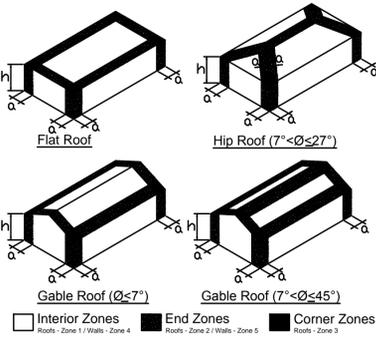


# STRUCTURAL GENERAL NOTES

## A. DESIGN LOADS

- Building Category II  
Ise=1.0  
Iw=1.0
- Floor Dead Load = 18 psf
- Floor Live Load = 100 psf  
Non Concurrent Point Load = 2000 lbs
- Roof Dead Load = 18 psf
- Snow Load: Ground snow Pg = 40 psf  
Cs = 1.0 Ct = 1.1 Cs = 1.0  
Snow load Pf = Pgx0.7CisCexCtCs = 28 psf (Typ)
- Unbalanced Snow Load as per Wisconsin Alternate = 36 psf  
Trusses may be designed for ASC7 Unbalanced Snow Load in lieu of the above at suppliers option.
- Seismic requirements  
Site Class = D  
SDS = 0.066 SD1 = 0.049  
Seismic Design Category = A  
Seismic analysis procedure = Minimum
- Wind Loads (Simplified Method)  
Wind Speed = 90 MPH  
Exposure Category = B



### Adjusted Components and Cladding:

Angle	ZONE							
	AREA	1	2	3	4	5	DHZ2	DHZ3
0-7	10	-13.3	-23.2	-34.3	-15.8	-19.5	-27.2	-45.7
	20	-13	-21.4	-32.1	-15.1	-18.2	-27.2	-41.2
	50	-12.5	-18.9	-29.1	-14.3	-16.5	-27.2	-35.3
	100	-12.1	-17	-26.9	-13.6	-15.1	-27.2	-30.9
	500	0	N/A	N/A	-12.1	-12.1	N/A	N/A

## B. SPECIFIED MATERIAL STRENGTHS

- Poured-in-place Concrete, f'c  
Slab-on-grade 3500 psi @ 28 days 1" stone  
Walls / piers 4000 psi @ 28 days  
Foundations 3000 psi @ 28 days 1 1/2" stone  
Exposed 3000 psi @ 28 days  
Air Entrained 5-7%
- Reinforcing Steel ASTM A615 Fy = 60 ksi
- Welded Wire Fabric ASTM A185 Fy = 65 ksi
- Structural Steel (UNO) ASTM A992
- Steel Tubing ASTM A500, Grade B
- Miscellaneous ASTM A36
- Bolts for Structural Connections ASTM A325, Type N
- Anchor Bolts ASTM AF1554-36
- Masonry Grout, f'c 2500 psi @ 28 days
- Masonry Running Bond, f'm 135 psi
- Allowable Soil Bearing Pressure 2000 psf
- Welding Electrodes 3000 E70

## C. FOUNDATIONS

- If there is a question regarding the soils, a Geotechnical Engineer, hired by the owner, shall inspect each footing excavation and shall confirm that the actual soil conditions meet or exceed the design pressure.
- Remove all topsoil and other soils containing organics from beneath floor slabs and foundations. Proof roll exposed sub grades under direction of the Geotechnical Engineer. Remove all soft or loose soils detected by proof rolling and replace with specified fill on a unit price basis.
- Provide a minimum of 4'-0" of soil cover above the bottom of all footings exposed to the weather or unheated spaces.
- Provide sufficient temporary protection to prevent all exposed footing sub grades from freezing and all footings with less than 4'-0" of soil cover from heaving. Do not place concrete or backfill over frozen soil.
- The Contractor shall slope the bottom of the excavation to a temporary sump pit to keep accumulated groundwater and surface runoff away from the foundation bearing stratum. Pump groundwater out of the excavation before placing backfill. Do not allow the water to stand in the excavation and soften the soils at or below bearing level.
- The sidewalls of all excavations shall be properly sloped, sheeted and braced in accordance with OSHA regulations and other procedures to provide safe working conditions. The responsibility for safe working conditions is solely that of the Contractor.
- Center all wall footings on walls unless noted otherwise. Center all column footings and piers on columns unless otherwise noted.
- Backfill walls with even lifts on alternate sides to prevent excessive horizontal load on walls.
- When excavating adjacent to an existing structure, use shoring as required to prevent undermining of the existing foundation.
- When backfilling walls, maintain adequate shoring until supporting elements are poured and cured.
- No holes, trenches or other disturbances of the soil below footings, other than shown on structural plans, will be allowed within the volume described by lines sloping downward at 45 degrees to the horizontal from the bottom edges of the footings.
- Specified compacted granular fill shall be well graded pit run sand and gravel mixture with no more than 8% passing a No. 200 sieve. Fill shall be free of shale, clay, friable material and debris. Compact fill to 95% Modified Proctor under footings and 90% under slabs.

## D. CONCRETE

- Proportioning of materials shall be in accordance with ACI 211.1-Latest "Recommended Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete." Maximum aggregate size shall be 1-1/2" for footings, 3/4" for slabs, walls and columns and 3/8" for toppings. Maximum water-cement ratio 0.45. Proportion concrete mixes for a 3' to 4' slump.  
Provide an approved Air Entraining Admixture conforming to ASTM C260 and ACI 318-89 table 4.4.1 for all concrete exposed to freeze thaw conditions.  
All concrete mixes may contain an approved non-chloride Water Reducing Admixture in accordance with ASTM C494, Type A. All concrete mixes shall contain a Water-Reducing Admixture except where other Water-Reducing type Admixture is required in the same concrete mix.  
Provide an approved non-chloride non-corrosive Accelerator conforming to ASTM C494, Type C or E for all concrete flatwork poured at an ambient temperature of less than 50 degrees F. Provide an approved Water-Reducing Retarding Admixture conforming to ASTM C494, Type D for all concrete flatwork poured at an ambient temperature of 80 degrees F or higher.  
Where more than one admixture is used in a concrete mix, provide substantiating data that indicates that these admixtures are compatible without producing detrimental or unpredictable results. Use admixtures from one manufacturer only provide the proper admixture quantities based upon total cementitious materials in accordance with the manufacturer's recommendations to achieve the desired results for specific site conditions and concrete materials. Maximum water soluble chloride ion concentrations in hardened concrete at an age of 28 days contributed from all ingredients including water, aggregates, cementitious materials and admixtures shall not exceed 0.10 percent.
- Submit two copies of proposed mix designs to the Structural Engineer. Provide sufficient time in the construction schedule to allow a minimum of five full working days of review period in the Engineer's office.
- A Testing Firm, hired and paid for by the Contractor shall conduct concrete testing
  - Four standard cylinders for each 50 cubic yards or 5000 square feet of wall or slab or fraction thereof of each mix design placed in any one day. Test one cylinder at 7 days and one at 14 days for information and the other two at 28 days for acceptance. Comply with ASTM C172-21, C31-69 and C39-72.
  - Slump test for each pour. Comply with ASTM C143-78.
  - Air content test for each corresponding set of cylinders. Comply with ASTM C231-78.
  - The contractor shall pay for all additional testing required for concrete suspected of non compliance.
- Convey concrete to point of use and deposit continuously in level layers to prevent separation of grout and aggregate. Work the concrete thoroughly around reinforcement, embedded fixtures, and into the corners of forms. Do not deposit concrete in free standing water, loose dirt, rubbish or other foreign matter. Proceed with concreting at such a rate that the concrete is plastic at all times and flows readily into the spaces between the bars. Do not retemper concrete. Use an approved method of vibration.
- Use "Conform" by Master Builders or equal on all flatwork constructed without protection of walls and roof.
- Protect all concrete and grout from premature drying, excessively hot or cold temperature, and mechanical injury. Maintain concrete and grout with minimum moisture loss at relatively constant temperature for the required curing period. When the mean daily ambient temperature is less than 40 degrees F, provide temporary heat, insulating blankets, etc. So as to maintain the temperature of the concrete and grout at a minimum of 50 degrees F for 7 days. Provide adequate venting for equipment exhaust.
- Cure concrete and grout such that the maximum moisture loss does not exceed 0.55 kg/m2 in 72 hours when tested in accordance with ASTM C156-90. Approved methods include approved curing compounds or soaking with water and covering with polyethylene sheets. Water cure slabs to receive toppings, grout beds, resinous flooring or other special coatings.
- Seal all exterior concrete with Master Builders 'GP' after the full curing period.
- Provide sawcut control joints in each direction for all slabs on grade. Control joint spacing shall not exceed 24' or nor 36 times the slab thickness unless otherwise shown. Control joint spacing shall not be less than 2/3 nor more than 1-1/2 times the spacing of the width of the slab in the other direction.
- Carefully examine architectural, mechanical, electrical and equipment drawings before each concrete pour to include all cast-in-items, anchorage devices, block outs, sleeves, depressions, and other special requirements.
- Conduit and pipes embedded in concrete shall conform to ACI 318-89 Section 6.3.

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## E. MASONRY

- Hollow concrete block masonry units shall conform to ASTM C90, Grade N. f'm = 1500 psi
- Use Type "M" mortar for below grade masonry. Use Type "M" or "S" mortar for above grade load bearing walls, shear walls and exterior walls. Use Type "N" mortar for interior non-load bearing walls and partitions.
- Grout for bond beams and vertical cores shall have a minimum compressive strength of 2500 psi @ 28 days.
- Masonry walls shall be adequately braced during construction to resist backfill and wind forces.
- Fill masonry solid with grout full height below all lintel bearings.
- Fill masonry cores with grout at locations which require embedded or drilled-in anchors or bolts.
- Provide horizontal ladder type wire reinforcing @ 16" o.c. Masonry joint reinforcement and brick shell angles shall be discontinuous at vertical control joints and expansion joints.
- Lap splice all reinforcing bars in masonry 48 bar diameters.
- All vertical reinforcement shall be dowelled to the foundation and extend 6' into the bond beam at the top of the wall.
- Where one reinforcing bar is placed in a single core, it shall be centered in the wall. Where two reinforcing bars are placed in a single core, place bars in separate layers, 2" clear from the outside of each face. Provide bar spacers to rigidly hold vertical reinforcement in place.
- Fill block cores at vertical reinforcing steel with grout, rodded or vibrated in place.
- Masonry shall be laid to a maximum height of 4'-0" before placement of grout.
- Construct all non-load bearing masonry walls 1" clear of structural members and deck. Pack void with fiberglass insulation.
- Provide an 8" deep continuous bond beam at all floors and roofs. Use (2) #4's in bond beam.

## F. REINFORCING STEEL

- Submit one electronic copy of each shop drawing to the Engineer for approval. Provide sufficient time in construction schedule to allow a minimum of five full working days of review period in the Engineer's office.
- Provide bolsters, chairs, dowel blocks, standees and #4 support bars as required to support specified reinforcement at spacings not to exceed 4'-0" in either direction. Tie securely together to hold steel in position.
- Welding of reinforcement is not permitted. Field bending of reinforcement is not permitted.
- Concrete cover for reinforcing steel, unless otherwise shown, shall be as follows:  
Footings 3" clear from bottom & sides, 2" clear from top  
Walls 1 1/2" clear from each side  
Beams, Columns 1 1/2" clear to stirrups or ties & piers  
Structural Slabs 1" clear from top & sides, 3/4" clear from bottom  
Slab-On-Grade 1/2" slab thickness from top, but not less than 3/8" nor greater than 2"  
When welded wire fabric is specified on the plans, provide the following reinforcement in flat sheets unless otherwise noted for all slabs on grade except sidewalks:  
4' slab WWF 6 x 6 x W1.8 x w1.4  
5' slab WWF 6 x 6 x W2.0 x W2.0  
6' slab WWF 6 x 6 x W2.9 x W2.9
- When fiber reinforcing is specified on the plans, provide the following minimum reinforcing and dosages for all slabs on grade except sidewalks:  
4' -5' slab 1.5# per cubic yard FRC Bl Blend, or approved Equal  
6' Slab 3# per cubic Yard Ferra Ferro, or approved equal
- All reinforcing bars shall be fabricated in accordance with ACI 318 and ACI Detailing Manual SP-66. Provide "standard hooks" unless otherwise noted. Specified bar length does not include length of hook. Place hooked end of bar 2" clear from edge of concrete, unless otherwise noted.
- All laps shall be Class "B", unless noted otherwise. Use "top bar" lap lengths for all horizontal wall bars and for top bars in slabs and beams over 14" deep. Mechanical couplers capable of developing the full tensile capacity of the bars may be used at any lap location.
- Corner bars shall be provided at all wall corners and intersections.
- Plain weld wire fabric shall be lapped and / or anchored to develop fy per ACI 318.
- Welding of reinforcing is not permitted.

## G. ANCHORS

- All post installed anchors must conform to ACI Appendix D requirements.
- All expansion bolts fastened to masonry shall be zinc plated sleeve type in accordance with Federal Specification FF-S-325, Group II, Type 3, Class 3.
- All adhesive anchors shall be POWERS 'AC100 + GOLD' -or- equal.
- All anchor bolts shall conform to ASTM F 1554-36 unless noted otherwise. Provide standard nut and washer tacked in place on embedded end. At gravity only connections, L-Shape rods are acceptable. Embedment to hooked end shall be 12 rod diameters. Embedment shall not exceed footing thickness minus 3 inches. Hook length shall be 4 rod diameters 3" min. Embedded portion of anchor bolts shall be clean and free of oil, grease and all foreign substances. Provide minimum 6" projection.
- All anchors in contact with treated lumber shall be hot dipped galvanized, stainless steel or have manufacturer's approved coating for contact with treated lumber.

## H. STRUCTURAL STEEL

- Structural steel details, fabrication, and erection shall conform to the latest edition of the AISC "Manual of Steel Construction - ASD", unless noted otherwise.
- High strength bolts shall be installed in accordance with AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts" latest edition. Bolts are designed as bearing type connections, unless noted otherwise.
- Bolts for slip-critical connections and bolts subject to tension shall be tightened to develop minimum tension specified by AISC using direct-tension indicator tightening method. Use direct-tension indicator washers under non-turning part assembly.
- All welding shall be done by AWS certified welders with experience and certification in the types of welding indicated. Certifications shall not have lapsed due to disuse for 6 months.
- All welds to be E70XX electrodes, unless noted otherwise.
- Field connections shall be welded or bolted. Shop connections shall be welded unless otherwise indicated or approved. Welds indicated with a shop weld symbol may be made in the field with the approval of the structural engineer.
- Unless noted otherwise, all welds shall be continuous 3/16" throat. All full and / or partial penetration welds shall be fully detailed on the shop drawings.
- Fabricator shall select AISC simple shear connections for steel beams capable of carrying the reaction force when indicated or 50% of the total uniform load for the given size, span, and grade of beam, as tabulated in the AISC tables for allowable loads.
- Simple shear connections shall be standard double angle or single shear plates, unless noted otherwise. Select connections from the AISC, Simple Shear Connections Design Aid, latest edition whenever possible. All bolted connections shall have minimum 2 bolts, unless noted otherwise.
- Shop painted structural steel with a standard primer.
- Beams noted thus W\_x\_x (number of studs) =camber in inches shall have 3/8"Ø shear stud connections developing capacity as listed in table 14.1 (ASD). Studs are to be uniformly spaced at the beam top flange.
- Camber beams as indicated on the drawings. Fabricate and install beams with natural camber upwards.
- Structural steel members for the work of other trades shall be shown on the shop drawings. Burning of holes and cuts in the field shall not be allowed, except by written authorization from the structural engineer.
- Furnish and install miscellaneous steel (curbs, hangers, expansion joint angles, struts, etc.) as called for or as necessary per architectural and mechanical / electrical drawings.
- See architectural drawings for fireproofing of structural steel. Do no prime members which are to receive spray-on fireproofing unless directed by the architect.
- Submit one reproducible copy, if needed, of each shop drawing to the Engineer for approval. Provide sufficient time in construction schedule to allow a minimum of five full working days of review period in the Engineer's office.
- Under all column base plates provide double nuts, or leveling plates. Provide 1" minimum leveling grout. Use "Set Grout" by Chemrex, Masterflow 555 by Masterbuilders, or approved equal unless otherwise noted on structural drawings.

## I. DIMENSION LUMBER

- Dimension lumber to be D-F-L / No. 2 or better for beams & headers.  
Use Spruce-Pine-Fir No.1/No.2 grade for wall studs & purlins. Unless noted otherwise on the plans
- All member sizes given on plan are nominal dimensions.
- All beams & joists not bearing on supporting members shall be framed w/ "Simpson" joist hangers or equal. Use type required for loading.
- All foundation plates, sills & sleepers on concrete slab, which is in direct contact w/ earth, and sills which rest on concrete or masonry foundation walls, shall be treated wood or foundation redwood.
- Hardware and fasteners in contact with treated lumber or exposed to the elements shall be hot dipped galvanized, stainless steel, or manufacturer's approved coating.
- Where not noted specifically otherwise, nailing shall be according to fastening schedule, in the Wisconsin Enrolled Commercial Code.
- All bolts and lag screws shall be American Standard Manufacture.
- Bolt holes in wood shall be drilled 3/16" maximum oversize. Holes for screws and lag screws shall be first bored for the same depth and diameter of the shank, then the remainder occupied by the threaded portion shall be bored not larger in diameter than the root of the thread. All screws shall be screwed, not driven into place.
- Provide washers under all nuts and heads of bolts and lag screws.
- All timber framing shall be accurately cut, notched, or tapped as indicated. No over cut is permitted for notches or daps. Members shall fit tight and true. Examine members for detrimental damage before installation, and avoid natural defects at connections. Where steel plates occur, they shall be used as the template for boring holes.
- Whenever necessary to cut or drill treated lumber, treat the cut or bored surfaces with two heavy coats of the same preservative as used in the original treatment.
- Design, fabrication, and construction shall conform to the "National Design Specification for Wood Construction" current edition as recommended by the American Forest & Paper Association.

## J. ROOF TRUSSES

- Submit one electronic copy, of each shop drawing to the Engineer for approval. Provide sufficient time in construction schedule to allow a minimum of five full working days of review period in the Engineer's office.
- Trusses, jack rafters and valley rafters shall be designed to meet all loading and spans as indicated on the plans.
- Trusses and rafters shall be designed and certified by a Registered Professional Engineer.
- Supplier shall be responsible for all bracing and/or bridging required for the design of the truss members.
- Contractor shall be responsible for bracing and/or bridging required during construction.
- All connector plates shall be made of Grade "A" galvanized steel, minimum 20 gage per latest TPI Specifications.
- All connection hardware shall be designed & furnished by the truss supplier unless noted otherwise on the plans.
- Scissors trusses shall be designed such that horizontal live load deflections do not exceed 1/8". Walls are not designed to resist a horizontal truss reaction.

## K. NAILING SCHEDULE

FASTENING SCHEDULE (PER IBC TABLE 2304.9.1)		
CONNECTION	FASTENING	LOCATION
1. Joist to sill or girder	3-8d common	toe/nail
2. Bridging to joist	2-8d common	toe/nail each end
3. 1"x6" sub floor or less to each joist	2-8d common	face nail
4. Wider than 1"x6" sub floor to each joist	3-8d common	face nail
5. 2" sub floor to joist or girder	2-16d common	blind and face nail
6. Sole plate to joist or blocking	16d at 16" o.c.	typical face nail
7. Sole plate to joist or blocking at braced wall panel	3-16d at 16"	braced wall panels
8. Stud to sole plate	2-16d common	end nail
9. Stud to sole plate	4-8d common	toe nail
10. Double top plates	2-16d common	end nail
11. Blocking between joists or rafters to top plate	16d at 16" o.c.	typical face nail
12. Rim joist to top plate	8-16d common	lap splice
13. Top plates, laps and intersections	3-8d common	toe/nail
14. Continuous header, two pieces	8d at 6" o.c.	face nail
15. Ceiling joists to plate	16d common	face o.c. along edge
16. Continuous header to stud	3-8d common	toe/nail
17. Ceiling joists, laps over partitions (a)	3-16d common minimum	face nail
18. Ceiling joists to parallel rafters (a)	3-16d common minimum	face nail
19. Rafter to plate (a)	3-8d common	toe/nail
20. 1" diagonal brace to each stud and plate	2-8d common	face nail
21. 1"x 8" sheathing to each bearing wall	2-8d common	face nail
22. Wider than 1"x8" sheathing to each bearing	3-8d common	face nail
23. Built-up corner studs	3-8d common	24" o.c.
24. Built-up girder and beams	16d common	24" o.c.
25. 2" planks	20d common 32" o.c.	face nail at top and bottom staggered on opposite sides
26. Collar tie to rafter	2-20d common	face nail at ends and at each splice
27. Jack rafter to hip	16d common	at each bearing
28. Collar tie to rafter	3-10d common	face nail
29. Jack rafter to hip	3-10d common	toe/nail
30. Ledger strip	2-16d common	face nail
31. Wood structural panels and particle board.(b) Sub floor, roof and wall sheathing (to framing): Single Floor (combination subfloor-underlayment to framing):	1/2" and less 6d(d,e) 3/4" to 1" 8d(f) 1 1/4" to 1" 8d(g) 1 1/2" to 1 1/2" 10d(f) 1 3/4" to 1 3/4" 10d(f)	
32. Panel siding (to framing)	1/2" or less 6d(g) 3/4" 8d(g)	
33. Fiberboard sheathing: (c)	1/2" No. 11 gage roofing nail(h) 6d common nail 3/4" No. 11 gage roofing nail(h) 8d common nail	

- See Section 2308.10.1, Table 2308.10.4.1
- Nails spaced at 6 inches on center at edges, 12 inches at intermediate supports except 6 inches at supports where spans are 48 inches or more. For nailing of wood structural panel and particle board diaphragms and shear walls, refer to Section 2305. Nails for wall sheathing are permitted to be common, box or casing.
- Fasteners spaced 3 inches on center at exterior edges and 6 inches on center at intermediate supports.
- Common or deformed shank.
- For roof sheathing applications, 8d nails are the minimum required for wood structural panels.
- Deformed shank.
- Corrosion-resistant siding or casing nail.

Verify all existing site conditions

REVISIONS:

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SHEET INDEX:  
STRUCTURAL GENERAL  
NOTES

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