



CFS Engineering Group, Inc.
Structural Engineers

**Casa Robles 131
6545 SW 131st Street
Pinecrest, FL**

CFS Project Number 24002.00

Supplemental Structural Calculations

Prepared by

CFS Engineering Group, Inc.
Structural Engineers / CA #30725
185 NW 108th Street
Miami Shores, Florida 33168
305.420.6453

July 25, 2024

This item has been digitally signed and sealed
by Carlos F. Sanz, PE, on July 25, 2024.
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verified on any electronic copies.



Carlos F. Sanz, PE
PE – 51500



CFS Engineering Group, Inc.
Structural Engineers

**Casa Robles 131
6545 SW 131st Street
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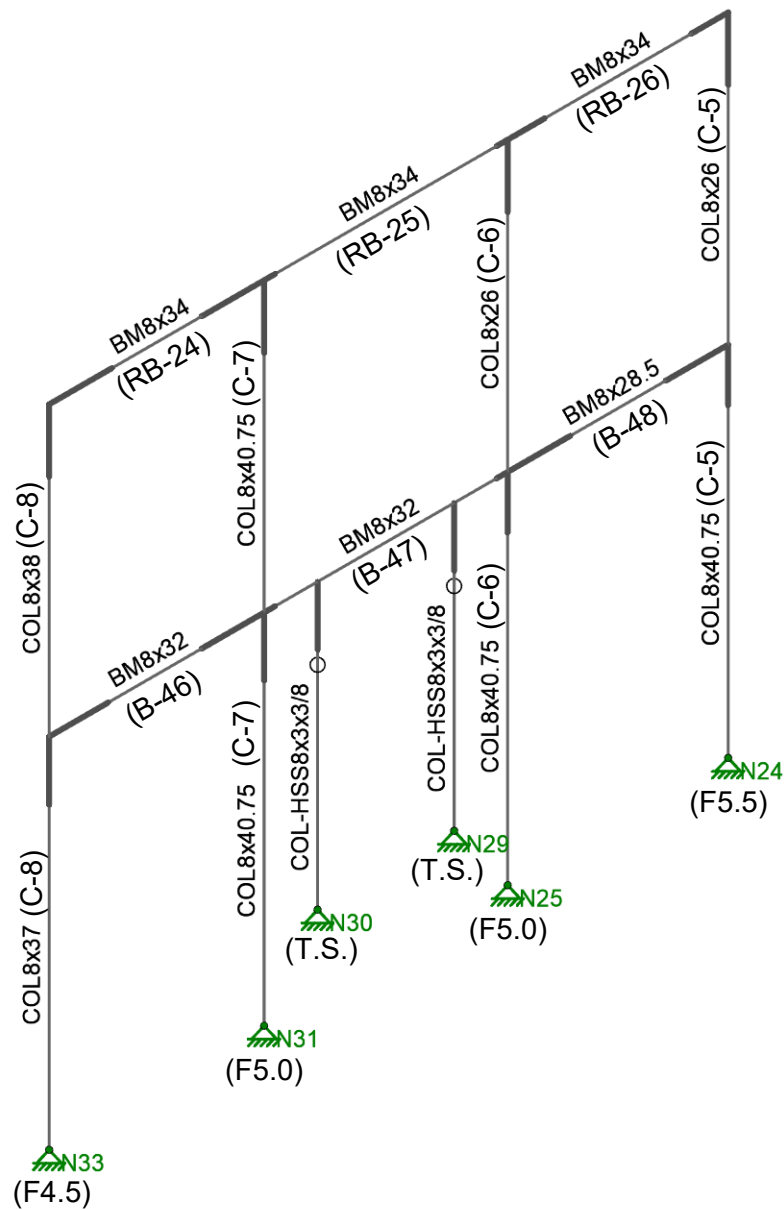
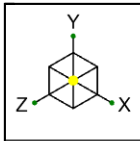
**Supplemental Structural Calculations
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Combined Footing Verification



CFS Engineering Grou...	Casa Robles 131 - Structural Frames and...	SK-1
Carlos F. Sanz, PE	Canopy	Structural Frames and Ca...
24002.00	Partial Frame at Grid 10	

Company :CFS Engineering Group, Inc.
 Designer :Carlos F. Sanz, PE
 Job Number :24002.00
 Model Name:Casa Robles 131 - Structural Frame...

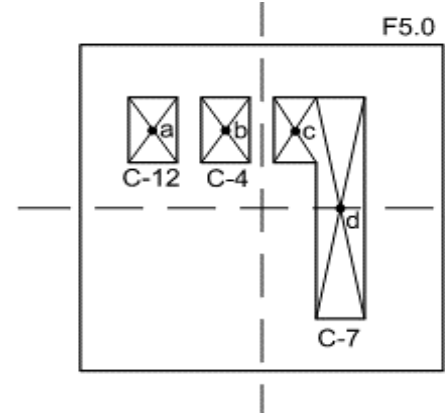
Checked By : _____

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
(F5.5)	N24	max	-0.354	1	65.252	4	-0.032	2	0	4	0	4	0	4
		min	-0.378	4	58.649	1	-0.045	3	0	1	0	1	0	1
(F5.0)	N25	max	0.127	2	33.07	4	-0.67	1	0	4	0	4	0	4
		min	0.094	3	30.162	1	-0.764	4	0	1	0	1	0	1
(T.S.)	N29	max	0	4	4.704	2	0	1	0	4	0	4	0	4
		min	0	1	4.248	1	0	4	0	1	0	1	0	1
(T.S.)	N30	max	0	4	6.091	4	0	1	0	4	0	4	0	4
		min	0	1	5.371	1	0	4	0	1	0	1	0	1
(F5.0)	N31	max	-0.033	2	39.764	4	0.536	4	0	4	0	4	0	4
		min	-0.057	3	35.187	1	0.462	1	0	1	0	1	0	1
(F4.5)	N33	max	-0.016	2	44.578	4	-0.421	1	0	4	0	4	0	4
		min	-0.04	3	39.432	1	-0.527	2	0	1	0	1	0	1

For combined footing F5.0 verification use controlling reaction at N31 of 39.764 kips.

Casa Robles 131 - Footing Supporting Columns C-12, C-4 and C-7



Column C-12

$$\text{Column Self Weight} = 83.68 \text{ ft}^2 \times 1.0 \text{ ft} \times 0.145 \text{ k/ft}^3 = 12.134 \text{ k}$$

$$\text{Column Trib. Area} = 39.5 \text{ ft}^2$$

$$\text{Canopy Slab Weight} = 0.157 \text{ k/ft}^2$$

$$\text{Canopy RLL} = 0.03 \text{ k/ft}^2$$

$$\text{Reaction a: } R_a = 12.134 \text{ k} + (39.5 \text{ ft}^2 \times 0.157 \text{ k/ft}^2) + 0.75 (39.5 \text{ ft}^2 \times 0.03 \text{ k/ft}^2)$$

$$R_a = 19.224 \text{ k}$$

Column C-4

$$\text{Column Self Weight} = 17.556 \text{ ft}^2 \times 1.0 \text{ ft} \times 0.145 \text{ k/ft}^3 = 2.546 \text{ k}$$

$$\text{Column Trib. Area} = 6.0 \text{ ft}^2$$

$$\text{Canopy Slab Weight} = 0.157 \text{ k/ft}^2$$

$$\text{Canopy RLL} = 0.03 \text{ k/ft}^2$$

$$\text{Reaction b: } R_b = 2.546 \text{ k} + (6.0 \text{ ft}^2 \times 0.157 \text{ k/ft}^2) + 0.75 (6.0 \text{ ft}^2 \times 0.03 \text{ k/ft}^2)$$

$$R_b = 3.623 \text{ k}$$

Column C-7

$$\text{Partial Column Self Weight} = 15.361 \text{ ft}^2 \times 1.0 \text{ ft} \times 0.145 \text{ k/ft}^3 = 2.227 \text{ k}$$

$$\text{Partial Column Trib. Area} = 4.5 \text{ ft}^2$$

$$\text{Canopy Slab Weight} = 0.157 \text{ k/ft}^2$$

$$\text{Canopy RLL} = 0.03 \text{ k/ft}^2$$

$$\text{Reaction c: } R_c = 2.227 \text{ k} + (4.5 \text{ ft}^2 \times 0.157 \text{ k/ft}^2) + 0.75 (4.5 \text{ ft}^2 \times 0.03 \text{ k/ft}^2)$$

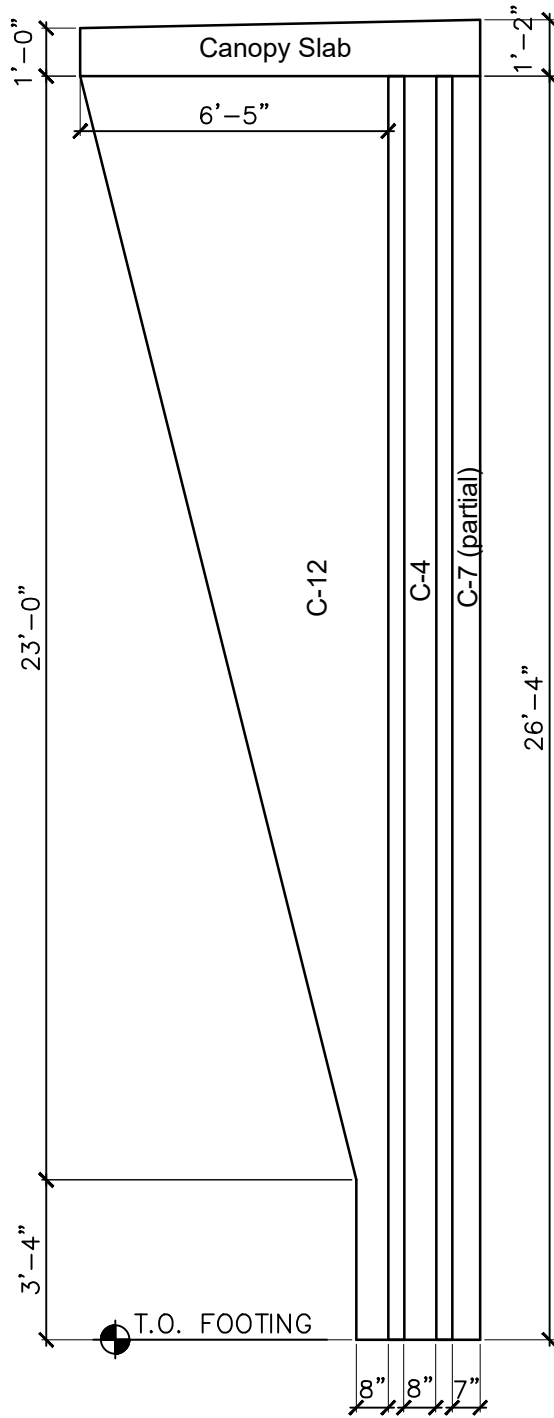
$$R_c = 3.035 \text{ k}$$

$$\text{Reaction d: } R_d = 39.764 \text{ k} \quad (\text{from analysis run})$$

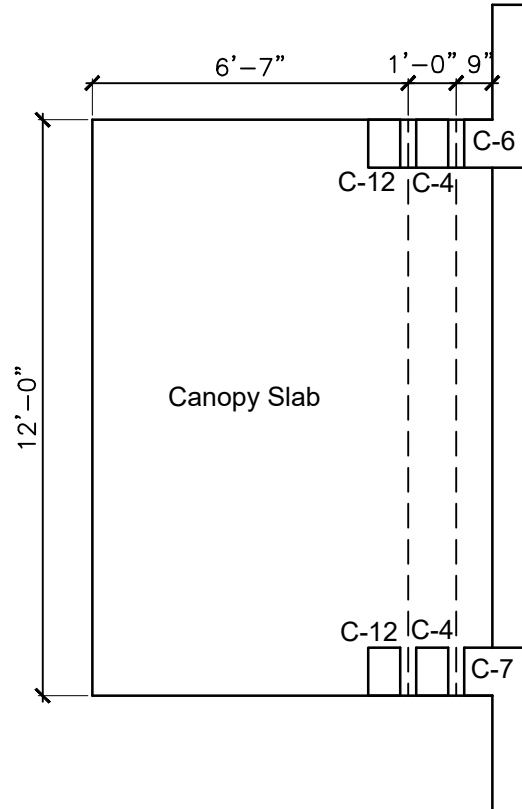
$$\text{Allowable soil bearing pressure (PSF)} = 3000$$

Column Label	Reaction Point	Reaction (kips)	Square Footing Size Needed (ft)	Footing Used
C-12	a	19.224	4.68	F5.0
C-4	b	3.623		
C-7	c	3.035		
C-7	d	39.764		

OK



Columns Elevation

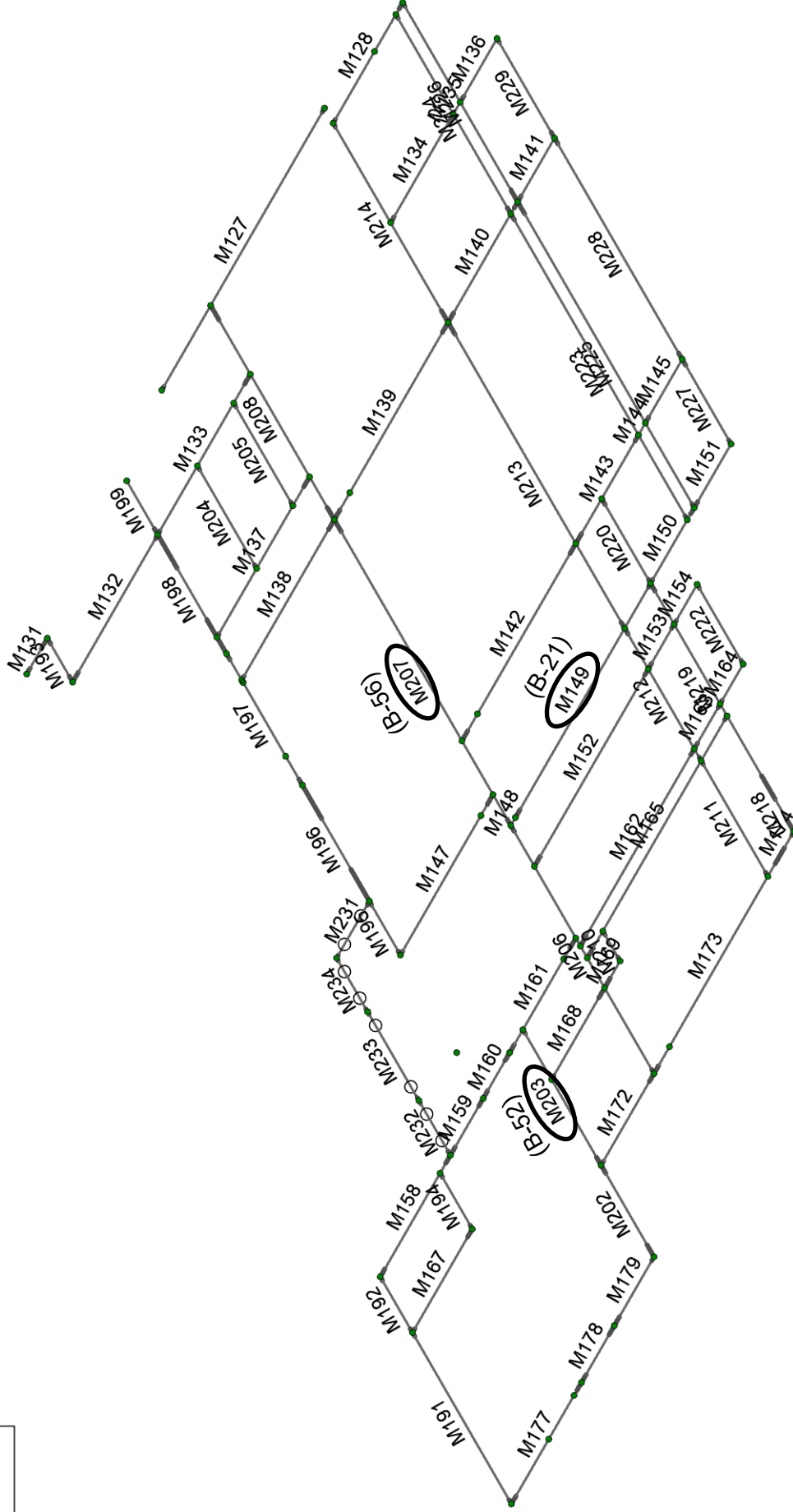
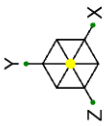


Roof Canopy Plan



CFS Engineering Group, Inc.
Structural Engineers

Detailed Analysis Beams B-21, B-52 & B-56



CFS Engineering Group, Inc.

Carlos F. Sanz, PE

24002.00

Casa Robles 131 - Structural Frames and Canopy

SK-1

Structural Frames and Canopy.r3d

Partial 2nd Floor - Member Labels

Factored Load Analysis Results

Envelope Member Section Forces

Member Sec			Axial[k]	LC y	Shear[k]	LC z	Shear[k]	LC Torque[k-ft]	LC y-y Moment[k-ft]	LC z-z Moment[k-ft]	LC				
1	M149	1	max	0	29	17.131	18	0	29	-23.91	28	0	24	50.452	18
2	(B-21)		min	0	24	10.154	29	0	24	-40.103	19	0	29	29.799	29
3		2	max	0	29	10.504	18	0	29	-23.91	28	0	26	-7.993	28
4			min	0	24	6.238	29	0	24	-40.103	19	0	31	-13.811	18
5		3	max	0	29	3.509	19	0	29	-23.91	28	0	26	-27.717	31
6			min	0	24	2.112	29	0	24	-40.103	19	0	31	-46.41	18
7		4	max	0	29	-1.695	28	0	29	-23.91	28	0	29	-28.131	31
8			min	0	24	-3.06	18	0	24	-40.103	19	0	24	-46.624	18
9		5	max	0	29	-22.494	31	0	29	-58.923	28	0	29	95.744	18
10			min	0	26	-36.494	18	0	24	-96.85	19	0	24	58.024	28
11	M203	1	max	0.909	27	17.459	27	0.175	28	-0.877	29	0.044	25	22.45	27
12	(B-52)		min	0.063	30	9.478	30	-0.152	25	-1.505	19	-0.032	28	11.922	30
13		2	max	0	30	2.593	23	0.109	29	-0.9	29	0.005	25	-0.762	28
14			min	0	27	1.271	30	-0.177	24	-1.546	19	-0.008	28	-1.348	18
15		3	max	0.061	30	5.191	20	0.136	24	-0.956	29	0.014	28	-3.727	29
16			min	-0.332	27	2.847	29	-0.068	29	-1.65	19	-0.016	25	-6.53	19
17		4	max	0.001	29	-2.756	31	0	24	0.375	27	0	31	-6.333	31
18			min	-0.001	24	-7.93	26	0	29	-0.537	30	0	26	-14.456	26
19		5	max	0.001	29	-4.037	31	0	24	0.375	27	0	24	9.087	26
20			min	-0.001	24	-9.974	26	0	29	-0.537	30	0	29	2.689	31
21	M207	1	max	0	29	70.102	19	0	24	-16.397	29	0	29	222.7	19
22	(B-56)		min	0	26	42.457	31	0	29	-30.313	20	0	24	135.109	31
23		2	max	0	24	56.849	19	0	25	-31.433	31	0	26	-82.692	30
24			min	0	29	34.085	31	0	28	-53.289	19	0	31	-138.557	19
25		3	max	0	29	-4.216	31	0	26	6.135	18	0	31	-63.212	29
26			min	0	24	-7.638	22	0	31	3.667	30	0	24	-104.472	18
27		4	max	0	29	-15.057	31	0	26	6.135	18	0	26	-5.492	22
28			min	0	24	-25.192	18	0	31	3.667	30	0	31	-13.705	18
29		5	max	0	29	-22.708	31	0	26	6.135	18	0	26	185.744	18
30			min	0	24	-38.624	18	0	31	3.667	30	0	31	111.067	31

Envelope Maximum Member Section Forces

Member	Axial[k]	Loc[ft]	LCy	Shear[k]	Loc[ft]	LCz	Shear[k]	Loc[ft]	LC Torque[k-ft]	Loc[ft]	LCy-y	Moment[k-ft]	Loc[ft]	LCz-z	Moment[k-ft]	Loc[ft]	LC		
1 M149	max	0	15.1	29	17.131	0	18	0	18.584	29	-23.91	15.1	28	0	15.293	24	95.744	18.584	18
2 (B-21)	min	0	0	24	-36.494	18.584	18	0	15.293	24	-96.85	15.293	19	0	18.584	24	-50.386	11.615	18
3 M203	max	0.909	1.076	27	17.459	0	27	0.272	4.736	24	0.375	10.334	27	0.062	6.459	25	22.45	0	27
4 (B-52)	min	-0.332	4.736	27	-9.974	10.334	26	-0.278	2.906	24	-1.65	4.736	19	-0.081	2.906	28	-23.066	6.566	26
5 M207	max	0	6.523	24	70.102	0	19	0	2.007	24	6.135	24.084	18	0	6.523	26	222.7	0	19
6 (B-56)	min	0	6.774	24	-38.624	24.084	18	0	0	29	-53.289	2.258	19	0	2.258	25	-166.897	6.523	19

Envelope Concrete Beam Design Results

Member	Shape	UC Max Top	Loc[ft]	UC LCUC	Max Bot	Loc[ft]	UC LC	Shear	UC Loc[ft]	UC LC	Phi*Mnz Top	Loc[ft]	Phi*Mnz Bot	Loc[ft]	Phi*Vny	LC
(B-21)	1	M149	CRECT16X20	0.881	18.584	18	0.618	11.615	18	0.743	17.035	18	108.711	81.501	47.066	
(B-52)	2	M203	CRECT16X8	0.596	0	27	0.613	6.566	26	0.352	1.83	27	37.651	37.651	10.862	
(B-56)	3	M207	CRECT16X20	0.84	24.084	18	0.971	6.523	19	0.927	2.007	19	221.206	171.852	73.269	

All beam code checks < 1.0 **OK**

Concrete Beam Bending Reinforcement

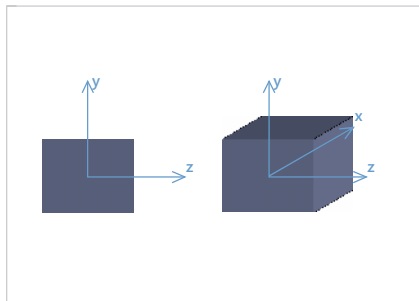
	Member	Shape	Span	Left Top	Mid Top	Mid Bot	Right Top
(B-21)	1	M149	CRECT16X20	1	3 #6		3 #7
(B-52)	2	M203	CRECT16X8	1	2 #5	2 #5	2 #5
(B-56)	3	M207	CRECT16X20	1	5 #9	3 #9	4 #9

Reinforcing required <= reinforcing provided **OK**

Detail Report: M149 (Beam B-21)

Load Combination: Envelope

Code check: 0.881 (LC 18)



Input Data

Shape:	CRECT16X20	I Node:	N161
Member Type:	Beam	J Node:	N163
Length (ft):	18.584	I Release:	Fixed
Material Type:	Concrete	J Release:	Fixed
Design Rule:	Typical	I Offset (in):	8
Internal Sections:	97	J Offset (in):	4
Design Code:	ACI 318-19	T/C Only:	Both Way

Material Properties

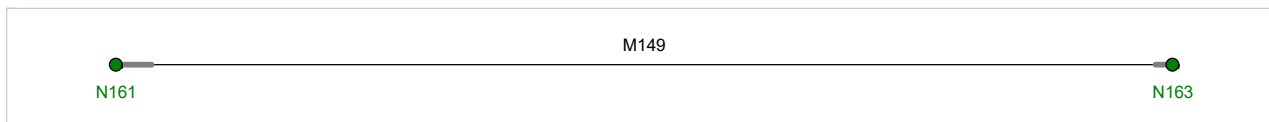
Material:	Conc4000NW	Therm. Coeff. (10^{-5} F^{-1}):	0.6	Flex Steel (ksi):	60
E (ksi):	3644	Density (k/ft ³):	0.145	Shear Steel (ksi):	60
G (ksi):	1584	f'_c (ksi):	4		
Nu:	0.15	λ :	1		

Shape Properties

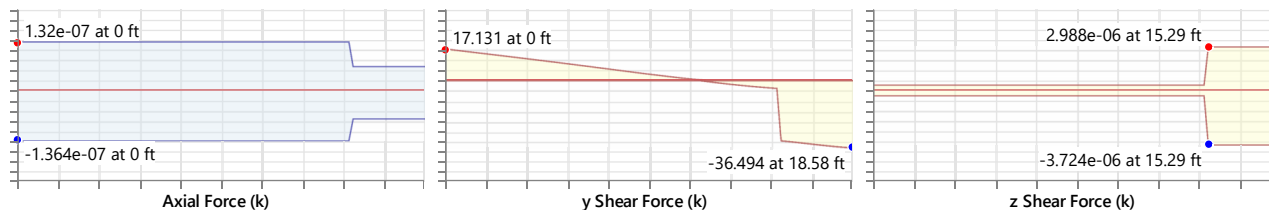
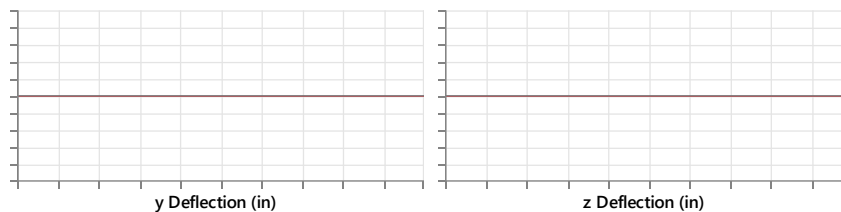
D (in):	16	W (in):	20
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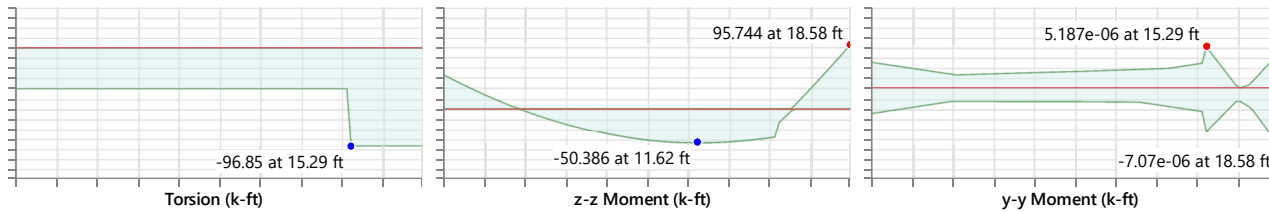
Design Properties

B-eff Left:	N/A	Cracked Sections Used:	Yes	Shear Rebar Set:	ASTM A615
B-eff Right:	N/A	Cracked "I" Factor:	0.35	Top Cover (in):	1
Slab Thk Left:	N/A	Effective "I" (in ⁴):	2389.333	Bottom Cover (in):	1
Slab Thk Right:	N/A	Effective "I" (Service) (in ⁴):	3416.747	Side Cover (in):	1
Concrete Stress Block:	Rectangular	Flex Rebar Set:	ASTM A615	Legs/Stirrup:	2



Diagrams:





ACI 318-19 Code Check

Beam Design does not consider any 'T' & 'My' Moments, nor 'A' & 'Vz' Forces.
 Factored torsional moment T_u exceeds the threshold torsion per ACI 318-19 22.7.4.1

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-	-
Applied Loading - Shear	-	-	-	-	-
Top Bending Steel Requirements	18	2.649 bars	3 bars	-	PASS
Top Flexural Minimum	18	1.573 bars	3 bars	-	PASS
Top 4/3 Requirement	18	-	-	-	-
Top Bending Check	18	95.744 k-ft	108.711 k-ft	0.881	PASS
Bottom Bending Steel Requirements	18	1.85 bars	3 bars	-	PASS
Bottom Flexural Minimum	18	2.15 bars	3 bars	-	PASS
Bottom 4/3 Requirement	18	-	-	-	-
Bottom Bending Check	18	50.386 k-ft	81.501 k-ft	0.618	PASS
Threshold Torsion	-	96.85 k-ft	5.622 k-ft	17.227	FAIL
Shear Design Strength	18	34.958 k	47.066 k	0.743	PASS
Shear Reinforcement Required	18	13.459 k	-	-	-
Minimum Development Length	-	-	-	-	-
Hook Development Length	-	-	-	-	-

Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	0 - 18.6	8	4

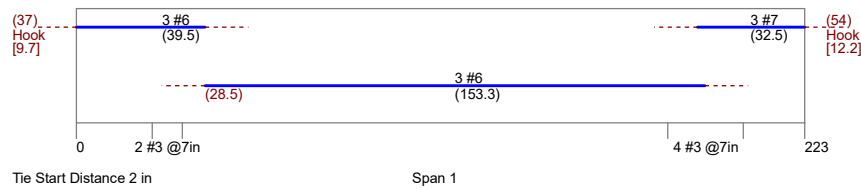
Bending Steel

Span	Loc	Top/Bot	Bars Provided
1	Left	T	3 #6
	Left	B	-
	Mid	T	-
	Mid	B	3 #6
	Right	T	3 #7
	Right	B	-

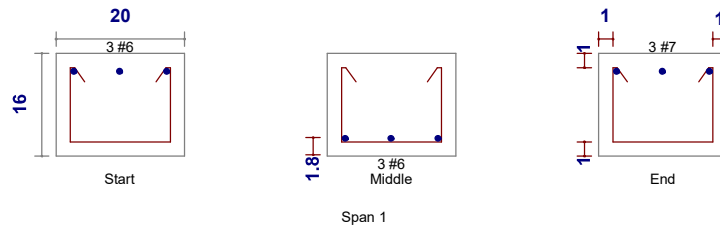
Shear Steel

Span	Region (ft)	Bars Provided
1	1.9 - 2.7	2 #3 @7in
	-	-
	-	-
	15.1 - 17	4 #3 @7in

Rebar Detailing, face of support to face of support of each span(Units: in)



Cross Section Detailing(All Bars Equally Spaced, Units: in)



From Beam Schedule on sheet S-502:

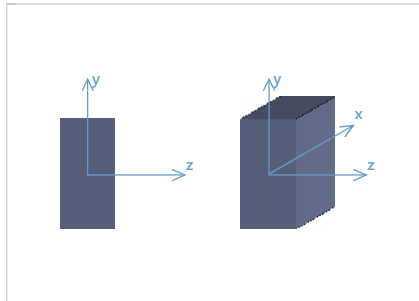
B-21	20"	16"		4-#7M	4-#7M		#3	S28	8@3"/R@6"O.C.
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Reinforcing provided > reinforcing required **OK**

Detail Report: M203 (Beam B-52)

Load Combination: Envelope

Code check: 0.613 (LC 26)



Input Data

Shape:	CRECT16X8	I Node:	N200
Member Type:	Beam	J Node:	N180
Length (ft):	10.334	I Release:	Fixed
Material Type:	Concrete	J Release:	Fixed
Design Rule:	Typical	I Offset (in):	8
Internal Sections:	97	J Offset (in):	4
Design Code:	ACI 318-19	T/C Only:	Both Way

Material Properties

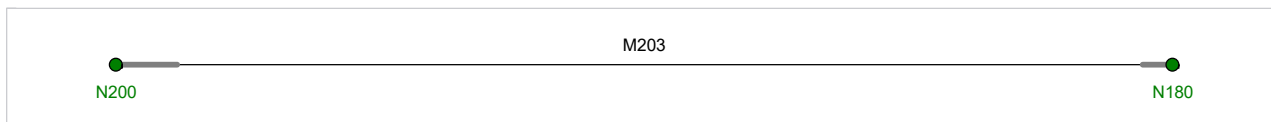
Material:	Conc4000NW	Therm. Coeff. (10^{-5}):	0.6	Flex Steel (ksi):	60
E (ksi):	3644	F^{-1} :		Shear Steel (ksi):	60
G (ksi):	1584	Density (k/ft^3):	0.145		
Nu:	0.15	f'_c (ksi):	4		
		λ :	1		

Shape Properties

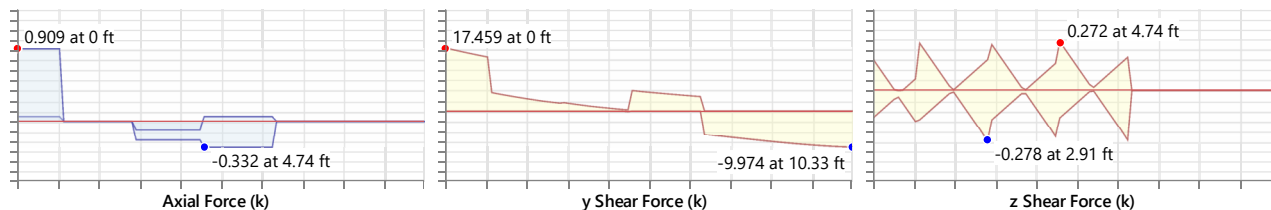
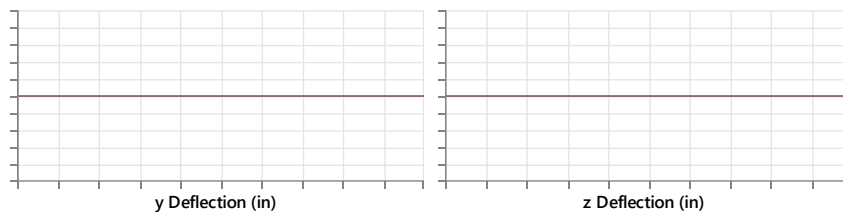
D (in):	16	W (in):	8
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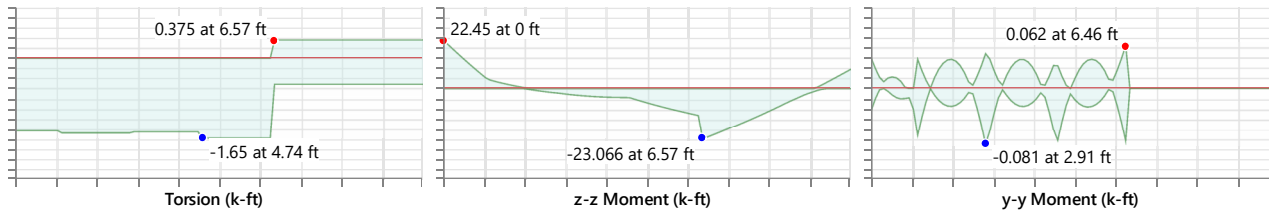
Design Properties

B-eff Left:	N/A	Cracked Sections Used:	Yes	Shear Rebar Set:	ASTM A615
B-eff Right:	N/A	Cracked "I" Factor:	0.35	Top Cover (in):	1
Slab Thk Left:	N/A	Effective "I" (in^4):	955.733	Bottom Cover (in):	1
Slab Thk Right:	N/A	Effective "I" (Service) (in^4):	1366.699	Side Cover (in):	1
Concrete Stress Block:	Rectangular	Flex Rebar Set:	ASTM A615	Legs/Stirrup:	2



Diagrams:





ACI 318-19 Code Check

Beam Design does not consider any 'T' & 'My' Moments, nor 'A' & 'Vz' Forces.
 Factored torsional moment T_u exceeds the threshold torsion per ACI 318-19 22.7.4.1

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-	-
Applied Loading - Shear	-	-	-	-	-
Top Bending Steel Requirements	27	1.191 bars	2 bars	-	PASS
Top Flexural Minimum	27	1.244 bars	2 bars	-	PASS
Top 4/3 Requirement	27	-	-	-	-
Top Bending Check	27	22.45 k-ft	37.651 k-ft	0.596	PASS
Bottom Bending Steel Requirements	26	1.224 bars	2 bars	-	PASS
Bottom Flexural Minimum	26	1.244 bars	2 bars	-	PASS
Bottom 4/3 Requirement	26	-	-	-	-
Bottom Bending Check	26	23.066 k-ft	37.651 k-ft	0.613	PASS
Threshold Torsion	-	1.65 k-ft	1.349 k-ft	1.223	FAIL
Shear Design Strength	27	3.827 k	10.862 k	0.352	PASS
Shear Reinforcement Required	27	5.431 k	-	-	-
Minimum Development Length	-	-	-	-	-
Hook Development Length	-	-	-	-	-

Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	0 - 10.3	8	4

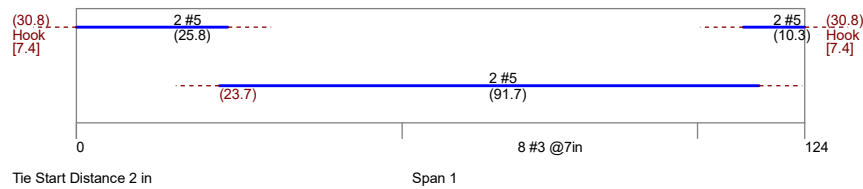
Bending Steel

Span	Loc	Top/Bot	Bars Provided
1	Left	T	2 #5
	Left	B	-
	Mid	T	-
	Mid	B	2 #5
	Right	T	2 #5
	Right	B	-

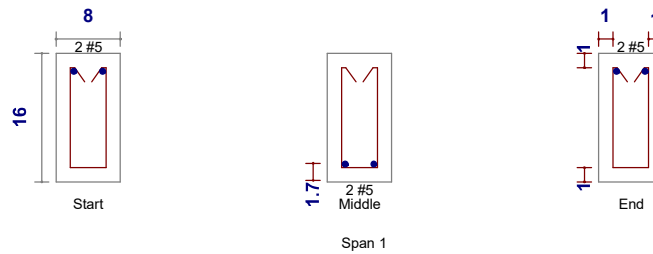
Shear Steel

Span	Region (ft)	Bars Provided
1	1.8 - 4.6	
	-	
	-	
	4.6 - 8.8	8 #3 @7in

Rebar Detailing, face of support to face of support of each span(Units: in)



Cross Section Detailing(All Bars Equally Spaced, Units: in)



From Beam Schedule on sheet S-502:

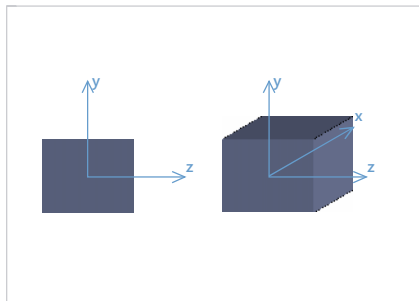
B-52	8"	16"		2-#5M	2-#5M		#3	T1	8@3"/R@6"O.C.
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Reinforcing provided = reinforcing required **OK**

Detail Report: M207 (Beam B-56)

Load Combination: Envelope

Code check: 0.971 (LC 19)



Input Data

Shape:	CRECT16X20	I Node:	N160
Member Type:	Beam	J Node:	N138
Length (ft):	24.084	I Release:	Fixed
Material Type:	Concrete	J Release:	Fixed
Design Rule:	Typical	I Offset (in):	6
Internal Sections:	97	J Offset (in):	12
Design Code:	ACI 318-19	T/C Only:	Both Way

Material Properties

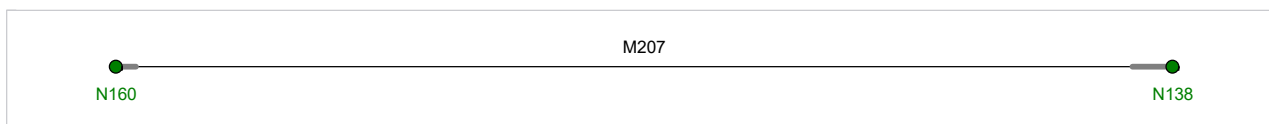
Material:	Conc4000NW	Therm. Coeff. (10^{-5} F^{-1}):	0.6	Flex Steel (ksi):	60
E (ksi):	3644	Density (k/ft ³):	0.145	Shear Steel (ksi):	60
G (ksi):	1584	f'c (ksi):	4		
Nu:	0.15	λ :	1		

Shape Properties

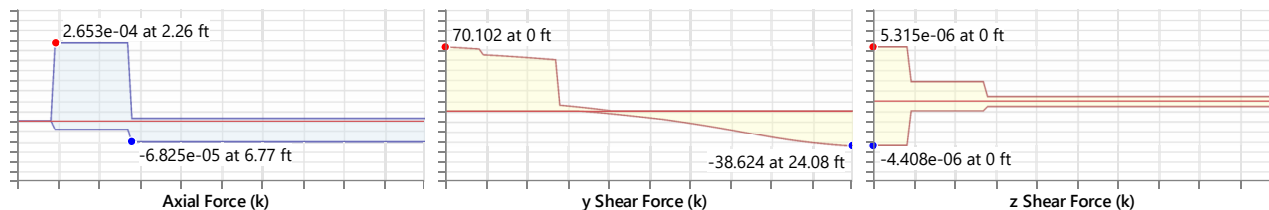
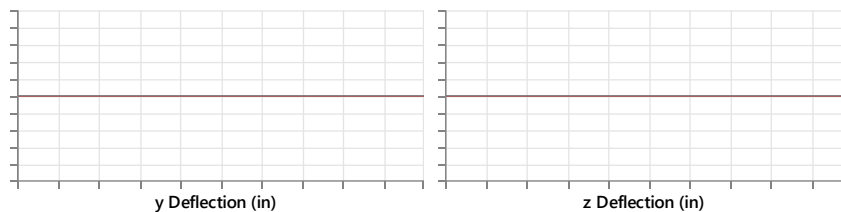
D (in):	16	W (in):	20
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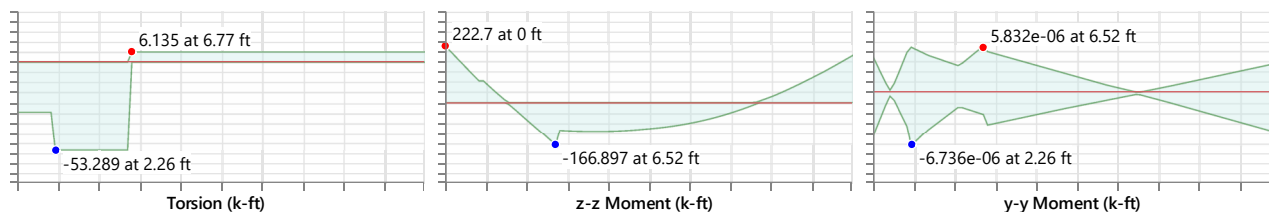
Design Properties

B-eff Left:	N/A	Cracked Sections Used:	Yes	Shear Rebar Set:	ASTM A615
B-eff Right:	N/A	Cracked "I" Factor:	0.35	Top Cover (in):	1
Slab Thk Left:	N/A	Effective "I" (in ⁴):	2389.333	Bottom Cover (in):	1
Slab Thk Right:	N/A	Effective "I" (Service) (in ⁴):	3416.747	Side Cover (in):	1
Concrete Stress Block:	Rectangular	Flex Rebar Set:	ASTM A615	Legs/Stirrup:	2



Diagrams:





ACI 318-19 Code Check

Beam Design does not consider any 'T' & 'My' Moments, nor 'A' & 'Vz' Forces.
 Factored torsional moment T_u exceeds the threshold torsion per ACI 318-19 22.7.4.1

Limit State	Gov. LC	Required	Available	Unity Check	Result
Applied Loading - Bending/Axial	-	-	-	-	-
Applied Loading - Shear	-	-	-	-	-
Top Bending Steel Requirements	18	3.273 bars	4 bars	-	PASS
Top Flexural Minimum	18	0.938 bars	4 bars	-	PASS
Top 4/3 Requirement	18	-	-	-	-
Top Bending Check	18	185.744 k-ft	221.206 k-ft	0.84	PASS
Bottom Bending Steel Requirements	19	2.904 bars	3 bars	-	PASS
Bottom Flexural Minimum	19	0.938 bars	3 bars	-	PASS
Bottom 4/3 Requirement	19	-	-	-	-
Bottom Bending Check	19	166.897 k-ft	171.852 k-ft	0.971	PASS
Threshold Torsion	-	53.289 k-ft	5.622 k-ft	9.479	FAIL
Shear Design Strength	19	67.925 k	73.269 k	0.927	PASS
Shear Reinforcement Required	19	13.339 k	-	-	-
Minimum Development Length	-	-	-	-	-
Hook Development Length	-	-	-	-	-

Span Information

Span	Span Length (ft)	I-Face Dist. (in)	J-Face Dist. (in)
1	0 - 24.1	10	12

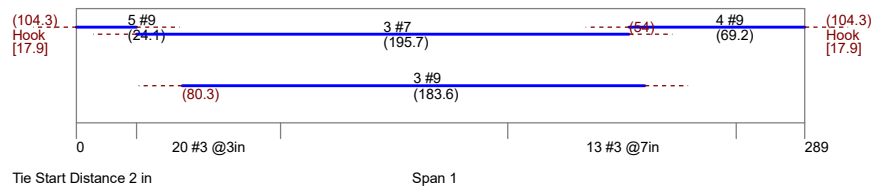
Bending Steel

Span	Loc	Top/Bot	Bars Provided
1	Left	T	5 #9
	Left	B	-
	Mid	T	3 #7
	Mid	B	3 #9
	Right	T	4 #9
	Right	B	-

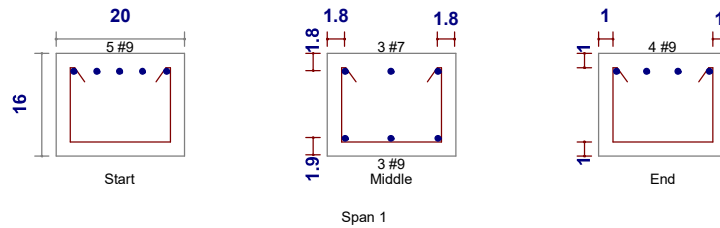
Shear Steel

Span	Region (ft)	Bars Provided
1	2 - 6.8	20 #3 @3in
	-	-
	-	-
	14.3 - 21.8	13 #3 @7in

Rebar Detailing, face of support to face of support of each span(Units: in)



Cross Section Detailing(All Bars Equally Spaced, Units: in)



From Beam Schedule on sheet S-502:

B-56	20"	16"		7-#8H	7-#8M		#3	S28	8@3"/R@6"O.C.
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Reinforcing provided > reinforcing required **OK**