

STRUCTURAL DESIGN CRITERIA

ALL DESIGNS SHALL CONFORM TO THE PROVISIONS OF THE INTERNATIONAL BUILDING CODE, 2009 EDITION.

1.0 DESIGN LOADS

1.1 DEAD LOADS

	MAXIMUM GRAVITY LOAD
SHINGLE ROOFING	8 PSF
STEEL DECK & UNDERLAY	2 PSF
COLD - FRAMED METAL TRUSS	5 PSF
MECH, ELECT, FP	10 PSF
CEILING & MISC.	5 PSF
	30 PSF

1.2 LIVE LOADS (PER INTERNATIONAL BUILDING CODE, 2009 EDITION.)

1.2.1 ROOF LIVE LOAD:
GREATER OF 1.0 KPa MINIMUM OR SNOW LOAD

1.2.3 SLAB ON GRADE LIVE LOADS

CLASSROOM & STORAGE AREAS	100 PSF
CORRIDOR AREAS	100 PSF
MECHANICAL & ELECTRICAL AREAS	150 PSF
ALL OTHER AREAS	100 PSF

1.3 SNOW LOAD - NEGLIGIBLE

1.4 WIND LOAD (PER INTERNATIONAL BUILDING CODE, 2009 EDITION.)

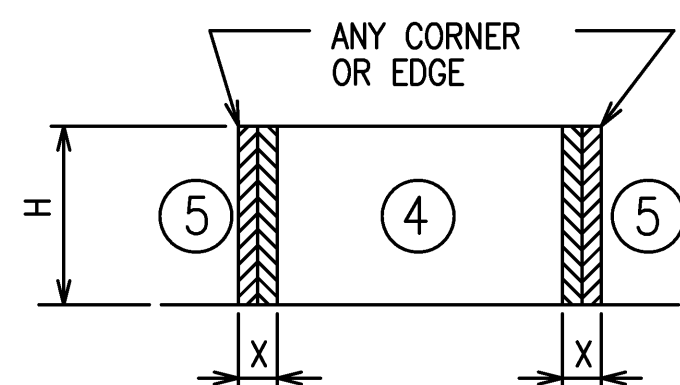
1.4.1 BASIC WIND SPEED = 95 mph,
EXPOSURE C; IMPORTANCE FACTOR I=1.15

1.4.2 DESIGN WIND PRESSURE - MAIN WINDFORCE RESISTING SYSTEM

LOCATION	WINDWARD + LEEWARD (@ MEAN ROOF HEIGHT)	ROOF
BUILDING END ZONE	+19.2, -8.8 psf	-25 psf (UPLIFT)
BUILDING INTERIOR ZONE	+13.9, -4.7 psf	-17.4 psf (UPLIFT)

1.4.3 DESIGN WIND PRESSURE - WALL COMPONENTS & CLADDING

EXTERIOR WALL SYSTEMS & THEIR ATTACHMENTS TO THE PRIMARY STRUCTURE SHALL BE DESIGNED FOR THE PRESSURES SHOWN IN THE DIAGRAM BELOW:



PRESSURE ON EXTERIOR WALL SYSTEMS FOR BUILDINGS WITH MEAN ROOF HEIGHT (H) = 0 TO 18'-0"

LOCATION	H	WINDWARD PRESSURE PSF (INWARD)		LEEWARD PRESSURE PSF (OUTWARD)		X
		(4)	(5)	(4)	(5)	
BLDG	18'	+21	+21	-23	-26.6	7.2 ft

1.4.4 DESIGN WIND PRESSURE - ROOF COMPONENTS

ZONE:	1 (-)	2 (-)	3 (-)
1,2,3 (+)	1 (-)	2 (-)	3 (-)
9.6 PSF	-19.6 PSF	-47.6 PSF	-53.5 PSF

1.5 SEISMIC LOAD (PER INTERNATIONAL BUILDING CODE, 2009 EDITION.)

- 1.5.1 OCCUPANCY CATEGORY III
- 1.5.2 IMPORTANCE FACTOR 1.25
- 1.5.3 SPECTRAL RESPONSE ACCELERATION, $S_s = 0.29$ & $S_1 = 0.13$
- 1.5.4 SOIL SITE CLASS D
- 1.5.5 SPECTRAL RESPONSE COEFFICIENTS, $S_{DS} = 0.303$ & $S_{D1} = 0.160$
- 1.5.6 SEISMIC DESIGN CATEGORY C
- 1.5.7 RESISTANCE SYSTEM: ORDINARY REINFORCED MASONRY SHEAR WALLS
- 1.5.8 SEISMIC RESPONSE COEFFICIENT $C_s = 0.152$
- 1.5.9 RESPONSE MODIFICATION FACTOR $R = 2.5$
- 1.5.10 EQUIVALENT LATERAL FORCE PROCEDURE

2.0 FOUNDATION DESIGN CRITERIA

- 2.1 MINIMUM FOOTING BEARING DEPTH BELOW GRADE IS 24".
- 2.2 MINIMUM FACTOR OF SAFETY FOR STABILITY AGAINST SLIDING, OVERTURNING AND UPLIFT IS 1.5
SLIDING FRICTION COEFFICIENT FOR FOOTINGS IS 0.35
- 2.3 ALLOWABLE SOIL BEARING CAPACITIES AS NOTED BELOW:
3000 PSF

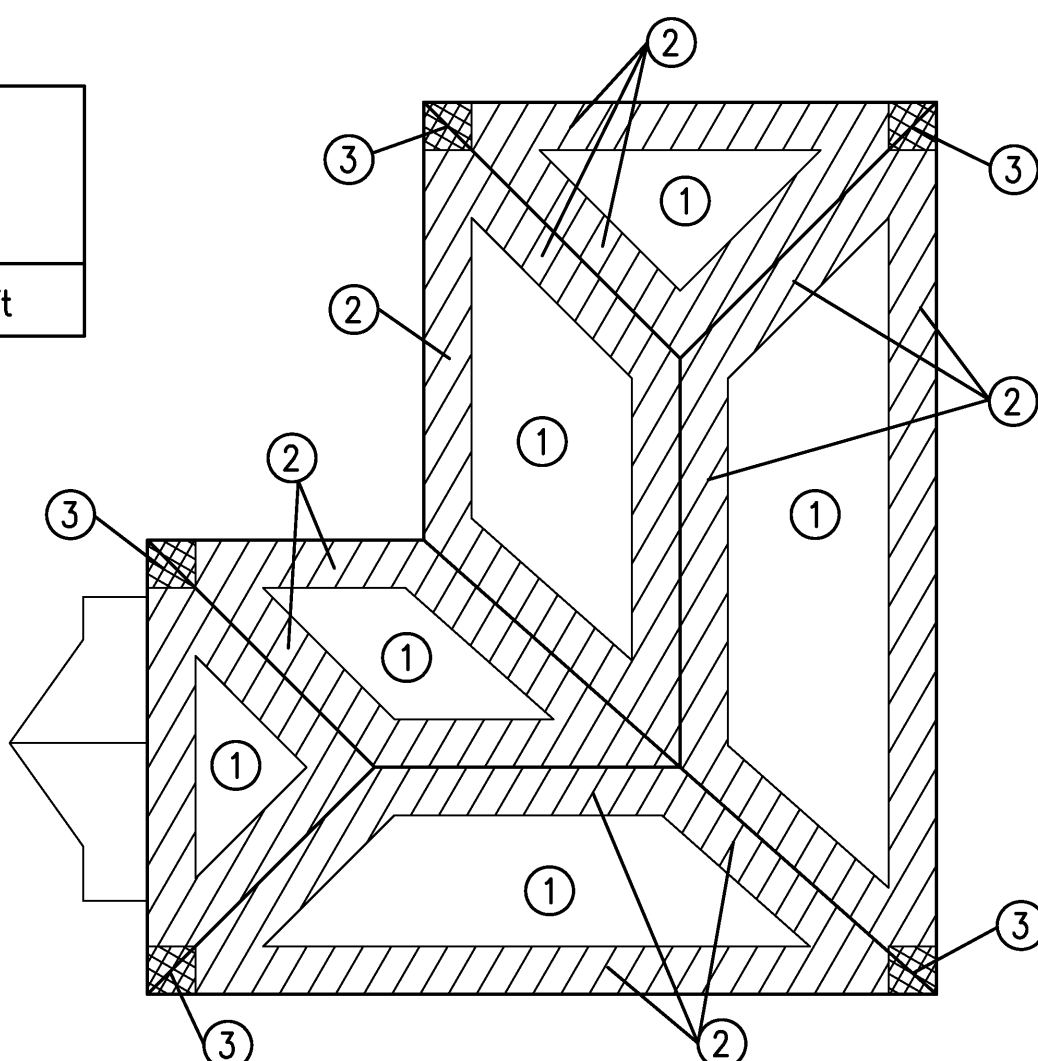
2.4 SOIL PARAMETERS

UNIT WEIGHT OF SOIL (MOIST) = 120 PCF
ACTIVE EARTH PRESSURE COEF. $K_A = 0.33$
PASSIVE EARTH PRESSURE COEF. $K_P = 3.0$
AT-REST EARTH PRESSURE COEFF. $K_0 = 0.5$

2.5 SOIL DESIGN PARAMETERS WERE TAKEN FROM INVESTIGATION REPORT PERFORMED BY: SOILS SECTION, GEOTECHNICAL & HTRW BRANCH, U.S. ARMY ENGINEER DISTRICT, SAVANNAH, DATED MAY 2006.

3.0 FORCE PROTECTION

- 3.1 WINDOW FRAMES AND CONNECTIONS SHALL BE DESIGNED IN ACCORDANCE WITH UFC 4-010-01 8 OCT. 2003 INCLUDING CHANGE 1, 22 JAN. 2007. CALCULATIONS SHALL BE SUBMITTED FOR THE WINDOW FRAMES AND CONNECTIONS AND SHALL BE SEALED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA.
- 3.2 MINIMUM SET-BACK IS 82"
- 3.3 LEVEL OF THREAT IS CONSIDERED AS LOW.
- 3.4 LEVEL OF PROTECTION IS CONSIDERED LOW.
- 3.5 BLAST FORCE ON GLAZING IS 45 PSF.



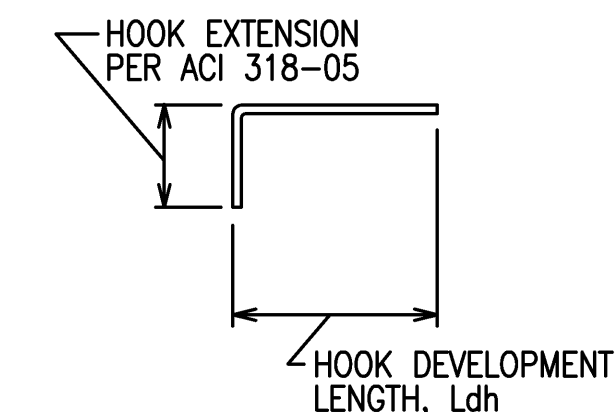
CONCRETE MATERIALS SCHEDULE		
STRUCTURAL ELEMENT	f'_c CONCRETE COMPRESSIVE STRENGTH @ 28 DAYS (PSI)	REMARKS
ALL FOOTINGS U.N.O.	3000	
SLAB-ON-GRADE	3500	
ALL OTHER CONCRETE	3000	

NOTES:
1. ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE. (150 PCF) (U.N.O.)

STEEL MATERIALS SCHEDULE		
STRUCTURAL ELEMENT	YIELD STRENGTH (KSI)	REMARKS
BEAMS & GIRDERS	50	ASTM A992
COLUMNS	50	ASTM A992
BRACING,	36	ASTM A36
CONNECTIONS, PLATES, & ALL OTHERS	36	ASTM A36
ANCHOR BOLTS	36	ASTM F1554
PIPES	35	ASTM A573 GRADE B
TUBING	46	ASTM A500 GRADE B

CONCRETE COVER SCHEDULE	
MINIMUM CONCRETE COVER PROTECTION FOR REINFORCEMENT BARS SHALL BE AS FOLLOWS: (SEE ACI 318-05, SECTION 7.7 FOR CONDITIONS NOT NOTED). DIMENSIONS FOR BAR PLACEMENT GIVEN IN SECTIONS AND DETAILS SHALL SUPERSEDE MINIMUM COVER REQUIREMENTS GIVEN HERE.	
FOOTINGS (EARTH FORMED)	3 INCHES
COLUMNS / PIERS	1 1/2 INCHES
GRADE BEAMS OR SLAB TURNED DOWN EDGES:	
TOP	1 1/2 INCHES
BOTTOM	3 INCHES
SIDES (EARTH FORMED)	3 INCHES
SIDES (BOARD FORMED)	1 1/2 INCHES
#5 BAR & SMALLER	2 INCHES
#6 THRU #11 BAR	
SLABS-ON-GRADE (NO EXPOSURE TO WEATHER) FROM TOP	3/4 INCHES
SLABS-ON-GRADE (EXPOSURE TO WEATHER) FROM TOP	1 1/2 INCHES
RETAINING WALLS (NO SURFACES SHALL BE EARTH FORMED EARTH SIDE AND FRONT SIDE (EXPOSED TO WEATHER):	
#5 BAR AND SMALLER	1 1/2 INCHES
#6 THRU #11 BAR	2 INCHES
PROVIDE STANDARD BAR CHAIRS AND SPACERS AS REQUIRED TO MAINTAIN CONCRETE PROTECTION SPECIFIED.	

STANDARD HOOKS IN TENSION PER (ACI 318-05)		
HOOK DEVELOPMENT LENGTH L _{dh} (INCHES)		
BAR SIZE	f'_c 4000 PSI	f'_c 3000 PSI
#3	7	9
#4	10	11
#5	12	14
#6	15	17
#7	17	19
#8	19	22
#9	22	25
#10	24	28
#11	27	31



MINIMUM LAP SPLICES OF REINFORCING BARS IN TENSION (PER ACI 318-05)					
$f'_c = 3500\text{psi}$					
CENTER TO CENTER BAR SPACING	(--TOP BARS--)		(--OTHER BARS--)		
	LESS THAN 4db	4db OR MORE	LESS THAN 4db	4db OR MORE	4db
#3	20	20	16	16	1 1/2 "
#4	28	26	22	21	2"
#5	43	33	34	23	2 1/2 "
#6	61	39	47	30	3"
#7	83	46	64	36	3 1/2 "
#8	110	58	84	45	4"
#9	139	74	107	57	4 1/2 "
#10	176	94	136	72	5"
#11	216	115	169	89	5 5/8 "

- NOTES:
1. YIELD STRENGTH OF REINFORCEMENT, f_y , IS 60 KSI (LAP SPLICE LENGTH IS IN INCHES).
 2. CONCRETE IS NORMAL WEIGHT (150 PCF).
 3. TOP BAR INDICATES HORIZONTAL REINFORCEMENT WHICH IS PLACED ABOVE 12" OR MORE OF FRESH CONCRETE.
 4. UNLESS NOTED OTHERWISE COLUMNS & PIERS UTILIZE TENSION LAP SPLICES.
 5. STRAIGHT DEVELOPMENT LENGTH OF AN UNLAPPED BAR IS EQUAL TO VALUE FROM TABLE DIVIDED BY 1.3.
 6. CATEGORY FOR BARS SPACED LESS THAN 4d, ON CENTER CORRESPONDS TO CATEGORY 1 IN THE CRSI HANDBOOK WHEREAS FOR BARS SPACED 4d, OR MORE ON CENTER CORRESPOND TO CRSI CATEGORY 5.

MINIMUM LAP SPLICES OF REINFORCING BARS IN TENSION (PER ACI 318-05)					
$f'_c = 3000\text{psi}$					
CENTER TO CENTER BAR SPACING	(--TOP BARS--)		(--OTHER BARS--)		
	LESS THAN 4db	4db OR MORE	LESS THAN 4db	4db OR MORE	4db
#3	21	17	16	13	1 1/2 "
#4	28	28	22	22	2"
#5	44	41	34	23	2 1/2 "
#6	56	56	43	43	3"
#7	90	90	69	69	3 1/2 "
#8	111	111	86	86	4"
#9	135	135	104	104	4 1/2 "
#10	162	162	125	125	5"
#11	190	190	146	146	5 5/8 "

- NOTES:
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US ARMY CORPS OF ENGINEERS SAVANNAH

DATE	BY	SYMBOL	DESCRIPTION

DESIGNED BY: KUS	DATE: 25 JAN 2010
DWN BY: KUS	SOLICITATION NO.: W912H-09-R-0018
CHK / TML	CONTRACT NO.:
SUBMITTED BY:	CATEGORY CODE: 730-44-01
FILE NAME:	PLOT DATE:
SIZE: 34x22	

ALBRITTON JUNIOR HIGH SCHOOL ADDITION
FT BRAGG NORTH CAROLINA

BASIS OF DESIGN

PLATE REFERENCE NUMBER S-002
SHEET 31