STRUCTURAL GENERAL NOTES

40 O'Brion St.
Portland, Maine
SI Job #: 16-0052

DESIGN LOADS: International Building Code; IBC 2009 Edition, except as noted

Occupancy Category, Table 1604.5 — II — Standard

Roofs:

Ground Snow,	Pg		60 psf	(used for drifting calculations)
Sloped Roof Snow,	Ps		38 psf	
Snow Exposure Factor,	Ce	Table 1608.3.1	0.9	
Snow Importance Factor,	Is	Table 1604.5	1.0	
Snow Thermal Factor,	Ct	Table 1608.3.2	1.0	

Floors:

Residential	40 psf
Corridors above first floor	40 psf
Storage Areas	125 psf
Stairs	100 psf

Lateral:

Wind	IBC 1603.1.4, ASCE 7-05		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	GCpi=0.18
	Exposure		C	
	Components and Cladding Pressures		DP 50 uno. Also see specs	
Seismic	Use Group		1	
	Importance Factor		1.0	
	Spectral Response	Acceleration		Coefficient
	Short Period	S_S	0.217 g	S_{DS} 0.362 g
	One Second	S_1	0.075 g	S_{D1} 0.175 g
	Soils Site Class	Table 1615.1.1	E	
	Design Category	Table 1616.3	C	
	Basic Force Resisting System, Table 1617.6.2			
	Design Base Shear		28 kips	
	Seismic Response Coefficient	Cs	0.056	
	Response Modification Coefficient	R	6.5	
	Analysis Procedure		Equivalent Lateral Force	

FOUNDATION DESIGN:

--Footings---
Foundations are designed without an engineer's soil investigation. Foundation design criteria was assumed for the 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 shall be placed on undisturbed natural soil or compacted fill tested and approved by soils engineer.

Maximum design soil pressure: 1500 psf

--Retaining Structures---
Earth Equivalent Fluid Lateral Pressure:

Restrained Walls (at rest)	64 pcf
Cantilevered Walls (active)	42 pcf
Passive Resisting	375 pcf
Coefficient of Friction	0.45

REINFORCED CONCRETE:
We encourage the use of blast furnace slag.
Design is based on "Building Code Requirements for Reinforced Concrete"(ACI 318). Concrete work shall conform to "Standard Specifications for Structural Concrete" (ACI 3019).
Structural concrete shall have the following properties:

Intended Use	f'c, psi 28day	Max W/C Ratio	Maximum Aggregate	Slump inches	Entrained Air Percent ±1.5%	Cement Type	Admixtures, Comments
footings	3,500	.6	¾" Stone	4	---	I/II	
walls	4,000	.45	¾" Stone	4	6%	I/II	
grade beams, pile caps	4,000	.5	¾" Stone	4	3%	I/II	
struct slab on deck	4,000	.5	¾" Stone	4	---	I/II	6x6 – W2.1xW2.1 W.F.F.
formed struct slab	4,000	.45	¾" Stone	4	3%	I/II	
exterior slab on grade	4,500	.45	¾" Stone	4	6%	I/II	
interior slabs on grade	3,500	.5	¾" Stone	4	---	I/II	Fibermesh
beams, columns	4,000	.45	¾" Stone	4	6%	I/II	

Detailing, fabrication, and placement of reinforcing steel shall be in accordance with the Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI 315).
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 50 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.
Permanent corrugated steel forms for concrete floor slabs shall be manufactured and erected according to the "Specifications and Code of Standard Practice" of the Steel Deck Institute.
All concrete work is subject to inspection by a qualified special inspector employed by the owner in accordance with IBC Section 1704.4.

STRUCTURAL STEEL:
Structural steel shall be detailed, fabricated, and erected in accordance with latest AISC Specifications, and Code of Standard Practice.
Structural steel wide flange beams shall conform to ASTM A992.
Except as noted, framed beam connections shall be bearing-type with 3/4" diameter, snug tight, A325-X 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".
All beams shall have full depth web stiffeners each side of webs above and below columns
Anchor rods shall conform to ASTM F1554, Grade 55), with weldability supplement S1.
Headed anchor studs (HAS) shall be attached to structural steel with equipment approved by the stud manufacturer according to the stud manufacturer's recommendations.
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 7,500 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

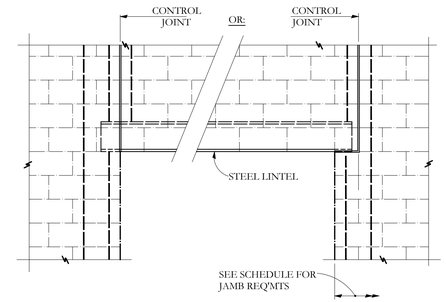
STRUCTURAL WOOD FRAMING:
In-Grade Base Values have been used for design.
2x framing shall be Spruce-Pine-Fir S4S No. 2 and better unless noted.
All lumber shall be 19% maximum moisture content, unless noted.
Solid timber beams and posts shall be Douglas Fir-Larch No. 1.
Studs shall be Spruce-Pine-Fir S4S No. 2 and better.
Top and bottom plates shall be Spruce-Pine-Fir S4S No. 2 and better.
Wood in contact with concrete shall be pressure-treated Spruce-Pine-Fir S4S No. 2 or 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 4" o.c. at panel edges, and 12" o.c. at intermediate framing except as noted.
SHEATH ALL EXTERIOR WALLS. SHEATH INTERIOR WALLS AS SHOWN ON THE DRAWINGS. BLOCK AND NAIL ALL EDGES BETWEEN STUDS.
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 nail 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.
Pre-engineered, prefabricated trusses shall be designed for the fabricator by a Professional Engineer Registered in the State of construction, and shall comply with Code Requirements.
Truss to truss connections specified shall be by truss supplier, unless specifically noted on the drawings.
Lower chord of gable end trusses shall be anchored to wall plate with framing anchors at 4'-0 spacing and laterally braced to roof framing at 8'-0 spacing.
Truss supplier shall specify all floor and roof truss bracing and bridging.
All roof rafters, joists, trusses, and beams shall be anchored to supports with metal framing anchors.
Light gage framing anchors shown or required, shall be Simpson "Strong Tie" 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 6.23 of the AITC Timber Construction Manual, 3rd edition.

PLANT FABRICATED / PRE-ENGINEERED WOOD FRAMING:
Trussed floor joists and roof joists shall be designed and stamped by a registered engineer to support the full dead loads and the superimposed design loads noted on the drawings.
Stresses shall not exceed those listed in the NDS. 15% stress increase may not be used.
Web arrangement and member forces shall be determined by the fabricator.
Manufacture and installation of trusses shall comply with
ANSI/TPI 1 "National Design Standard for Metal-Plate-Connected Wood Truss Construction",
TPI HIB "Commentary and Recommendations for Handling Installing and Bracing Metal Plate Connected Wood Trusses",
TPI DSB "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses".
Calculations and shop drawings, including member sizes, lumber species and grades, and substantiating data for connector capacities, shall be submitted to the Architect and Engineer for review prior to fabrication.
Manufactured "I"-series roof and floor joists shall be by TJI/ILevel, LPI, BCI, NJI, OJ with structural wood flanges and webs, and carry Code approval for the composite section.
Bridging and blocking shall be installed according to the fabricator's requirements.
Shop drawings shall be submitted to the Architect for review prior to fabrication.
Beams noted as 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 I Level,
Shall have the following minimum allowable design stresses:
Fb = 2600 psi Fv = 285 psi Fc (||) = 2460 psi Fc(⊥) = 750 psi E = 1900 ksi
Beams noted as PSL on plan shall be plant-fabricated
Manufactured by I Level, and have the following minimum allowable design stresses:
Fb = 2900 psi Fv = 290 psi Fc (||) = 2900 psi Fc(⊥) = 750 psi E = 2000 ksi

SHOP DRAWINGS:
Construction Documents are copyrighted and shall not be copied for use as erection plans or shop details.
Use of SI Inc.'s electronic files as base for shop drawings requires prior approval by SI Inc,
signed release of liability by subcontractor,
payment of an administration fee of $100 per drawing sheet to SI Inc, and
deletion of SI Inc's name and Logo from all sheets so used.
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, wood trusses
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 Architect before proceeding.

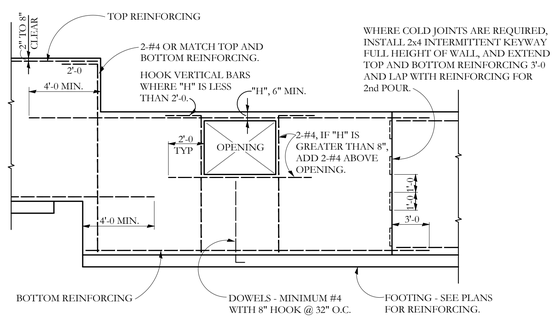
STRUCTURAL ERECTION AND BRACING REQUIREMENTS:
The structural drawings illustrate the completed structure with elements in their final positions, properly supported and braced.
These construction documents contain typical and representative details to assist the contractor.
Details shown apply at all 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.



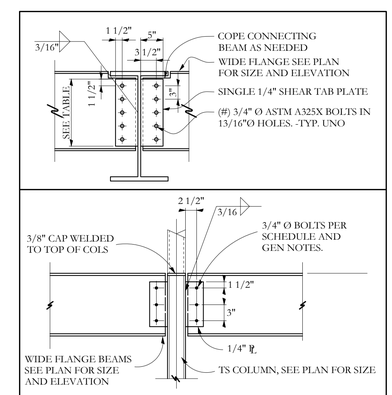
TYPICAL LOOSE LINTEL INSTALLATION
NO SCALE

OPENING SIZE	LINTEL SIZE	GROUTED JAMB WIDTH
LESS THAN 4'-0	L 3-1/2" x 3-1/2" x 1/4"	8"
4'-0" TO 5'-4"	L 5" x 3-1/2" x 1/4"	8"
5'-5" TO 6'-6"	L 6" x 3-1/2" x 5/16"	1'-4"

* Minimum lintel except as noted, one angle for each 4" of wall thickness to bear 6" each end



TYPICAL REINFORCING AT STEPS AND OPENINGS
NO SCALE

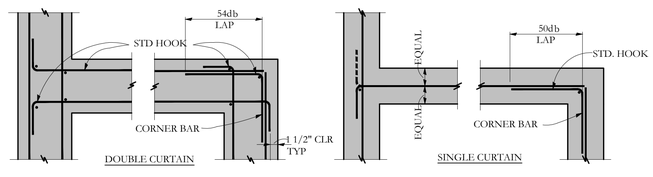


SINGLE-PLATE SHEAR CONNECTION SCHEDULE

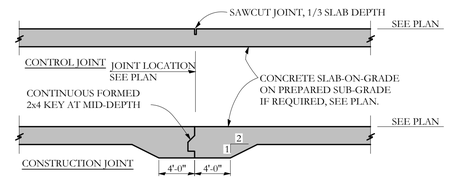
CONN. BM. SIZE	# OF 3/4"Ø BOLTS	L (in.)	CONN CAP. (kips)
W8, W10	2	6	9
W12, W14	3	9	16
W16	4	12	21
W18	5	15	26
W21	6	18	46
W24	7	21	56

*ALL BOLTS TO BE ASTM A325 -TYP UNO
TYPICAL SINGLE PLATE SHEAR CONNECTION

(PROVIDE SIMILAR BOLTING AT BEAM-TO-BEAM CONNECTION)



TYPICAL CONCRETE WALL INTERSECTIONS



TYPICAL JOINTS AT INTERIOR SLAB-ON-GRADE

Structural Drawing Index

S-1.0	General Notes, Etc.
S-1.1	Foundation and First Floor Framing Plan
S-1.2	Second and Third Floor Framing Plan
S-1.3	Roof Framing Plan
S-2.1	Details

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October 26th, 2017

PERMIT SET

40 O'Brion St CONDOS

40 O'Brion Street
Portland, Maine

#	DATE	DESCRIPTION

Date Issued: OCTOBER 26, 2017
Project Number: 15030
Drawing Scale: AS NOTED

GENERAL NOTES

Drawn By: CJO
Checked By: CJO

S-1.0

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