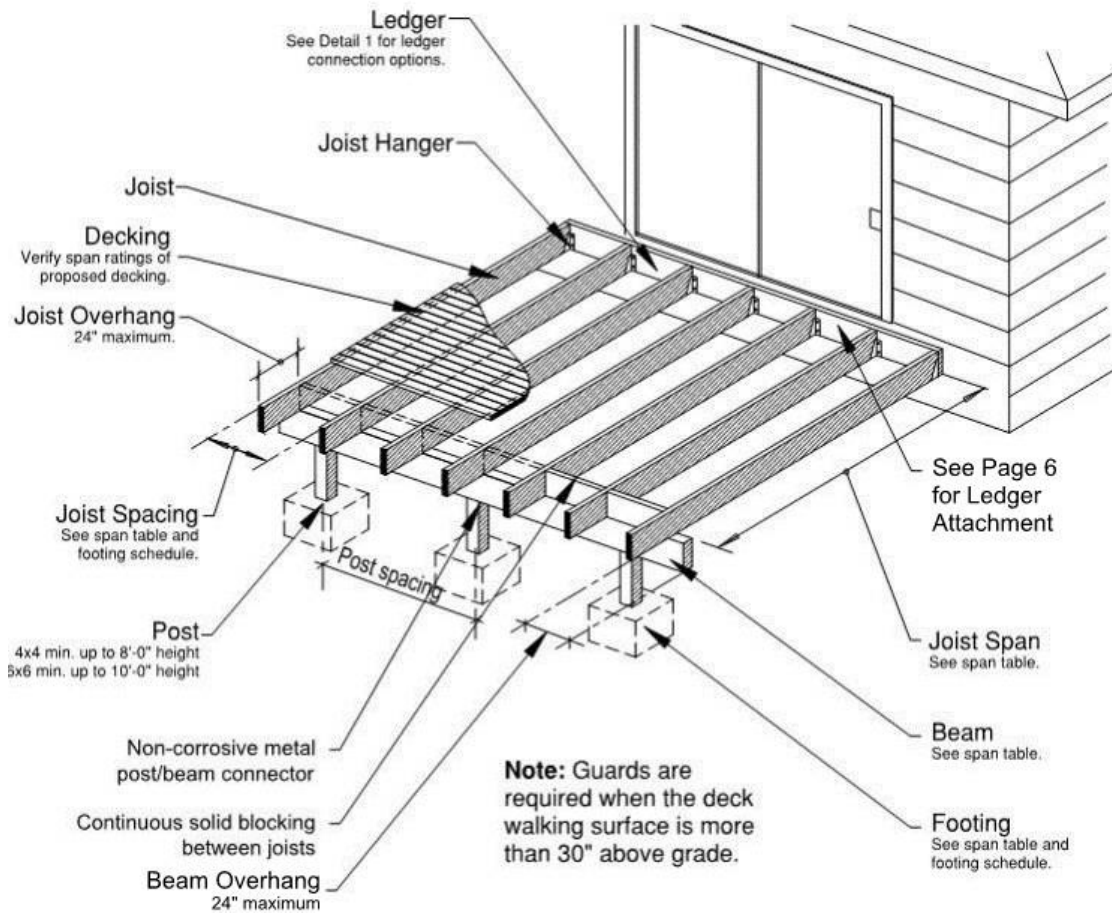


## PRESCRIPTIVE RESIDENTIAL DECK DESIGN

This document provides building code information applicable to prescriptive residential wood deck design. You may need to hire a licensed architect or an engineer to design a deck where any of the following conditions apply:

- The deck serves other than a one- or two-family dwelling building
- The deck design includes more than one level
- The deck will support a hot tub, spa or other heavy object, including heavy deck covering (such as pavers)
- The walking surface is more than 10' above grade
- The deck ledger is attached to house overhangs, bay windows, bricks, stone or concrete block
- The deck is bearing on ground with a slope greater than 1' horizontal for every 1' vertical
- The deck is self-supporting (not attached to an exterior wall)

### Typical Deck Construction



### **Deck Construction Notes**

- Please note that due to the new 60 psf loading, previous lumber spans and footing sizes have changed.
- Guardrails are required when the deck is more than 30-inches above grade. See related City of Richland Handout for [Residential Stairways, Handrails & Guardrails](#)
- **This handout is intended to represent good construction practices for deck construction and related IRC requirements. The following figures and tables are provided for your use in understanding the code requirements, however does not address all possible scenarios.**

### **Deck Framing and Framing Connections**

Many grades and sizes of materials exist; therefore, all combinations cannot be provided. Deck framing shall be of moisture resistant materials, however pressure treated lumber is not required. Connections between deck framing members shall be made with corrosion resistant fasteners, nails, bolts, screws, and connectors.

Lateral loads shall be transferred to a structure capable of transmitting forces to the ground. Provided a minimum of 300lbs of lateral load connectors.

### **Section 1 – Deck Connections**

<b>Connection:</b>	<b>Fastening:</b>
Manufactured Connectors	Per manufacturer's instructions
Post to Footing	Post base required
Post to Beam	Mechanical connector required
Ledger to House Framing	See Section 2
Joist to Beam or Girder	(3) 8d toe-nails
Blocking/Bridging to Joist	(2) 10d toe-nails each end
Wood Decking	(2) 8d nails or (2) No. 8 screws at each joist
Composite Decking	Per manufacturer's instructions

## Section 2 – Ledger Attachment

### Deck Ledger Connection to Band Joist <sup>a,b</sup>

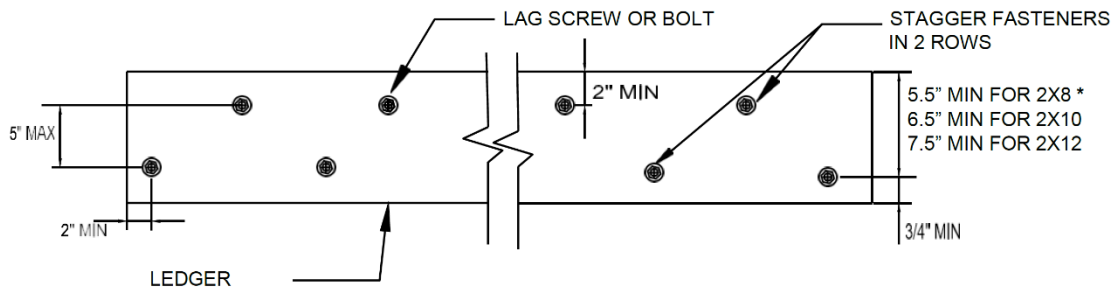
(Reference IRC Table R507.2 – Deck live load = 60psf, deck dead load = 10psf)

Connection Details	Joist Span						
	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
	On-center spacing of fasteners						
½ inch diameter lag screw with ½ inch maximum sheathing <sup>c, d</sup>	22	16	13	11	9	8	7
½ inch diameter bolt with ½ inch maximum sheathing <sup>d</sup>	30	22	18	15	13	11	10
½ inch diameter bolt with 1 inch maximum sheathing <sup>e</sup>	26	19	16	13	11	10	9

- a. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- b. Snow load shall not be assumed to act concurrently with live load.
- c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- d. Sheathing shall be wood structural panel or solid sawn lumber.
- e. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to ½-inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

### Placement of Lag Screws and Bolts in Ledgers

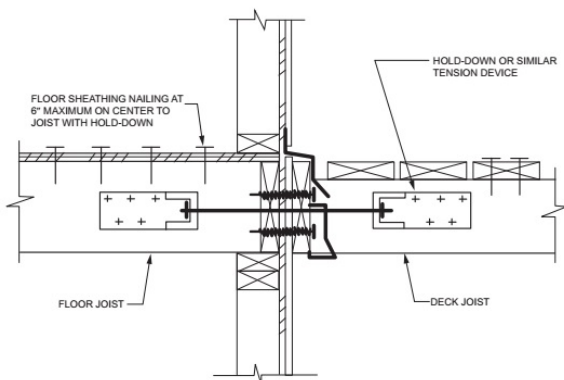
(Reference IRC Figure 507.2.1(1))



\*DISTANCE CAN BE REDUCED TO 4.5" IF LAG SCREWS ARE USED OR IF BOLT SPACING IS REDUCED TO THAT OF LAG SCREWS TO ATTACH 2X8 LEDGERS TO 2X8 BAND JOISTS.

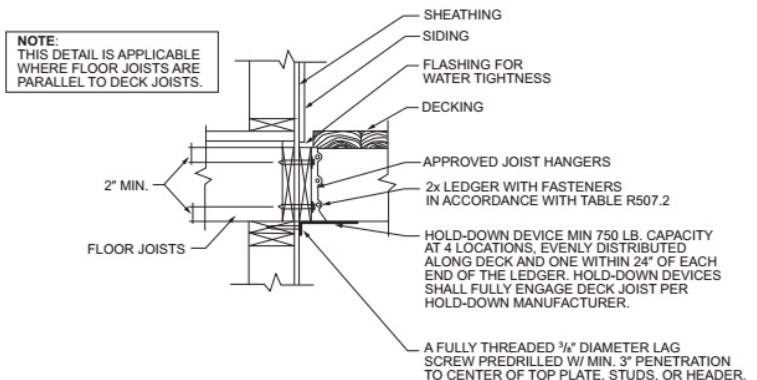
### Ledger Attachment for Lateral Loads

(Reference IRC 507.2.3)



#### New Construction

(2) 1500lbs connectors w/ 24-in of each end of deck



#### Existing Construction

(4) 750lbs connectors evenly distributed

### Section 3 – Deck Framing Spans

Spans and footings assume the maximum 24" cantilever using Hem-Fir/Doug Fir No. 2 or better framing lumber.  
Table uses 70 psf. loading (10 psf. dead load + 60 psf live load)

#### Deck Joist Span Lengths

(Reference WA Amended IRC Table R507.5 – Deck live load = 60psf, deck dead load = 10psf)

JOIST SIZE	ON-CENTER SPACING	MAXIMUM JOIST SPAN	MAXIMUM JOIST SPAN WITH CANTILEVERS
2X6 <sup>a</sup>	16" o.c.	7 feet 0 inches	6 feet 9 inches
	24" o.c.	5 feet 9 inches	5 feet 9 inches
2X8 <sup>a</sup>	16" o.c.	9 feet 5 inches	8 feet 8 inches
	24" o.c.	7 feet 8 inches	7 feet 7 inches
2X10 <sup>a</sup>	16" o.c.	11 feet 6 inches	11 feet 6 inches
	24" o.c.	9 feet 4 inches	9 feet 5 inches
2X12 <sup>a</sup>	16" o.c.	13 feet 4 inches	13 feet 4 inches
	24" o.c.	10 feet 10 inches	10 feet 11 inches

a. Grade No. 2 douglas fir-larch, hem-fir, or spruce-pine-fir. Includes wet service and incising factors.

#### Deck Beam Span Lengths

(Reference WA Amended IRC Table R507.6 – Deck live load = 60psf, deck dead load = 10psf)

SIZE OF BEAM	SPAN OF JOIST RESTING ON BEAM	MAXIMUM SPAN
4x6	6 feet	6 feet 3 inches
	8 feet	5 feet 11 inches
	10 feet	4 feet 11 inches
	12 feet	4 feet 1 inches
	14 feet	3 feet 6 inches
	16 feet	3 feet 1 inches
	18 feet	2 feet 9 inches
4x8	6 feet	8 feet 9 inches
	8 feet	7 feet 9 inches
	10 feet	6 feet 6 inches
	12 feet	5 feet 5 inches
	14 feet	4 feet 8 inches
	16 feet	4 feet 1 inches
	18 feet	3 feet 7 inches
4x10	6 feet	11 feet 0 inches
	8 feet	9 feet 6 inches
	10 feet	8 feet 3 inches
	12 feet	6 feet 11 inches
	14 feet	5 feet 11 inches
	16 feet	5 feet 2 inches
	18 feet	4 feet 7 inches

a. Grade No. 2 douglas fir-larch, hem-fir, or spruce-pine-fir. Includes wet service and incising factors.  
b. For beams supporting deck joist from one side only.