Schafer Engineering LLC

14952 Main St. Alachua FL 32615

Prepared for:

RONALD CLARK CONSTRUCTION
THE RADINSKI 18' X 25' ADDITION
ALACHUA COUNTY, FLORIDA

COLUMBIA COUNTY BUILDING DEPARTMENT
Received for
FILE COPY
Code Compliance
PLANS EXAMINER

By:

Schafer Engineering, LLC

386-462-1340 / 352-375-6329

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SCHAFER ENGINEERING, LLC

August 22, 2013

SUMMARY: Wind Load Analysis for Ronald Clark Construction \ Radinski Residence
Wind Speed: 135 M.P.H. \ No Copies Permitted \ FBC-2010 \ Not Valid without raised seal

Foundation:
20" wide x 10" deep stemwall footing with (2) #5 rebar continuous minimum. CMU walls must have #5 dowels at 72" o.c. maximum with a standard 90 degree ACI hook in footing and a 4" slab on grade. Monolithic slab to be 12" wide x 20" deep minimum with (2) #5 rebar continuous with 12" minimum coverage on face of foundation. Fiber mesh or wwm may be used in concrete slab. All steel must be grade 40 minimum. 1500 psf soil bearing pressure minimum.

Walls:
8" CMU block with vertical #5 reinforcing bar in grout filled cell at 72" o.c. maximum spacing. Wall heights are 8' maximum. Provide an 8" x 8" bond beam with 1-#5 rebar horizontal continuous at the top course. Install pre-cast, pre-engineered lintels spanning over all openings. One #5 rebar each corner. One #5 rebar each side of door and window openings. Two #5 rebar in openings wider than 12'-0". One #5 rebar where girders or girder trusses bear on masonry wall.

Shearwalls:
Transverse: 10'-8"
Longitudinal: 20'-0"

Allowable pounds per foot unit shear on shearwalls: 314
Unit shear transferred from diaphragm: Trs: 217 plf Long: 78 plf

Trusses:
Pre-engineered Pre-fabricate trusses with the bracing system designed by the manufacturer. Trusses must be installed and anchored according to the truss engineering requirements.

Roof Sheathing:
7/16" osb minimum attached to the top chords of the trusses with 8d/113 gauge ring shank nails spaced at 4" o.c. edges and 6" interior.

8-23-13

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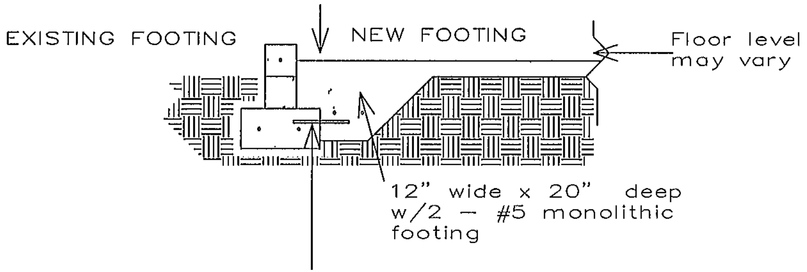
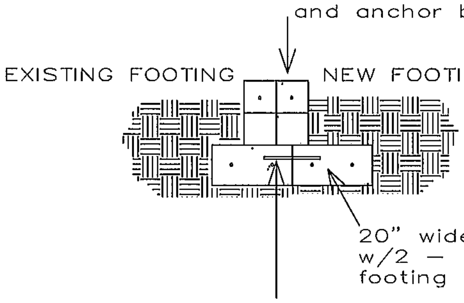
see wind load analysis for
anchor bolt spacing



12" wide x 20" deep
w/2 – #5 monolithic
footing

Install #5 rebar with 7" embedment
into each footing @ 24" o c minimum

see wind load analysis for
vertical reinforcement spacing
and anchor bolt spacing



20" wide x 10" deep
w/2 – #5 stemwall
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Install #5 rebar with 7" embedment
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see wind load analysis for
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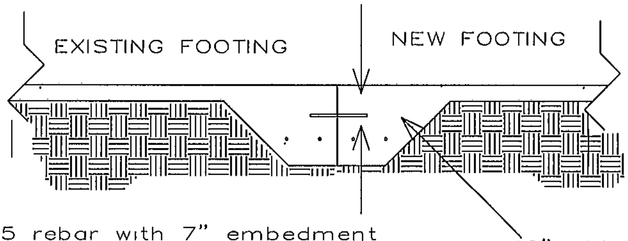

Install #5 rebar with 7" embedment
into each footing @ 24" o c minimum

12" wide x 20" deep
w/2 – #5 monolithic
footing

Note
All steel must be grade 40 minimum

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TIE-DOWN TABLES

HEADER STRAPPING

Uplift Lbs	Top Connector	Rating Lbs	Bottom Connector	Rating Lbs
to 455	LSTA19	635	H3	320
to 910	LSTA12	795	2-H3	640
to 1265	LSTA18	1110	LTT19	1305
to 1750	2-LSTA12	1810	LTT20	1750
to 2530	2-LSTA18	2530	HD2A-2 5	2165
to 2865	3-LSTA18	3255	HD2A-3 5	2865
to 3700	3-LSTA24	3880	HD5A-3	3130

Total the uplift for each truss sitting on the header and divide by 2 to determine the uplift on the header Use proper bolt anchors sufficient to support required uplift loads

TRUSSES \ GIRDERS

Uplift Lbs	Top Connector	Bottom Connector	Rating Lbs
to 535	H2 5A	NA	
to 1015	H10A	NA	
to 1215	TS22	LTT19	1305
to 1750	2-TS22	LTT20	1750
to 2570	2-TS22	HD2A	2775
to 3665	3-TS22	HD5A	4010
to 5420	2-MST37	HTT22	5250
to 9660	2-MST60	HD10A	9540

Two 12d common toenials are required per truss for each bearing point into top plate
It is the contractors responsibility to provide a continuous load path from truss to foundation

	TOP CONNECTOR	RATING LBS	BOTTOM CONNECTOR	RATING LBS
BEAM SEATS	LSTA18	1110	LTT19	1305
POSTS	2-LSTA18	2220	ABU44	2300

1 Simpson or equivient hardware may be used
For nailing into spruce members, multiply table values by 86
2 See truss engineering for anchor uplift values
3 This schedule is not meant to be a replacement to the specified values of any manufactures values

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Wind Load Design per ASCE 7-05

User Input Data		
Structure Type	Building	
Basic Wind Speed (V)	135	mph
Structural Category	II	
Exposure	B	
Struc Nat Frequency (n1)	1	Hz
Slope of Roof (Theta)	26.6	Deg
Type of Roof	Hipped	
Eave Height (Eht)	8.00	ft
Ridge Height (RHt)	13.34	ft
Mean Roof Height (Ht)	10.92	ft
Width Perp. to Wind (B)	18.00	ft
Width Parallel to Wind (L)	26.33	ft
Damping Ratio (beta)	0.01	

Red values should be changed only through "Main Menu"

Calculated Parameters	
Type of Structure	
Height/Least Horizontal Dim	0.61
Flexible Structure	No

Calculated Parameters		
Importance Factor	1	
Non-Hurricane, Hurricane (v=85-100 mph) & Alaska		
Table C6-4 Values		
Alpha =	7.000	
zg =	1200.000	
At =	0.143	
Bt =	0.840	
Am =	0.250	
Bm =	0.450	
Cc =	0.300	
l =	320.00	ft
Epsilon =	0.333	
Zmin =	30.00	ft

Gust Factor Category I: Rigid Structures - Simplified Method			
Gust1	For rigid structures (Nat Freq > 1 Hz) use 0.85	0.85	
Gust Factor Category II: Rigid Structures - Complete Analysis			
Zm	Zmin	30.00	ft
Izm	Cc * (33/z)^0.167	0.3048	
Lzm	l*(zm/33)^Epsilon	309.99	ft
Q	(1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5	0.9360	
Gust2	0.925*((1+1.7*Izm*3.4*Q)/(1+1.7*3.4*Izm))	0.8873	
Gust Factor Category III: Flexible or Dynamically Sensitive Structures			
Vhref	V*(5280/3600)	198.00	ft/s
Vzm	bm*(zm/33)^Am*Vhref	87.00	ft/s
NF1	NatFreq*Lzm/Vzm	3.56	Hz
Rn	(7.47*NF1)/(1+10.302*NF1)^1.667	0.0627	
Nh	4.6*NatFreq*Ht/Vzm	0.58	
Nb	4.6*NatFreq*B/Vzm	0.95	
Nd	15.4*NatFreq*Depth/Vzm	4.66	
Rh	1/Nh-(1/(2*Nh^2)*(1-Exp(-2*Nh)))	0.7048	
Rb	1/Nb-(1/(2*Nb^2)*(1-Exp(-2*Nb)))	0.5810	
Rd	1/Nd-(1/(2*Nd^2)*(1-Exp(-2*Nd)))	0.1915	
RR	((1/Beta)*Rn*Rh*Rb*(0.53+0.47*Rd))^0.5	1.2620	
gg	+(2*LN(3600*n1))^0.5+0.577/(2*LN(3600*n1))^0.5	4.19	
Gust3	0.925*((1+1.7*Izm*(3.4^2*Q^2+GG^2*RR^2)^0.5)/(1+1.7*3.4*Izm))	1.41	

Gust Factor Summary			
Main Wind-force resisting system:		**Components and Cladding:**	
Gust Factor Category:	I	Gust Factor Category:	I
Gust Factor (G)	0.89	Gust Factor (G)	0.89

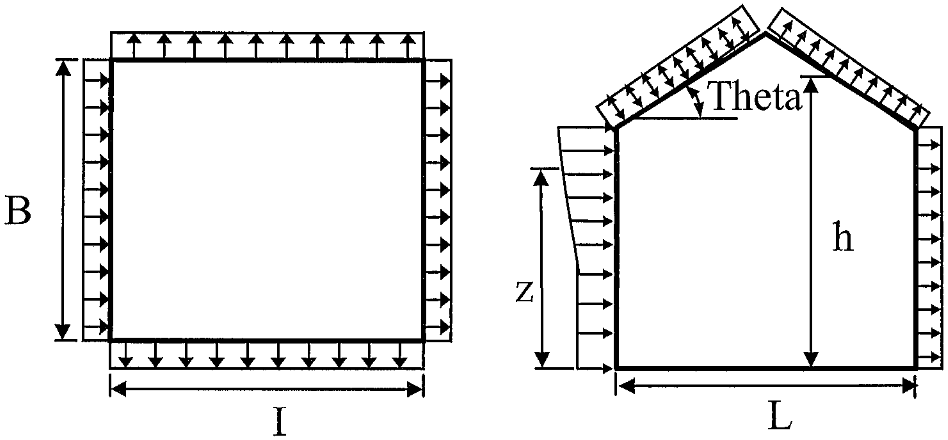
Wind Load Design per ASCE 7-05

6.5.12.2.1 Design Wind Pressure - Buildings of All Heights (Non-flexible)

Elev.	Kz	Kzt	Kd	qz	Pressure (lb/ft^2)	
					Windward Wall*	
ft			1.00	lb/ft^2	+GCpi	-GCpi
15	0.70	1.00	1.00	32.69	18.37	28.03

Figure 6-3 - External Pressure Coefficients, Cp

Loads on Main Wind-Force Resisting Systems



Variable	Formula	Value	Units
Kh	2.01*(15/zg)^(2/Alpha)	0.57	
Kht	Topographic factor (Fig 6-2)	1.00	
Qh	.00256*(V)^2*ImpFac*Kh*Kht*Kd	26.81	psf

Wall Pressure Coefficients, Cp	
Surface	**Cp**
Windward Wall (See Figure 6.5.12.2.1 for Pressures)	0.80

Roof Pressure Coefficients, Cp	
Roof Area (sq. ft.)	-
Reduction Factor	1.00

Description	Cp	Pressure (psf) +GCpi	-GCpi
Leeward Walls (Wind Dir Parallel to 18 ft wall)	-0.41	-14.52	-4.87
Leeward Walls (Wind Dir Parallel to 26.33 ft wall)	-0.50	-16.72	-7.07
Side Walls	-0.70	-21.48	-11.83
Roof - Normal to Ridge (Theta>=10)			
Windward - Max Negative	-0.24	-10.65	-1.00
Windward - Max Positive	0.23	0.74	10.40
Leeward Normal to Ridge	-0.60	-19.10	-9.45
Overhang Top	-0.24	-5.82	-5.82
Overhang Bottom	0.80	0.71	0.71
Roof - Parallel to Ridge (All Theta)			
Dist from Windward Edge: 0 ft to 5.46 ft	-0.90	-26.24	-16.59
Dist from Windward Edge: 5.46 ft to 10.92 ft	-0.90	-26.24	-16.59
Dist from Windward Edge: 10.92 ft to 21.84 ft	-0.50	-16.72	-7.07
Dist from Windward Edge: > 21.84 ft	-0.30	-11.96	-2.31

* Horizontal distance from windward edge

Figure 6-4 - External Pressure Coefficients, GCpf

Wind Load Design per ASCE 7-05

Loads on Main Wind-Force Resisting Systems w/ Ht <= 60 ft

Kh = 2.01*(15/zg)^(2/Alpha) = 0.57
Kht = Topographic factor (Fig 6-2) = 1.00
Qh = 0.00256*(V)^2*ImpFac*Kh*Kht*Kd = 26.81

Case A						
Surface	**GCpf**	**+GCpi**	**-GCpi**	**qh (psf)**	**Min P (psf)**	**Max P (psf)**
1	0.55	0.18	-0.18	32.69	12.09	23.85
2	-0.10	0.18	-0.18	32.69	-9.02	2.75
3	-0.45	0.18	-0.18	32.69	-20.49	-8.73
4	-0.39	0.18	-0.18	32.69	-18.64	-6.88
5	0.00	0.18	-0.18	32.69	-5.88	5.88
6	0.00	0.18	-0.18	32.69	-5.88	5.88
1E	0.73	0.18	-0.18	32.69	17.89	29.66
2E	-0.19	0.18	-0.18	32.69	-11.95	-0.18
3E	-0.58	0.18	-0.18	32.69	-24.99	-13.22
4E	-0.53	0.18	-0.18	32.69	-23.35	-11.58
5E	0.00	0.18	-0.18	32.69	-5.88	5.88
6E	0.00	0.18	-0.18	32.69	-5.88	5.88

* p = qh * (GCpf - GCpi)

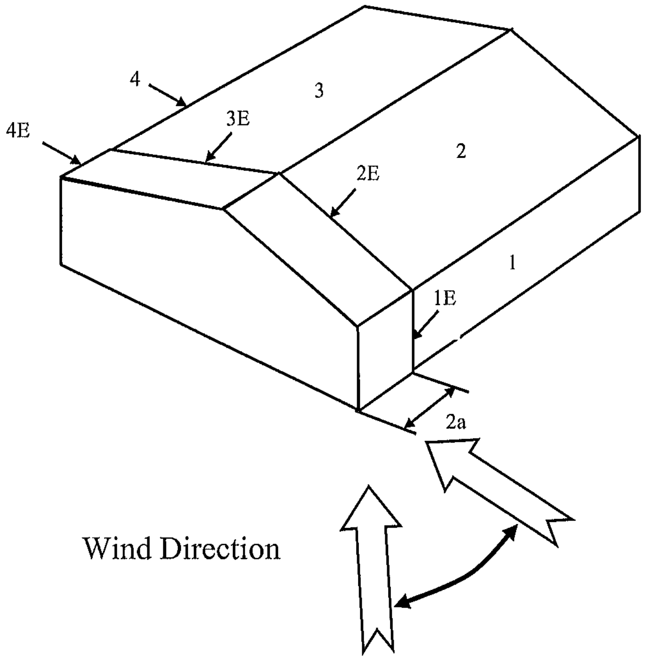


Figure 6-4 - External Pressure Coefficients, GCpf

Loads on Main Wind-Force Resisting Systems w/ Ht <= 60 ft

Kh = 2.01*(15/zg)^(2/Alpha) = 0.57
Kht = Topographic factor (Fig 6-2) = 1.00
Qh = 0.00256*(V)^2*ImpFac*Kh*Kht*Kd = 26.81

Case B

Wind Load Design per ASCE 7-05

Surface	GCpf	+GCpi	-GCpi	qh (psf)	Min P (psf)	Max P (psf)
1	-0.45	0.18	-0.18	32.69	-20.59	-8.83
2	-0.69	0.18	-0.18	32.69	-28.44	-16.67
3	-0.37	0.18	-0.18	32.69	-17.98	-6.21
4	-0.45	0.18	-0.18	32.69	-20.59	-8.83
5	0.40	0.18	-0.18	32.69	7.19	18.96
6	-0.29	0.18	-0.18	32.69	-15.36	-3.60
1E	-0.48	0.18	-0.18	32.69	-21.57	-9.81
2E	-1.07	0.18	-0.18	32.69	-40.86	-29.09
3E	-0.53	0.18	-0.18	32.69	-23.21	-11.44
4E	-0.48	0.18	-0.18	32.69	-21.57	-9.81
5E	0.61	0.18	-0.18	32.69	14.06	25.82
6E	-0.43	0.18	-0.18	32.69	-19.94	-8.17

* p = qh * (GCpf - GCpi)

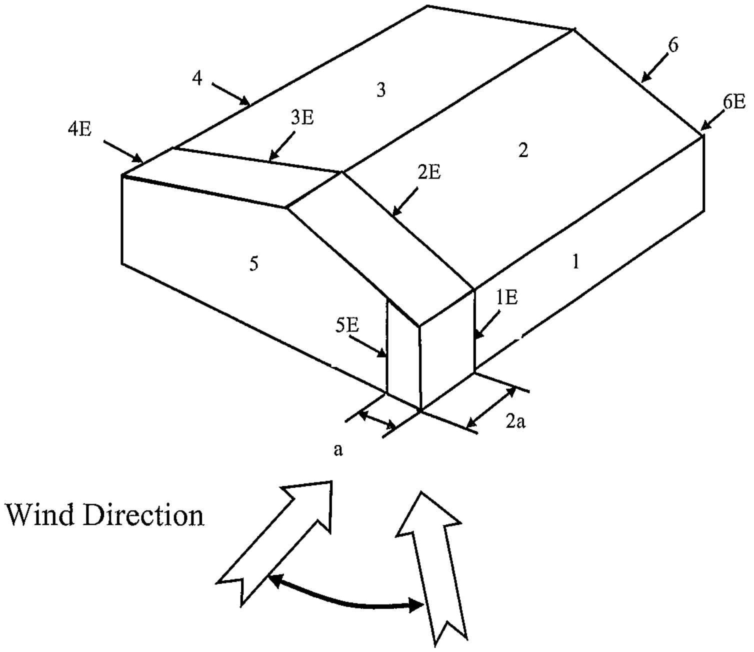
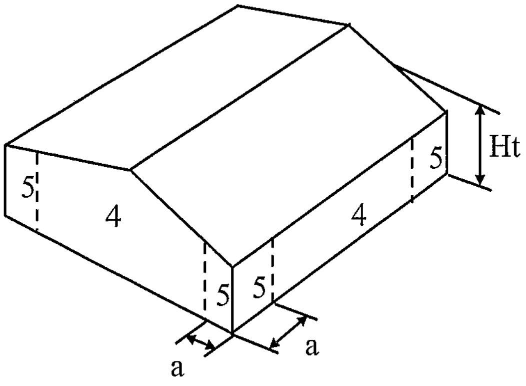
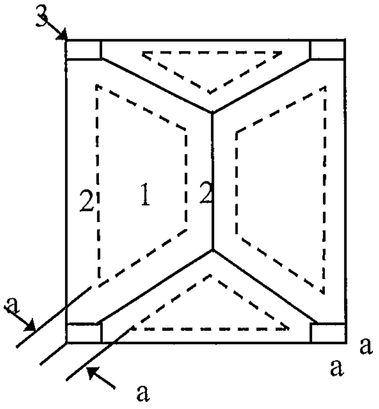


Figure 6-5 - External Pressure Coefficients, GCp

Loads on Components and Cladding for Buildings w/ Ht <= 60 ft





Hipped Roof

Wind Load Design per ASCE 7-05

Hipped Roof

10 < Theta <= 30

a = 1.8 ==> 3.00 ft

Component	Width (ft)	Length (ft)	Area (ft^2)	Zone	GCp		Wind Press (lb/ft^2)	
					Max	Min	Max	Min
	16	7	112.00	5	0.81	-1.03	26.67	-32.43
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
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	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					
	0	0	0.00					

Note: * Enter Zone 1 through 5, or 1H through 3H for overhangs.

Table 6-7 Internal Pressure Coefficients for Buildings, Gcpi

Condition	Gcpi	
	Max +	Max -
Open Buildings	0.00	0.00
Partially Enclosed Buildings	0.55	-0.55
Enclosed Buildings	0.18	-0.18
Enclosed Buildings	**0.18**	**-0.18**