Inspections Division
Date: 01/02/14

51 Hammond Street
Portland, Maine 04101
Carrying beam load calculations
December 31, 2013

Loads

Roof	LL 50 psf
	DL 10 psf
2nd floor	LL 40 psf
	DL 10 psf
1st floor	LL 40 psf
	DL 10 psf
Total load	TL 160 psf

Distributed load: 160psf x 5.5ft = 880 plf = 73 pli (pounds per linear inch)

Span length L=96”
Max. deflection D=L/360 =0.25”
Modulus of elasticity of #2SPF: E=1,400,000

Required moment of inertia (I) to limit deflection to 0.25”: I=(5w(L^4))/384(E)D

Required I = 231in^4 → beam 3”w x 9.71”h or 4.5”w x 5.89”h

→ (3) 2x10’s meet deflection criteria

Check compression perpendicular to grain:
Point load at center pier = 880psf x 5.5ft = 7040lbs
Max. allowable compression perpendicular to grain = 400lbs
7040/400 = 17.6 square inches
→ Need 4.5” x 3.9” bearing area at pier