Project: Mr. & Mrs. Friedman's Residence,
Location: Windmill Lake Estates, Weston, Florida

This report provides full structural calculations of the building elements to be built at the above referenced address. This new residence has approximate total area of 8600 ft^2 of which approximate 1250 ft^2 is a second floor. Details of these calculations are documented in the enclosed A-H exhibits as follows:

Exhibit A: Wind Calculations for Main Wind Force Resisting System & Components and Claddings
Exhibit B: Truss and Girder loading, Connectors to Structure, & Foundation Loading.
Exhibit C: Concrete Masonry Unit Typical cross sections.
Exhibit D: Wood Frame Wall and Wood Posts
Exhibit E: Concrete Beams
Exhibit F: Steel Posts
Exhibit G: Foundation
Exhibit H: Shear Wall Analysis

SEAL

Consulting Engineer
AL ALI, PhD PE 53318

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Mr. & Mrs. Friedman's Residence, Windmill Lake Estates, Weston, Florida

Exhibit A

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Velocity Pressure Calculations, qz (Cont.)

Where :	Kh	=	Velocity pressure coefficient @ height z	(Eq. C6-4a)
		=	2.01·(Z/Zg) ^ (2/Alpha) for 15 ft <= Z <= Zg	(Eq. C6-4b)
		=	2.01 · (15/Zg) ^ (2/Alpha) for Z < 15 ft	
		=	0.87155	
	Kzt	=	Topographic factor obtained from Fig. 6-4	
		=	(1 + K1·K2·K3)^2	
	Kzt @ h	=	1	
	Topography	=	None	
	K1,K2,K3	=	Multipliers from Fig. 6-4 to obtain Kzt	
	Lh	=	100	
	H	=	[illegible]	
	H/Lh	=	[illegible]	
	K1	=	0	
	X	=	100	
	X/Lh	=	[illegible]	
	K2	=	[illegible]	
	z/Lh	=	[illegible]	
	K3 @ h	=	[illegible]	
	Kd	=	Wind directionality factor obtained from Table 6-4	
		=	[illegible]	
	qh	=	[illegible]	

Internal Pressure Coefficient, GCpi, Figure 6-5

The internal pressure coefficients are given in Figure 6-5

Enclosure Classification	GCpi+	GCPi-	Ri	GCpi+	GCPi-
Enclosed Buildings	0.18	-0.18	1	0.18	-0.18

Velocity Pressure Calculations, qz (Cont.)

Where :	Kh	=	Velocity pressure coefficient @ height z	(Eq. C6-4a)
		=	2.01·(Z/Zg) ^ (2/Alpha) for 15 ft <= Z <= Zg	(Eq. C6-4b)
		=	2.01 · (15/Zg) ^ (2/Alpha) for Z < 15 ft	
		=	0.960705	
	Kzt	=	Topographic factor obtained from Fig. 6-4	
		=	[illegible]	
	Kzt @ h	=	1	
	Topography	=	None	
	K1,K2,K3	=	Multipliers from Fig. 6-4 to obtain Kzt	
	Lh	=	100	
	H	=	[illegible]	
	H/Lh	=	[illegible]	
	K1	=	0	
	X	=	100	
	X/Lh	=	[illegible]	
	K2	=	[illegible]	
	z/Lh	=	[illegible]	
	K3 @ h	=	[illegible]	
	Kd	=	Wind directionality factor obtained from Table 6-4	
		=	[illegible]	
	qh	=	[illegible]	

Internal Pressure Coefficient, GCpi, Figure 6-5

The internal pressure coefficients are given in Figure 6-5

Enclosure Classification	GCpi+	GCPi-	Ri	GCpi+	GCPi-
Enclosed Buildings	0.18	-0.18	1	0.18	-0.18

Mr. & Mrs. Friedman's Residence, Windmill Lake Estates, Weston, Florida

Exhibit B

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Connector	All. Uplift (#)	All. F1 (#)	All. F2 (#)	Design OK?	
AB1	3350	1225	1520		
Is force independent?		NO	NO		
Ratio (Lt/Ft)	**0.44**	**0.65**	**0.89**	**OK**	**Case1**
			0.82	**OK**	**Case 2**

Foundation					
Load for Foundation lb/ft			*2,508.1*		
Required length of 1' Ftg. (inches)			*12.0*		**Monolithic**

GT3

See GT4 calculations

GT4

Span	[illegible]			
Tributary area		[illegible] load/ft	Rear Reaction	Front Reaction
conc. Load from above			[illegible]	[illegible]3650
Uniform over 8.5 ft.		[illegible]	(1,275.0)	(1,275.0)
uplift	[illegible]	[illegible]	(254.3)	(254.3)
UPLIFT			(5,179.3)	(5,179.3)
DL				
conc. Load from above				
tributary area per corner	58.5			
DL	25.00		2,407.2	2,407.2
LL	30.00		1,755.0	1,755.0
uniform load from above				
average tributary area	5			
reaction on each end, DL			531.25	531.25
reaction on each end, LL			637.5	637.5
DL of wall			594.7875	594.8
uniform load from first roof				
average tributary area	1			
reaction on each end			279.125	279.125
			334.95	334.95
Conc. Load				
DL @	9.5		807.5	**807.5**
LL @	9.5		969	**969.0**

Truss and Girder Loadings, connectors, and Foundation
First Floor

Truss ID	Uplift (lbs)	DL (lbs)	LL (lbs)	TL (lbs/ft)	TL (for Foundation)	Foundation	Anchor	F2 (#)	F1 int (Lt/Ft)	F2 int (Lt/Ft)	OK?	INT	OK?
T01	495	150	180	165	897	MONO	B	1100	0.89	0.89	OK	1.13	OK
T02	540	200	240	[illegible]	1052	MONO	[illegible]	1100	0.91	0.92	OK	1.15	OK
T03	372	150	180	[illegible]	897	MONO	B	1100	0.82	0.82	OK	1.08	OK
T04	1190	913	1095	1004	1795	MONO	C	725	0.75	0.94	OK	1.26	OK
T05	785	469	563	516	1288	MONO	B	1100	1.05	1.05	OK	1.25	OK
T06	852	542	650	[illegible]	[illegible]	MONO	C	725	0.75	0.94	OK	1.26	OK
T07	1030	738	885	[illegible]	[illegible]	MONO	[illegible]	[illegible]	0.75	0.94	OK	1.26	OK
T08	678	336	403	370	1102	MONO	B	1100	[illegible]	0.99	OK	1.20	OK
T09	767	439	527	483	1215	MONO	B	1100	1.04	1.04	OK	1.24	OK
T10	638	449	538	494	[illegible]	MONO	B	1100	0.97	0.97	OK	1.19	OK
T11	398	194	233	214	[illegible]	MONO	[illegible]	1050	0.44	0.87	OK	0.81	OK
T12	429	227	272	250	982	MONO	B	1100	0.85	0.85	OK	1.10	OK
T13	658	313	375	344	1076	MONO	[illegible]	1250	0.58	1.01	OK	0.92	OK
T14	563	225	270	248	980	MONO	[illegible]	1100	0.93	0.93	OK	1.16	OK
T15	609	275	330	303	1035	MONO	B	1100	0.95	0.95	OK	1.18	OK
T16	1064	775	930	853	1585	MONO	[illegible]	725	0.75	0.94	OK	1.26	OK
T17	761	442	530	486	1218	MONO	[illegible]	725	0.75	0.94	OK	1.26	OK
T18	780	463	555	509	1241	MONO	[illegible]	1105	0.25	1.09	OK	1.01	OK
GT16	1364	590	708	649	863	MONO	D	1520	0.75	0.99	OK	0.90	OK
GT17	780	463	555	509	631	MONO	D	1520	0.52	0.76	OK	0.72	OK
GT18	2793	903	1083	993	1430	MONO	KA	6000	0.46	0.70	OK	0.57	OK

Mr. & Mrs. Friedman’s Residence, Windmill Lake Estates, Weston, Florida

Exhibit C

Concrete Masonry Unit Typical Cross Sections.

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```
Short Period Spectral Acceleration,   Ss =    0.00 %
One Second Spectral Acceleration,     S1 =    < 0.75 g
(Computed) Design Category,              =    Category A
Parapet Component Importance Factor, Ip =    1
Parapet Height/Roof Height Ratio     z/h =    0
Veneer Weight                            =    0.00 psf.
Seismic Load on Main Wall*               =    5.50 psf.
* Minimum Code Required Value
Seismic Load on Parapet Wall             =    0.00 psf.
```

Masonry Wall: MASONRY WALL ANALYSIS AND DESIGN

```
==============================================================================
     Project : Friedman
     Location: Weston, Florida                           AL ALI, PhD, PE # 53318
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WIND LOADS:

	Load W or H	Magnitude (plf, lb)	Distance From Base of Wall (ft) Start	End
1	W	30.00	0.00	12.00
2				
3				
4				
5				

Notes: 1. ""W"" designates a uniform distributed wind load.
""H"" designates a concentrated horizontal wind load.
2. Horizontal loads are positive to the right.

MASONRY DATA:

```
Masonry Unit Strength                  = 1900.00 psi.

Masonry Compressive Strength,    f'm = 1500.00 psi.
Allowable Flexural Stress,        Fb =  500.00 psi.
Allowable Shear Stress,           Fv =   38.73 psi.
Allowable Tension:     No Grout,  Ft =   25.00 psi.
                    Solid Grout,  Ft =   68.00 psi.

Modulus of Elasticity,            Em =   1,350 ksi.
Modular Ratio,           Es/Em =   n =   21.48

Single Grouted Cell + Web Width      =    8.00 in.
Nominal Length of Masonry Unit       =   16.00 in.
Block Face Shell Thickness           =    1.25 in.
Nominal Minus Actual Thickness       =    0.38 in.
```

MATERIAL DATA:

Steel Yield Strength, Fy = 60.00 ksi.
Allowable Steel Stress, Fs = 24.00 ksi.
Modulus of Elasticity, Es = 29,000 ksi.

REINFORCED WALL DATA:

Minimum Steel Ratio, As/bt = 0.0007

Masonry Wall: MASONRY WALL ANALYSIS AND DESIGN

===

Project : Friedman
Location: Weston, Florida AL ALI, PhD, PE # 53318

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****

S U M M A R Y O F R E S U L T S

F O R M A I N W A L L

****

DESIGN LOADS:

Moment, Ms = [illegible]48.0 ft-lb / 12.00 in.
Axial Load, Ps = 471.6 lb / 12.00 in.
Load Combination = 0.6*DL+[illegible]WL
Eccentricity at Moment, e = M/P = [illegible].49 in.

NOTE: Max. moment is located in Zone [illegible] (e [illegible])
Wall is cracked, steel is stressed in tension.

Max. Shear, Vs = 216.0 LB / 12.00 in.
Load Combination = 0.6*DL+[illegible]

ANALYSIS RESULTS:

Design Strip Width = 12.00 in.
Actual Wall Thickness, t = 7.63 in.
Effective Height, h' = 12.00 ft.
Seismic Force, (IBC 2000 1620.1.7) Fp = 5.50 plf. / 12.00 in.

Minimum Area of Steel, Vertical Reinf. = 0.064 in.^2 / 12.00 in.
Minimum Area of Steel, Horiz. Reinf. = Not Required

Ref. ACI 99 1.11/IBC 2000 2109.6.5

DESIGN RESULTS:

All. Moment

6	4.80	622.1	1,400.0	43.2
7	3.60	544.3	1,466.0	86.4
8	2.40	414.7	1,532.0	129.6
9	1.20	233.3	1,598.0	172.8
10	0.00	0.0	1,664.0	216.0

WALL PROPERTIES:

Effective Flange Width bf = 10.29 in. / 12.00 in.
Effective Grouted Core Width, b' = 1.71 in. / 12.00 in.

Solid Masonry Area, Ae = 34.50 in.^2 / 12.00 in.
Gross Moment of Inertia, Ig = 283.84 in.^4 / 12.00 in.
Section Modulus, S = 2*Ig/t = 74.45 in.^3 / 12.00 in.
Radius of Gyration, r = 2.868 in. / 12.00 in.
Slenderness Factor, h'/r = 50.20

ALLOWABLE STRESSES:

Allowable Axial Stress, Fa = 435.[illegible] psi.
Allowable Bending Stress, Fb = 666.67 psi.
Allowable Shear Stress, Fv = 51.64 psi.
Allowable Steel Stress, Fs = 32000.00 psi.

Masonry Wall: MASONRY WALL ANALYSIS AND DESIGN

===

Project : Friedman
Location: Weston, Florida [illegible] PhD, PE # 53318

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DETAILED RESULTS FOR MAIN WALL:

LOAD COMBINATION : 1*DL+1*LL+0.7*E
REBAR DESIGN : #5 @ 56 in.
FURNISHED AREA OF STEEL : 0.066 in^2 / 12.00 in.
MINIMUM AREA OF STEEL : 0.064 in^2 / 12.00 in.

No.	Dist From Bot (ft)	Mom. (ft-lb)	Axial (lbs)	Shear (lbs)
0	12.00	0.0	1,004.0	-23.1
1	10.80	24.9	1,070.0	-18.5
2	9.60	44.4	1,136.0	-13.9
3	8.40	58.2	1,202.0	-9.2
4	7.20	66.5	1,268.0	-4.6
5	6.00	69.3	1,334.0	0.0
6	4.80	66.5	1,400.0	4.6
7	3.60	58.2	1,466.0	9.2
8	2.40	44.4	1,532.0	13.9
9	1.20	24.9	1,598.0	18.5
10	0.00	0.0	1,664.0	23.1

Universal Engineering, Inc.

Short Period Spectral Acceleration, Ss = 0.00 %
One Second Spectral Acceleration, S1 = < 0.75 g
(Computed) Design Category, = Category A
Parapet Component Importance Factor, Ip = 1
Parapet Height/Roof Height Ratio z/h = 0
Veneer Weight = 0.00 psf.
Seismic Load on Main Wall* = 5.50 psf.
* Minimum Code Required Value
Seismic Load on Parapet Wall = 0.00 psf.

Masonry Wall: MASONRY WALL ANALYSIS AND DESIGN

==

Project : Friedman
Location: Weston, Florida AL ALI, PhD, PE #53318

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WIND LOADS:

	Load W or H	Magnitude (plf, lb)	Distance From Base of Wall (ft) Start	End
1	W	30.00	0.00	12.00
2				
3				
4				
5				

Notes: 1. ""W"" designates a uniform distributed wind load.
""H"" designates a concentrated horizontal wind load.
2. Horizontal loads are positive to the right.

MASONRY DATA:

Masonry Unit Strength = 1900.00 psi.

Masonry Compressive Strength, f'm = 1500.00 psi.
Allowable Flexural Stress, Fb = 500.00 psi.
Allowable Shear Stress, Fv = 38.73 psi.
Allowable Tension: No Grout, Ft = 25.00 psi.
Solid Grout, Ft = 68.00 psi.

Modulus of Elasticity, Em = 1,350 ksi.
Modular Ratio, Es/Em = n = 21.48

Single Grouted Cell + Web Width = 8.00 in.
Nominal Length of Masonry Unit = 16.00 in.
Block Face Shell Thickness = 1.25 in.
Nominal Minus Actual Thickness = 0.38 in.

MATERIAL DATA:

Universal Engineering, Inc.

Bar Size	Fa, psi (4/3*.25*f'm*R)	fv, psi (V/b'd)	@ Axial Load (P=955.5 lb)	Bar Spa. (in. o.c.)
#3	448.34	7.34	1,037.2	16.00
#4	457.62	14.68	970.8	32.00
#5	461.13	25.69	888.8	56.00
#6	461.13	33.03	915.3	72.00
#7	461.13	33.03	1,003.7	72.00
#8	461.13	33.03	1,081.0	72.00
#9	461.13	33.03	1,144.5	72.00

Max. vertical bar spacing is 72 inch per ACI 99 2.3.3.3 (commentary)
Per IBC 2000 2107.2.4, bar size is limited to #8

Masonry Wall: MASONRY WALL ANALYSIS AND DESIGN

Project : Friedman
Location: Weston, Florida

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MASONRY WALL INTERACTION DIAGRAM: (DEAD + LIVE LOAD ONLY)

Effective Wall Height = [illegible] ft. Solid Masonry Area Ae = 34.50 in^2
Actual Wall Thickness = 7.63 in. All. Axial Stress Fa = 345.85 psi.
Depth to c.g. Steel = 3.81 in. All. Bending Stress Fb = 500.00 psi.
Design Width = 12.00 in. All. Steel Stress Fs = 24.00 ksi.
Reinforcing Design #5 @ 56 in. o.c.

Axial	Moment
11932	956
11389	1054
10847	1151
10305	1249
9762	1346
9220	1444
8678	1542
8135	1625
7593	1674
7051	1656
6508	1606
5966	1533
5424	1460
4881	1381

```
       |                                              +
  4339 |                                             +                1300
       |                                           +
  3796 |                                          +                   1217
       |                                        +
  3254 |o                                      +                      1135
       |o                                    +
  2712 |                                    +                         1053
       |                                  +
  2169 |                                 +                             972
       |                               +
  1627 |                              +                                891
       |                            +
  1085 |                          +                                    768
       |                        +
   542 |                      +                                        618
       |                    +
     0 |                  +                                            467
     -----------------------------------------------------------------
```

NOTES: Axial Load = Lb,   Moment = ft-lb
+ = Moment Capacity
o = Applied Moment

Positive moment is defined as moment which causes compression on the outside face of wall.

Masonry Wall: MASONRY WALL ANALYSIS AND DESIGN

===

Project : Friedman
Location: Weston, Florida   ... L AHU, PhD, PE # 53318

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MASONRY WALL INTERACTION DIAGRAM: (WIND / SEISMIC LOADS)

```
Effective Wall Height =   9.33 ft.   Solid Masonry Area,   Ae =  34.50 in^2
Actual Wall Thickness =   7.63 in.   Allow. Axial Stress,  Fa = 461.13 psi.
Depth to c.g. Steel   =   3.81 in.   Allow. Bending Stress, Fb = 666.67 psi.
Design Width          =  12.00 in.   Allow. Steel Stress,  Fs =  32.00 ksi.
Reinforcing Design    = #5 @ 56 in. o.c.

 Axial                                                              Moment
-------                                                             ------
 15909 | +  +  +  +  +  +  +  +  +  +  +  +                           1275
       |                                    +
 15186 |                                      +                       1405
       |                                       +
 14463 |                                         +                    1535
       |                                           +
 13740 |                                             +                1665
       |                                              +
 13017 |                                                +             1795
       |                                                  +
 12293 |                                                    +         1925
       |                                                     +
 11570 |                                                       +      2055
       |                                                         +
```

Mr. & Mrs. Friedman's Residence, Windmill Lake Estates, Weston, Florida

Exhibit D

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Timber Design 1 - Option 1 - Design of Member 1 - 2x6 ✔

Design Data

Design of Member 1 - 2x6 ✔		
Material type is No. 2 -Southern Pine - Dimensional		
Check for repetitive use? No	Top flange bracing is Fully Braced	E_{bx}: 1.6e+06 psi
Moist use? No	Bottom flange bracing is Fully Braced	E_{by}: 1.6e+06 psi
I_x= 20.8 in^4 S_x= 7.6 in^3	I_y= 1.5 in^4 S_y= 2.1 in^3	G assumed as .06E
Shear C_H = 1 Snow C_d= 1.15	This is not a spaced column	F_b: 1250 psi
Side loaded? No	K_x = 1	[illegible] psi
Overstress factor = 1	L_x = 9'4"	F_c: 1600 psi
Allowable Floor live load deflection = L/360	K_y = 1	$F_{c\perp}$: 565 psi
Allowable Floor total load deflection = L/240 (3 in Maximum)	L_y = 9'4"	F_v: 90 psi
Member weight used in analysis = 0 plf	Area = 8.25 in^2	Actual density: 37 pcf

Critical Design Checks

	Critical Reaction lb	[illegible]	[illegible]	[illegible]	[illegible]	LL Defl. in	TL Defl. in
Span 1 Value Allowable % of Allow. Location	392 1271.33 31 ✔ 0'	[illegible] N.A 0 ✔ 5'3"	[illegible]	[illegible]	[illegible]	[illegible] [illegible] [illegible] 4'11-3/32"	0.269 0.4667 57 ✔ 4'11-3/32"

	C_D	C_t	C_L	C_V	[illegible]	[illegible]	[illegible]	[illegible]	C_{Py}	C_H	C_T
Span 1	1.600	1.000	1.000	1.000	1.000	[illegible]	[illegible]	0.399	0.000	1.000	1.000

	C_b	C_{Fb}	C_{Ft}	C_{Fc}	C_{Mb}	[illegible]	[illegible]	$C_{Mc\perp}$	C_{Mc}	C_{ME}	R_b
Span 1	1.000	1.000	1.000	1.000	1.000	1.000	[illegible]	1.000	1.000	1.000	0

	L/d Limit	L_x/d	L_y/d	$F_{CE\ x}$ psi	$F_{CE\ y}$ psi	F_{bE} psi	K_{cE}	c	F^*_c psi
Span 1	50	20.36	74.67	1157.53	86.0969	1e+06	0.3	0.8	2560

Notes:

- Member has an actual/allowable ratio in span 1 of 86 ✔%.
- Design is governed by live load deflection.

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- Governing load combination is Dead+Wind in Neg X.
- Maximum hanger forces: 392 lb (Left) and -304.889 lb (Right).

Minimum Bearing

Span	Actual Length ft	Left Support Min. Bearing in	Right Support Min. Bearing in
Span 1	9'4"	1.5	1.5

Notes:

- Locations of maximum stress, moment, etc. are measured from the left end of the member.
- Bearing across full width of beam is required.
- Structural adequacy of supporting members must be confirmed.
- Bearing lengths required may be limited by bearing stress on supporting members.
- A negative reaction indicates that the beam must be fastened to the support to resist uplift.
- See manufacturer's literature for side loaded connection requirements.
- Cantilever deflection allowables are based on twice the span length.
- Timber design if governed by NDS 1997

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- Governing load combination is Dead+Roof Live.
- Axial capacity of member is 3203.75 lb.
- Maximum hanger forces: 261.333 lb (Left) and 261.333 lb (Right).

Minimum Bearing

Span	*Actual Length ft*	*Left Support Min. Bearing in*	*Right Support Min. Bearing in*
Span 1	9'4"	1.5	1.5

Notes:

- Locations of maximum stress, moment, etc. are measured from the left end of the member.
- Bearing across full width of beam is required.
- Structural adequacy of supporting members must be confirmed.
- Bearing lengths required may be limited by bearing stress on supporting members.
- A negative reaction indicates that the beam must be fastened to the support to resist uplift.
- See manufacturer's literature for side loaded connection requirements.
- Cantilever deflection allowables are based on twice the span length.
- Timber design governed by NDS 1997.

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Exhibit E

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![Universal Engineering, Inc. logo]

```
=========
  # 1  Concentrated Load:       3.700  K            3.330  K
                Distance:       4.330  Ft           4.330  Ft

  # 2  Concentrated Load:       0.780  K            0.940  K
                Distance:       3.000  Ft           3.000  Ft

  # 1       Uniform Load:       0.120  K /Ft        0.140  K /Ft
       Distance to Begin:       0.000  Ft           0.000  Ft
       Distance to   End:       6.000  Ft           6.000  Ft

  # 2       Uniform Load:       0.094  K /Ft        0.113  K /Ft
       Distance to Begin:       0.000  Ft           0.000  Ft
       Distance to   End:       3.200  Ft           6.000  Ft

  # 3       Uniform Load:       0.200  K /Ft        0.000  K /Ft
       Distance to Begin:       0.000  Ft           0.000  Ft
       Distance to   End:       6.000  Ft           [illegible]
```

C R I T I C A L   S H E A R S   &   M O M E N T S

```
                           DEAD LOAD         LOAD COMB 1         LOAD COMB 2         LOAD COMB 3          LOAD
COMB 4

Load Combination Dead Load: [illegible]
Load Combination         # 1: [illegible]
Load Combination         # 2: [illegible]
Load Combination         # 3: [illegible]
Load Combination         # 4: [illegible]

  Shear          Left End:   [illegible]  K      -6.570  K     [illegible]  K     [illegible]  K       -
5.276  K
  Moment         Left End:   0.000  K -Ft    [illegible]    [illegible]    0.000  K -Ft
0.000  K -Ft
  Shear         Right End:   [illegible]    [illegible]    [illegible]    4.920  K
8.553  K
  Moment        Right End:   [illegible]    [illegible]    [illegible]    0.000  K -Ft
0.000  K -Ft
  Maximum Moment        :   -8.[illegible]    [illegible]    [illegible]   -7.682  K -Ft   -
13.395  K -Ft
               Located at:   4.330  Ft      [illegible]    [illegible]  Ft   4.330  Ft
4.330  Ft
  Max Deflection        :    0.072  In      [illegible]  In    [illegible]  In   0.072  In
0.167  In
               Located at:   3.169  Ft      [illegible]    3.174  Ft     3.169  Ft
3.174  Ft
                Dead Part:                                 0.072  In     0.072  In
0.072  In
      Inflection Points:     0.000  Ft      [illegible]    0.000  Ft     0.000  Ft
0.000  Ft
                             6.000  Ft      6.000          6.000  Ft     6.000  Ft
6.000  Ft
  Reaction       Left End:  -3.641  K      -6.570  K      -5.276  K     -3.121  K       -
5.276  K
  Reaction      Right End:  -5.741  K     -10.732  K      -8.553  K     -4.920  K       -
8.553  K
```

C R I T I C A L   S H E A R S   &   M O M E N T S

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	LOAD COMB 5	LOAD COMB 6	LOAD COMB 7	LOAD COMB 8	LOAD COMB 9

Load Combination # 5: 1.200 x Dead Load + 1.000 x L + 1.400 x E + 0.200 x R
Load Combination # 6: 0.900 x Dead Load + 1.600 x W
Load Combination # 7: 0.900 x Dead Load + 1.400 x E
Load Combination # 8: 1.200 x Dead Load – 0.800 x W + 1.600 x R
Load Combination # 9: 1.200 x Dead Load + 1.000 x L – 1.600 x W + 0.500 x R

		LOAD COMB 5	LOAD COMB 6	LOAD COMB 7	LOAD COMB 8	LOAD COMB 9
Shear	Left End:	-5.276 K	-2.340 K	-2.340 K	-3.121 K	-5.276 K
Moment	Left End:	0.000 K -Ft	0.000 K -Ft	0.000 K -Ft	0.000 K -Ft	0.000 K -Ft
Shear	Right End:	8.553 K	3.[illegible] K	3.690 K	4.920 K	8.553 K
Moment	Right End:	0.000 K -Ft	[illegible]	0.000 K -Ft	0.000 K -Ft	0.000 K -Ft
Maximum Moment	:	-13.395 K -Ft	[illegible]	-5.761 K -Ft	-7.682 K -Ft	-13.395 K -Ft
	Located at:	4.330 Ft	[illegible]	4.330 Ft	4.330 Ft	4.330 Ft
Max Deflection	:	0.167 In	0.072 In	0.072 In	0.072 In	0.167 In
	Located at:	3.174 Ft	[illegible]	[illegible]	3.169 Ft	3.174 Ft
	Dead Part:	[illegible]	0.072 In	[illegible]	0.072 In	0.072 In
	Inflection Points:	[illegible]	0.000 Ft	0.000 Ft	0.000 Ft	0.000 Ft
		6.000 Ft	6.000 Ft	6.000 Ft	6.000 Ft	6.000 Ft
Reaction	Left End:	[illegible]	-2.340 K	[illegible]	[illegible] K	-5.276 K
Reaction	Right End:	[illegible]	[illegible]	[illegible]	-4.920 K	-8.553 K

	LOAD COMB 10	LOAD COMB 11	LOAD COMB 12	LOAD COMB 13	LOAD COMB 14

Load Combination #10: 1.200 x Dead Load [illegible] 0.200 x R
Load Combination #11: 0.900 x Dead Load – [illegible]
Load Combination #12: 0.900 x Dead Load – 1.[illegible]

		LOAD COMB 10	LOAD COMB 11	LOAD COMB 12
Shear	Left End:	-5.276 K	-2.[illegible]	-2.340 K
Moment	Left End:	0.000 K -Ft	0.0[illegible] K -Ft	0.000 K -Ft
Shear	Right End:	8.553 K	3.690 K	3.690 K
Moment	Right End:	0.000 K -Ft	0.000 K -Ft	0.000 K -Ft
Maximum Moment	:	-13.395 K -Ft	-5.761 K -Ft	-5.761 K -Ft
	Located at:	4.330 Ft	4.330 Ft	4.330 Ft
Max Deflection	:	0.167 In	0.072 In	0.072 In
	Located at:	3.174 Ft	3.169 Ft	3.169 Ft
	Dead Part:	0.072 In	0.072 In	0.072 In
	Inflection Points:	0.000 Ft	0.000 Ft	0.000 Ft
		6.000 Ft	6.000 Ft	6.000 Ft
Reaction	Left End:	-5.276 K	-2.340 K	-2.340 K
Reaction	Right End:	-8.553 K	-3.690 K	-3.690 K

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S E C T I O N   D E S I G N   I N F O R M A T I O N

S E C T I O N   F L E X U R A L   D E S I G N

```
Mid-Span Region
================

  Cross-Section Information
    Total Depth                :     8.000  In        Distance to Centroid As   :      5.88  In
    Top Width                  :     8.000  In        Distance to Centroid A's  :      2.13  In
  For Design Moment, Mu        :     0.000  K -Ft
              Required As      :     0.130  In^2 [illegible]
              Required A's     :     0.000  In^2 [illegible]
              Provided As      :     0.40[illegible]  In^2 [illegible]
              Provided A's     :     0.0[illegible]  In^2 [illegible]
  Reduction Factor, Phi        :     0.[illegible]
  Moment Capacity, *Mn         :     [illegible]
  Gross Area                   :     [illegible]
  Gross Moment of Inertia      :     [illegible]      Neutral Axis Location     :      4.00  In

                  N (Es/Ec)    :     [illegible]                                :   3606.51  K /In ^2
  Cracked Moment of Inertia    :     [illegible]      Neutral Axis Location     :      6.19  In
  Cracking Moment              :     [illegible]

Mid-Span Region
================

  Cross-Section Information
    Total Depth                :     [illegible]                                :      5.75  In
    Top Width                  :     [illegible]                                :      2.25  In
  For Design Moment, Mu        :     [illegible]
              Required As      :     [illegible]
              Required A's     :     [illegible]
              Provided As      :     [illegible]
              Provided A's     :     [illegible]
  Reduction Factor, Phi        :     0.[illegible]
  Moment Capacity, *Mn         :   -18.12[illegible]
  Gross Area                   :    64.000  [illegible]
  Gross Moment of Inertia      :   341.333  [illegible]  [illegible]cation          :      4.00  In

                  N (Es/Ec)    :     8.04                                       :   3606.51  K /In ^2
  Cracked Moment of Inertia    :   116.259  In^4      [illegible]xis Location   :      5.57  In
  Cracking Moment              :     3.343  K -Ft

* Indicates That Nominal Resistance Includes Appropriate [illegible]ctor
```

B O T T O M [illegible]

```
Mid-Span Region
================
```


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```
  Shear          Left End:       9.931  K            4.532  K            4.532  K            6.043  K
9.931  K
  Moment         Left End:       0.000  K -Ft        0.000  K -Ft        0.000  K -Ft        0.000  K -Ft
0.000  K -Ft
  Shear         Right End:      -9.931  K           -4.532  K           -4.532  K           -6.043  K          -
9.931  K
  Moment        Right End:       0.000  K -Ft        0.000  K -Ft        0.000  K -Ft        0.000  K -Ft
0.000  K -Ft
  Maximum Moment         :      43.868  K -Ft       20.022  K -Ft       20.022  K -Ft       26.696  K -Ft
43.868  K -Ft
               Located at:       8.835  Ft           8.835  Ft           8.835  Ft           8.835  Ft
8.835  Ft
  Max Deflection         :      -0.042  In          -0.024  In          -0.024  In          -0.024  In         -
0.042  In
               Located at:       8.835  Ft           8.835  Ft           8.835  Ft           8.835  Ft
8.835  Ft
                Dead Part:      -0.024  In          -0.024  In          -0.024  In          -0.024  In         -
0.024  In
          Inflection Points:     0.000  Ft           0.000  Ft           0.000  Ft           0.000  Ft
0.000  Ft
                                17.670  Ft          17.670  Ft          17.670  Ft          17.670  Ft
17.670  Ft

  Reaction       Left End:       9.931  K            4.532  K            4.532  K            6.043  K
9.931  K
  Reaction      Right End:       9.931  K            4.532  K            4.532  K            6.043  K
9.931  K
```

```
                    LOAD COMB 10        LOAD COMB 11        LOAD COMB 12        LOAD COMB 13        LOAD
COMB 14
```

```
Load Combination        #10: [illegible]
Load Combination        #11: [illegible]
Load Combination        #12: 0. [illegible]

  Shear          Left End:       9.931  K          [illegible]           4.532  K
  Moment         Left End:       0.000  K -Ft      [illegible]           0.000  K -Ft
  Shear         Right End:      -9.931  K          [illegible]          -4.532  K
  Moment        Right End:       0.000  K -Ft      [illegible]           0.000  K -Ft
  Maximum Moment         :      43.868  K -Ft      [illegible]          20.022  K -Ft
               Located at:       8.835  Ft         [illegible]           8.835  Ft
  Max Deflection         :      -0.042  In         [illegible]          -0.024  In
               Located at:       8.835  Ft         [illegible]           8.835  Ft
                Dead Part:      -0.024  In         [illegible]          -0.024  In
          Inflection Points:     0.000  Ft         [illegible]           0.000  Ft
                                17.670  Ft         [illegible]          17.670  Ft

  Reaction       Left End:       9.931  K           4.532  K             4.532  K
  Reaction      Right End:       9.931  K           4.532  K             4.532  K
```

S E C T I O N   D E S I G N   I N F O R M A T I O N

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Exhibit F

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Steel Column Check SC1

Element:	**SC1**	Company:	**Universal Engineering, Inc.**
Description:	Steel Column with worst loading conditions	User:	**Dr. AL ALI**
Date:	**10/24/2009 01:02 PM**	Software:	**Digital Canal Steel Beam Column Design**

GENERAL INFORMATION

Description	Value	Description	Value
Run Mode	Check Mode	K_y	1.00
Design Code	AISC ASD (1990)	K_z	1.00
Beam-Column Length	12.00 ft	Total Load Deflection Limit	L / 240
Steel Yield Stress	50.00 ksi	Live Load Deflection Limit	L / 360
C_b Calculation	$1.75 + 1.05M_1 / M_2 + 0.3(M_1 / M_2)^2 \leq 2.3$	Lateral Torsional Braced (LTB) Length	[illegible]
C_{mx} Calculation	Always use 1.0 (conservative)	Section Shape	-
C_{my} Calculation	Always use 1.0 (conservative)	Maximum Section Depth	-
L_x	12.00 ft	Minimum Section Depth	-
L_y	12.00 ft	Back to Back Distance (double angles only)	-
L_z	12.00 ft	Section Width (angles, double angles)	-
K_x	1.00	Check Section List	TS3.5x3.5x.25
		Maximum Stress Ratio	-

LOAD INFORMATION

Ref. No.	Load Case	Load Type	Direction	Begin Value	Begin Position	End Value	End Position
1	Dead	Concen	Z	[illegible] (kips)	12.000 (ft)	-	-
2	Live	Concen	Z	[illegible] (kips)	12.000 (ft)	-	-
3	Wind	Concen	Z	[illegible] (kips)	12.000 (ft)	-	-

SELECTED LOAD COMBINATIONS

Load Combination	Code	Total	Live	Dependent	Conditional
LC1: 1.0DL+1.0LL+1.0WL+1.0SL					x
LC2: 1.4DL				x	
LC3: 1.2DL+1.6LL+0.5SL	x			x	
LC4: 1.2DL+1.6SL+0.5LL	x			x	
LC5: 1.2DL+1.6SL+0.8WL	x			x	
LC6: 1.2DL+1.3WL+0.5LL+0.5SL	x			x	
LC7: 1.2DL+0.5LL+0.2SL	x			x	

CRITICAL STRESS SUMMARY

Ref. No.	Section Name	Status	Governing Criteria	Stress Ratio	Load Combination	Distance (ft)

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MF1

Based on loadings in Exhibit B, use 16"X18", 2#5 bottom and 1 #5 top

MF2

Based on loadings in Exhibit B, use 16"X24", 3#5 bottom and 1 #5 top

MF3

Based on loadings in Exhibit B, use 16"X24", 3#5 bottom and 1 #5 top

F3

Based on loadings in Exhibit B, F3 locations receive less than 18 kips. Use 3 ft. X 3ft. X 16", 5#5 each way

F3.5

Based on loadings in Exhibit B, F4 locations receive less than 20 kips but more than 18 kips. Use 3.5 ft. X 3.5ft. X 16", 6#5 each way

SW-

Stem wall footings, 12" deep, dimension vary with 2#5 @ 12" O.C. longtudinal and #5 @ 32" O.C. transverse

TE-

Thickened edge for [illegible] with minimum 1#5 for each 10" thickness

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