STRUCTURAL ABBREVIATION INDEX

AB	Anchor Bolt/Column Anchor Rod	ID	Inside Diameter
A/E	Architect/Engineer	IF	Inside Face
AESS	Architecturally Exposed Structural Steel	INT	Interior
		JB	Joist Bearing Elevation
AFF	Above Finished Floor	L	Lintel
ALT	Alternate	LAT	Lateral
AP	Anchor Plate	LD	Load
ARCH	Architectural	LF	Linear Foot
B.O.	Bottom of	LG	Long
BB	Bond Beam	LLH	Long Leg Horizontal
BFF	Below Finished Floor	LLV	Long Leg Vertical
BL	Brick Ledge	LOC'N	Location
BM	Beam	LP	Low Point
BP	Bearing Plate	LT	Light
BRG	Bearing	MAX	Maximum
BT	Bent	MECH	Mechanical
℄	Centerline	MCJ	Masonry Control Joint
CANT	Cantilever	MIN	Minimum
C/C	Center-to-Center	NS	Near Side
CBP	Column Base Plate	NTS	Not To Scale
CJP	Complete Joint Penetration Weld	O/O	Out-to-Out
CJ	Construction Joint	OC	On-Center
CJ	Contraction Joint	OD	Outside Diameter
CJ	Control Joint	OF	Outside Face
CLR	Clear	OFD	Overflow Drain
CMU	Concrete Masonry Unit	OH	Opposite Hand
COL	Column	P	Pier
CONC	Concrete	PEMB	Pre-Engineered Metal Building
CONN	Connection, Connect	PERP	Perpendicular
CONT	Continuous	ℙ	Plate
COORD	Coordinate	PT	Pressure Treated
DBE	Deck Bearing Elevation	R, RAD	Radius
DA	Deck Angle	RD	Roof Drain
DB	Deck Bar	REF	Reference, Refer to
DIA, Ø	Diameter	REINF	Reinforce
DP	Deck Plate	REQ'D	Required
DWG	Drawing(s)	RMW	Reinforced Masonry Wall
EA	Each	RTU	Roof Top Unit
EF	Each Face	RXN	Reaction
EL	Elevation	SC	Slip Critical
EQ	Equal	SF	Step Footing
ES	Each Side	SIM	Similar
EW	Each Way	SOG	Slab On Grade
EX	Existing	SPCS	Spaces
EXP	Expansion	SS	Stainless Steel
EXT	Exterior	STL	Steel
FD	Floor Drain	T&B	Top and Bottom
FF	Finished Floor	TCX	Top Chord Extension
FFE	Finished Floor Elevation	T.O.	Top of
FDN	Foundation	TOB	Top of Beam
FP	Foundation Pier	TOF	Top of Footing
FS	Far Side	TOL	Top of Ledge
FTG, F	Footing	TOM	Top of Masonry
FV	Field Verify	TOS	Top of Steel
GA	Gauge	TOW	Top of Wall
GALV	Galvanized	TYP	Typical
GB	Grade Beam	UNO	Unless Noted Otherwise
GS	Grout Solid	VERT	Vertical
GT	Girder Truss	w/	With
HD	Hold Down Anchor	w/o	Without
HORZ	Horizontal	WF	Wall Footing
HP	High Point	WP	Working Point
HS	Headed Stud	WWF	Welded Wire Fabric
HT	Height		

NAILING SCHEDULE

ELEMENT	NAIL SIZE	NUMBER & LOCATION
STUD TO SOLE PLATE	16d	4 TOE NAIL OR 2 DIRECT NAIL
STUD TO CAP PLATE	16d	2 TOE NAIL OR 2 DIRECT NAIL
DOUBLE STUDS	10d	12" OC DIRECT
CORNER STUDS	16d	24" OC DIRECT
DOUBLE CAP PLATE	10d	16" OC DIRECT
HEADER TO TRIMMERS	16d	3 EACH END
TRUSS TO PLATE		
TYPICAL EXTERIOR SUPPORT	SST-H10, UNO	1 EACH TRUSS BRG POINT
TYPICAL INTERIOR SUPPORT	SST-H10, UNO	1 EACH TRUSS BRG POINT
HIP GIRDER AT EXTERIOR	SST-HCP	1 EACH TRUSS BRG POINT
GIRDER TRUSS	SST-H8, UNO	2 EACH TRUSS BRG POINT
ROOF SHEATHING	8d	6" OC DIRECT EDGES AND 12" OC INTERMEDIATE
WALL SHEATHING	8d	6" OC ALL EDGES AND 12" OC INTERMEDIATE
FLOOR SHEATHING	8d	6" OC ALL EDGES AND 12" OC INTERMEDIATE

This schedule is a minimum nailing requirement.
See specifications, drawings, shear wall schedule.
and IBC Table 2304.9.1 for possible higher requirements.

SHOP FABRICATED WOOD TRUSS NOTES

1. Metal plate connected wood trusses shall conform to the specifications of The Truss Plate Institute (TPI), American Forest Products Association (AFPA), and National Design Standard (NDS) specifications. All connector plates shall be galvanized. All material used in wood trusses shall be #2 or better.
2. Trusses and connections shall be designed to support the superimposed loads or forces indicated on the drawings with a maximum live load deflection of L/360 at roof trusses and L/480 at floor trusses. Total deflection shall be limited to L/240. Differential total load deflection between parallel, adjacent trusses shall be limited to 3/8".
3. The manufacturer shall engage a qualified engineer experienced in the design of wood truss structures and licensed in the State of Michigan, as required by the building code. The engineer shall closely follow the design intent of the truss roof structure as shown in the contract documents. Any layouts or details designed by the manufacturer's engineer that do not comply with the contract documents must be brought to the attention of the A/E prior to truss fabrication.
4. The manufacturer's engineer is responsible to design all connections between wood trusses. Connections to girder trusses shall be capable of transferring the reaction to all plies.
5. Truss bracing (temporary and permanent) shall comply with BCSI 1-03, the truss manufacturer engineer's requirements, and any additional requirements in the contract documents.
6. Temporary and permanent bracing for truss member slenderness and stability shall be designed, specified, and inspected by the manufacturer's engineer. Where fewer than three trusses with the same web layout occur, alternate methods of stabilizing web members such as T-bracing or L-bracing, in lieu of continuous lateral web braces, shall be specified by the manufacturer's engineer. Provide a signed and sealed letter of installation acceptance for truss bearing and bracing requirements.
7. If trusses with a clear span of 60 feet or greater are utilized, the owner shall contract with a qualified registered design professional to design temporary and permanent truss bracing for these trusses (MBC 2303.4.1.3)
8. Note BCSI 1-03 section B3 requirement of diagonal bracing where horizontal web bracing is shown. This is permanent diagonal bracing required to anchor the horizontal web braces. Diagonal bracing should occur every 20', and may be applied in sections between horizontals. It should be installed no more than 45 degrees from horizontal. At least one pair of diagonal braces should be provided for every "set" of trusses with identical web layouts.
9. Truss bottom chords shall be assumed to be braced continuously where sheathing is attached to bottom chord. If no sheathing is present, bottom chord bracing shall be designed and detailed by the truss manufacturer's engineer.
10. Truss shop drawings shall be submitted for review and shall include design criteria, truss design and deflection information, end reactions, all member sizes, and a plan layout referencing each component of the roof. Each sheet shall be signed and sealed by the manufacturer's engineer.
11. The metal plate connected wood truss manufacturer, the truss erector, and the contractor are to work together to assure the owner is provided a completed structure as is required by these contract documents and the requirements of the building code.
12. Permanent bracing for overall building stability is complete when roof sheathing, shear wall sheathing, and bearing wall sheathing is complete with fastening and anchorage. Provide temporary bracing until roof and bearing wall sheathing is complete.
13. Trusses shall not be field-modified or cut without the approval of the truss manufacturer's engineer.

WOOD NOTES

1. Comply with National Design Specification (NDS), American Forest Products Association (AFPA), and American Institute of Wood Construction (AITC).
2. Bolt wall plates with 1/2" dia. anchor bolts at 32" o.c., unless otherwise noted. Bolt beam plates with 1/2" diameter bolts at 24" o.c., staggered.
3. When treated lumber is in contact with steel (bolts, nails, fasteners, hangers, etc.), steel shall be G-185 galvanized or stainless. Dimensional lumber bolted to steel beams and columns shall be untreated, or protective coatings equivalent to G-185 shall be applied to the steel.
4. Unless noted, align studs above and below with joists. Provide squash blocking to transfer loads at joists or trusses.
5. At multiple ply framing members, provide at least one supporting stud per ply. Provide squash blocking to transfer loads as required.
6. All Material used in load bearing stud walls shall be #2 or better. Refer to "Engineering Data" for minimum wood strength requirements, UNO.
7. Unless noted otherwise, do not countersink bolts or fasteners into wood. Provide washers with bolts that are a minimum of 2 times the diameter of the bolt.
8. Unless noted otherwise, refer to International Building Code Table 2304.9.1 for minimum nailing requirements. All nails shall be common wire nails.
9. Comply with I-joist supplier's construction requirements and details, unless more stringent requirements are shown in construction documents.

GENERAL FOUNDATION AND CONCRETE NOTES

1. The contractor shall implement all requirements and recommendations stated in the geotechnical engineer's report by PSI, entitled "Cottages at Thornapple Manor", dated August 29, 2011, PSI Project No. 0525-379.
2. Fill material shall be thoroughly compacted prior to placement of concrete. Fill under all slabs on grade shall be as recommended in the geotechnical report. If there is no geotechnical report, a minimum of 6" of well draining granular material shall be placed under all slabs on grade (UNO elsewhere in the construction documents).
3. Unless otherwise noted, a 15 mil, ASTM E 1745 Class A vapor barrier, with a permeability rate of 0.01 perms or lower, shall be placed under all slabs on grade after under floor work and compaction is complete. Seal all laps and penetrations. Turn up vapor barrier against wall at all slab edges.
4. All slabs on grade shall have contraction or construction joints at a maximum spacing of 24 times the slab thickness (spacing need not be less than 10'-0") each way, except as noted on the drawings. Maintain an aspect ratio of not more than 1.5. Coordinate joint locations with joints in flooring materials, such as tile, and with changes in floor finish material. Refer to details and specifications for additional information regarding slab joints.
5. Provide diagonal reinforcing (across each corner) of openings in foundation walls and slabs as follows: (1)-#4 x 44" for each 4" of concrete thickness.
6. Coordinate finish of all foundation work, including slabs on grade, with architectural and flooring supplier's requirements.
7. Lap all reinforcing as indicated in "Reinforcement Development and Lap Splice Lengths" detail. Provide corner bars for all horizontal reinforcing. Provide dowels from footing equal in size and number to vertical wall or pier reinforcing (UNO).
8. Cover for reinforcing shall be in accordance with ACI-318.
9. All exposed edges of concrete piers, beams, and walls shall be chamfered ¾" x 45 degrees.
10. Provide beam pockets in foundation walls where needed. Fill pockets with concrete after beams are set.
11. Grade beams and walls that retain earth on both sides shall be backfilled on both sides simultaneously.
12. Do not backfill earth retaining walls until concrete has reached 75% of its required 28 day strength, and all bracing elements are in place (lower and upper floors).
13. Coordinate placement of column anchor rods with foundation reinforcing. All column anchor rods shall be installed using templates and setting drawings. No tilted or misplaced bolts will be accepted. Notify Architect/Engineer for approval of any corrective action. Tolerances for the installation of the anchor bolts shall be in accordance with AISC "Code of Standard Practice" guidelines.
14. Welded wire fabric shall conform to ASTM A185. Wire fabric reinforcement must lap one full mesh plus 2" at side and end laps, but not less than 6", and shall be wire tied together.
15. Anchors for embedded plates shall be as shown on the drawings. Headed studs shall conform to ASTM A108 with 60,000psi minimum tensile strength. Reinforcing bars to be welded to plates shall be ASTM A615 Grade 40 or ASTM A706 Grade 60.

CONCRETE MIX GUIDELINES

Footings and Foundations

f'c	3500 psi (Min)
Slump	4 inch ± 1 inch
Large Aggregate	1 inch

4" Slabs-on-grade - Interior

Water/Cement Ratio	0.45 (this must be held: Note 3)
Slump	3 inch ± 1 inch
Large Aggregate	1 inch
f'c	3500 psi (Minimum)
Fibrous Reinforcing	1-1/2 lb/yd

Topping Slabs (lightweight 115 psf max)

f'c	3500 psi (Min)
Slump	3 inch ± 1 inch
Large Aggregate	3/8 inch
Fibrous Reinforcing	1-1/2 lb/yd

Exterior Concrete

f'c	4000 psi
Cementitious Material (Min)	564 lbs/yd
Slump	3 inch ± 1 inch
Large Aggregate	1 inch (Crushed Limestone)
Air	6% +or- 1%

1. In footings and foundation concrete 25% flyash or 30% ground blast furnace slag is acceptable. A minimum of 30% ground blast furnace slag is recommended for interior slabs.
2. Aggregates shall be clean uniformly graded from coarse to fine.
3. Water-reducing admixtures may be used to maintain water/cement ratio AND workability- note that this may affect finishing procedures.
4. Coordinate admixtures and curing measures to be compatible with flooring materials and adhesives.

STEEL NOTES

1. Structural steel shall be finished as follows:
   a. Non-fireproofed interior steel shall be shop painted with min. 1.5 mil dry film thickness of a rust inhibiting primer.
   b. Fireproofed steel shall be not be primed.
2. Erector is to provide temporary bracing sufficient to hold frame in position until all construction necessary for building stability is complete.
3. Beams without a specified camber shall be oriented such that any incidental camber is upward.
4. Bolted connections not specified to be slip critical shall be tightened snug tight (all metal surfaces in contact).
5. Refer to specs. and Arch. drawings for all fireproofing requirements and UL assembly Nos. Beams and columns do not necessarily conform to minimum size requirements of the UL assembly. Adjust thickness of fireproofing as required based on (W/D) ratio as outlined in the latest edition of the "Fire Resistance Directory" by Underwriters" Laboratories, Inc. All beams and assemblies shall be considered unrestrained.

ENGINEERING DATA

Design soil bearing pressure	2500 psf
Design stresses	
Concrete	
Footings and Foundations	f'c = 3500 psi
Grade slabs	f'c = 3500 psi
Topping slabs	f'c = 3500 psi
Exterior concrete (6% air)	f'c = 4000 psi
Reinforcing steel	Fy = 60000 psi
Steel	
W shapes	Fy = 50000 psi
Tube shapes (A500)	Fy = 46000 psi
All other shapes	Fy = 36000 psi
Structural bolts	ASTM A325
Anchor bolts/Column anchor rods	ASTM F 1554 - Grade 36
Welding electrode	E70XX
Lumber	
Dimension lumber (DF #2 or better)	Fb = 850 psi Fv = 180 psi
Engineered lumber (LVL)	Fb = 2600 psi Fv = 285 psi E = 1900 ksi
Glulam beams	Fb = 2400 psi (Tension in bottom only) Fv = 165 psi
Structural design requirements	
Floor live load (LL reductions used where permitted by code)	
Attic	80 psf
Roof live load	20 psf
Occupancy Category	II
Roof snow load	
Ground snow load (Pg)	30 psf
Flat roof snow load (Pf)	25 psf + Drift
Snow exposure (Ce)	1.0
Snow load importance factor (I)	1.0
Thermal factor (Ct)	1.1
Wind Load	
Basic wind speed (3 sec)	90 mph
Wind importance factor (I)	1.0
Wind exposure	C
Internal pressure coeff (GCpi)	0.18
Components & cladding (varies)	per ASCE 7
Earthquake	
Seismic importance factor, Ie	1.0
Spectral response	Ss = 0.100 S1 = 0.043 SDs = 0.107 SD1 = 0.069
Site class	D
Seismic design category	B
Basic seismic force resisting system: Ordinary reinforced masonry shear walls	
Design base shear	27 kips
Seismic response coefficient Cs	0.053
Response Modification Factor R	2
Analysis Procedure	"Equivalent lateral force"
Specific Design Loads	
Floor dead loads	
Slab & deck	21 psf
Structure	4 psf
Ceiling	3 psf
M/E/P	7 psf
	35 psf Total
Roof dead loads	
Shingles (2 layers)	6
Insulation	2
Trusses	3
Roof sheathing	3
Ceiling	3
M/E/P	3
Misc	5
	25 psf Total
Roof truss design loads	
Bottom chord dead load	15 psf
Top chord dead load	10 psf
Top chord snow load:	
Balanced	25 psf balanced
Unbalanced (see Fig 7-5 of ASCE 7-05)	
Design codes	
General building code	Michigan Building Code 2009
Concrete	ACI 318
Steel	AISC 360 - ASD
Wood	NDS

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THE COTTAGE at THORNAPPLE

Hastings, MI

PROJ. NO.: 2011-11-021

11/17/11	100% DESIGN DEVELOPMENT
02/07/12	QUALITY REVIEW
02/21/12	ISSUED FOR BIDS

CONSTRUCTION MANAGER
CM CONTRACTING

CIVIL ENGINEER
HURLEY & STEWART

STRUCTURAL ENGINEER
JDH ENGINEERING

MEP ENGINEER
E2W ENGINEERING

FOOD SERVICE CONSULTANT
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