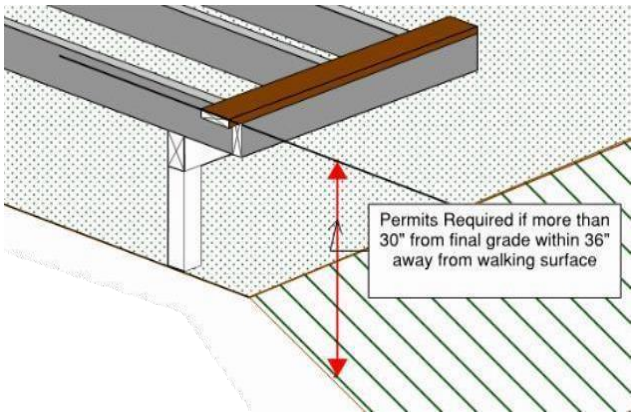
PRESCRIPTIVE RESIDENTIAL DECK CONSTRUCTION GUIDE

Based on the 2021 International Residential Code

When is a permit required?

A building permit is required for any residential deck that is more than 200 sq ft in size, if it is attached to a structure, if it serves the main egress, or if it is more than 30 inches tall, measured vertically from the walking surface of the deck to the grade below, at any point including up to 36" from the deck's edge.



How do I apply?

Complete and submit the following to permitcenter@libertylakewa.gov:

1. Complete all sections of this document, which will act as your **Construction Plans**.
*All construction shall be in accordance with 2021 IRC Section 507; Decks

2. **Site Plan**: show all property lines, all existing structures, septic (if applicable), critical areas (if applicable), new deck and setbacks.

3. **Elevation Drawing**: show height of deck

What comes next?

Approval: Once your application has been approved, you will receive an email that fees are ready to be paid. Once fees are paid, your permit will be issued. **Please print permit and keep onsite along with ALL approved plans for your inspector.**

Inspections: You will have 1–3 inspections, depending on your scope:

- Footing (Prior to pouring concrete)
- Framing (Prior to installing decking)
- Final (When work is complete)

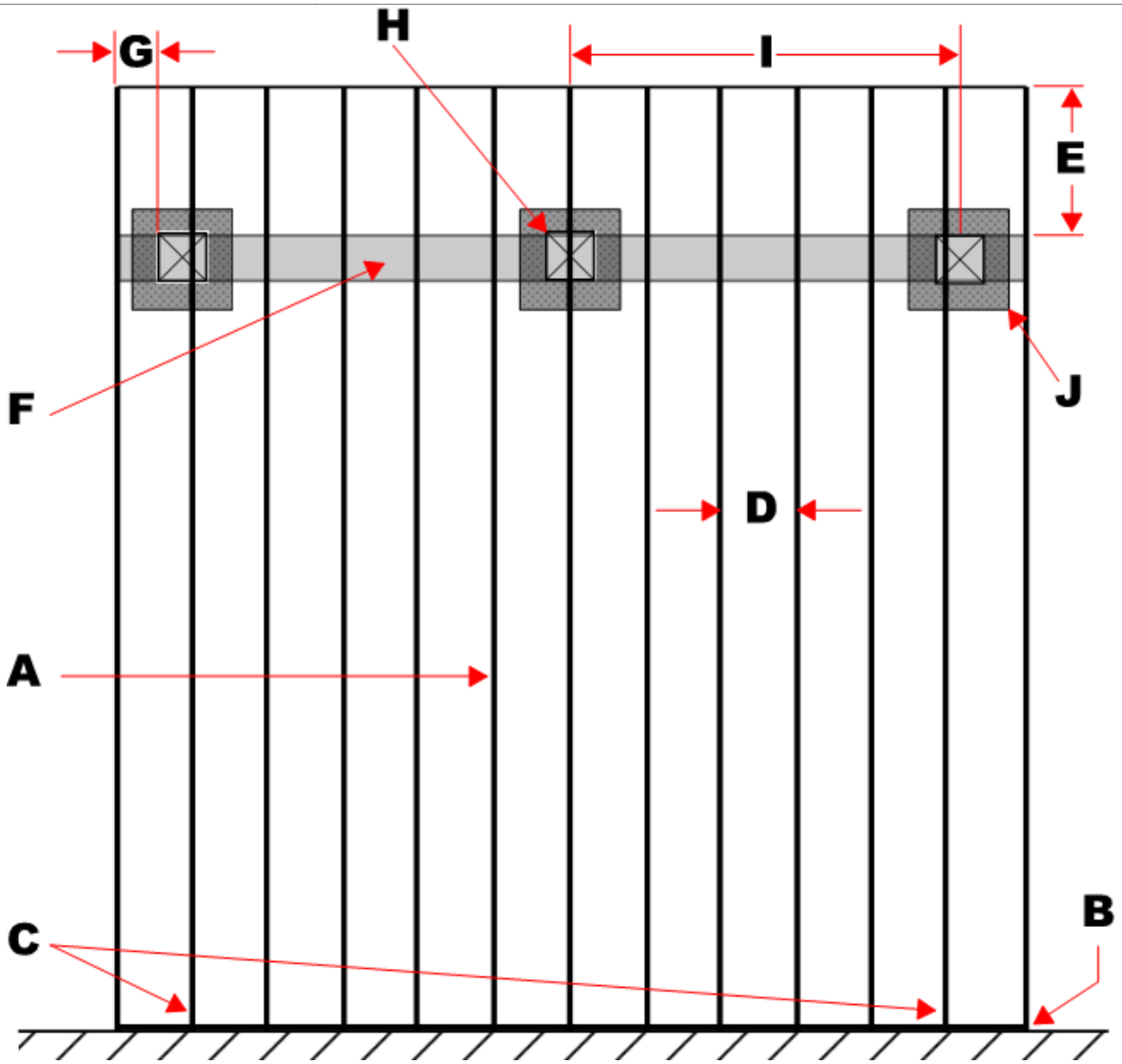
Additional Criteria:

- Lumber used for construction, including ledgers, shall be of naturally durable or preservative treated wood.
- Hardware and fasteners must be hot-dipped galvanized or stainless steel.
- The included design criteria will **not** support a hot tub, jacuzzi or pool.
- Decks using this design will be limited to a single joist span and a single beam span per the included tables.
- The deck **cannot** be supported by a mobile or manufactured home.

Note: All proposals are subject to additional requests for information and plan review at the discretion of your assigned Plans Examiner.

Please use the following details on pages 3–7 to complete A–J on the table below. Fill in the details column.

	Description	Example	Project Details
1.	Overall Deck Size	*10' wide x 12' long*	
2.	Decking Surface	*Cedar or Trex*	
3.	Decking Material	*2"x6", 5/4" x 4", 2"x 4"*	
4.	Height Above Grade	*48" at highest point*	
A.	Joist Length and Size	*12' and 2"x10"*	
B.	Ledger Size	*2"x10"*	
C.	Lateral Tension Device	*Detail 2*	
D.	Spacing of Joists	*16" O.C. or 24" O.C.*	
E.	Joist Overhang/ Cantilever (Max allowed 25% of Joist Span **TABLE 2**)		
F.	Beam Size	*6"x10"*	
G.	Beam Overhang (Max allowed 25% of beam Span **TABLE 3**)		
H.	Post Size	*6"x 6" - 10' tall*	
I.	Post Spacing	*48" Center - Center*	
J.	Footing Size	*Square 18"x 18" - 12" thick*	



A. Joist Length and Size—Use **TABLE 2** to determine minimum size of pressure treated lumber.

B. Use **TABLE 2** for ledger size, please note ledger must be equal to or greater than joist size. Connection of Ledger(A) to existing home with ½"diameter lag screws per **TABLE 1**, install ½"lag screws per **DETAIL 1**.

TABLE 1- Deck Ledger Connection

TABLE R507.9.1.3(1)
DECK LEDGER CONNECTION TO BAND JOIST

LOAD [c] (psf)	JOIST SPAN [a] (feet)	On-CENTER SPACING OF FASTENERS [b] (inches)		
		1/2-inch diameter lag screw with 1/2-inch maximum sheathing [d, e]	1/2-inch diameter bolt with 1/2-inch maximum sheathing [e]	1/2-inch diameter bolt with 1-inch maximum sheathing [f]
60 Live Load or 70 Ground Snow Load	6	22	36	35
	8	16	31	26
	10	13	25	21
	12	11	20	17
	14	9	17	15
	16	8	15	13
	18	7	13	11

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted. Extrapolation is not permitted.

b. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.

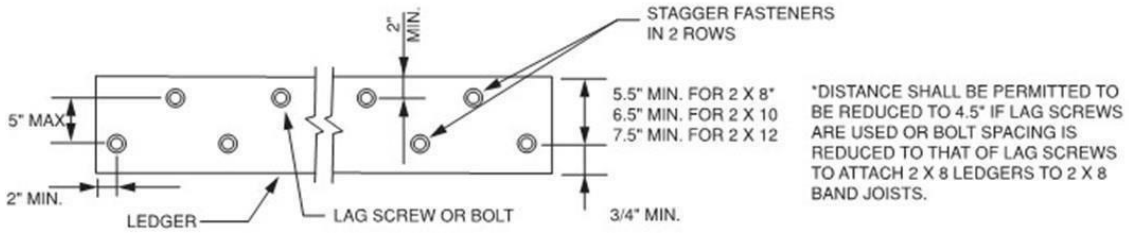
c. Dead load = 10 psf. Snow load shall not be assumed to act concurrently with live load.

d. The tip of the lag screw shall fully extend beyond the inside face of the band joist.

e. Sheathing shall be wood structural panel or solid sawn lumber.

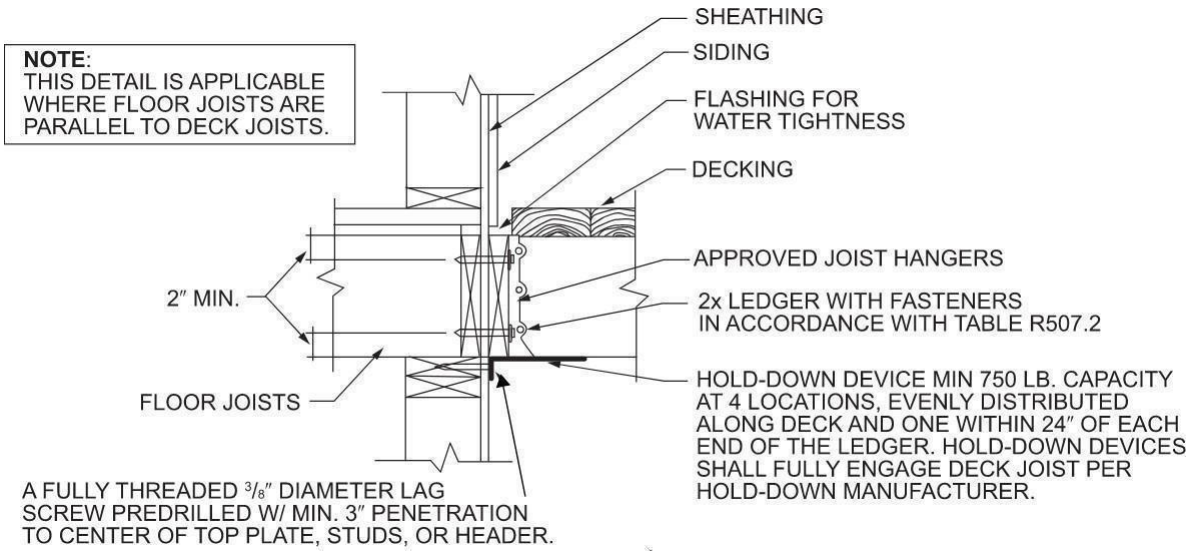
f. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to 1/2 inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

DETAIL 1

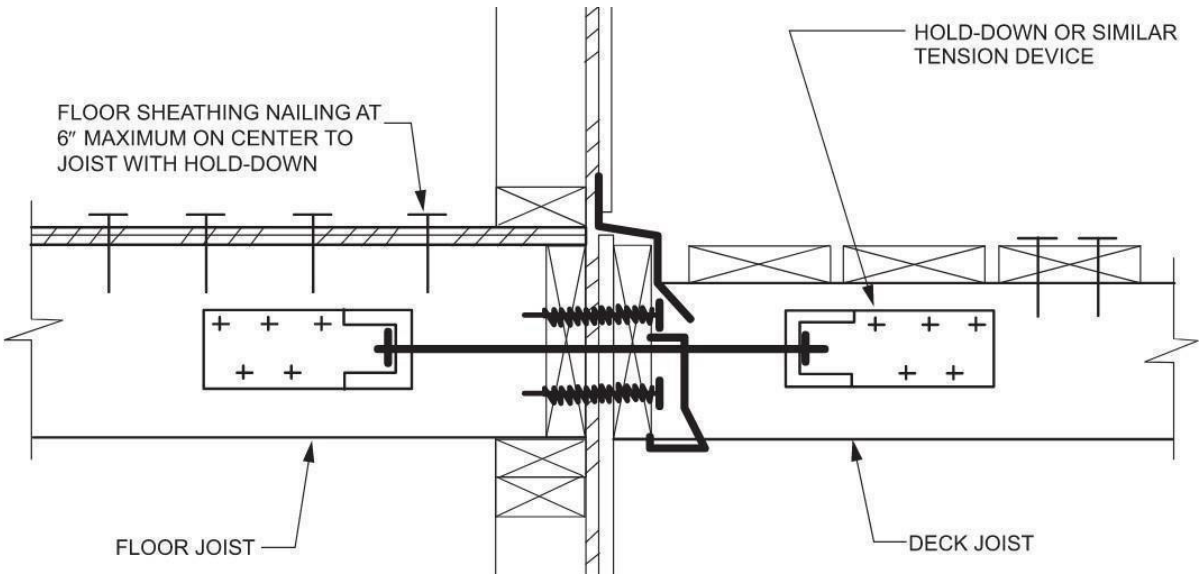


C. Lateral Tension Devise attachment—Choose **DETAIL 2** **or** **DETAIL 3**

DETAIL 2



DETAIL 3



D. Spacing of Joists—Use **TABLE 2** to determine layout of 12" O.C. / 16" O.C. / 24" O.C.

E. Joist Overhang—Max distance of overhang allowed is ¼ (25%) of Joist span from **TABLE 2**

TABLE 2: Deck Joist Span Lengths

TABLE R507.6
MAXIMUM DECK JOIST SPANS

LOAD[a] (psf)	JOIST SPECIES[b]	JOIST SIZE	ALLOWABLE JOIST SPAN [b, c] (feet-inches)			MAXIMUM CANTILEVER[d, f] (feet-inches)							
			Joist spacing (inches)			Adjacent joist back span[g] (feet)							
			12	16	24	4	6	8	10	12	14	16	18
60 Live Load or 70 Ground Snow Load	Douglas fir-larch[e], Hem-fir[e], Spruce-pine-fir[e]	2 × 6	7-11	7-1	5-9	1-0	1-6	NP	NP	NP	NP	NP	NP
		2 × 8	10-5	9-5	7-8	1-0	1-6	2-0	2-1	NP	NP	NP	NP
		2 × 10	13-3	11-6	9-5	1-0	1-6	2-0	2-6	2-8	NP	NP	NP
		2 × 12	15-5	13-4	10-11	1-0	1-6	2-0	2-6	3-0	3-3	NP	NP
	Redwood[f], Western cedars[f], Ponderosa pine[f], Red pine[f]	2 × 6	7-4	6-8	5-10	1-0	1-4	NP	NP	NP	NP	NP	NP
		2 × 8	9-8	8-10	7-4	1-0	1-6	1-11	NP	NP	NP	NP	NP
		2 × 10	12-4	11-0	9-0	1-0	1-6	2-0	2-6	2-6	NP	NP	NP
		2 × 12	14-9	12-9	10-5	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

NP = Not Permitted.

a. Dead load = 10 psf. Snow load not assumed to be concurrent with live load.
b. No. 2 grade, wet service factor included.
c. $L/\Delta = 360$ at main span.
d. $L/\Delta = 180$ at cantilever with a 220-pound point load applied to end.
e. Includes incising factor.
f. Incising factor not included.
g. Interpolation allowed. Extrapolation is not allowed.

No. 2 grade with wet service factor.

Ground snow load, live load = 60 psf, dead load = 10 psf, L/Δ = 360.

Ground snow load, live load= 60psf, deadload = 10psf,L/Δ = 360 at main span, L/Δ = 180at cantilever with a 220-pound point load applied to end.

Includes incising factor.

F. Beam Size—Use **TABLE 3** to determine minimum pressure treated beam sized

G. Beam Overhang—Max distance of overhang allowed is ¼(25%) of Beam Span from **TABLE 3**

TABLE 3: Deck Beam Span Lengths a,b (ft. - in.)

TABLE R507.5
MAXIMUM DECK BEAM SPAN—60 PSF LIVE LOAD OR 70 PSF GROUND SNOW LOAD[c]

BEAM SPECIES[d]	BEAM SIZE[e]	EFFECTIVE DECK JOIST SPAN LENGTH (feet)[a, i, j]						
		6	8	10	12	14	16	18
		MAXIMUM DECK BEAM SPAN LENGTH (feet-inches)[a, b, f]						
Douglas fir-larch [g], Hem-fir[g], Spruce -pine-fir[g]	1 – 2 × 6	3-5	2-10	2-5	2-2	2-0	1-10	1-9
	1 – 2 × 8	4-7	3-8	3-2	2-10	2-7	2-5	2-4
	1 – 2 × 10	5-8	4-9	4-1	3-8	3-4	3-1	2-11
	1 – 2 × 12	6-7	5-8	5-0	4-6	4-1	3-10	3-7
	2 – 2 × 6	5-2	4-6	4-0	3-5	3-1	2-10	2-7
	2 – 2 × 8	6-11	6-0	5-3	4-7	4-1	3-8	3-5
	2 – 2 × 10	8-5	7-4	6-6	5-10	5-2	4-9	4-5
	2 – 2 × 12	9-10	8-6	7-7	6-11	6-4	5-9	5-4
	3 – 2 × 6	6-6	5-7	5-0	4-7	4-2	3-9	3-5
	3 – 2 × 8	8-8	7-6	6-8	6-1	5-6	5-0	4-7
	3 – 2 × 10	10-7	9-2	8-2	7-6	6-11	6-4	5-10
	3 – 2 × 12	12-4	10-8	9-7	8-9	8-1	7-7	7-1
Redwood[h], Western cedars[h], Ponderosa pine[h], Red pine[h]	1 – 2 × 6	3-6	2-11	2-6	2-3	2-0	1-11	1-9
	1 – 2 × 8	4-6	3-10	3-3	2-11	2-8	2-6	2-4
	1 – 2 × 10	5-6	4-9	4-2	3-9	3-5	3-2	3-0
	1 – 2 × 12	6-4	5-6	4-11	4-6	4-2	3-11	3-8
	2 – 2 × 6	5-3	4-7	4-1	3-6	3-2	2-11	2-8
	2 – 2 × 8	6-8	5-9	5-2	4-8	4-2	3-10	3-6
	2 – 2 × 10	8-2	7-1	6-4	5-9	5-4	4-10	4-6
	2 – 2 × 12	9-5	8-2	7-4	6-8	6-2	5-9	5-5
	3 – 2 × 6	6-4	5-8	5-1	4-8	4-3	3-10	3-6
	3 – 2 × 8	8-4	7-3	6-5	5-11	5-5	5-1	4-8
	3 – 2 × 10	10-2	8-10	7-11	7-2	6-8	6-3	5-11
	3 – 2 × 12	11-10	10-3	9-2	8-4	7-9	7-3	6-10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Interpolation allowed. Extrapolation is not allowed.
b. Beams supporting a single span of joists with or without cantilever.
c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load not assumed to be concurrent with live load.
d. No. 2 grade, wet service factor included.
e. Beam depth shall be equal to or greater than the depth of intersecting joist for a flush beam connection.
f. Beam cantilevers are limited to the adjacent beam's span divided by 4.
g. Includes incising factor.
h. Incising factor not included.
i. Deck joist span as shown in Figure R507.6.

H. Post Height—Use **TABLE 4** to determine minimum post height and size

TABLE 4: Post Height

TABLE R507.4
DECK POST HEIGHT

LOADS [b] (psf)	POST SPECIES [c]	POST SIZE [d]	TRIBUTARY AREA[g,h] (sq. ft.) 20	40	60	80	100	120	140	160
			MAXIMUM DECK POST HEIGHT [a] (feet-inches)							
60 Live Load, ≤60 Ground Snow Load	Douglas Fire[e], Hem-fire[e], SPF [e]	4 x 4	14-0	10-10	8-7	7-0	5-8	4-1	NP	NP
		4 x 6	14-0	13-10	11-1	9-5	8-2	7-3	6-4	5-4
		6 x 6	14-0	14-0	14-0	14-0	14-0	13-3	10-9	6-11
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood [f], Western Cedars [f], Ponderosa Pine [f], Red Pine [f]	4 x 4	14-0	10-3	7-0	NP	NP	NP	NP	NP
		4 x 6	14-0	13-6	10-6	8-4	5-10	NP	NP	NP
		6 x 6	14-0	14-0	14-0	14-0	11-11	NP	NP	NP
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
70 Ground Snow Load	Douglas Fire[e], Hem-fire[e], SPF [e]	4 x 4	14-0	10-1	7-11	6-6	5-3	3-7	NP	NP
		4 x 6	14-0	12-10	10-3	8-9	7-7	6-8	5-10	4-11
		6 x 6	14-0	14-0	14-0	14-0	14-0	12-2	9-9	5-9
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood [f], Western Cedars [f], Ponderosa Pine [f], Red Pine [f]	4 x 4	14-0	9-5	6-5	NP	NP	NP	NP	NP
		4 x 6	14-0	12-6	9-8	7-7	5-3	NP	NP	NP
		6 x 6	14-0	14-0	14-0	14-0	10-8	NP	NP	NP
		8 x 8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m2, 1 pound per square foot = 0.0479 kPa, NP = Not permitted.

a. Measured from the underside of the beam to top of footing or pier.
b. 10 psf dead load. Snow load not assumed to be concurrent with live load.
c. No. 2 grade, wet service factor included.
d. Notched deck posts shall be sized to accommodate beam size in accordance with Section 507.5.2.
e. Includes incising factor.
f. Incising factor not included.
g. Area, in square feet, of deck surface supported by post and footing.
h. Interpolation permitted. Extrapolation not permitted.

*See **Calculating the Tributary Load** information

TABLE 5- Footing Size

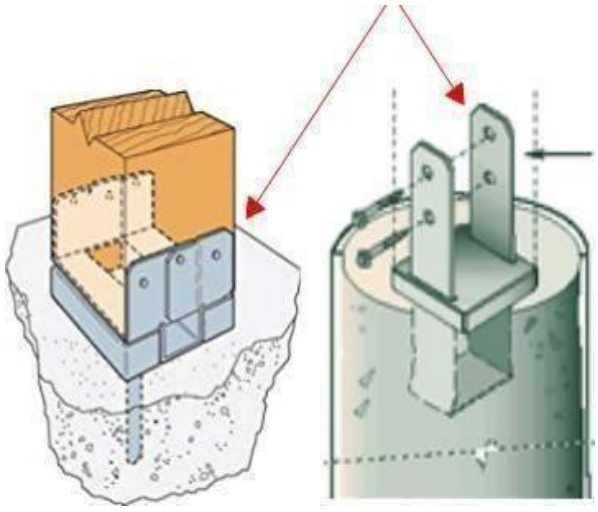
TABLE R507.3.1
MINIMUM FOOTING SIZE FOR DECKS

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (sq.ft.)	LOAD-BEARING VALUE OF SOILS [a, c, d] (psf)								
		1500[e]			2000 [e]			≥ 3000 [e]		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness [f] (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness [f] (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness [f] (inches)
60 Live or 70 Ground Snow Load	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	13	6	9	10	6
	40	18	20	6	15	17	6	12	14	6
	60	21	24	8	19	21	6	15	17	6
	80	25	28	9	21	24	8	18	20	6
	100	28	31	11	24	27	9	20	22	7
	120	30	34	12	26	30	10	21	24	8
	140	33	37	13	28	32	11	23	26	9
	160	35	40	15	30	34	12	25	28	9

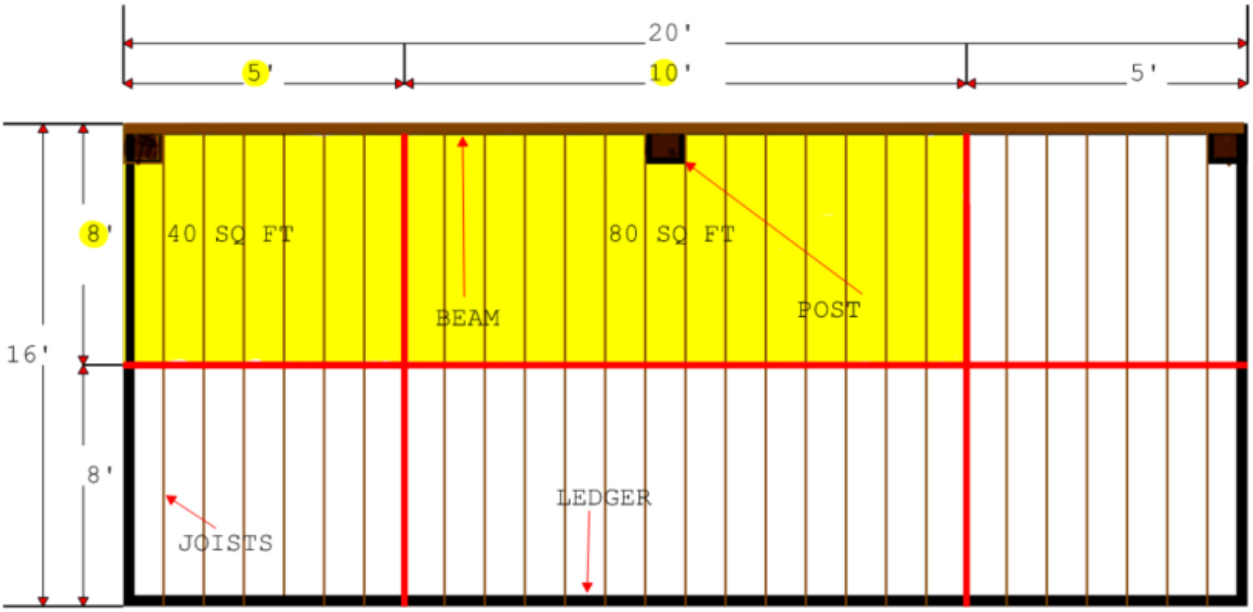
For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m2, 1 pound per square foot = 0.0479 kPa.
a. Interpolation permitted, extrapolation not permitted.
b. Reserved.
c. Footing dimensions shall allow complete bearing of the post.
d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.
e. Area, in square feet, of deck surface supported by post and footings.
f. Minimum thickness shall only apply to plain concrete footings,

DETAIL 4

Post to footing connection required to be standard post base hardware at all locations



Calculating the Tributary Load



Determining tributary area for prescriptive footing sizing:
(See above illustration example with below instruction)

Step 1: Calculate the distance between the supporting Posts. Measure to outside of end posts and center of interior posts.
Note: Interior posts take load from both sides. (See illustration)

- Divide the measured distance by 2.

Step 2: Take measurement from structure wall at ledger attachment to outside edge of beam.

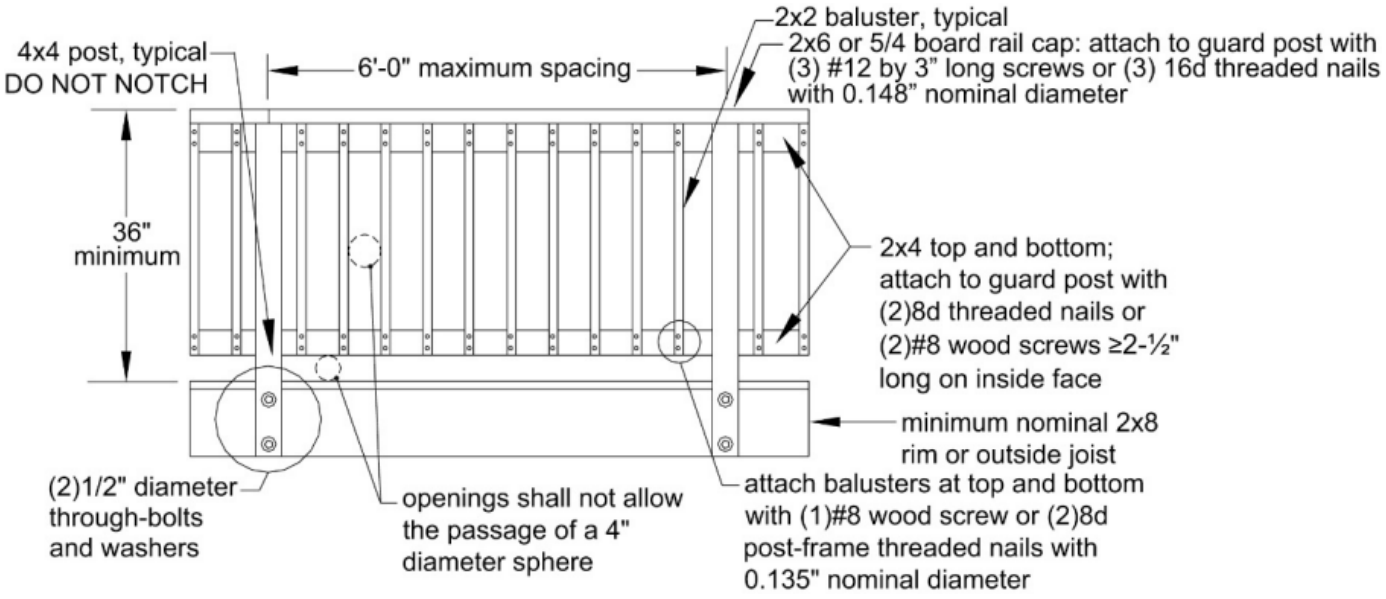
- Divide the measured distance by 2.
(Note If joists are cantilevered add measurement from outside of beam to joist end to divided result.)

Step 3: Multiply the arrived at numbers for step 1 and 2.

This will be the tributary area used to determine footing size on **TABLE 5**.

Typical Railing Attachments

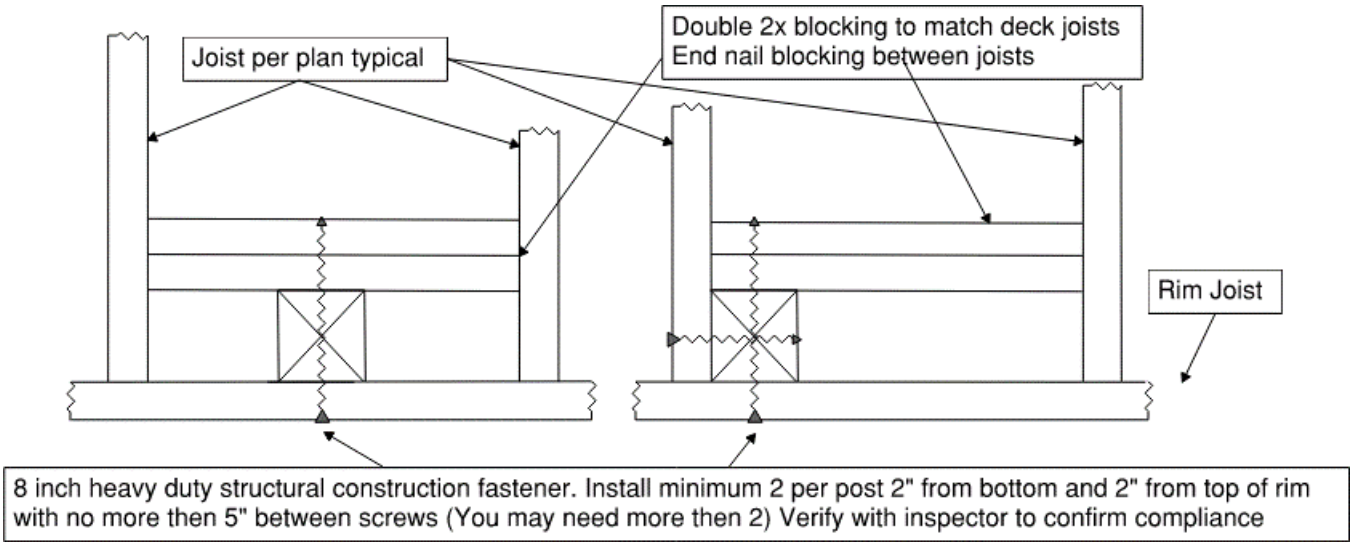
(required to resist 200 lbs of lateral force)



OVERHEAD VIEW

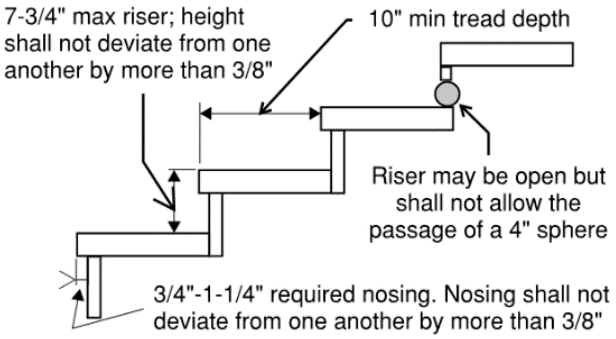
Typical Post Attachments

(required to resist 200 lbs of lateral force)

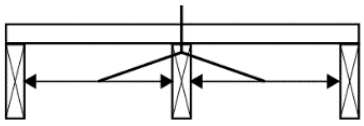


OVERHEAD VIEW

Typical Stair Stringer Construction

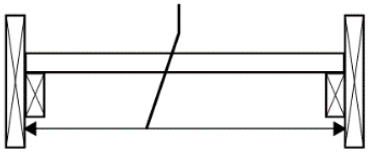


Tread Material
2x4 or 2x6 - Wood 18" max
5/4x4 or 5/4x6 - Wood 18" max
Composite Decking 12" max

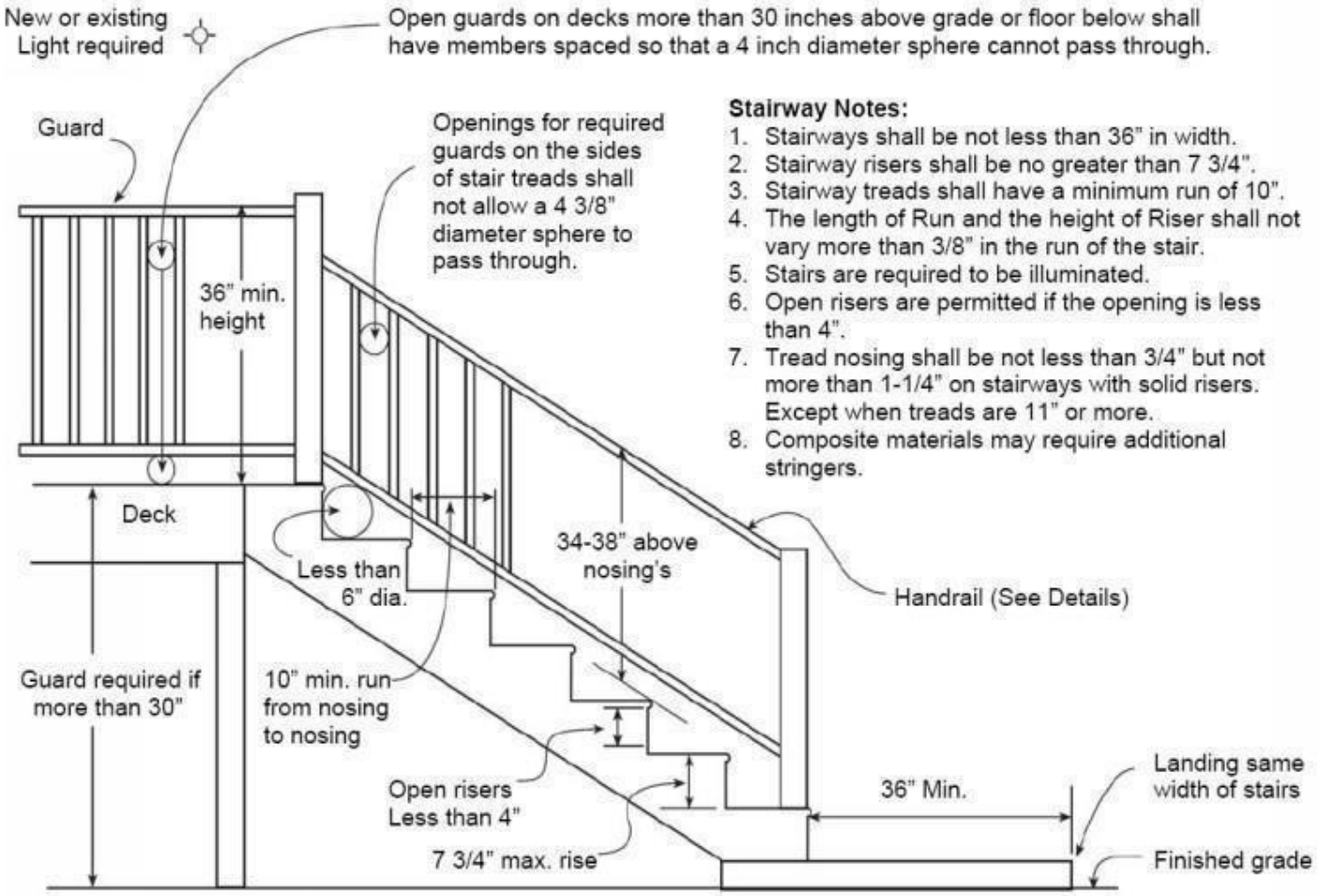


Cut Stringer
Min. 2x12 full supported top and bottom

Tread Material
2x12 or Greater - 36" max
Composite Decking Not Allowed



Solid Stringer
Min. 2x12 full supported top and bottom with min. 2x4 ledgers



Stairway Notes:

1. Stairways shall be not less than 36" in width.
2. Stairway risers shall be no greater than 7 3/4".
3. Stairway treads shall have a minimum run of 10".
4. The length of Run and the height of Riser shall not vary more than 3/8" in the run of the stair.
5. Stairs are required to be illuminated.
6. Open risers are permitted if the opening is less than 4".
7. Tread nosing shall be not less than 3/4" but not more than 1-1/4" on stairways with solid risers. Except when treads are 11" or more.
8. Composite materials may require additional stringers.

R311.7.8.4 Continuity.

Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned toward a wall, guard walking surface continuous to itself, or terminate to a post.

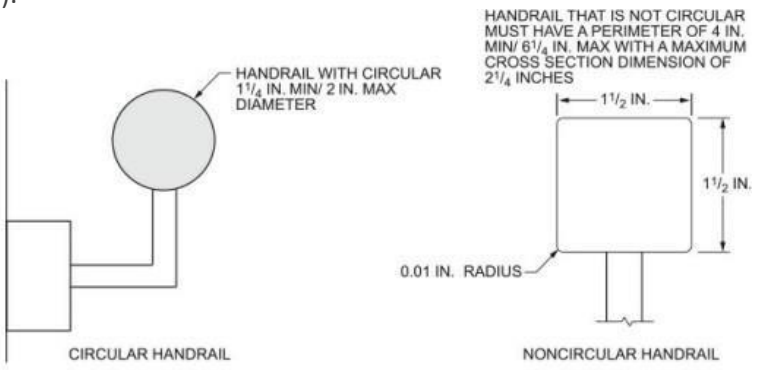
Exceptions:

1. Handrail continuity shall be permitted to be interrupted by a newel post at a turn in a flight with winders, at a landing, or over the lowest tread.
2. A volute, turnout or starting easing shall be allowed to terminate over the lowest tread and over the top landing.

R311.7.8.5 Grip size.

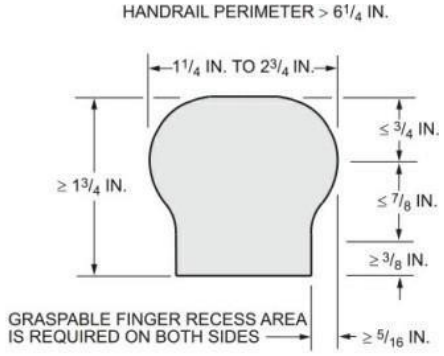
Required *handrails* shall be of one of the following types or provide equivalent graspability.

1. Type I. *Handrails* with a circular cross section shall have an outside diameter of not less than $1\frac{1}{4}$ inches (32 mm) and not greater than 2 inches (51 mm). If the *handrail* is not circular, it shall have a perimeter of not less than 4 inches (102 mm) and not greater than $6\frac{1}{4}$ inches (160 mm) and a cross section of not more than $2\frac{1}{4}$ inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).
2. Type II. *Handrails* with a perimeter greater than $6\frac{1}{4}$ inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within $\frac{3}{4}$ inch (19 mm) measured vertically from the tallest portion of the profile and have a depth of not less than $\frac{5}{16}$ inch (8 mm) within $\frac{7}{8}$ inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than $\frac{3}{8}$ inch (10 mm) to a level that is not less than $1\frac{3}{4}$ inches (45 mm) below the tallest portion of the profile. The width of the *handrail* above the recess shall be not less than $1\frac{1}{4}$ inches (32 mm) and not more than $2\frac{3}{4}$ inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).



For SI: 1 inch = 25.4 mm.

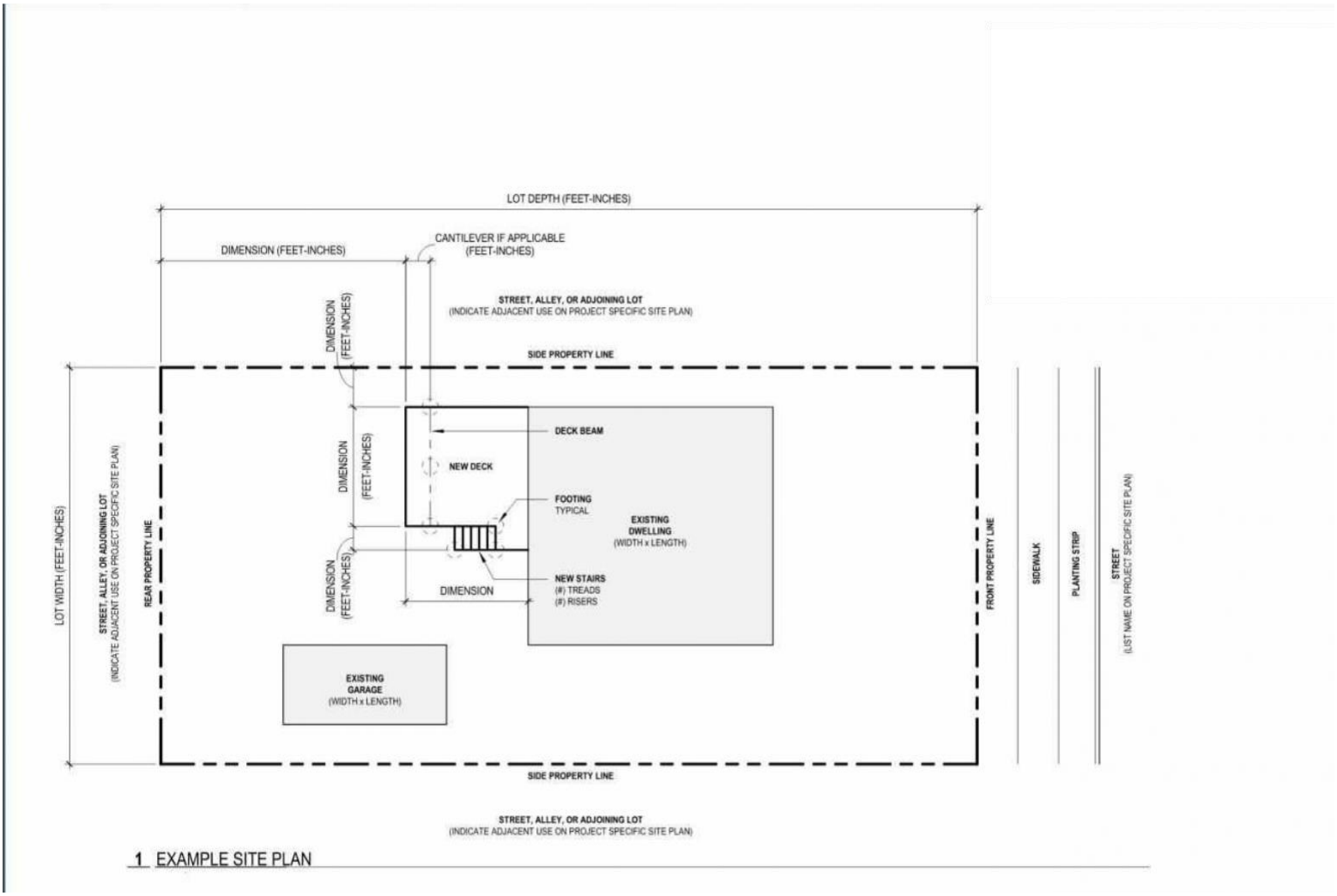
Commentary Figure R311.7.8.5(1)
TYPE I HANDRAIL



For SI: 1 inch = 25.4 mm.

Commentary Figure R311.7.8.5(2)
TYPE II HANDRAIL

Site Plan Example



1 EXAMPLE SITE PLAN

Site plan details shall include but not be limited to:

- ☐ Property line locations and dimensions
- ☐ Street names
- ☐ Location of sewer line or septic drain field
- ☐ Location of any critical areas on property
- ☐ Location of all existing structures on the property
- ☐ Location and dimensions of proposed deck and stairs
- ☐ Setback (distance from deck to property lines) labeled
- ☐ Proposed location of the deck footings with the footing size
- ☐ labeled Size and location of deck beams
- ☐ Location and length of any joist or beam canteliveres

Site Plan

Draw your site plan here, include footprint of new deck.