B

REPLACE EXISTING WINDOW WITH TEMPERED (FIXED)

BENCH

EXISTING WALL

AC/HEATER

EXISTING WALL

UNFINISHED STORAGE SPACE

CLOSET

LINEN

(N) SHOWER

ELECTRICAL SUBPANEL

TANKLESS WATER HEATER

THRESHOLD

ATTIC ACCESS

BATHROOM

(N)

CLOSET

18'3"

5'6"

EXISTING POLE

(N) (N)

EXISTING CHIMNEY

4'3"

EXISTING WALL

12'

LOW CEILING HEIGHT

BEDROOM

UP FROM BELOW

EXISTING STAIRS

27'

36" WIDE MIN
6'8" HEADROOM
8" MAX RISER
9" MIN TREAD
10 VARIATION
TOL. 3/8"

A

UNFINISHED STORAGE SPACE

11'

EXISTING FRAMED WALL

50

STEP (MIN) 4"

EXISTING FLOOR HEIGHT LANDING

7'9"

A

CLOSET

EXISTING CHIMNEY

ADD HEADER (N)

7'

UNFINISHED STORAGE SPACE

6'

7'

B

10'

INSULATE R-15 @ (E) 2×4

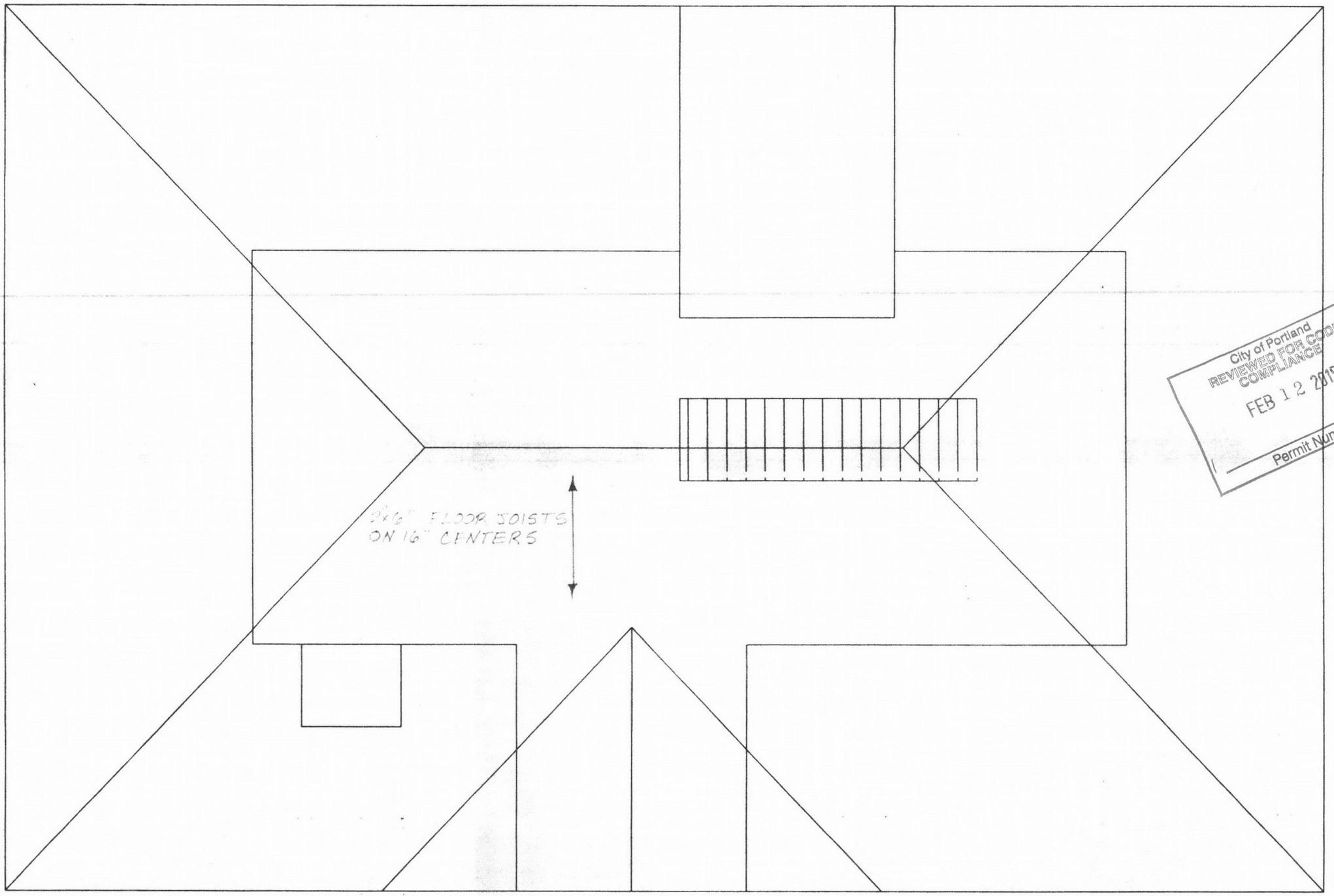
NEW WINDOW IN EXISTING 4'6" OPENING x 4'0" WITH EXISTING EGRESS CASEMENT U-VALUE .35 OR BETTER

ATTIC FLOOR PLAN

MUNRO
10807 NW 2ND ST.

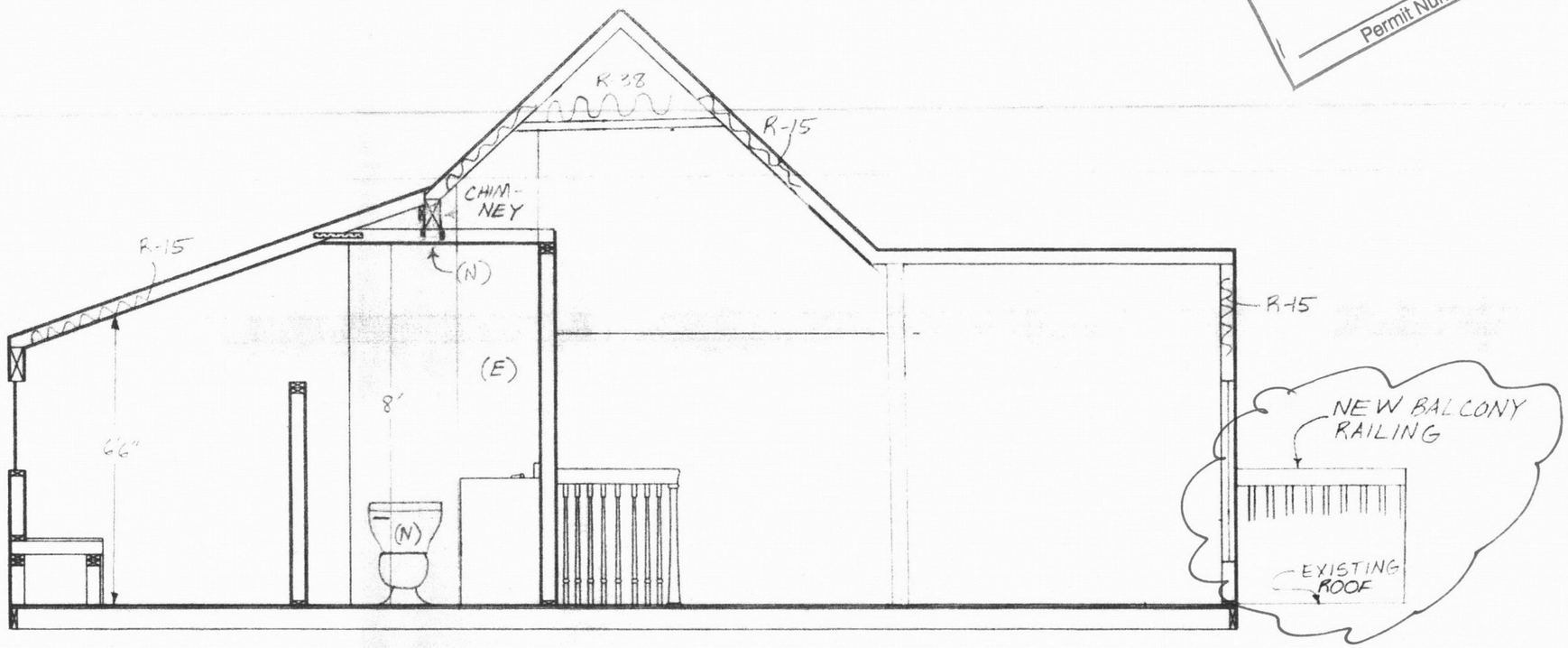
City of Portland
REVIEWED FOR CODE COMPLIANCE
FEB 12 2015
Permit Number

10-102032 RS REV01 2



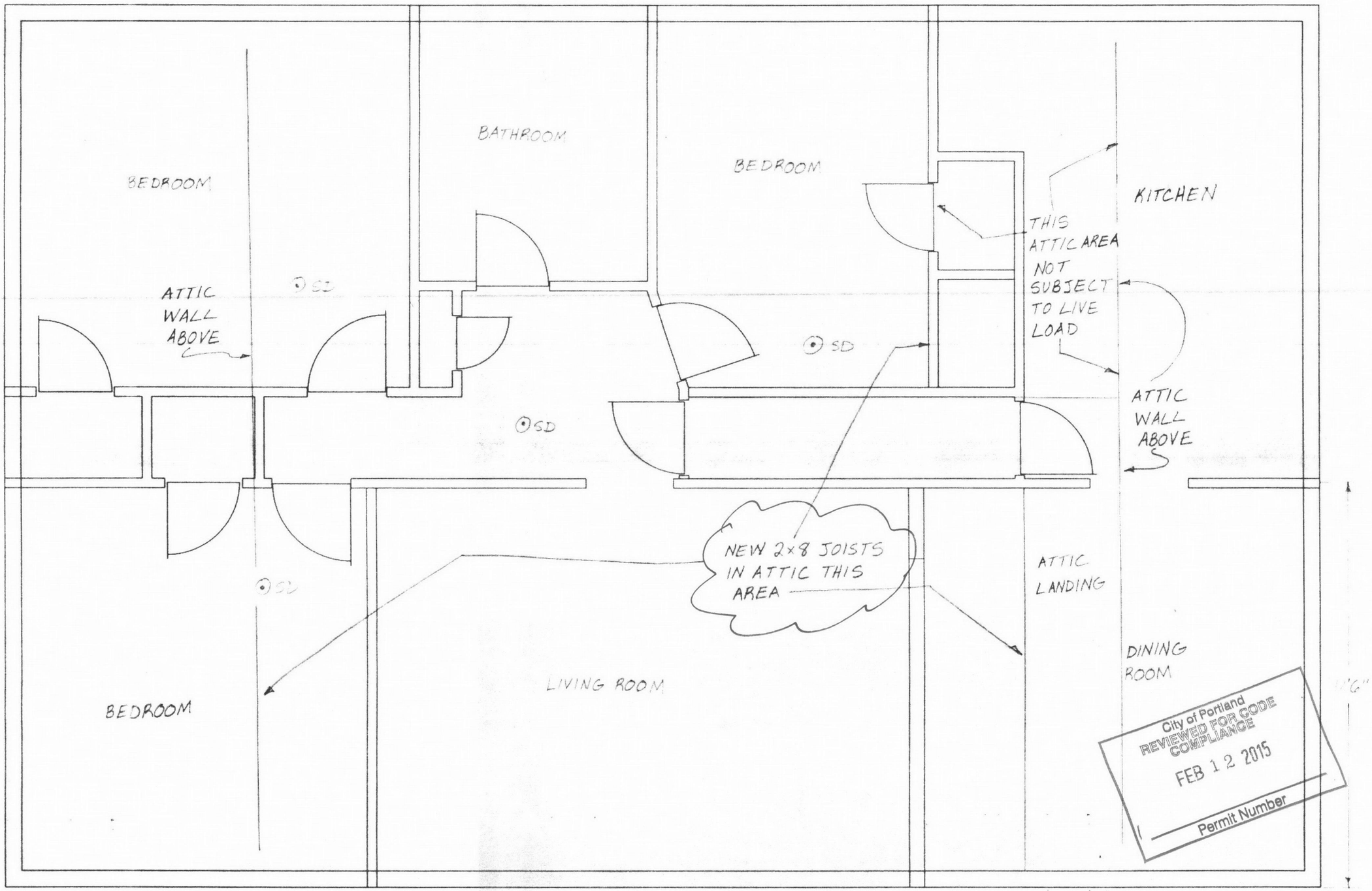
ROOFLINE

MUNRO
10807 NW 2ND ST



SECTION B-B

MUNRO
10807 NW 2ND ST



EXISTING LOWER FLOOR

MUNRO
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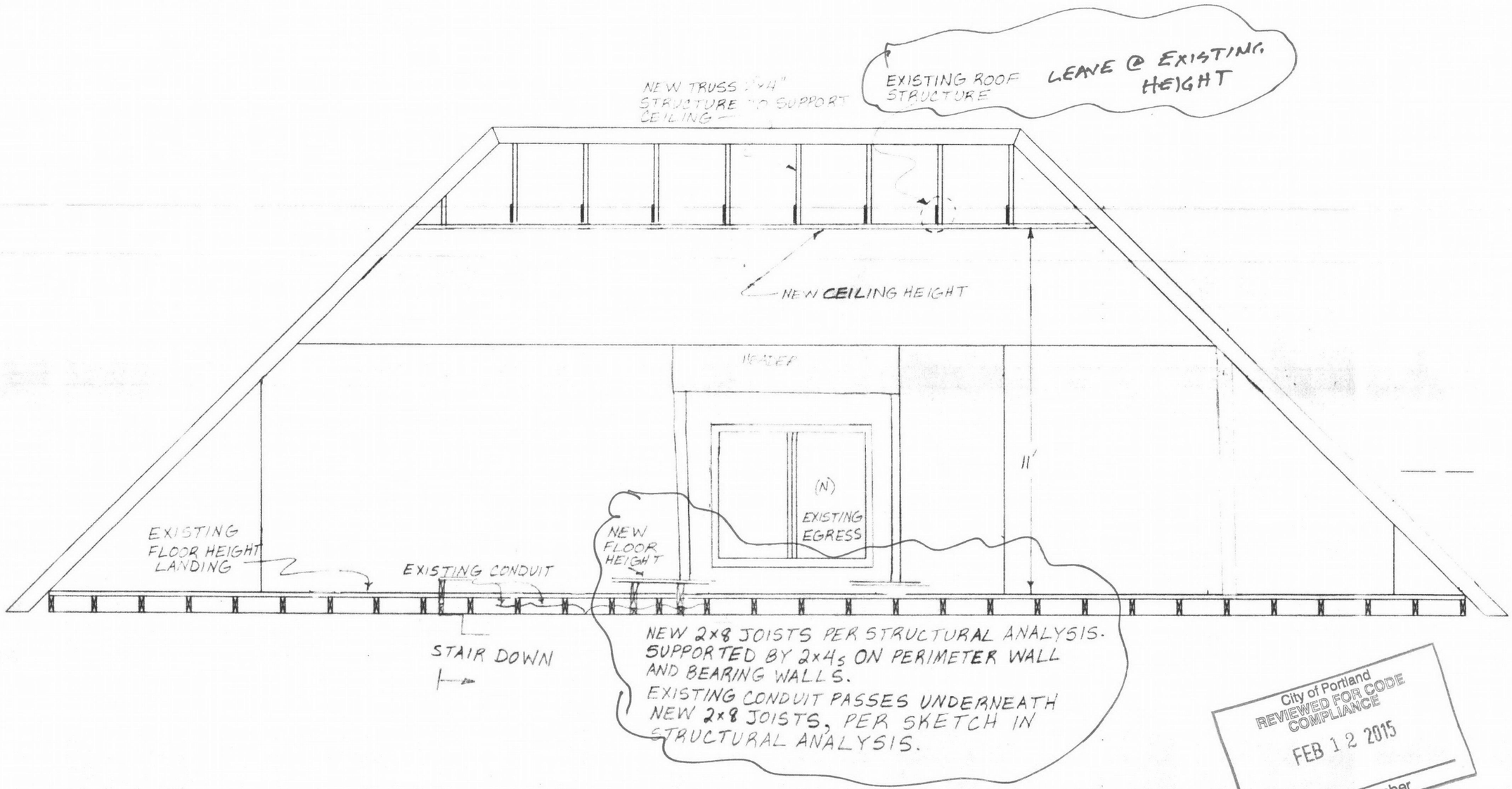
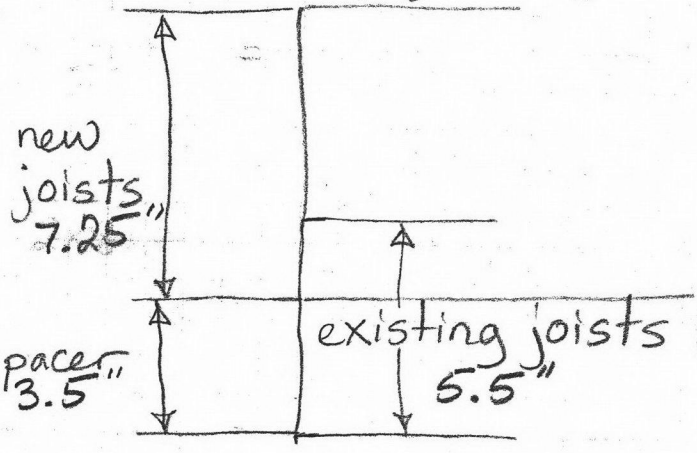


SECTION A-A

MUNRO

Impact of installing new 2x8 joists midway between existing joists, 16" on center.

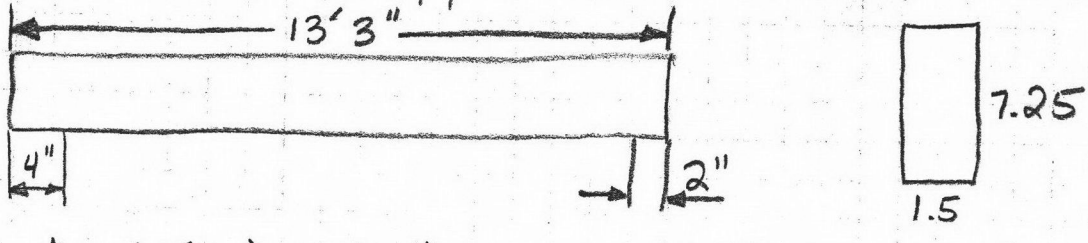


10.75
- 5.5
5.25 increased floor height

Dimensional lumber 2"x8" = 1.5" x 7.25"

16" span = 1.33 ft span

Floor is 13'3" supported 6" ⇒ 12'9" = 12.75 ft



Live load (LL) = 40 lb/ft² x 1.33 ft = 53.3 lb/ft

Dead load (DL) = 10 lb/ft² x 1.33 ft = 13.3 lb/ft

Total = 66.7 lb/ft = w

Bending strength, σ or $F_b = \frac{Mc}{I} = \frac{M}{S}$

$M = \frac{wL^2}{8}$ for simply supported

$M = \frac{66.7\ lb/ft\ (12.75\ ft)^2}{8} = 1355\ ft\cdot lb \times \frac{12\ in}{ft} = 16{,}264\ in\cdot lb$

$S = \frac{1}{6}bh^2 = \frac{1}{6}(1.5\ in)(7.25\ in)^2 = 13.14\ in^3$

$F_b = \frac{M}{S} = \frac{16{,}264\ in\cdot lb}{13.14\ in^3} = 1238\ psi$

10-102052 REV-01

Allowable Stress, F_b'

Occupancy = residential

Wood Grade = No. 2 Doug Fir

Base value = 900 psi

Adjustments that do not equal 1.0:

Size, $C_F = 1.20$ (Table A)

Repetitive Use, $C_r = 1.15$ B

$$F_b' = (900\,psi)(1.20)(1.15) = \underline{1242\,psi}$$

F_b (1238 psi) < F_b' (1242 psi) OK

Shear Strength, F_v

$$V_{max} = \frac{wL}{2} = 66.7\frac{lb}{ft} \times 12.75\,ft/2 = 425\,lb$$

$$F_v = \tau = \frac{3}{2}\cdot\frac{V}{bh} = \frac{3}{2}\left(\frac{425\,lb}{(1.5in)(7.25in)}\right) = \underline{58.6}\,psi$$

Base value = 180 psi OK

Bearing Strength, $F_{c\perp}$

$$P = \frac{wL}{2} = \frac{(66.7\,lb/ft)(13.25\,ft)}{2} = 442\,lb$$

$$F_{c\perp} = \frac{P}{bh} = \frac{442\,lb}{(1.5in)(3.5in)} = \underline{84.2}\,psi$$

← 2×4

Base value = 625 psi OK

Deflection, δ

$E = 1.6 \times 10^6$ psi for No 2 DF

For $LL = 40\ lb/ft^2$, $\delta_{max} < \frac{L}{360}$

$L = 12.75\ ft = 153\ in$

For simply supported beam, $\delta_{max} = \frac{5}{394} \cdot \frac{wL^4}{EI}$

$$\delta = \frac{5}{394} \cdot \frac{53.3\ lb/ft \times \frac{1\ ft}{12\ in} (153\ in)^4}{1.6e6\ lb/in^2 \times \frac{1.5\ in (7.25\ in)^3}{12}} = .405\ in$$

$$\delta_{max} = \frac{L}{360} = \frac{153\ in}{360} = .425\ in$$

$\delta\ (.405\ in) < \delta_{max}\ (.425\ in)$ OK

Citations

Hibbeler, "Mechanics of Materials", 9th Ed

"Western Lumber Product Use Manual: Base Values" Western Wood Products Assoc. 2008