PLANNING AND CODES
TOWN OF DENTON
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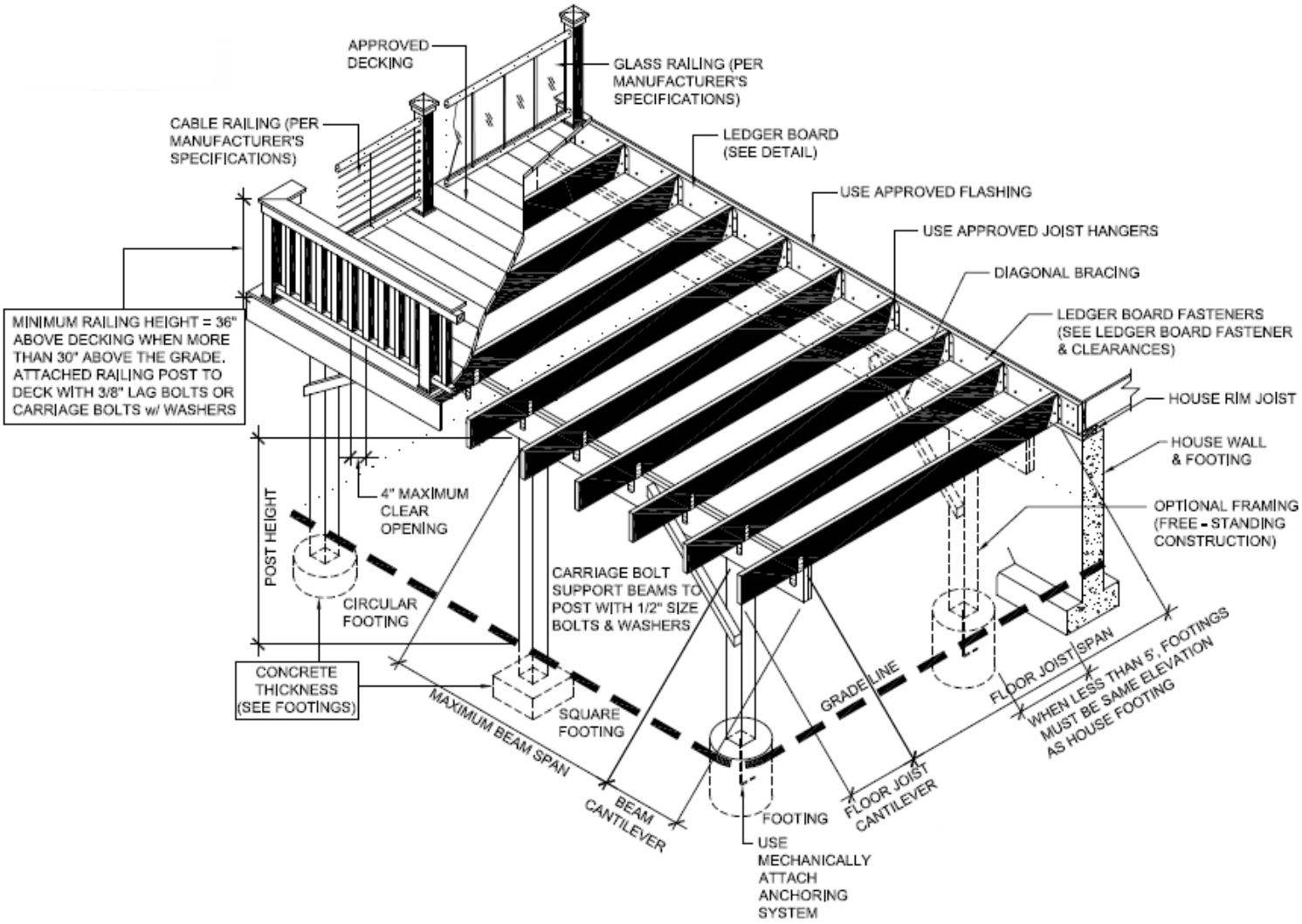
DECK CONSTRUCTION GUIDE

2021 International Residential Code

The intent of this guide is to assist homeowners and contractors to construct exterior wood-framed decks in accordance with the International Residential Code (IRC) – Section R507. Other decks can be built in accordance with IRC Section R301 and other applicable requirements.

This guide is for reference only. Please refer to the International Residential Code for complete details. Final review and approval shall be subjected to plan review and field inspections.



Applicant to first read through all applicable sections of the International Residential Code and all manufacture's requirements to become familiar with all requirements. Then, this guide can be utilized to assist in the design, review, construction and inspection of the deck.
Building permit submittal to include Construction Plans of the deck, scaled Site Plan, Standard Grading Plan

The applicant shall fill in these areas below with the applicable information, and attach this first page with their building permit submittal. The other pages of this document do not need to be submitted with the building permit submittal.

FOOTINGS

TO BE COMPLETED BY THE APPLICANT			
Footings (Square or Round):			
Footing #	Tributary Area (sq.ft.)	Footing Length / Diameter (inches)	Footing Thickness (inches)

DECK POSTS

TO BE COMPLETED BY THE APPLICANT			
Post #	Tributary Area (sq.ft.)	Post Size (inches)	Post Height (feet-inches)

DECK BEAMS

TO BE COMPLETED BY THE APPLICANT	
Beam Size:	
Joist Span:	
Beam Span:	
Beam Cantilever:	

DECK JOISTS

TO BE COMPLETED BY THE APPLICANT	
Joist Size:	
Joist Span:	
Joist Spacing:	
Joist Cantilever:	

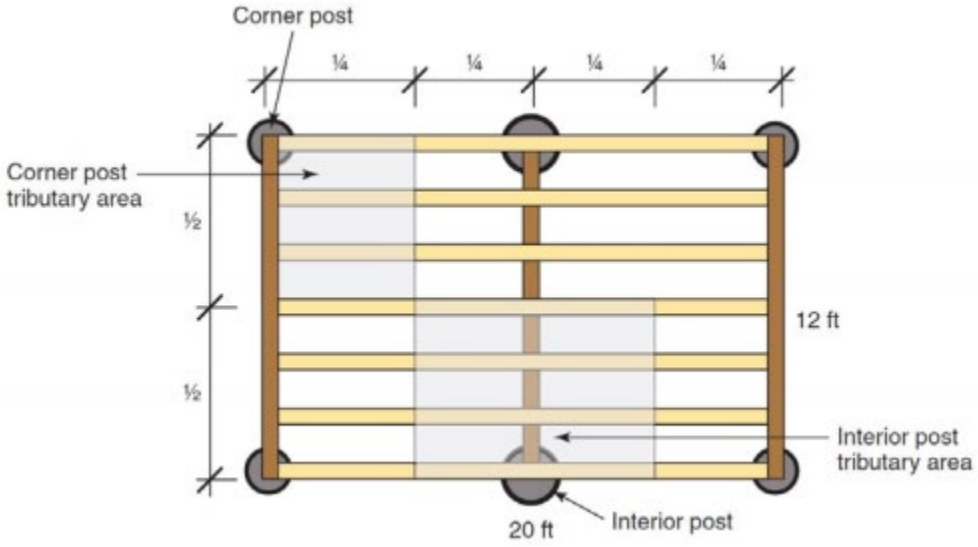
FOOTINGS

Footings to be a minimum of 30 inches deep for attached decks. Footings must bear on undisturbed soil.

Footing size is based on IRC; Table R507.3.1 for a load of 50 psf with a soil bearing capacity of 2000 psf.

MINIMUM FOOTING SIZE			
Tributary Area (sq.ft.)	**Side of a Square Footing (inches)**	**Diameter of a Round Footing (inches)**	**Thickness (inches)**
5	7	8	6
20	10	11	6
40	13	15	6
60	16	18	6
80	19	21	6
100	21	23	7
120	23	26	8
140	25	28	9
160	26	30	10

Below is an example of how to calculate the Tributary Area:



Tributary Area – Interior Post
Length is ¼ of total length = 20 ft x ½ = 10 ft
Width is ½ of total width = 12 ft x ½ = 6 ft
Area = 10 ft x 6 ft = 60 ft²

Footing Size – Interior Post
Min. 18 in. diameter
Min. 6 in. thick

DECK POSTS

Post size is based on IRC; Table R507.4, for a 40 psf live load, utilizing southern pine post species.

Deck Post Size (inches)	Tributary Area (sq.ft.)							
	20	40	60	80	100	120	140	160
	Maximum Deck Post Height (feet-inches)							
4x4	14'-0"	13'-8"	11'-0"	9'-5"	8'-4"	7'-5"	6'-9"	6'-2"
4x6	14'-0"	14'-0"	13'-11"	12'-0"	10'-8"	9'-8"	8'-10"	8'-2"
6x6	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"
8x8	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"	14'-0"

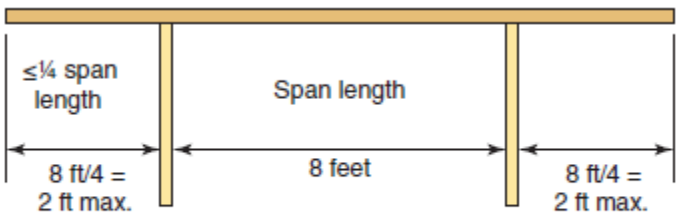
Where deck posts bear on concrete footings, lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches in concrete piers.

DECK BEAMS

Beam size is based on IRC; Table R507.5, for a 40 psf live load, utilizing southern pine beam species.

MAXIMUM BEAM SPAN LENGTH (feet-inches)							
	Deck Joist Span Less Than or Equal to (feet):						
Beam Size	6	8	10	12	14	16	18
1 (2x6)	4'-7"	4'-0"	3'-7"	3'-3"	3'-0"	2'-10"	2'-8"
1 (2x8)	5'-11"	5'-1"	4'-7"	4'-2"	3'-10"	3'-7"	3'-5"
1 (2x10)	7'-0"	6'-0"	5'-5"	4'-11"	4'-7"	4'-3"	4'-0"
1 (2x12)	8'-3"	7'-1"	6'-4"	5'-10"	5'-5"	5'-0"	4'-9"
2 (2x6)	6'-11"	5'-11"	5'-4"	4'-10"	4'-6"	4'-3"	4'-0"
2 (2x8)	8'-9"	7'-7"	6'-9"	6'-2"	5'-9"	5'-4"	5'-0"
2 (2x10)	10'-4"	9'-0"	8'-0"	7'-4"	6'-9"	6'-4"	6'-0"
2 (2x12)	12'-2"	10'-7"	9'-5"	8'-7"	8'-0"	7'-5"	7'-0"
3 (2x6)	8'-6"	7'-5"	6'-8"	6'-1"	5'-8"	5'-3"	4'-11"
3 (2x8)	10'-11"	9'-6"	8'-6"	7'-9"	7'-2"	6'-8"	6'-4"
3 (2x10)	13'-0"	11'-2"	10'-0"	9'-2"	8'-6"	7'-11"	7'-6"
3 (2x12)	15'-3"	13'-3"	11'-10"	10'-9"	10'-0"	9'-4"	8'-10"

The maximum beam cantilever is allowed to be ¼ of the beam span length. Below is an example:



Calculation of Maximum Cantilever Span Length

DECK JOISTS

Maximum allowable spans for joists shall be in accordance with the table below based on IRC; Table R507.6, for a 40 psf live load, utilizing southern pine beam species.

Allowable Joist Span			
Joist Size	Joist Spacing (inches)		
	12	16	24
2 x 6	9'-11"	9'-0"	7'-7"
2 x 8	13'-1"	11'-10"	9'-8"
2 x 10	16'-2"	14'-0"	11'-5"
2 x 12	18'-0"	16'-6"	13'-6"

Maximum allowable cantilever for joists shall be in accordance with the table below based on IRC; Table R507.6, for a 40 psf live load, utilizing southern pine beam species.

Maximum Cantilever								
Joist Size	Joist Back Span (feet)							
	4	6	8	10	12	14	16	18
2 x 6	1'-0"	1'-6"	1'-5"	NP	NP	NP	NP	NP
2 x 8	1'-0"	1'-6"	2'-0"	2'-6"	2'-3"	NP	NP	NP
2 x 10	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-4"	3'-4"	NP
2 x 12	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-1"

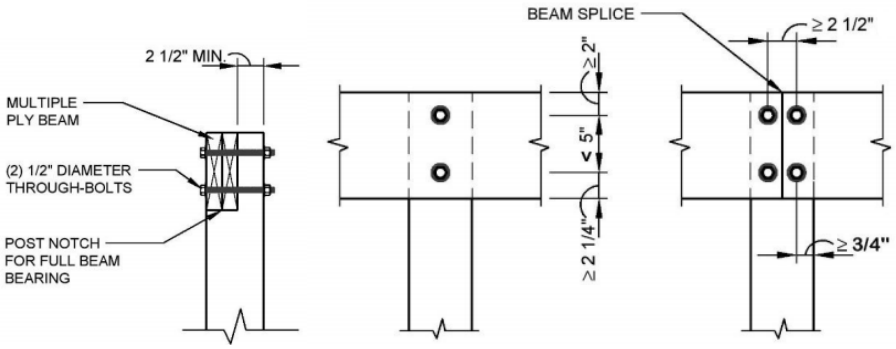
DECKING

Maximum allowable spacing for joists supporting decking (excluding stairways) shall be in accordance with the table below based on IRC; Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws.

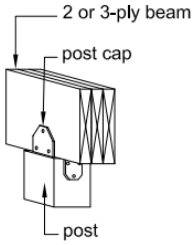
MAXIMUM JOIST SPACING FOR WOOD DECKING				
Decking Material Type and Size	Decking Perpendicular to Joist		Decking Diagonal to Joist	
	Single Span	Multiple Span	Single Span	Multiple Span
	MAXIMUM ON-CENTER JOIST SPACING			
1 1/4 inch thick wood	12 inches	16 inches	8 inches	12 inches
2 inch thick wood	24 inches	24 inches	18 inches	24 inches

DECK POSTS TO BEAM CONNECTION

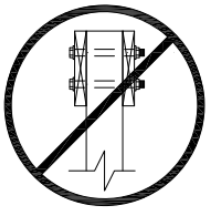
Notched Post:



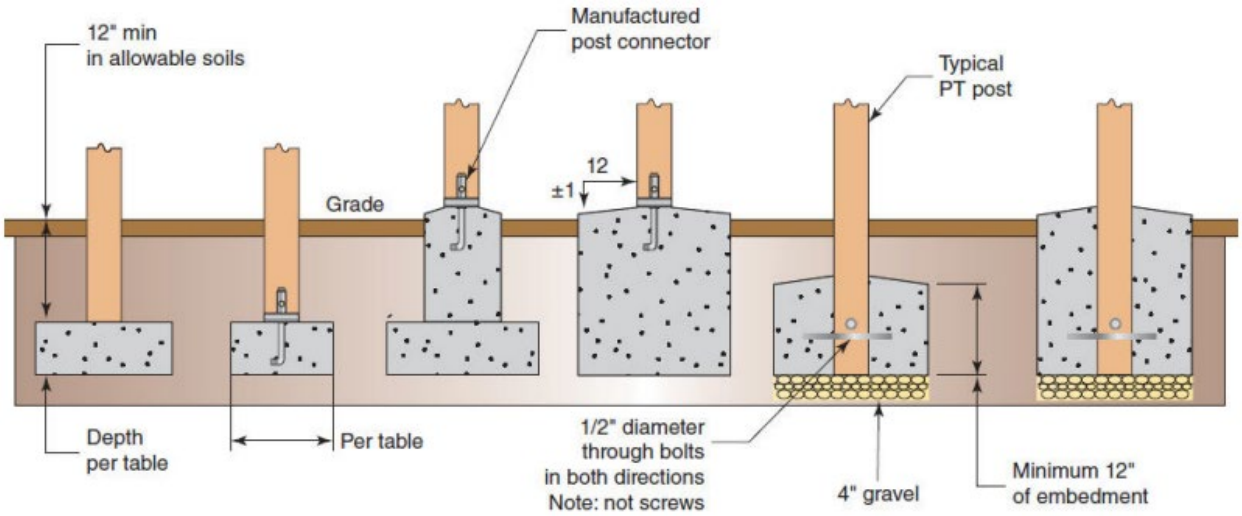
Post Cap:



Prohibited Connection:



DECK POSTS TO FOOTINGS CONNECTION:



Note: Posts must be centered on or in footing.

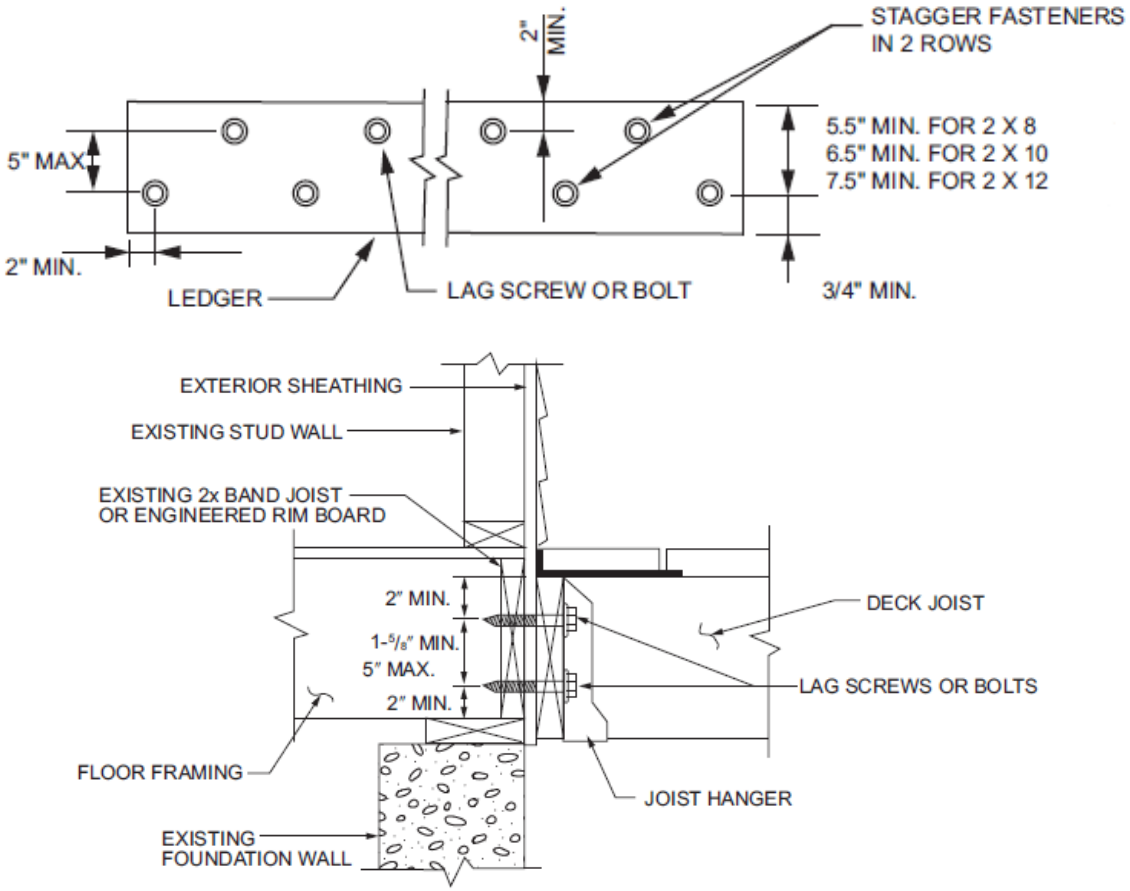
VERTICAL SUPPORT (DECK LEDGER)

Vertical loads of the deck shall be transferred to band joists with ledgers. Deck ledgers shall be a minimum 2-inch by 8-inch nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers shall not be supported on stone or masonry veneer. Ledgers shall be flashed in accordance with IRC; R703.4. Band joists supporting a ledger shall be a minimum 2-inch-nominal, solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch by 9-1/2-inch dimensional, Douglas fir or better, laminated veneer lumber. Band joists shall bear fully on the primary structure capable of supporting all required loads. For decks with cantilevered framing members, connection of the band joist to ledger shall be designed and constructed to resist uplift resulting from 40 psf acting on the cantilevered portion of the deck.

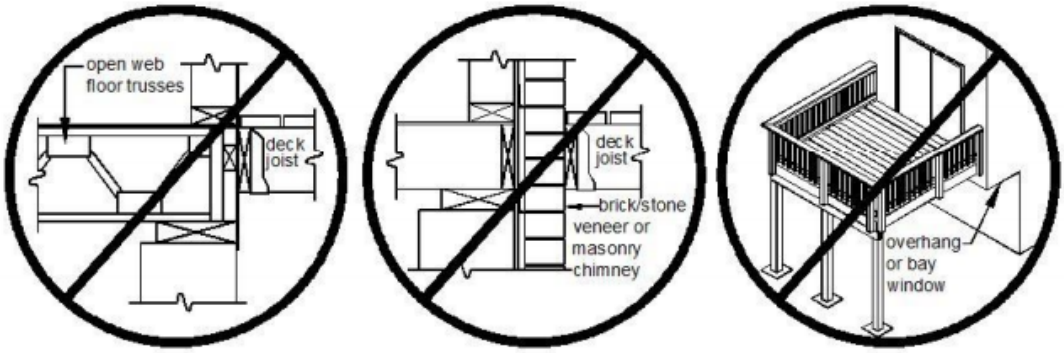
Fasteners used in deck ledger connections shall be in accordance with the table below. Fasteners shall be hot-dipped galvanized or stainless steel. Fasteners are not permitted to be nails subject to withdrawal.

DECK LEDGER CONNECTION TO BAND JOIST							
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 (inches)						
1/2-inch diameter lag screw with 1/2-inch maximum sheathing	30	23	18	15	13	11	10
1/2-inch diameter bolt with 1/2-inch maximum sheathing	36	36	34	29	24	21	19
1/2-inch diameter bolt with 1-inch maximum sheathing	36	36	29	24	21	18	16

Placement and spacing of lag screws and bolts in ledgers shall be in accordance with the figure below:



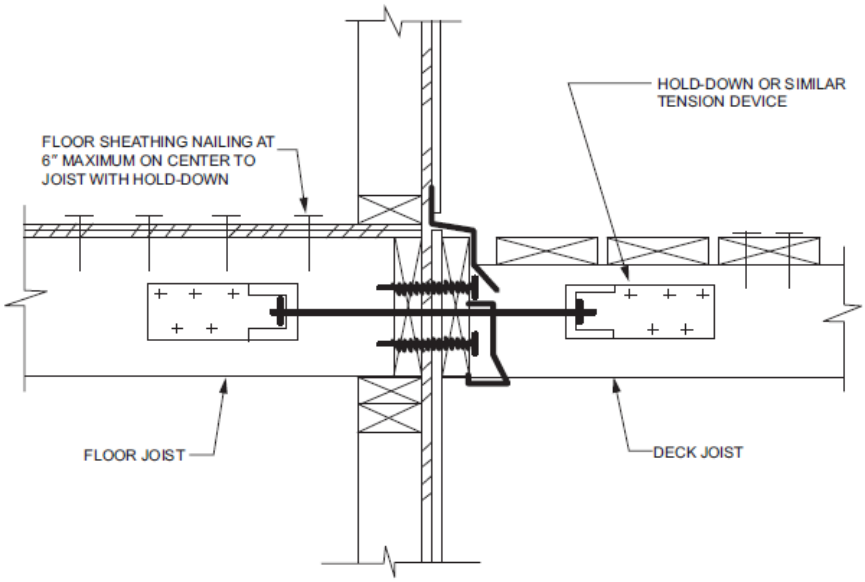
Prohibited ledger attachments are (with open web floor trusses, to brick/stone veneer or masonry chimney, and to an overhang or bay window):



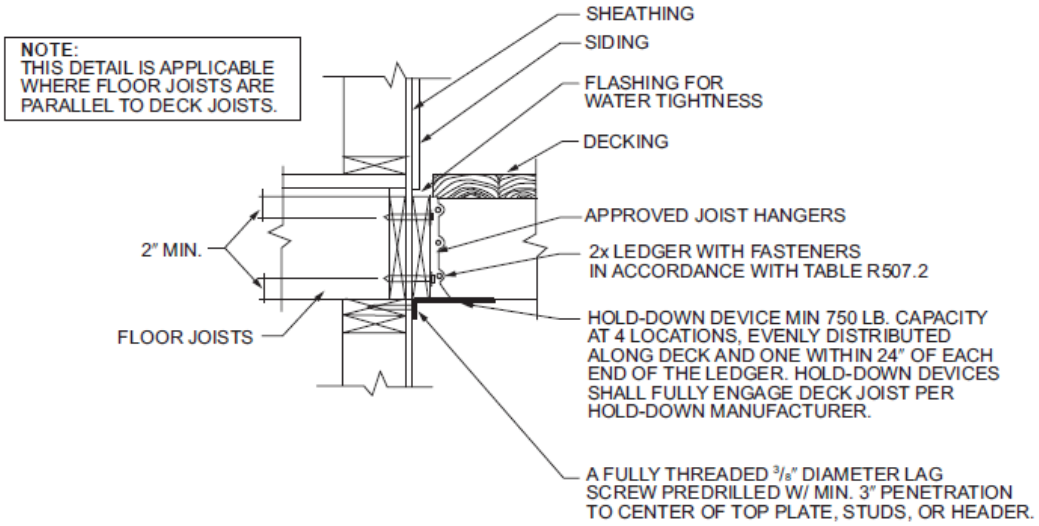
LATERAL CONNECTIONS

Lateral loads shall be transferred to the ground or to a structure capable of transmitting them to the ground.

Where the lateral load connection is with holddown tension devices, they shall be installed in not less than two locations per deck, within 24 inches of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds. See figure below:



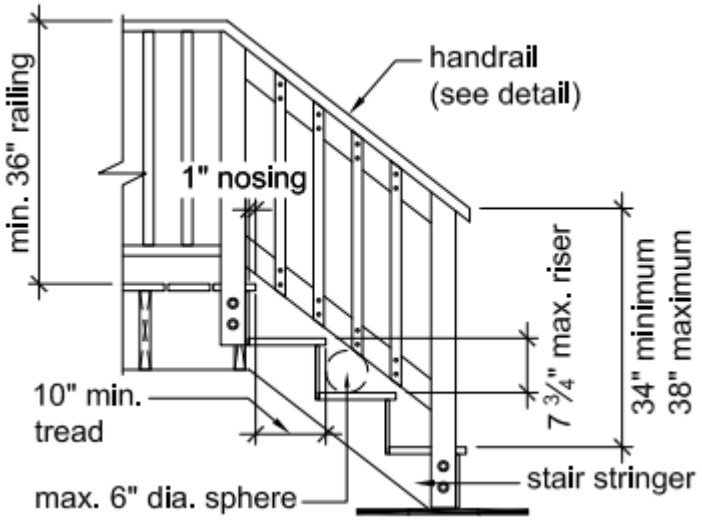
Where the lateral load connections are provided with hold-down tension devices, they shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds. See figure below:



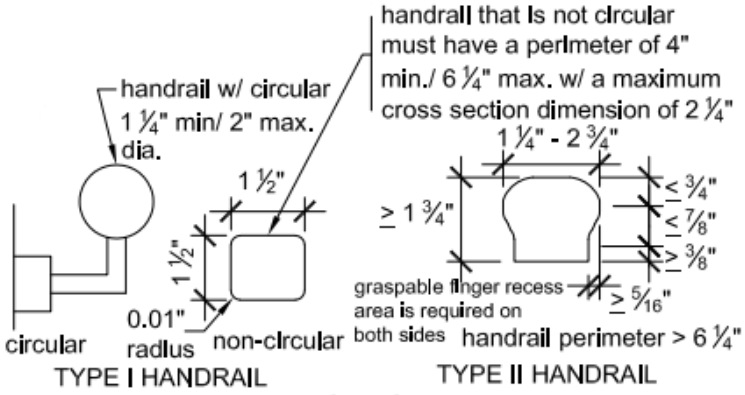
STAIRS, GUARDRAILS AND HANDRAILS

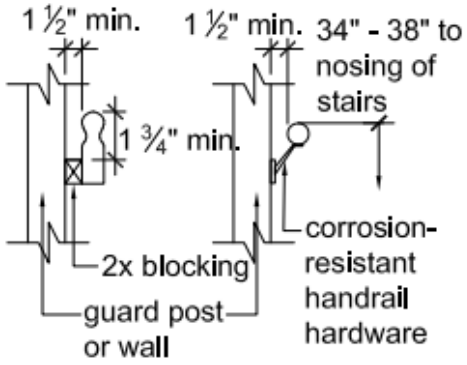
Stairs, guardrails and handrails are to be in accordance with IRC Sections R311 and R312 and the figures below:

Stair detail:

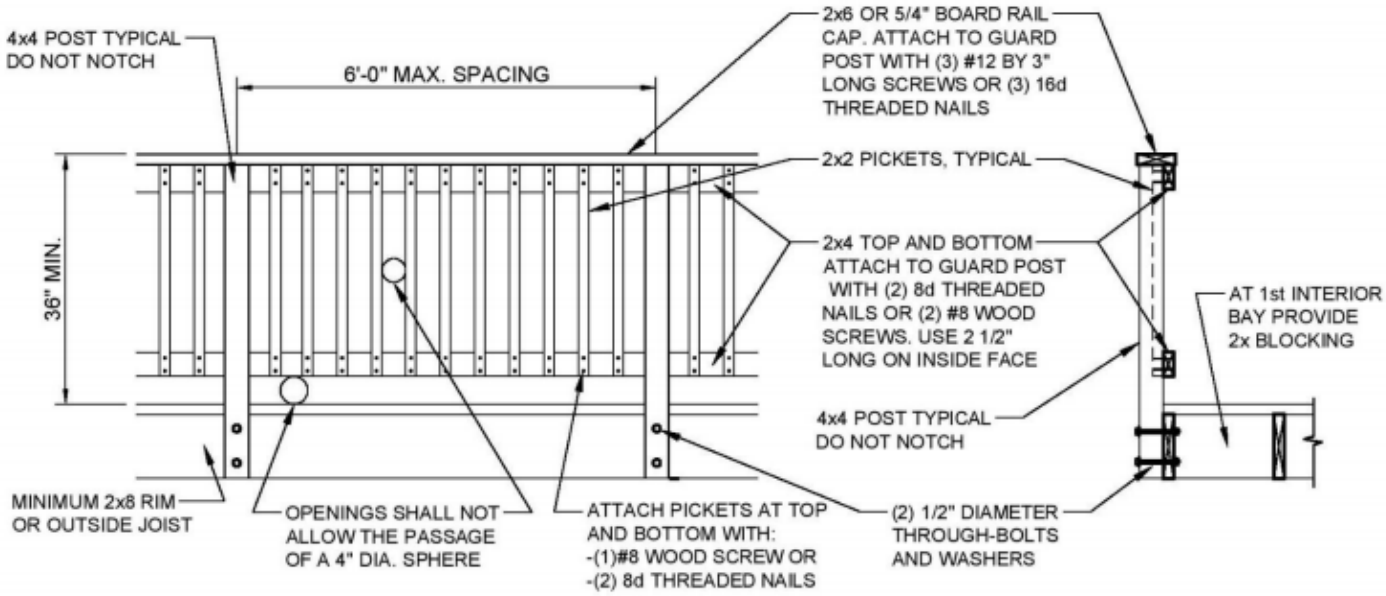


Handrails shall be continuous for the full length of the stairs, from a point directly above the top riser to a point directly above the lowest riser. Handrail ends shall be returned of shall terminate in newel posts or safety terminals. Handrail size and connection details:

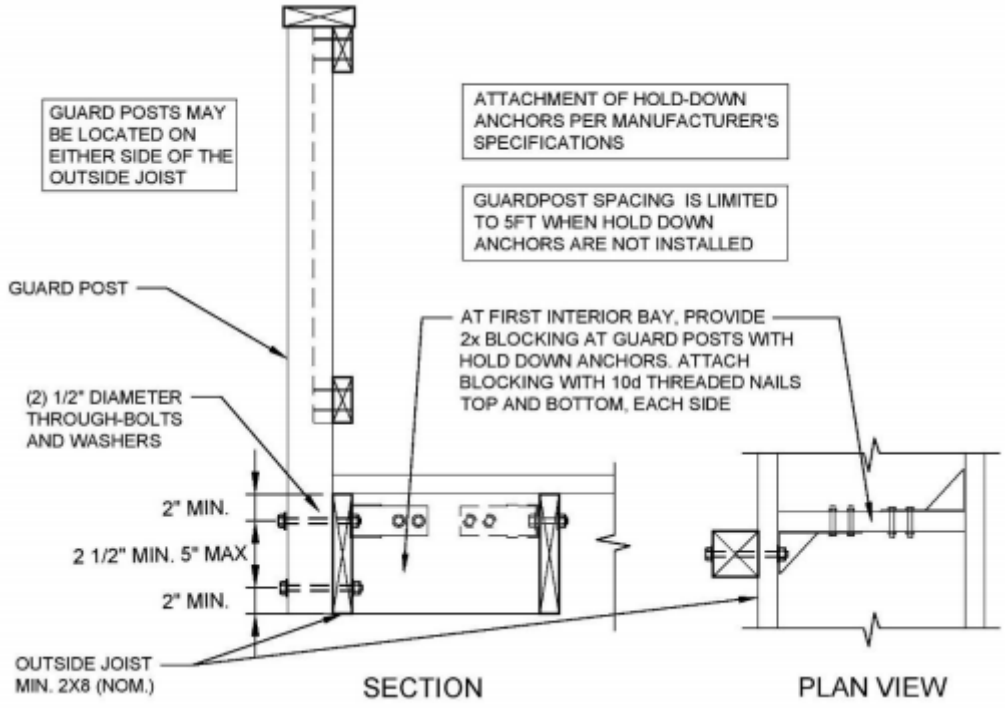




Guardrail details:



Guardrail post connection to deck:



INSPECTIONS

Applicants are required to obtain permitting and inspections through the Town Of Denton Planning and Codes Department. Inspections include Footers, Framing (Before Decking) and final.

Please see the Town Website www.DentonMaryland.com to apply.