

STRUCTURAL GENERAL NOTES

SI Inc. Job #: 10-0023
602 Congress Street Renovations
Portland, Maine 04101

DESIGN LOADS: International Building Code; IBC 2006 Edition, and International Existing Buildings Code, except as noted
Occupancy Category, Table 1604.5 II Standard

Roofs		Pg		
Ground Snow	Pg		50 psf	(used for drifting calculations)
Flat Roof Snow	PF		34 psf	
Snow Exposure Factor	Gc	Table 1608.3.1	1.0	
Snow importance Factor	Is	Table 1604.5	1.0	
Snow Thermal Factor	Ct	Table 1608.3.2	1.0	

Floors				
Residential			40 psf	
Office			50 psf	
Partitions in Offices			20 psf	
Corridors & Public Spaces, First Floor			100 psf	
Corridors above first floor			80 psf	
Storage Areas			125 psf	
Commercial 1 st floor			100 psf	

Lateral				
Wind	IBC 1603.1.4, ASCE 7-02	Analytic Method		
	3 Second Gust Velocity		100 mph	
	Importance Factor		1.0	
	Building Category and Internal Pressure Coefficient			
	IBC 1609.2, ASCE Figure 6-5	Enclosed		GCp=0.18
	Exposure	C		

Seismic	Use Group	I		
	Importance Factor		1.0	
	Spectral Response	Acceleration		Coefficient
	Short Period	S _s	0.30 g	S _{DS} 0.24 g
	One Second	S ₁	0.08 g	S _{D1} 0.09 g
	Seis Site Class	Table 1615.1.1	D	
	Design Category	Table 1616.3	B	
	Response Modification Coefficient	R	1.5, Ordinary Plain Masonry Shear Walls	
	Analysis Procedure		Equivalent Lateral Force	

FOUNDATION DESIGN:

Foundations are designed without an engineer's soil investigation. Foundation design criteria was assumed for purposes of foundation design and shall be confirmed by a soils engineer, at owner's expense, prior to construction. (This procedure may require revisions to foundation design, at additional expense to the owner, if soils engineer determines that such design criteria are inappropriate for this building site.)

--Footings--

Design of footings is based on
Maximum allowable bearing pressure 2,000 psf
Bear on the natural undisturbed soil, or compacted structural fill, below frost depth.

REINFORCED CONCRETE:

Design is based on "Building Code Requirements for Reinforced Concrete" (ACI 318). Concrete work shall conform to "Standard Specifications for Structural Concrete" (ACI 301).

Intended Use	F _c , psi 28day	Max. W/C Ratio	Maximum Aggregate	Slump inches	Entrained Air Percent ±1.5%	Cement Type	Admixtures, Comments
footings	3,000	.6	¾" Stone	4	---	I/II	
walls	4,000	.5	¾" Stone	4	5%	I/II	
interior slabs on grade	3,500	.5	¾" Stone	4	3%	I/II	Fibermesh

Detailing, fabrication, and placement of reinforcing steel shall be in accordance with the Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315-99).

Welded wire fabric shall conform to ASTM A185.

Reinforcing bars shall conform to ASTM A615,

Grade 60,

except ties or bars shown to be field-bent, which shall be Grade 40.

Epoxy coated reinforcing bars shall conform to ASTM 775.

Zinc coated (galvanized) reinforcing bars shall conform to ASTM 767.

Bars to be welded shall conform to ASTM 706.

At splices, lap bars 54 diameters unless noted otherwise.

At corners and intersections, make horizontal bars continuous or provide matching corner bars.

Around openings in walls and slabs, provide 2-#5, extending 2'-0" beyond edge of opening.

In continuous members, splice top bars at mid-span and splice bottom bars over supports.

Provide intermittent shear keys at all construction joints and elsewhere as shown on the drawings.

Except as noted on the drawings, concrete protection for reinforcement in cast-in-place concrete shall be as follows:

a. Cast against and permanently exposed to earth 3"

b. Exposed to earth or weather:

#6 through #18 bars 2"

#5 bar, W31 or D31 wire, and smaller 1-1/2"

c. Not exposed to weather or in contact with ground:

Slabs, walls, joists: #11 bar and smaller 3/4"

Beams, columns:

Primary reinforcement 1-1/2"

Stirrups, ties, spirals 1-1/2"

Fibermesh admixture shall be 100% virgin polypropylene, fibrillated fibers as manufactured by Fibermesh Co. per ASTM C-1116 type 111

4.1.3 and ASTM C-1116 performance level one, 1.5 lbs per cubic yard of concrete.

Anchor bolts and rods for beam and column-bearing plates shall be placed with setting templates.

All concrete work is subject to inspection by a qualified special inspector employed by the owner in accordance with IBC Section 1704.4.

STRUCTURAL MASONRY:

Design is based on Unit Strength Method

MSJC 2002, Section SC-1.4 B.2.

Compressive strength of masonry assembly used for design is 1500 psi, based on net-bedded area.

Hollow load-bearing concrete masonry (CMU) shall be lightweight units conforming to ASTM C90,

Grade N1, minimum compressive strength 1,900 psi based on average net area.

Facing brick shall conform to ASTM 216 Grade SW.

Building brick shall conform to ASTM C62 Grade SW.

Mortar shall be Type S or N conforming to ASTM C270.

Masonry cement shall not be used.

Provide full shovled mortar in all head and bed joints.

Admixtures shall not be added for any reason unless approved by the Architect.

Except for lintels, bond beam units shall be produced from standard vertically voided units with pre-cut knockout cross walls.

Grout used in masonry walls and block cells shall be:

course grout, as defined by ASTM C476, with a minimum cube strength = 2,000 psi. OR

3000 psi concrete using 3/8" diameter aggregate, placed by vibrating unless an approved self consolidating mix is used

Lintels shall not exceed five feet in height.

If grout pour height exceeds 5 feet, clean-out holes shall be provided.

Space continuous horizontal joint reinforcing at 16" maximum in all CMU walls.

Joint reinforcing shall be welded type with 9 gage side-wires and 9 gage trussed or ladder cross wires.

Reinforcing bars shall be as for reinforced concrete except as noted.

At splices, lap bars 48 diameters.

Provide reinforced grouted vertical cells

at corners, ends of walls, jambs of openings, each side of vertical control joints, and

at spacing 24" max. as noted on drawings.

Reinforcement shall be secured against displacement prior to grouting

by wire bar locators or other suitable devices at intervals not exceeding 200 bar diameters or 10 feet.

Where noted on the drawings,

provide clearance between masonry and structural elements, or

wrap steel with polyethylene film.

Submit for review

Certificates for materials used in masonry construction indicating compliance with the contract documents

Special Inspection is required by design. See Special Inspection Notes.

MSJC Level 2 Quality Assurance, MSJC Table 1.14.2

Pisn and grout tests will be required

Prior to the start of masonry work

shall consist of five (5) masonry pisms.

Test specimens shall be made by the masons, at the direction of the owner's representative,

with materials and techniques currently being used in the wall.

Specimens shall be protected and field cured for 48 hours before being transported to a testing agency.

The testing agent will be hired by the owner and shall be responsible for laboratory care and curing of specimens, testing, and

reporting results to the owner, contractor, architect, and engineer in accordance with ASTM E447-92

LOOSE LINTELS:

Unless noted otherwise, provide loose lintels as follows: (One angle for each 4" of wall thickness to bear 6" minimum each end).

Openings to 4'-0" Angle 3-1/2 x 3-1/2 x 1/4

Openings 4'-1 to 5'-4" Angle 5 x 3-1/2 x 1/4

Openings 5'-5 to 6'-0" Angle 6 x 3-1/2 x 5/16

STRUCTURAL STEEL:

Structural steel shall be detailed, fabricated, and erected in accordance with AISC Specifications, 2005, and Code of Standard Practice, 2000.

Structural steel wide flange beams and "WT" shapes shall conform to ASTM A992.

Other rolled shapes, including plates, channels, and angles shall conform to ASTM A36.

Hollow structural section (HSS) tube shapes shall conform to ASTM A500, Grade B, 46 ksi yield.

Pipe shapes shall conform to ASTM A53 Grade B.

Except as noted, framed beam connections shall be bearing-type with 3/4" diameter, knig tight, A325-N bolts, detailed in conformance

with Part 4, Tables II and III, for 0.6 times the allowable uniform loads tabulated in Part 2 of the AISC Manual, 9th Edition. Install

bolts in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", 1985.

All beams shall have full depth web stiffeners each side of webs above and below columns

Anchor rods shall conform to ASTM F1554, Grade 36 (or high strength G_s 55 or G_s 105 as noted), with weldability supplement S1.

Welding shall be done by a certified welder in accordance with AISC and AWS specifications and recommendations using E70- electrodes.

Where not specifically noted, minimum weld shall be 3/16" fillet by length of contact edge.

All post-installed anchors shall have current National Evaluation Report, and shall be installed in accordance with the manufacturer's

requirements.

Expansion anchors shall be approved "wedge" type unless specifically noted to be "sleeve" type.

Chemical anchors shall be approved epoxy or similar adhesive type and shall have current National Evaluation Report. Where base material

is not solid, approved screen tubes shall be used.

Grout beneath column base and beam-bearing plates shall be

minimum 28-day compressive strength of 3,500 psi,

approved pre-bagged, non-metallic, non-gaseous, bleed free,

non-shrink, when tested in accordance with ASTM C1107

Grade B or C at a flow cone fluid consistency of 20 to 30 seconds

STRUCTURAL WOOD FRAMING:

In-Grade Base Values have been used for design.

2x framing shall be S.P.F. S4S No. 2 and better unless noted.

All lumber shall be 19% maximum moisture content, unless noted.

Solid timber beams and posts shall be Douglas Fir-Larch No. 1.

Studs shall be S.P.F. No. 2 and better.

Top and bottom plates shall be S.P.F. No. 2 and better.

Wood in contact with concrete shall be pressure-treated Southern Yellow Pine.

Conventional light framing shall comply with IBC Section 2308.

Except as noted otherwise, minimum nailing shall be provided as specified in IBC Table 2304.9.1 "Fastening Schedule"

Plywood and oriented strand board (OSB) floor and roof sheathing shall be APA graded with panel identification index, thickness, and

nailing as noted on the drawings.

Nail wall sheathing with 8d commons at 6" o.c. at panel edges, and 12" o.c. at intermediate framing except as noted.

Sheathing shall be continuous from bottom plate to top plate. Cut in "L" and "T" shapes around openings. Lap sheathing over rim

joists min. 4" at all floors to tie upper and lower stud walls together.

Minimum height of sheathing panels shall be 16" to assure that plates are tied to studs.

Minimum 3-8d per stud and nad plates with "edge nail" spacing.

Sole plate at all perimeter walls and at designated shear walls shall be nailed as for braced panels with 3-16d x 3 1/2" long box nails (coated

or deformed shank) per 16", 12d nails are not acceptable.

Provide solid blocking between joists under jamb studs of openings.

All roof rafters, joists, trusses, beams shall be anchored to supports with metal framing anchors.

Light gage framing anchors shown or required, shall be Simpson "Strong Tie" or equal Code approved connectors and installed with the

number and type of nails recommended by the manufacturer to develop the rated capacity.

Note that heavy-duty hangers and skewed hangers may not be stocked locally and require special order from the factory.

All beams and trusses shall be braced against rotation at points of bearing.

Unless otherwise indicated, install two lengths of solid blocking x joist depth x 12 inches long in floor framing under column loads.

Columns must have a continuous load path to foundation.

Lead holes for lag screws shall be drilled in accordance with Table 6.25 of the ATTC Timber Construction Manual, 5th edition.

PLANT FABRICATED / PRE-ENGINEERED WOOD FRAMING:

Beams noted as ML or LVL on plan shall be 1-3/4" wide Laminated Veneer Lumber beams of the depth noted on plan

Shall be plant-fabricated and manufactured by Trus-Joist Co. / Ilevel or equal,

Shall have the following minimum allowable design stresses:

F_b = 2600 psi F_v = 285 psi F_c (| |) = 2460 psi F_c(L) = 750 psi E = 1800 ksi

Beams noted as PSL on plan shall be plant-fabricated

Manufactured by Trus-Joist Co./iLevel or equal, and have the following minimum allowable design stresses:

F_b = 2900 psi F_v = 290 psi F_c (| |) = 2900 psi F_c(L) = 750 psi E = 2000 ksi

Beams noted as TS or LSL on plan shall be plant-fabricated

Manufactured by Trus-Joist Co./iLevel or equal, and have the following minimum allowable design stresses:

F_b = 1700 psi F_v = 400 psi F_c (| |) = 1400 psi F_c(L) = 680 psi E = 1300 ksi

SHOP DRAWINGS:

Construction Documents are copyrighted and shall not be copied for use as erection plans or shop details.

The General Contractor and his subcontractors shall submit in writing any requests to modify the plans or specifications.

All shop and erection drawings shall be checked and stamped by the General Contractor prior to submission for Engineer's review.

Unchecked submittals will be returned without review.

Furnish one (1) reproducible and two (2) prints of shop and erection drawings to the Structural Engineer for review prior to fabrication

for:

Reinforcing steel,

Structural steel

Submit in a timely manner to permit ten (10) working days for review.

Shop drawings submitted for review do not constitute "in writing" unless specific suggested changes are clearly marked.

In any event, such changes by means of the shop drawing submittal process become the responsibility of the one initiating such change.

FIELD VERIFICATION OF EXISTING CONDITIONS:

Contractor shall thoroughly inspect and survey existing structure to verify conditions that affect the work shown on the drawings.

Contractor shall report any variations or discrepancies to the Owner and SI Inc before proceeding.

STRUCTURAL ERECTION AND BRACING REQUIREMENTS:

The structural drawings illustrate the completed structure with elements in their final positions, properly supported and braced.

These construction documents contain typical and representative details to assist the contractor.

Details shown apply at all similar conditions unless otherwise indicated.

Although due diligence has been applied to make the drawings as complete as possible, not every detail is illustrated, nor is every exceptional

condition addressed.

All proprietary connections shall be installed in accordance with the manufacturers' recommendations.

All work shall be accomplished in a workmanlike manner and in accordance with the applicable code and local ordinances.

The general contractor is responsible for coordination of all work, including layout and dimension verification, materials coordination, shop

drawing review, and the work of subcontractors.

Any discrepancies or omissions discovered in the course of the work shall be immediately reported to the architect for resolution.

Continuation of work without notification of discrepancies relieves the architect and engineer from all consequences.

Unless otherwise specifically indicated, the drawings do not describe methods of construction.

The contractor, in the proper sequence, shall perform or supervise all work necessary to achieve the final completed structure, and to

protect the structure, workmen, and others during construction.

Such work shall include, but not be limited to, bracing, shoring for construction equipment, shoring for excavation, formwork, scaffolding,

safety devices and programs of all kinds, support and bracing for cranes and other erection equipment.

Do not backfill against basement or retaining walls until supporting slabs and floor framing are in place and securely anchored, unless

adequate bracing is provided.

Temporary bracing shall remain in place until all floors, walls, roofs and any other supporting elements are in place.

The architect and engineer bear no responsibility for the above items, and observation visits to the site do not in any way include inspection

of them.

Structural Drawing Index	
S-1.0	General Notes, Etc.
S-1.1	Basement/ Foundation Plan
S-1.2	First Floor Framing Plan
S-1.3	Second Floor Framing Plan
S-1.4	Third Floor Framing Plan
S-1.5	Fourth Floor Framing Plan
S-1.6	Roof Framing Plan
S-2.1	Sections