GENERAL STRUCTURAL NOTES

GENERAL STRUCTURAL :

WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON FRAMED CONSTRUCTION. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD (PER SQUARE FOOT) SHOWN BELOW. NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT AND GOVERNING BUILDING CODES.

CODES

2003 IBC (INTERNATIONAL BUILDING CODE)
2003 IRC (INTERNATIONAL RESIDENTIAL CODE)
2003 ASPC (ARIZONA STATE PLUMBING CODE)
2003 IMC (INTERNATIONAL MECHANICAL CODE)
2003 IECC (AS AMENDED IN THE 2004 ICC SUPPLEMENT, AND WITH CITY OF PHOENIX
2003 IFC (INTERNATIONAL FIRE CODE)
2003 IEBC (INTERNATIONAL EXISTING BUILDING CODE)
2003 ICCPC (INTERNATIONAL CODE COUNCIL PERFORMANCE CODE
2005 NEC / NFPA-70 (NATIONAL ELECTRICAL CODE/NFPA-70)

DESIGN LOADS :

SEISMIC (IBC)

SHORT PERIOD DESIGN ACCELERATION, SDS	0179 g
LONG PERIOD DESIGN ACCELERATION, SD1	0.08 g
SOIL CLASSIFICATION	E
SEISMIC USE GROUP	I
SEISMIC DESIGN CATEGORY	B
OCCUPANCY IMPORTANCE FACTOR, IE	1.00
SEISMIC FORCE RESISTING SYSTEM	MOMENT RESISTING FRAME
ANALYSIS PROCEDURE	SIMPLIFIED ANALYSIS
BASE SHEAR, V = Cs x W	0.035 W

WIND - PARAMETERS

BASIC WIND SPEED	85 MPH
EXPOSURE CLASS	B
IMPORTANCE FACTOR	1.0

WIND - MAIN WIND FORCE RESISTING SYSTEM PRESSURES
PER APPLICABLE BUILDING CODE

WIND - ELEMENTS AND COMPONENTS
PER APPLICABLE BUILDING CODE

DEAD LOADS

ROOF DEAD LOAD	= 17 psf
LIVING FLOOR DEAD LOAD	= 10 psf
MAIN FLOOR DEAD LOAD	= 30 psf

LIVE LOADS

ROOF LIVE LOAD	= 25 psf
LIVING FLOOR LIVE LOAD	= 30 psf
MAIN FLOOR LIVE LOAD	= 40 psf

SNOW LOADS

GROUND SNOW LOAD	= 40 PSF
IMPORTANCE FACTOR	= 1.0

STRUCTURAL LUMBER:

1. ALL STRUCTURAL LUMBER SHALL BE PRESSURE-PRESERVATIVE TREATED DOUGLAS FIR LARCH WITH THE FOLLOWING MINIMUM GRADES:

RAFTERS AND JOISTS(2" WIDE)	NO.2(Fb= 875 PSI)
BEAMS(4" WIDE)	NO.1(Fb=1000 PSI)
BEAMS(6" WIDE)	NO.1(Fb=1350 PSI)
POSTS	NO.1(Fb=1000 PSI)
STUDS	NO.2(Fb= 875 PSI)

2. GLUE-LAMINATED BEAMS SHALL BE PRESSURE-PRESERVATIVE TREATED DOUGLAS FIR COMBINATION 24F-V4 WITH STANDARD CAMBER, UNLESS OTHERWISE NOTED.
3. ALL PLYWOOD PRODUCTS SHALL BE DOUGLAS FIR MINIMUM C-D GRADE WITH EXTERIOR GLUE. NAILS AND SCREWS IN PLYWOOD SHALL BE DRIVEN FLUSH WITH THE OUTER SURFACE(DO NOT OVER-DRIVE NAILS AND SCREWS)
4. ALL BOLTS, AND WASHERS SHALL BE HOT-DIPPED GALVANIZED. ALL BOLTS SHALL BE ASTM TYPE A-307 GRADE A "MACHINE BOLTS" BOLT HOLES SHALL BE 1/16" LARGER THAN THE BOLT DIAMETER. USE STANDARD CUT WASHERS UNDER BOLT HEADS AND NUTS. RE-TIGHTEN ALL NUTS PRIOR TO CLOSING IN.
5. ALL CONNECTOR REFERENCES ARE FROM "SIMPSON COMPANY STRONG-TIE" CATALOG, LATEST PRINTING. USE ALL FASTENERS AS SPECIFIED IN THE SIMPSON CATALOG.
6. MINIMUM NAILING SHALL COMPLY WITH TABLE 23-11-B-1 OF THE UBC. ALL NAILS SHALL BE HOT-DIP GALVANIZED "COMMON WIRE" TYPE NAILS. SCREWS SHALL BE HOT-DIP GALVANIZED OR CORROSION-PROOF COATED DECKING SCREWS. PRE-DRILL HOLES AS REQUIRED TO PREVENT SPLITTING
7. ALL METAL BRACKETS SIMPSON CONNECTORS, AND FASTENERS EXPOSED TO WEATHER SHALL BE HOT-DIP GALVANIZED.
8. PROVIDE 30# FELT BETWEEN ALL WOOD AND CONCRETE OR MASONARY SURFACES.
9. PROVIDE SOLID BLOCKING BETWEEN JOISTS AND RAFTERS SPACED AT 8'-0" MAX
10. DO NOT BORE OR CUT JOISTS, RAFTERS OR BEAMS WITHOUT PROJECT ENGINEER'S PRIOR APPROVAL HOLES THROUGH SILLS, PLATES, AND STUDS IN WALLS SHALL NOT EXCEED 1/3 THE PLATE OR STUD WIDTH, AND SHALL BE BORED HOLES LOCATED IN THE CENTER OF THE PLATE OR STUD.
11. TREAT ALL END CUTS AND DRILLED HOLES IN WOOD MEMBERS WITH PRESERVATIVE PRIOR TO INSTALLATION.

SHEATING

1. ROOF SHEATING SHALL BE 1/2" STD. GRADE SHEATING (5 PLY) W/EXTERIOR GLUE. SPAN INDEX RATIO 32/16 W STAMP OF APPROVED TESTING AGENCY OR ORIENTED STRAND BOARD (NER-108)

2. ALL ROOFING SHEATING SHALL HAVE: 8d COMMAN AT 6" O.C. AT EDGES AND BOUNDARY. 8d AT 12" O.C. AT INTERMEDIATE FRAMING MEMBERS, OR 14 GA. X 1-3/4" LONG X 7/16" O.D. CROWN GALVANIZED WIRE STAPLES AT 6" O.C. AT EDGES AND BOUNDARY, AT 12" O.C. AT INTERMEDIATE (NER-272)

REINFORCING

1. ASTM A-615 (60) EXCEPT AS FOLLOWS:
   A #2 AND #3 BARS: ASTM A-615, GRADE 40.
   B WELDED: ASTM A706
   C WELDED PLAIN WIRE FABRIC: ASTM A-185
2. REINFORCING BARS DEFORMED EXCEPT #2 AND WELDED PLAIN WIRE FABRIC.
3. CONCRETE COVERAGE FOR REINFORCING BARS (TO FACE OF BAR INCLUDED STIRRUPS, TIES AND SPIRALS) AS SHOWN OR NOTED:
   A UNIFORMED CONCRETE IN CONTACT WITH EARTH: 3".
   B FORMED CONCRETE IN COTACT WITH EARTH: 2" - #6 REBAR AND LARGER + OR - 1 -1/2" - #5 BAR AND SMALLER.
   C WALL EXTERIOR FACE: 2".
   D WALL INTERIOR FACE: 1"
4. LAP SPLICES IN CONCRETE 36 BAR DIAMETERS.
5. LAP SPLICES IN WELDED WIRE FABRIC: 2 MESH SPACES BUT NOT LESS THAN 6". LAPPED REINFORCING BARS SHALL NOT BE TIED TOGETHER BUT SHALL BE SEPARATED BY 2" IN SHOTCRETE APPLICATIONS.
6. LAP SPLICES IN MASONRY: 48 BAR DIAMETER.
   SPLICE REINFORCING ONLY IN APPROVED LOCATIONS.
7. REINFORCING SAPCINGS GIVEN ARE MAXIMUM ON CENTER AND
8. ALL REINFORCING IN CONTINUOUS UNLESS OTHERWISE NOTED.
9. PROVIDE BENT CORNER REINFORCING TO MATCH AND LAP HORIZ. REINFORCING AT CORNERS AND INTERSECTIONS OF WALLS, BEAMS AND FOOTINGS PER A.C.I. DETAILING MANUAL A.C.I. 315-80.
10. DOWEL ALL VERTICAL REINFORCING TO FOUNDATIONS, UNLESS OTHERWISE NOTED ON DRAWINGS.
11. SECURELY TIE ALL REINFORCING AND EMBEDDED ITEMS IN POSITION BEFORE PLACING CONCRETE OR GROUT.
12. PRE-HEAT REINFORCING TO BE WELDED TO 500 DEGREE WITHIN 6" OF THE WELDED PLACEMENT PER AWS 1.4-79 OR USE ASTM 709 REINFORCING BARS IN WELDED CONNECTIONS USE LOW HYDROGEN ELECTRODES.
13. REFORCING PLACEMENT, BAR BENDS, AND STANDARD HOOKS PER A.CI. 318-83 AND C.R.S.I. STANDARDS
14. WELDING AS AN AID TO FABRICATION AND/OR INSTALLATION WILL NOT BE PERMITTED EXCEPT AS SPECIFICALLY SHOWN BY THE CONTRACT DRWINGS, OR AS APPROVED BY THE STRUCTURAL ENGINEER
15. WELDED WIRE FABRIC SHALL BE PLACED 1" CLEAR FROM THE TOP OF CONCRETE SLABS ON GRADE.
16. REINFORCING SHALL BE CONINUOUS THROUGH ALL CONSTRUCTION JOINTS.

CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO ALL REQUIREMENTS OF ACI 301 CONCRETE: PER ASTM C94, READY MIXED CONCRETE.
   CEMENT: PER ASTM C150, PORTLAND CEMENT, TYPE 11
   AGGREGATE: PER ASTM C33, NORMAL WEIGHT AGGREGATE, OR ASTM C330 LIGHTWEIGHT AGGREGATE.
2. WATER: POTABLE

DESIGN STRENGTH:	2500 PSI
FOUNDATIONS:	2500 PSI
SLAB ON GRADE:	2500 PSI
CONC. WALLS (ABOVE GRADE):	2500 PSI
FLOOR SLABS:	2500 PSI

3. CONC. WALLS (BELOW GRADE):
   SPACING OF CONTRACTION JOINTS AND CONSTRUCTION JOINTS FOR SLABS ON GRADE SHALL BE 20 FEET MAXIMUM IN EACH DIRECTION AND MAXIMUM ASPECT RATIO OF RESULTING PANELS SHALL BE 1:25 TO 1, U.O.N.
4. GROUT UNDER COLUMN BASE PLATES, ETC.: HIGH STRENGTH, NON-SHRINK, NON-METALLIC GROUT EQUIVALENT TO MASTER BUILDERS' MASTERFLOW 713 APPLIED FOR MANUFACTURER'S RECOMMENDATIONS.
5. AGGREAGATE SIZE: 1 1/2" MAX. FOR FOOTINGS, AND OTHERS MASS CONCRETE AND 3/4" MAX. FOR OTHER CONCETE.
6. MINIMUM 28 DAY COMPLRESSIVE STRENGTH:
   WALL FOUNDATIONS: 3000 P.S.I. (2500 P.S.I. IS USED FOR DESIGN)
   SLABS ON GRADE: (2500 P.S.I. IS USED FOR DESIGN)
7. MAXIMUM SLUMP: 4 1/2" FOR REGULAR WEIGHT CONCRETE.
   MECHANICALLY VIBRATE CONCRETE EXCEPT THAT SLABS ON GRADE NEED BE VIBRATED ONLY AROUND UNDER-FLOOR DUCTS AND OTHER ITEMS EMBEDDED IN THE SLAB, REVIBRATE TOPS OF COLUMNS AND CAISSONS.
8. NO ADMIXTURES WITHOUT APPROVAL. ADMIXTURES CONTAINING CHLORIDES SHALL BE NOT USED. CONCRETE SHALL NO BE IN CONTACT WITH ALL ALUMINUM.
9. WAIT 48 HOURS BETWEEN ADJACENT CONCRETE CASTINGS.
   CONSTRUCTION SHRINKAGE, AND EXPANSION JOINT LOCATIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS MUST BE APPROVED BY THE STRUCTURAL ENGINEER.
   DO NOT TAMP SLABS.
10. CLEAR COVERAGE OF CONCRETE TO OUTER REINFORCING BARS SHALL BE AS FOLLOWS:

CONCRETE POURED DIRECTLY AGAINST EARTH:	=3"CLEAR
CONCRETE SURFACES EXPOSED TO EARTH OR WEATHER	=2"CLEAR
INTERIOR CONCRETE.	=1"CLEAR

11. EPOXY GROUT FOR ANCHOR BOLTS AND DOWELS SHALL BE IN PREPACKAGED CARTRIDGES WITH "MIXING INJECTION" GUN: HILTI "HIT" SYSTEM OR EQUAL. CLEAN OUT DRILLED HOLES WITH BRUSH AND COMPRESSED AER PRIOR TO FILLING WITH EPOXY.

MINIMUM NAILING SCHEDULE

(INTERNATIONAL RESIDENTIAL CODE TABLE R602.3) DESCRIPTION OF BUILDING ELEMENTS	# & TYPE OF a,b,c,d, FASTENER
1. JOIST TO SILL OR GIRDER, TOENAIL	3-8d
2. 1" x 6" (25MM X 152MM) SUBFLOOR OR LESS TO EACH JOIST, FACE NAIL	2-8d 2-STAPLES, 1 -3/4"
3. 2" SUBFLOOR TO JOIST OR GIRDER, BLIND AND FACE NAIL	2-16d 16d at 16" o.c.
4. SOLE PLATE TO JOIST OR BLOCKING, FACE NAIL	2-16d
5. TOP PLATE TO STUD, END NAIL	3-8d, or 2-16d
6. STUD TO SOLE PLATE TOE NAIL	10d @ 24" o.c.
7. DOUBLE STUDS, FACE NAIL	10d @ 24" o.c.
8. DOUBLED TOP PLATES, FACE NAIL	3-16d @ 16" o.c.
9. SOLE PLATE TO JOIST OR BLOCKING AT BRACED WALL PANELS	8-16d
10. DOUBLE TOP PLATE, MINIMUM 24" OFFSET OF THE JOINTS, FACE NAIL IN LAPPED AREA	3-8d
11. BLOCKING BETWEEN JOISTS OR RAFTERS TO TOP PLATE, TOE NAIL	8d @ 6" o.c.
12. RIM JOIST TO TOP PLATE, TOE NAIL	2-10d
13. TOP PLATES, LAPS AT CORNERS AND INTERSECTIONS FACE NAIL	16d 16" o.c. ALONG EACH EDGE
14. BUILT-UP HEADER, TWO PIECES WITH 1/2" SPACER	16d 16" o.c. ALONG EACH EDGE
15. CONTINUED HEADER, TWO PIECES	3-8d
16. CEILING JOISTS TO PLATE, TOE NAIL	4-8d
17. CONTINUOUS HEADER TO STUD, TOE NAIL	3-10d
18. CEILING JOISTS, LAPS OVER PARTITIONS, FACE NAIL	3-10d
19. CEILING JOISTS TO PARELLEL RAFTERS, FACE NAIL	2-16d
20. RAFTER TO PLATE, TOE NAIL	2-8d
21. 1" BRACE TO EACH STUD AND PLATE, FACE NAIL	2 STAPLES, 1 3/4"
22. 1" x 6" SHEATHING TO EACH BEARING, FACE NAIL	2-8d 2 STAPLES, 1 3/4"
23. 1" x 8" SHEATHING TO EACH BEARING, FACE NAIL	2-8d 3 STAPLES, 1 3/4"
24. WIDER THAN 1" x 8" SHEATHING TO EACH BEARING, FACE NAIL	3-8d 4 STAPLES, 1 3/4"
25. BUILT-UP CORNER STUDS	10d @ 24" o.c.
26. BUILT-UP GIRDER AND BEAMS 2- INCH LAMBER LAYER.	10d NAIL EACH LAYER AS FOLLOWS: 32" O.C. AT TOP AND BOTTOM AND STAGGERED. TWO NAILS AT ENDS AND AT EACH SPLICE.
27. 2" PLANKS	2-16d at each bearing
28. ROOF RAFTERS TO RIDGE, VALLEY OR HIP RAFTERS, TOE NAIL	4-16d
FACE NAIL	3-16d
29. RAFTER TIES TO RAFTERS, FACE	3-8d

WOOD STRUCTURAL PANELS, SUBFLOOR, ROOF AND WALL SHEATING TO FRAMING, AND PARTICLEBOARD WALL SHEATING TO FRAMING

DESCRIPTION OF BUILDING ELEMENTS	DESCRIPTION OF FASTENER a,b,c,d	EDGES (INCHES)	SPACING FASTENERS INTERMEDIATE SUPPORT c,e (INCHES)
5/16" - 1/2"	6d common nail (subfloor, wall)	6	12g
	6d common nail (roof)		
19/32" - 1"	8d common nail		
1 1/8" - 1 1/4"	10d common nail or	6	12g
	10d common nail	6	12g
OTHER WALL SHEATING			
1/2" regular cellulosic fiberboard sheating	1 1/2" galvanized roofing nail 6d common nail staple 16ga. 1 1/2" long.	3	6
1/2" structural cellulosic fiberboard sheating	1 1/2" galvanized roofing nail 6d common nail staple 16ga. 1 1/2" long.	3	6
25/32" structural cellulosic fiberboard sheating	1 3/4" galvanized roofing nail 6d common nail staple 16ga. 1 3/4" long.	3	6
1/2" gypsum sheating	1 1/2" galvanized roofing nail 6d common nail staple 16ga. 1 1/2" long; 1 1/4" screws, type W or S	3	6
5/8" gypsum sheating	1 3/4" galvanized roofing nail 8d common nail staple 16ga. 1 5/8" long; 1 5/8" screws, type W or S	3	6
WOOD STRUCTURAL PANELS, COMBINATION SUBFLOOR UNDERLAYMENT TO FRAMING			
3/4" AND LESS	6d deformed nail or 8d common nail	6	12
7/8"-1"	8d common nail or 8d deformed nail	6	12
1 1/8"-1 1/4"	10d common nail or 8d deformed nail	6	12

a ALL NAILS ARE SMOOTH-COMMON, BOX OR DEFORMED SHANKS EXCEPT WHERE OTHERWISE STATED. NAILS USED FOR FRAMING AND SHEATING CONNECTIONS SHALL HAVE MINIMUM AVERAGE BENDING YIELD STRENGTHS AS SHOWN: 80 ksi (551 MPa) FOR SHANK DIAMETERS OF 0.142 INCH OR LESS.

b STAPLES ARE 16 GAGE WITE AND HAVE A MINIMUM 7/16-INCH ON DIAMETER CROWN WIDTH.

c NAILS SHALL BE SPACED AT NOT MORE THAN 6 INCHES ON CENTER AT ALL SUPPORTS WHERE SPANS ARE 48 INCHES OR GREATER.

d FOUR-FOOT-By-8-FOOT OR 4-FOOT-By-9-FOOT PANELS SHALL BE APPLIED VERTICALLY.

e SPACING OF FASTENERS NOT INCLUDED IN THIS TABLE SHALL BE BASED ON TABLE R602.3(2)

f FOR REGIONS HAVING BASIC WIND SPEED OF 110 MPH OR GREATER, 8D DEFORMED NAILS FOR ATTACHING PLAYWOOD AND WOOD STRUCTURAL PANEL ROOF SHEATING TO FRAMING WITHIN MINIMUM 48-INCH DISTANCE FROM GABLE AND WALLS, IF MEAN ROOF HEIGHTS IS MORE THAN 25 FEET, UP TO 35 FEET MAXIMUM.

g FOR REGIONS HAVING BASIC WIND SPEED OF 100 MPH OR LESS, NAILS FOR ATTACHING WOOD STRUCTURAL PANEL ROOF SHEATING TO GABLE END WALL FRAMING SHALL BE SPACED 6 INCHES ON CENTER.
WHEN BASIC WIND SPEED IS GREATER THAN 100 MPH, NAILS FOR ATTACHING PANEL ROOF SHEATING TO INTERMEDIATE SUPPORTS SHALL BE SPACED 6 INCHES ON CENTER FOR NIMIMUM 48-INCH DISTANCE FROM RIDGES, EAVES END GABLE END WALLS; AND 4-INCHES ON CENTER TO GABLE END WALL FRAMING.

h GYPSUM SHEATING SHALL BE COMFORM TO ASTM 79 AND SHALL BE INSTALLED IN ACCORDANCE WITH GA 253. FIBERBOARD SHEATING SHALL CONFORM TO EITHER AHA 194.1 OR ASTM C 208.

i SPACING OF FASTENERS ON FLOOR SHEATING PANEL EDGES APPLIES TO PANEL EDGES SUPPORTED By FRAMING MEMBERS AND AT ALL FLOOR PERIMETERS ONLY. SPACING OF FASTENERS ON ROOF SHEATING PANEL EDGES APPLIES TO PANEL EDGES SUPPORTED By FRAMING MEMBERS AND AT ALL ROOF PLENE PERIMETERS. BLOCKING OF ROOF SHEATING PANEL EDGES PERPENDICULAR TO THE FRAMING MEMBERS SHALL NOT BE REQUIRED EXCEPT AT INTERSECTION OF ADJACENT ROOF PLANES. FLORR AND ROOF PERIMETER SHALL BE SUPPORTED By FRAMING MEMBERS OR SOLID BLOCKING.

3DModel-rvt-WMGroupLogo1-179794.jpg

www.theWMgroup.net

Owner 1
Address
Address
Phone
Fax
e-mail

Owner 2
Address
Address
Phone
Fax
e-mail

Architect
Address
Address
Phone
Fax
e-mail

Consultant
Address
Address
Phone
Fax
e-mail

Consultant
Address
Address
Phone
Fax
e-mail

Consultant
Address
Address
Phone
Fax
e-mail

No.	Description	Date

General Notes
New Duplex

Project number	APN: 094 -0155-003-01
Date	December 2008
Drawn by	Author
Checked by	Checker

S.01

Scale

3/12/2007 11:26:28 AM