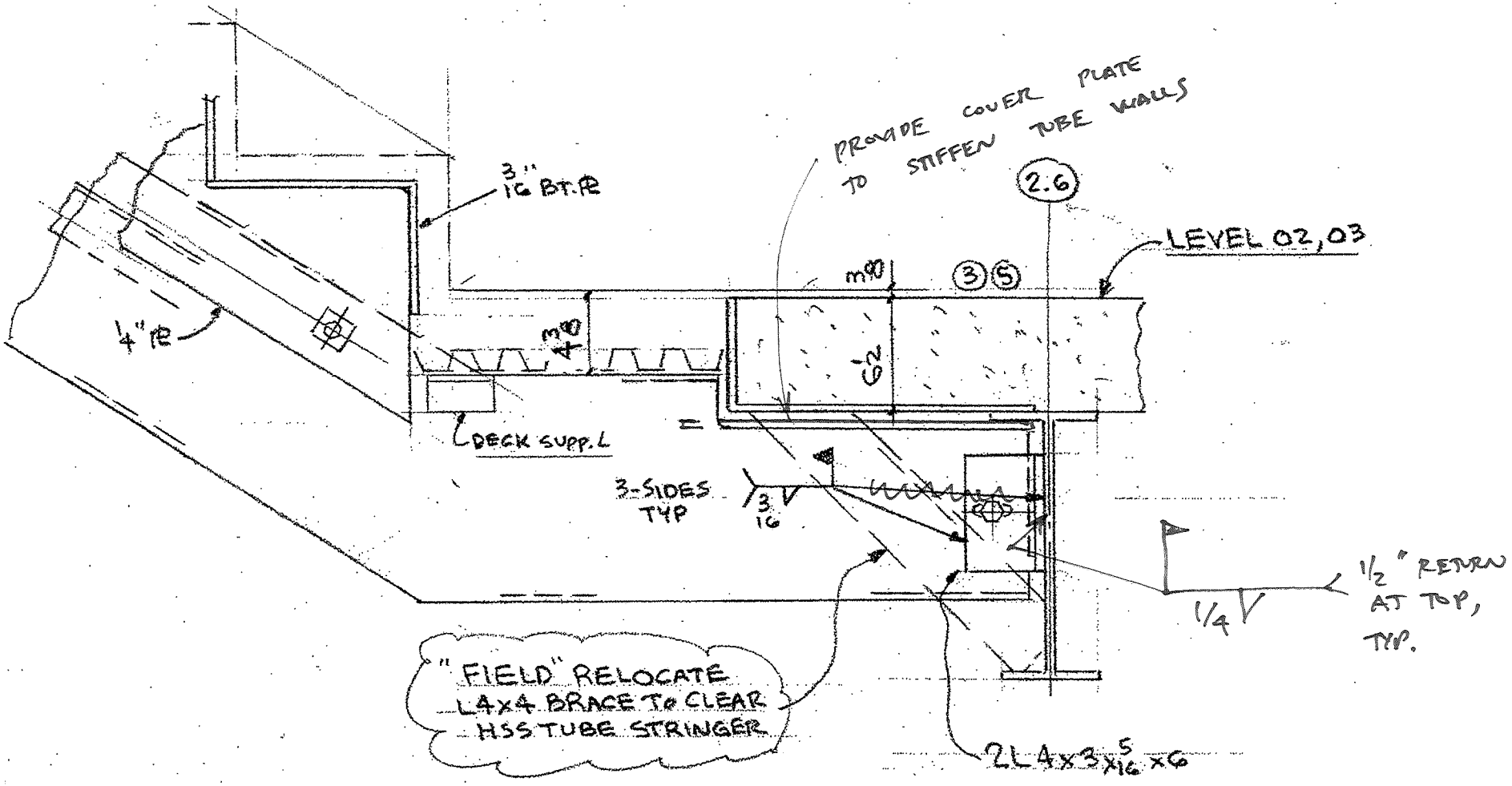
$M_{@1.5'}$ = 9.5 K·FT = 114 K·IN



APPROXIMATE $S_{X\ TOP}$ = 10.35 in³ (SEE ATTACHED RISA SECTION REPORT)

$f_{b\ TOP} = \frac{M}{S} = \frac{114}{10.35}$ = 11.0 KSI

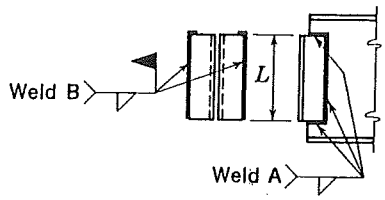
* PROVIDE COVER PLATE STIFFENER OR BY INSPECTION



SECT. "G"

DWG. E100

FRAMED BEAM CONNECTIONS
Welded—E70XX electrodes
Table IV



Weld A		Weld B		Angle Length	Angle Size	[a]Minimum Web Thickness for Weld A	
Capacity Kips	Size[b] In.	Capacity[c] Kips	Size[b] In.	L In.	F_y = 36 ksi	F_y = 36 ksi F_v = 14.5 ksi	F_y = 50 ksi F_v = 20 ksi
104	5/16	75.9	3/8	10	3 × 3 × 1/2	.64	.46
83.2	1/4	63.3	5/16	10	3 × 3 × 3/8	.51	.37
62.4	3/16	50.5	1/4	10	3 × 3 × 5/16	.38	.28
94.6	5/16	64.3	3/8	9	3 × 3 × 1/2	.64	.46
75.7	1/4	53.7	5/16	9	3 × 3 × 3/8	.51	.37
56.7	3/16	42.9	1/4	9	3 × 3 × 5/16	.38	.28
85.8	5/16	53.2	3/8	8	3 × 3 × 1/2	.64	.46
68.6	1/4	44.4	5/16	8	3 × 3 × 3/8	.51	.37
51.5	3/16	35.5	1/4	8	3 × 3 × 5/16	.38	.28
74.8	5/16	42.5	3/8	7	3 × 3 × 1/2	.64	.46
59.8	1/4	35.5	5/16	7	3 × 3 × 3/8	.51	.37
44.9	3/16	28.3	1/4	7	3 × 3 × 5/16	.38	.28
64.9	5/16	32.6	3/8	6	3 × 3 × 1/2	.64	.46
51.9	1/4	27.1	5/16	6	3 × 3 × 3/8	.51	.37
38.9	3/16	21.7	1/4	6	3 × 3 × 5/16	.38	.28
54.0	5/16	23.4	3/8	5	3 × 3 × 1/2	.64	.46
43.2	1/4	19.5	5/16	5	3 × 3 × 3/8	.51	.37
32.4	3/16	15.7	1/4	5	3 × 3 × 5/16	.38	.28
44.0	5/16	15.5	3/8	4	3 × 3 × 1/2	.64	.46
35.2	1/4	12.9	5/16	4	3 × 3 × 3/8	.51	.37
26.4	3/16	10.4	1/4	4	3 × 3 × 5/16	.38	.28

[a]When the beam web thickness is less than the minimum, multiply the connection capacity furnished by Welds A by the ratio of the actual thickness to the tabulated minimum thickness. Thus, if 5/16-in. Weld A, with a connection capacity of 85.8 kips and an 8-in. long angle, is considered for a beam of web thickness 0.305 in. and F_y = 36 ksi, the connection capacity must be multiplied by 0.305/0.64, giving 40.9 kips.

[b]Should the thickness of material to which connection angles are welded exceed the limits set by AISC ASD Specification Sects. J2.1b and J2.2b for weld sizes specified, increase the weld size as required, but not to exceed the angle thickness.

[c]For welds on outstanding legs, connection capacity may be limited by the shear capacity of the supporting members, as stipulated by AISC ASD Specification Sect. F4. See Ex. 13 and 14 for Table IV.

Note 1: Capacities shown in this table apply only when connection angles are F_y = 36 ksi steel and the material to which they are welded is either F_y = 36 ksi or F_y = 50 ksi steel.

Section Properties: Section1

Section Information:

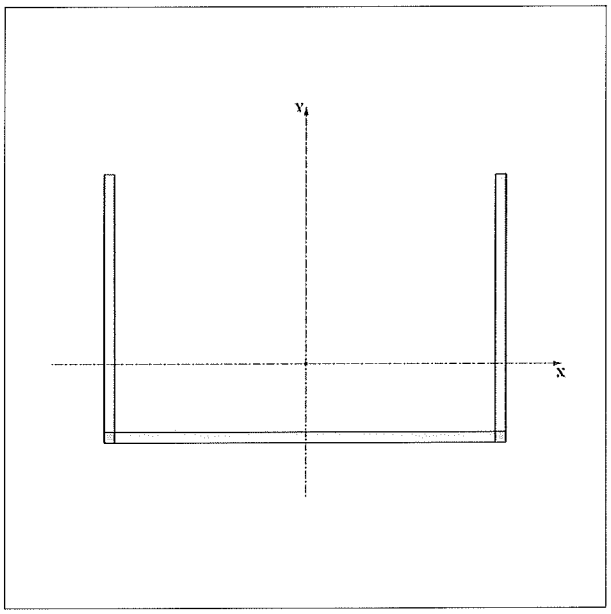
Material Type	=	General
Shape Type	=	Arbitrary
Number of Shapes	=	3

Basic Properties:

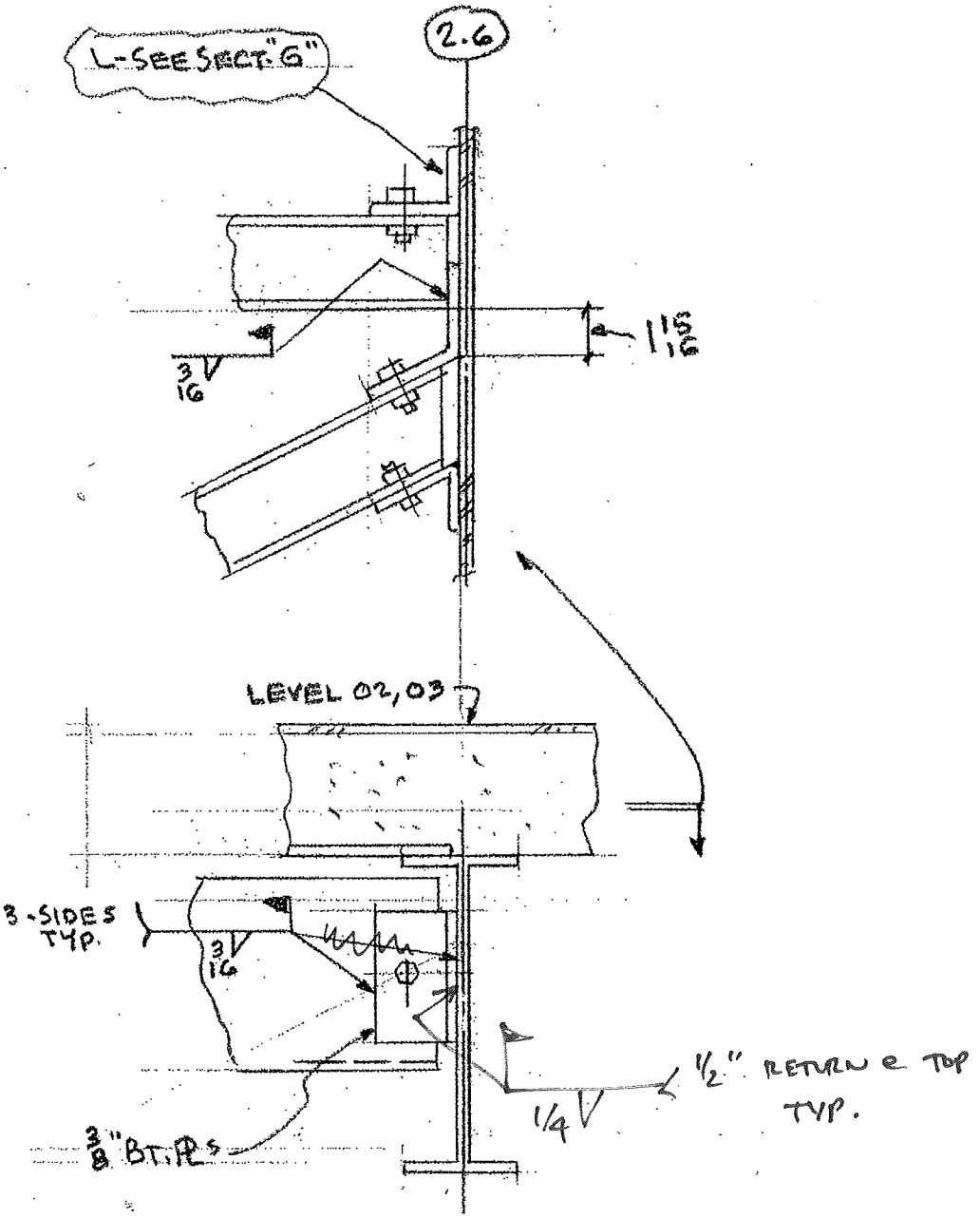
Total Width	=	12.000	in
Total Height	=	8.000	in
Centroid, Xo	=	0.000	in
Centroid, Yo	=	2.196	in
X-Bar (Right)	=	6.000	in
X-Bar (Left)	=	6.000	in
Y-Bar (Top)	=	5.647	in
Y-Bar (Bot)	=	2.353	in
Max Thick	=	0.313	in

Equivalent Properties:

Area, Ax	=	8.764	in^2
Inertia, Ixx	=	58.446	in^4
Inertia, Iyy	=	216.12	in^4
Inertia, Ixy	=	0.000	in^4
Sx (Top)	=	10.350	in^3
Sx (Bot)	=	24.841	in^3
Sy (Left)	=	36.020	in^3
Sy (Right)	=	36.020	in^3
rx	=	2.582	in
ry	=	4.966	in
Plastic Zx	=	18.818	in^3
Plastic Zy	=	40.532	in^3
Torsional J	=	0.280	in^4
As-xx Def	=	1.000	
As-yy Def	=	1.000	
As-xx Stress	=	1.000	
As-yy Stress	=	1.000	



Section Diagram



SECT. "H"
DWG. E100

a Structural Design Group

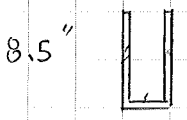
JOB NO. 16130.01 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY VLC DATE 12/6/2016 SHEET NO.

- DESIGN CONNECTION HSS 12x4 TO (E) W14x26
- CHECK MOMENT ON HSS 12x4 COPE)

$M_{@\ 1.5'} = 4.0$ K·FT (2) = 48 K·IN



APPROX $S_{x\ TOP} = 6.985$

$f_{b\ TOP} = \frac{M}{S} = \frac{48}{6.985} = 6.9$ KSI

* PROVIDE COVER PLATE STIFFENER OIC BY WSPECTION

- REMAINDER OF CONNECTION SIMILIAR TO HSS 12x12 TO (E) W14x26 (SEE PREVIOUS CALCULATION)

Section Properties: Section1

Section Information:

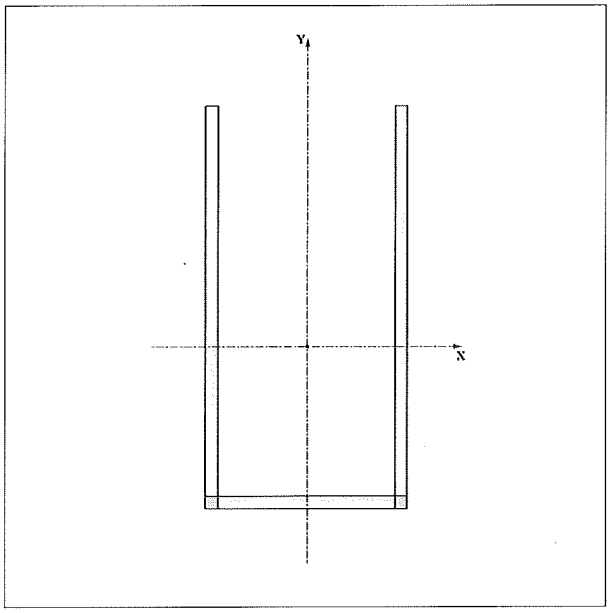
Material Type	=	General
Shape Type	=	Arbitrary
Number of Shapes	=	3

Basic Properties:

Total Width	=	4.000	in
Total Height	=	8.000	in
Centroid, Xo	=	0.017	in
Centroid, Yo	=	3.069	in
X-Bar (Right)	=	2.000	in
X-Bar (Left)	=	2.000	in
Y-Bar (Top)	=	4.775	in
Y-Bar (Bot)	=	3.225	in
Max Thick	=	0.313	in

Equivalent Properties:

Area, Ax	=	5.000	in^2
Inertia, Ixx	=	33.351	in^4
Inertia, Iyy	=	15.417	in^4
Inertia, Ixy	=	0.000	in^4
Sx (Top)	=	6.985	in^3
Sx (Bot)	=	10.341	in^3
Sy (Left)	=	7.708	in^3
Sy (Right)	=	7.708	in^3
rx	=	2.583	in
ry	=	1.756	in
Plastic Zx	=	11.375	in^3
Plastic Zy	=	8.500	in^3
Torsional J	=	0.102	in^4
As-xx Def	=	1.000	
As-yy Def	=	1.000	
As-xx Stress	=	1.000	
As-yy Stress	=	1.000	



Section Diagram

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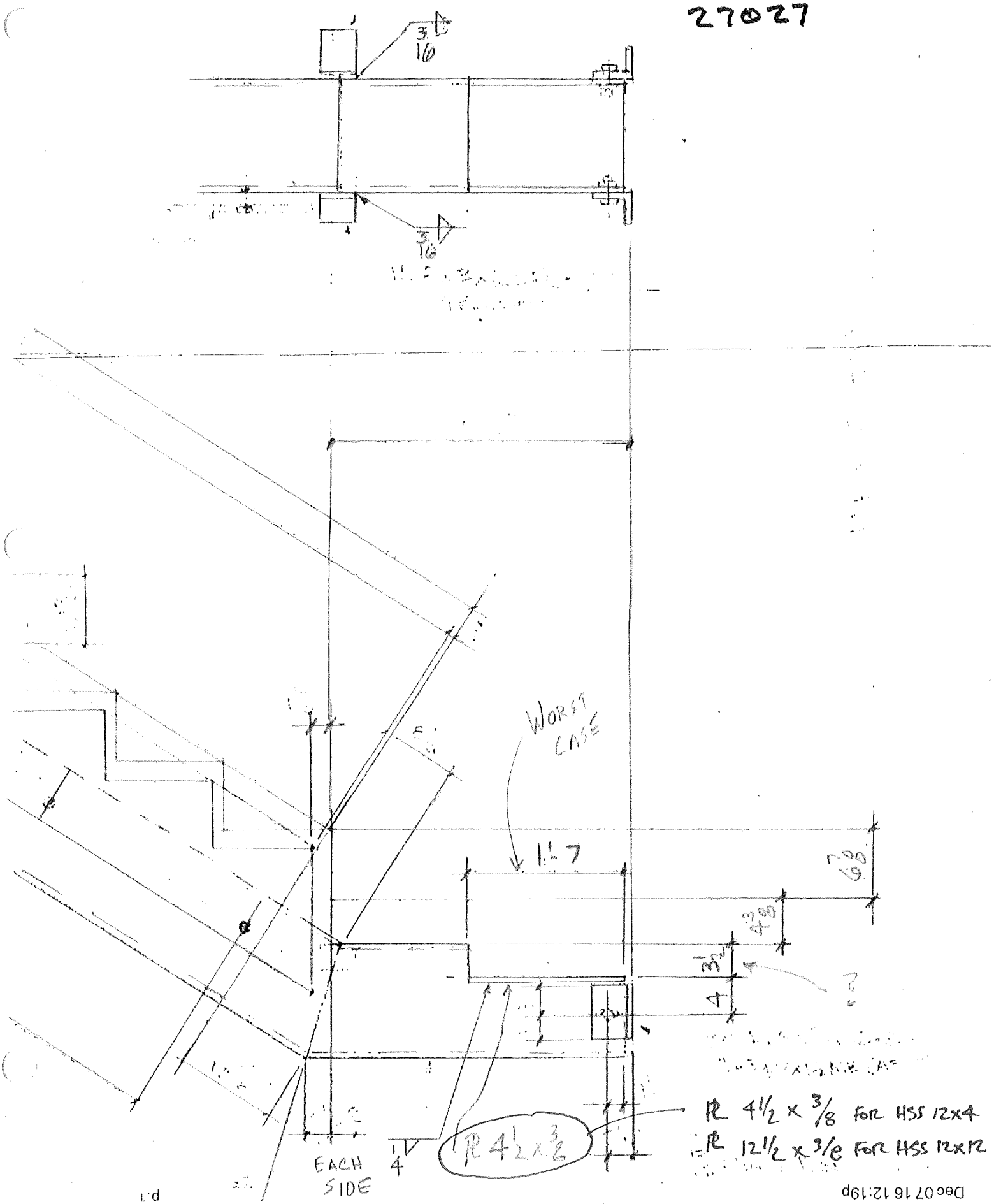

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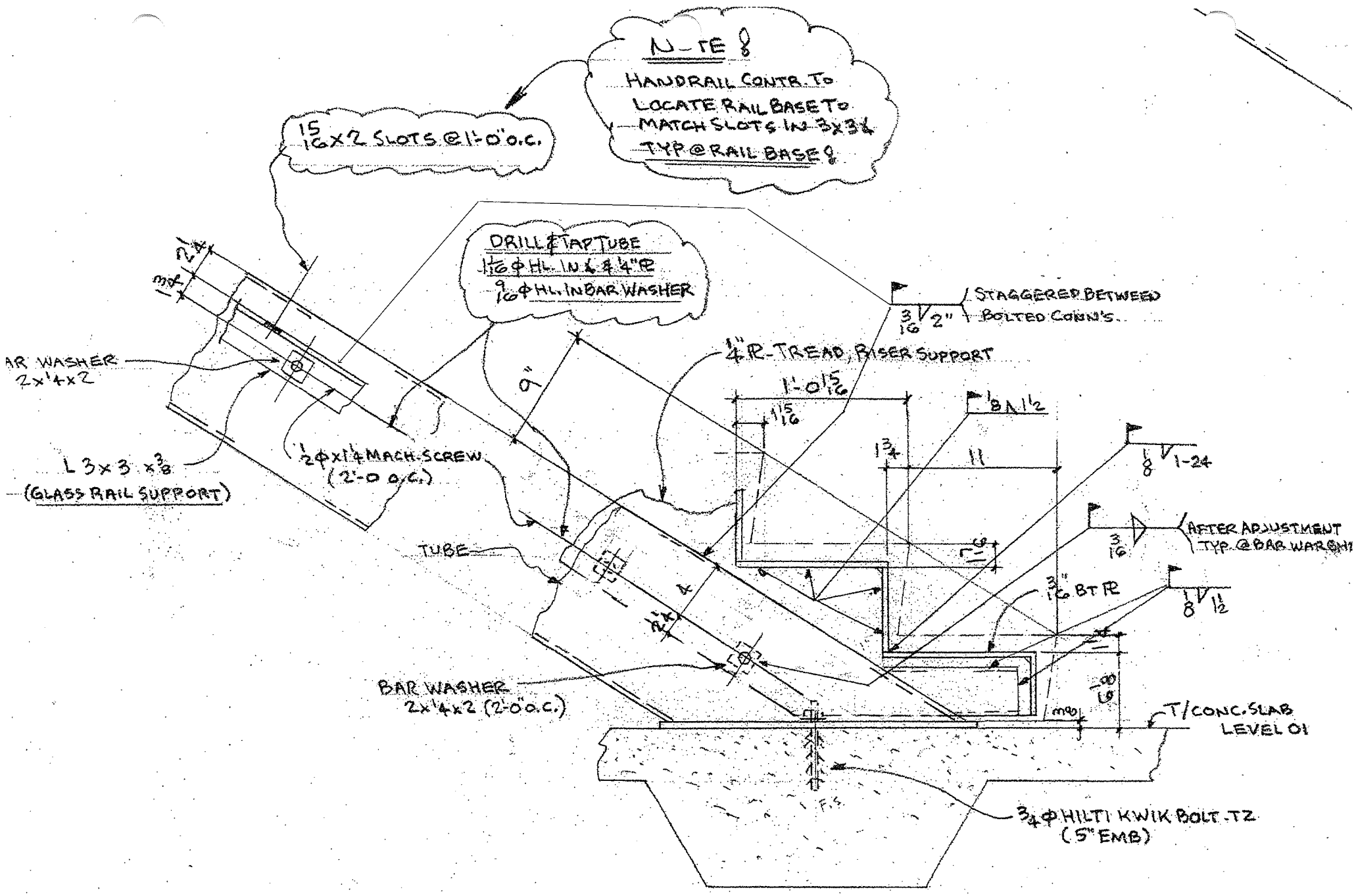


VIEW "F"

DWG. E101

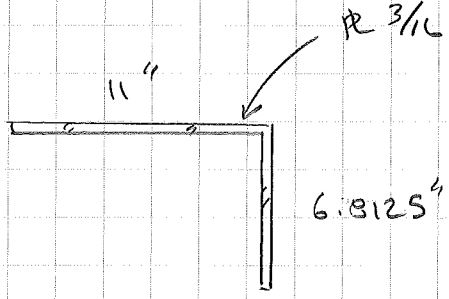
JOB NO. 16130 101 JOB WEBSTER UNIVERSITY STAIRS

SUBJECT STAIR #1

BY KLC DATE 12/6/2016 SHEET NO.

- CHECK 3/16" BENT PLATE TREAD / RISER,

* SAY 1/4" R SUPPORT PR & CONNECTION OK BY INSPECTION



APPROX S_x TOP = 10.0 IN^3

S_x BOTT = 2.5 IN^3

SPAN = 3.33

$$M = \frac{100\,(3.33)^2(12)}{8\,(1000)} = 1.67 \text{ K-IN}$$

$$OR = \frac{300\,(3.33)(12)}{4\,(1000)} = 3.0 \text{ K-IN}$$

$$f_b = M/S = 3.0/2.5 = 1.2 \text{ KSI} \quad \underline{OK}$$

- CHECK TREAD PR ONLY,

$$M = \frac{300\,(11)}{4\,(1000)} = 0.825 \text{ K-IN}$$

$$S = \frac{1}{6}(12)(.1875)^2 = .107$$

$$f_b = M/S = .825/.107 = 11.7 \text{ KSI} \quad \underline{OK}$$

Section Properties: Section1

Section Information:

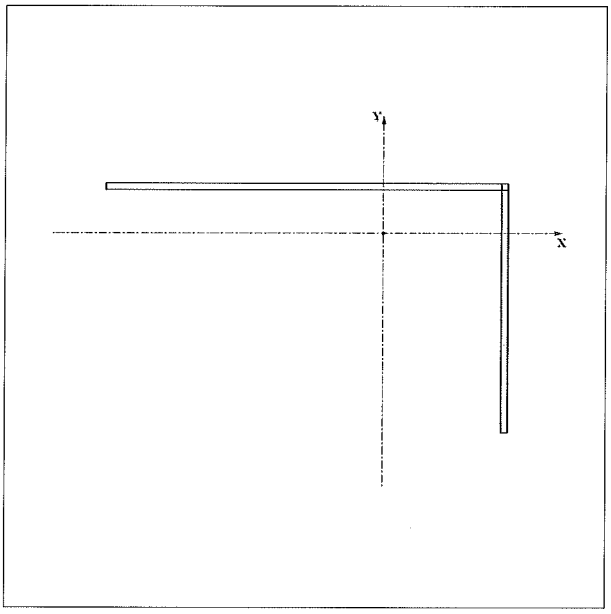
Material Type	=	General
Shape Type	=	Arbitrary
Number of Shapes	=	2

Basic Properties:

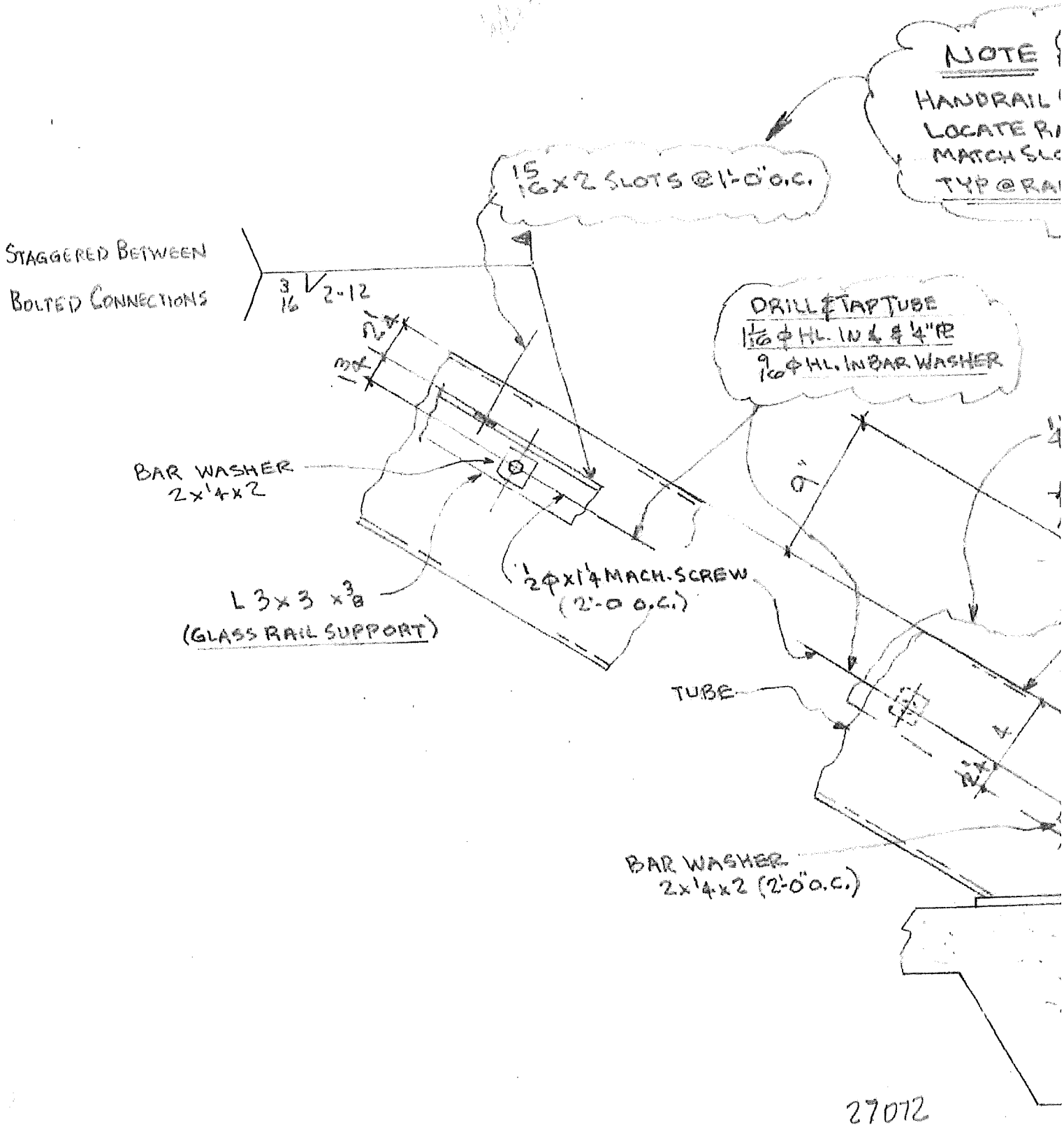
Total Width	=	11.000	in
Total Height	=	6.813	in
Centroid, Xo	=	2.505	in
Centroid, Yo	=	6.170	in
X-Bar (Right)	=	3.432	in
X-Bar (Left)	=	7.568	in
Y-Bar (Top)	=	1.361	in
Y-Bar (Bot)	=	5.452	in
Max Thick	=	0.313	in

Equivalent Properties:

Area, Ax	=	3.349	in^2
Inertia, Ixx	=	13.639	in^4
Inertia, Iyy	=	43.972	in^4
Inertia, Ixy	=	-14.164	in^4
Sx (Top)	=	10.022	in^3
Sx (Bot)	=	2.502	in^3
Sy (Left)	=	5.810	in^3
Sy (Right)	=	12.811	in^3
rx	=	2.018	in
ry	=	3.624	in
Plastic Zx	=	4.307	in^3
Plastic Zy	=	10.430	in^3
Torsional J	=	0.039	in^4
As-xx Def	=	1.000	
As-yy Def	=	1.000	
As-xx Stress	=	1.000	
As-yy Stress	=	1.000	



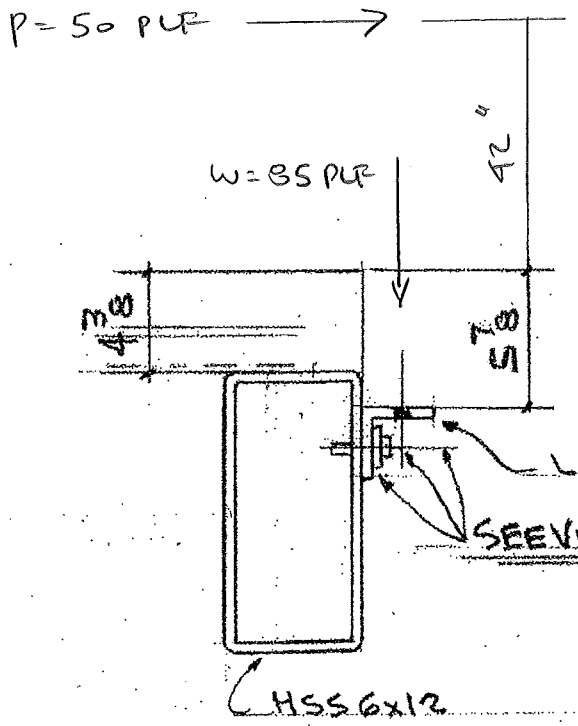
Section Diagram



27072
ATLAS IRON.

– CHECK GLASS RAIL SUPPORT TYPE ①

* ASSUME CONTINUOUS RAIL & FORCE DISTRIBUTION TO SUPPORT ANGLE.



DETAIL "M"
DWG. E100, SECT. E-E

$M = \frac{50}{1000}(47.875) + \frac{85}{1000}(1.5) = 2.5 \frac{K \cdot IN}{FT}$

TRY $\frac{3}{8}$" ANGLE

$S = \frac{1}{6}(12)(.375)^2 = 0.281 \frac{IN^3}{FT}$

$f_b = \frac{2.5}{.281} = 8.9 \text{ KSI}$

OK

BOLT TENSION $\approx \frac{2.5 \text{ K·IN/FT } (2)}{1.25"} = 4.0K$

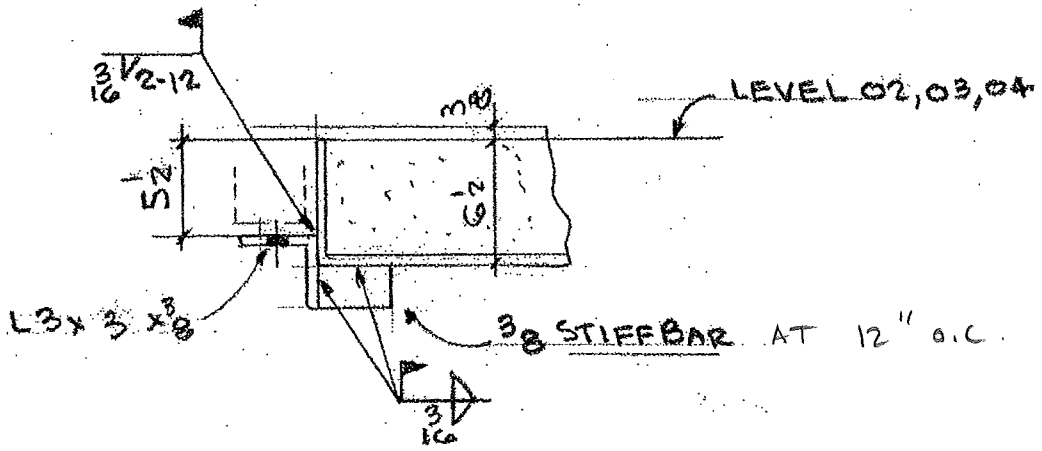
* WELD OPTION) 3/16" FILLET, 2@12"

WELD TENSION $\approx \frac{2.5 \text{ K·IN/FT}}{3"} = 0.8K$

OK BY INSPECTION

– CHECK GLASS RAIL SUPPORT TYPE (2)

* SEE PREVIOUS CALCULATION FOR TYPE (1)



SECT. "K"
DWG. E100

– CHECK WELD TO EDGE R

$M = 2.5$ K·IN/FT

$T_{WELD} = \frac{2.5 \text{ K·IN}}{1.25"} = 2.0$ K

USE 3/16 FILLET 2 @ 12 ; $T_{ALLOW} = 2.78$ K/IN (2)
$= 5.56$ K > 2.0 K

O.K.