CITY OF BILLINGS
DECK CONSTRUCTION GUIDE

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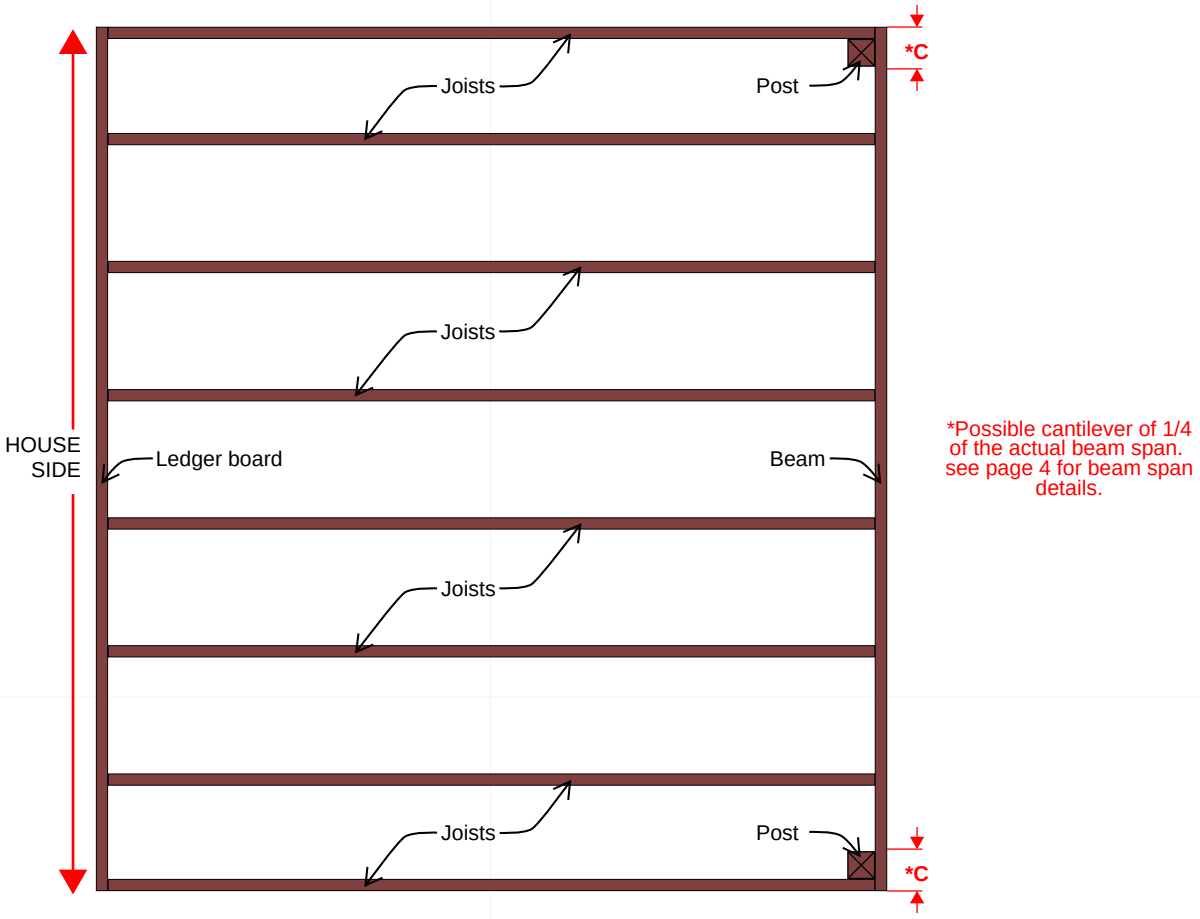
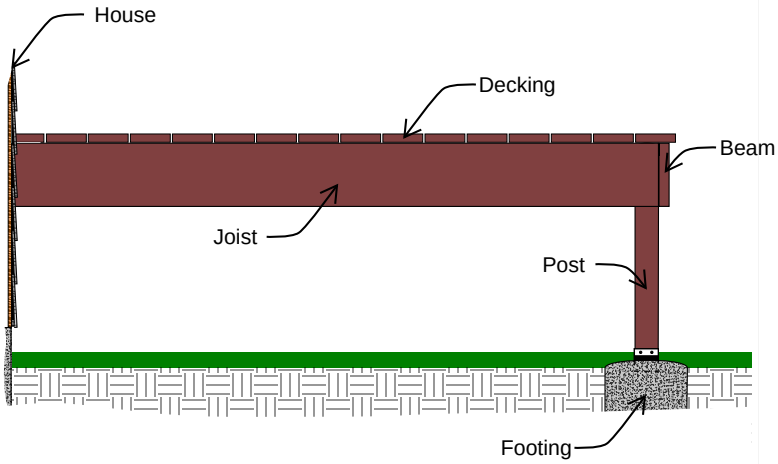
FLUSH BEAM DECK

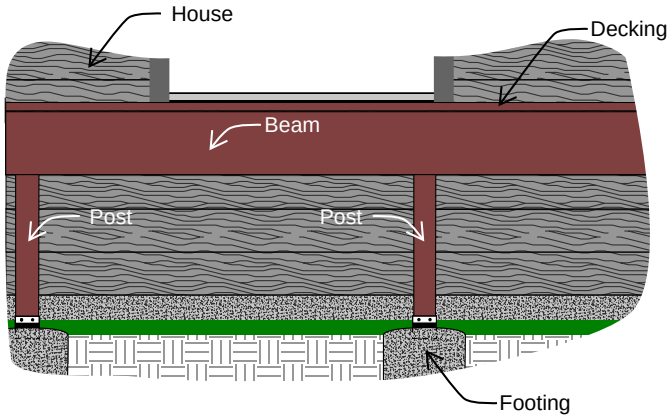
A flush beam deck has the back face of the beam attached to the post. There is no cantilever past the beam away from the house. However, a cantilever of 1/4 of the actual beam span is possible off of each corner. A flush beam deck has six basic components: ledger board, beam, joist, post, footing, and decking. The ledger board is attached to the house. The beam is parallel to the ledger board on the opposite side of the deck from the house. The ledger board and the beam are connected by the joists. The joists are the support for the decking. The ledger, beam, posts, and footings provide the vertical support for the deck. It is important to supply the dimensions for the ledger board, beam, joists, posts, and footings on the deck worksheets.



FLUSH BEAM DECK TOP-DOWN VIEW



FLUSH BEAM DECK SIDE VIEW



FLUSH BEAM DECK FRONT VIEW

FLUSH BEAM DECK BEAM & BEAM SPAN

Once the length and width of the deck are set, choose what size beam will be used. This will provide the maximum span, from post-to-post, that the chosen beam size can support. Use Table R507.5(2) to find the maximum span allowed for the chosen beam size and effective joist length. The effective joist length is the distance from the ledger board face to the back face of the beam (see example below). It is good practice to round the effective joist length up to the highest effective joist length measure on Table R507.5(2). For example, an effective joist length of 9'-2" would be rounded up to 10' or an effective joist length of 10'-8" would be rounded up to 12'. Once the maximum beam span is determined for the chosen beam, the post positions can be determined along the beam. For a Flush beam deck, there will always be posts in each corner of the beam and joists. It is a good practice to start at either of the outer posts and position the remaining posts at the maximum beam span interval. For example, if the chosen beam is Southern Pine 1 - 2 × 10 and the effective joist length is 8' the maximum beam span is 5'-10". A post will be placed every 5'-10" from the center of one post to center of the next post (see example below). For the example below, a post in the center of the beam length would suffice.

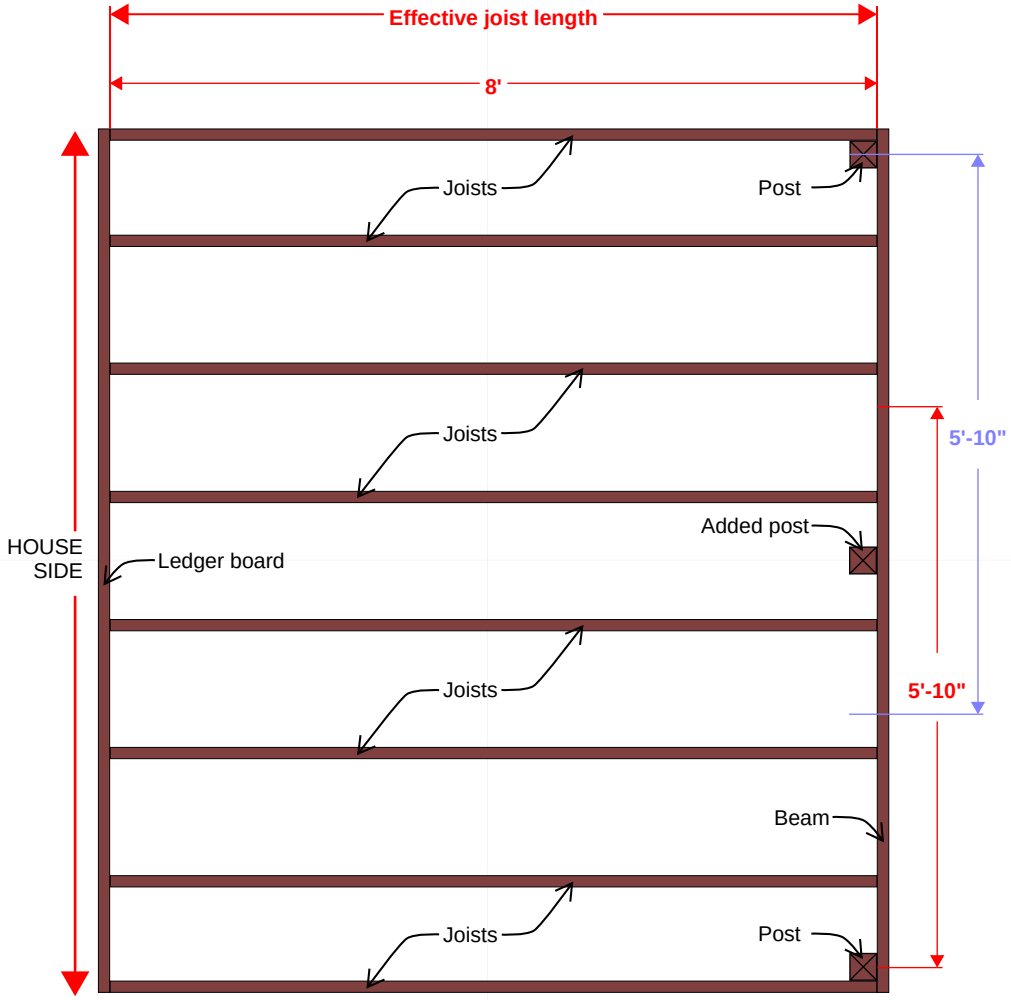


TABLE R507.5(2) MAXIMUM DECK BEAM SPAN - 50PSF GROUND SNOW LOAD

BEAM SPECIES	BEAM SIZE	EFFECTIVE DECK JOIST SPAN LENGTH (feet)						
		6	8	10	12	14	16	18
		MAMIMUM DECK BEAM SPAN LENGTH (feet-inches)						
SOUTHERN PINE	1 - 2×6	4-6	3-11	3-6	3-2	2-11	2-9	2-7
	1 - 2×8	5-9	4-11	4-5	4-0	3-9	3-6	3-3
	1 - 2×10	6-9	5-10	5-3	4-9	4-5	4-2	3-11
	1 - 2×12	8-0	6-11	6-2	5-8	5-3	4-11	4-7
	2 - 2×6	6-8	5-9	5-2	4-9	4-4	4-1	3-10
	2 - 2×8	8-6	7-4	6-7	6-0	5-7	5-2	4-11
	2 - 2×10	10-1	8-9	7-10	7-1	6-7	6-2	5-10
	2 - 2×12	11-11	10-3	9-2	8-5	7-9	7-3	6-10
	3 - 2×6	7-11	7-2	6-6	5-11	5-6	5-1	4-10
	3 - 2×8	10-5	9-3	8-3	7-6	6-11	6-6	6-2
	3 - 2×10	12-8	10-11	9-9	8-11	8-3	7-9	7-3
	3 - 2×12	14-11	12-11	11-6	10-6	9-9	9-1	8-7

FLUSH BEAM DECK TRIBUTARY AREA

After all the posts are placed along the beam, the area of the deck that each post will support (tributary area) needs to be determined. To start, the tributary areas are divided into the area the ledger board will support and the area that the posts & footings will support. For the figure below, start by finding the middle point of the width of the deck. This could be done by finding the middle of the effective joist length and drawing a line down the middle of the width. Also check Table R507.6 to see what the maximum allowable joist span is for the chosen joist species, size, and spacing.

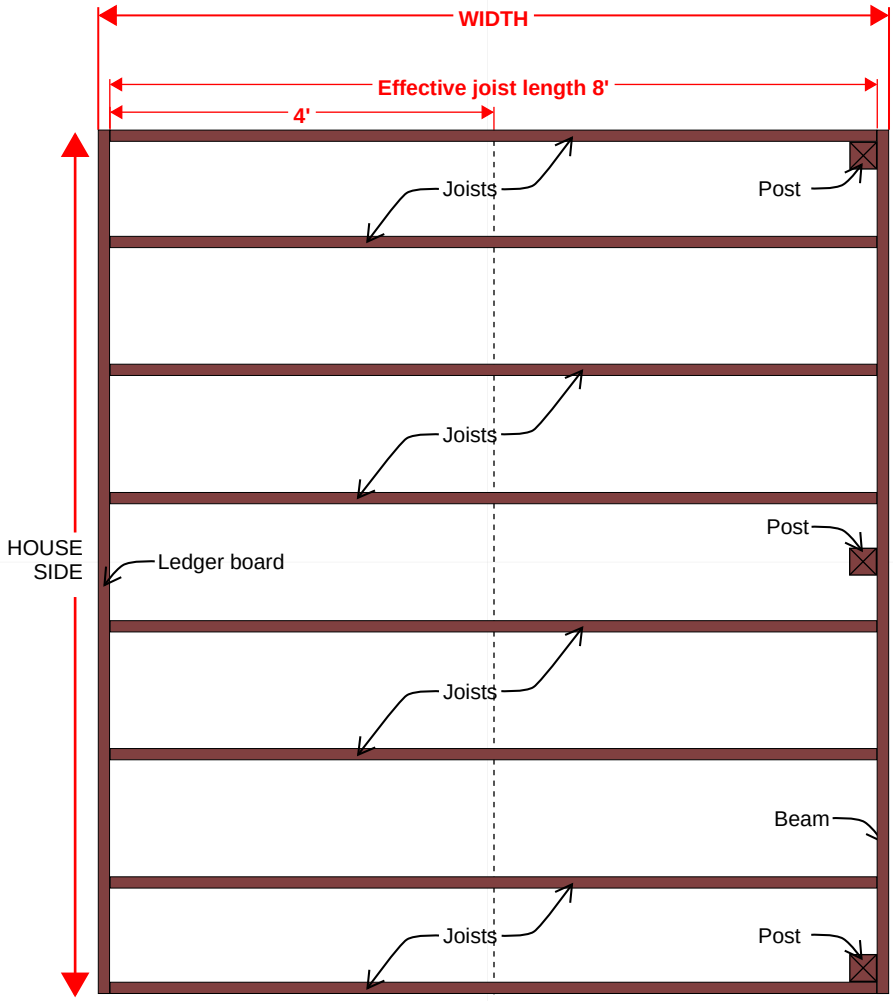
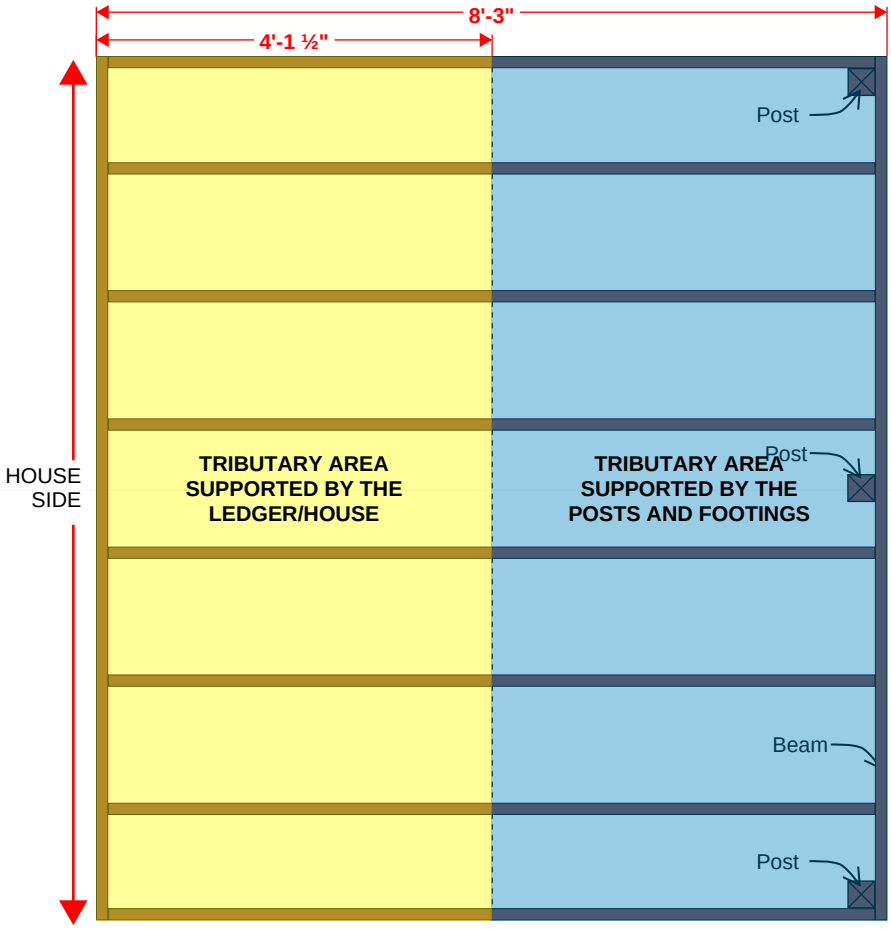


TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD (psf)	JOIST SPECIES	JOIST SIZE	ALLOWABLE JOIST SPAN (feet-inches) JOIST SPACING (inches) 12	16	24	MAXIMUM CANTILEVER (feet-inches) JOIST BACK SPAN (feet) 4	6	8	10	12	14	16	18
50 GROUND SNOW LOAD	SOUTHERN PINE	2×6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2×8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2×10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2×12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PINE-FIR	2×6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2×8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2×10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2×12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	2×6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2×8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2×10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2×12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP

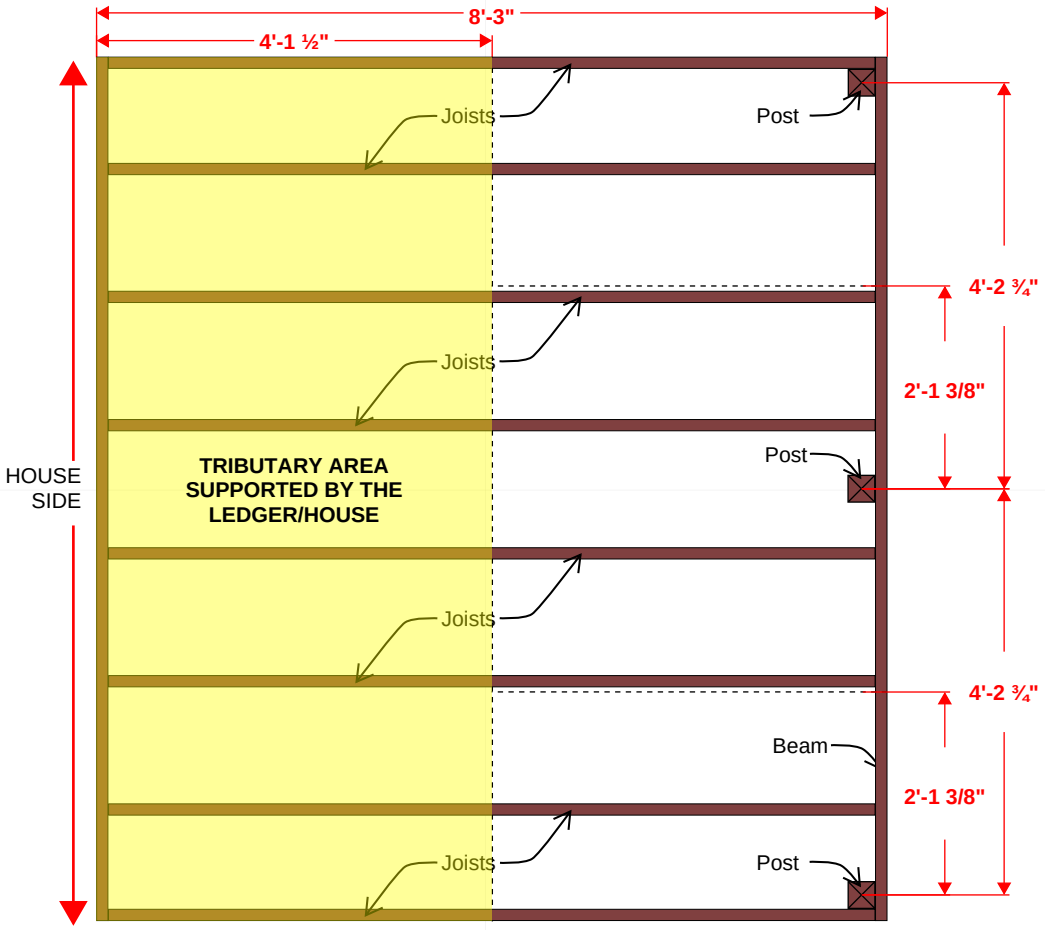
FLUSH BEAM DECK
HOUSE AND POST/FOOTING TRIBUTARY AREAS

With the deck divided in half along the width, the house and post/footing tributary areas are revealed. The ledger board attached to the house supports half of the deck. While the posts and footings support the other half of the deck.



FLUSH BEAM DECK
TRIBUTARY AREAS BY POST AND FOOTING

The tributary area supported by each post and footing needs to be determined in order to find the footing size. To do this, start by measuring from the center of one post to the center of the next nearest post. Then draw a line parallel to the width at each measured middle point



FLUSH BEAM DECK
TRIBUTARY AREA BY POST AND FOOTING

Measure each individual tributary area length and width (figure 1). The length and width for each individual tributary are is multiplied to find the square footage that each individual post and footing will support.

Tributary area 1= 4'-1 ½" × 2'-4 ⅝"
Tributary area 1= 49.5" × 28.625"
Tributary area 1= 1416.94 in² ÷ 144
Tributary area 1= 9.8 ft²

Tributary area 2= 4'-1 ½" × 4'-2 ¾"
Tributary area 2= 49.5" × 50.75"
Tributary area 2= 2512.13 in² ÷ 144
Tributary area 2= 17.4 ft²

Tributary area 3= 4'-1 ½" × 2'-4 ⅝"
Tributary area 3= 49.5" × 28.625"
Tributary area 3= 1416.94 in² ÷ 144
Tributary area 3= 9.8 ft²

With the square footage for each tributary area known, the footing size can be found. Interpolated Table R507.3.1 (figure 2) can be used to find the footing size that would apply to common round concrete forms. In this example, tributary areas 1 & 3 require a 10" diameter × 6" thick footing or a 10" diameter concrete form to 42" below grade (figure 3). Tributary area 2 must be rounded up to the next highest tributary area - can never round down. Tributary area requires a 14" diameter × 6" footing with the bottom at 42" below grade and a 8" concrete pier to the surface (figure 3).

Interpolated Table R507.3.1 to common round concrete form size

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

FIGURE 2

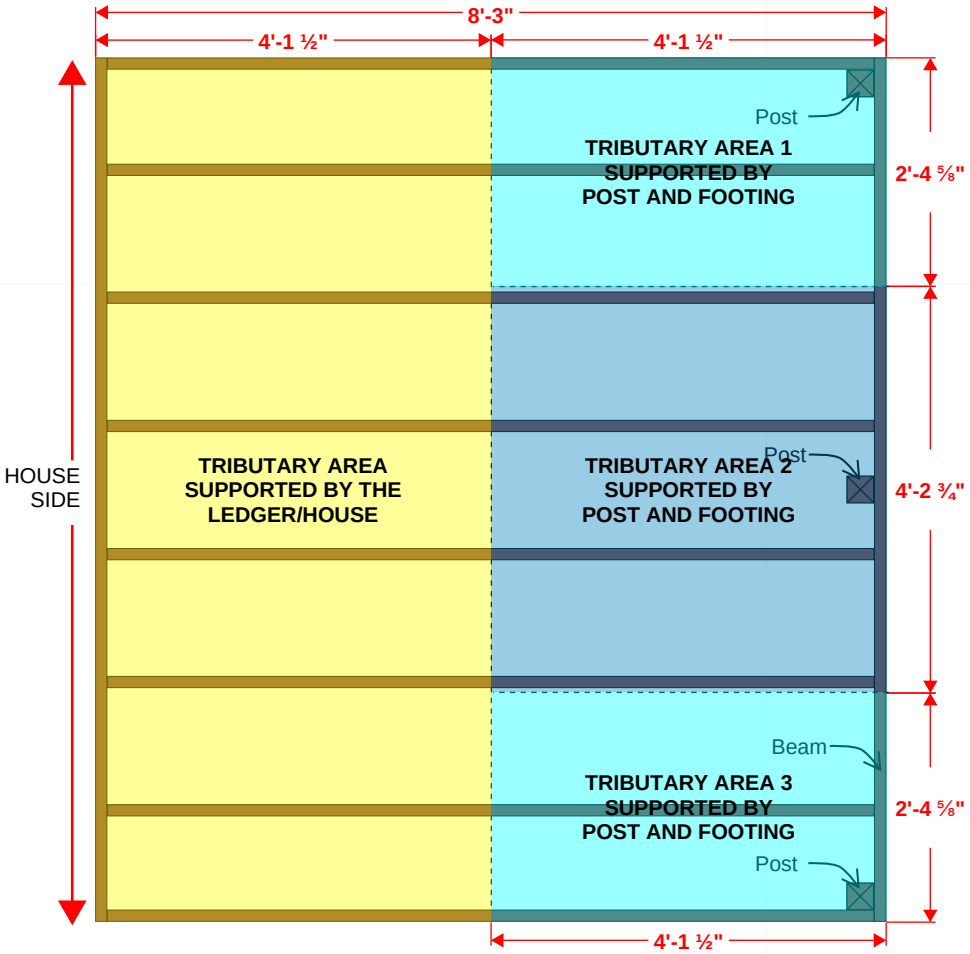
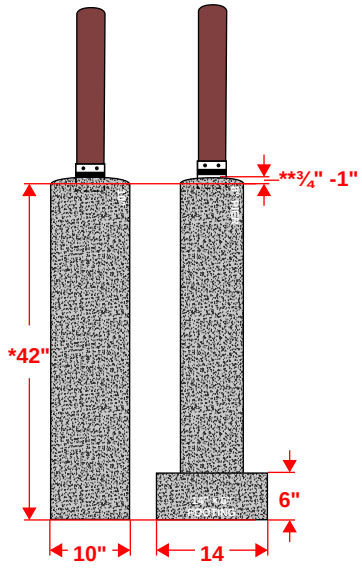


FIGURE 1



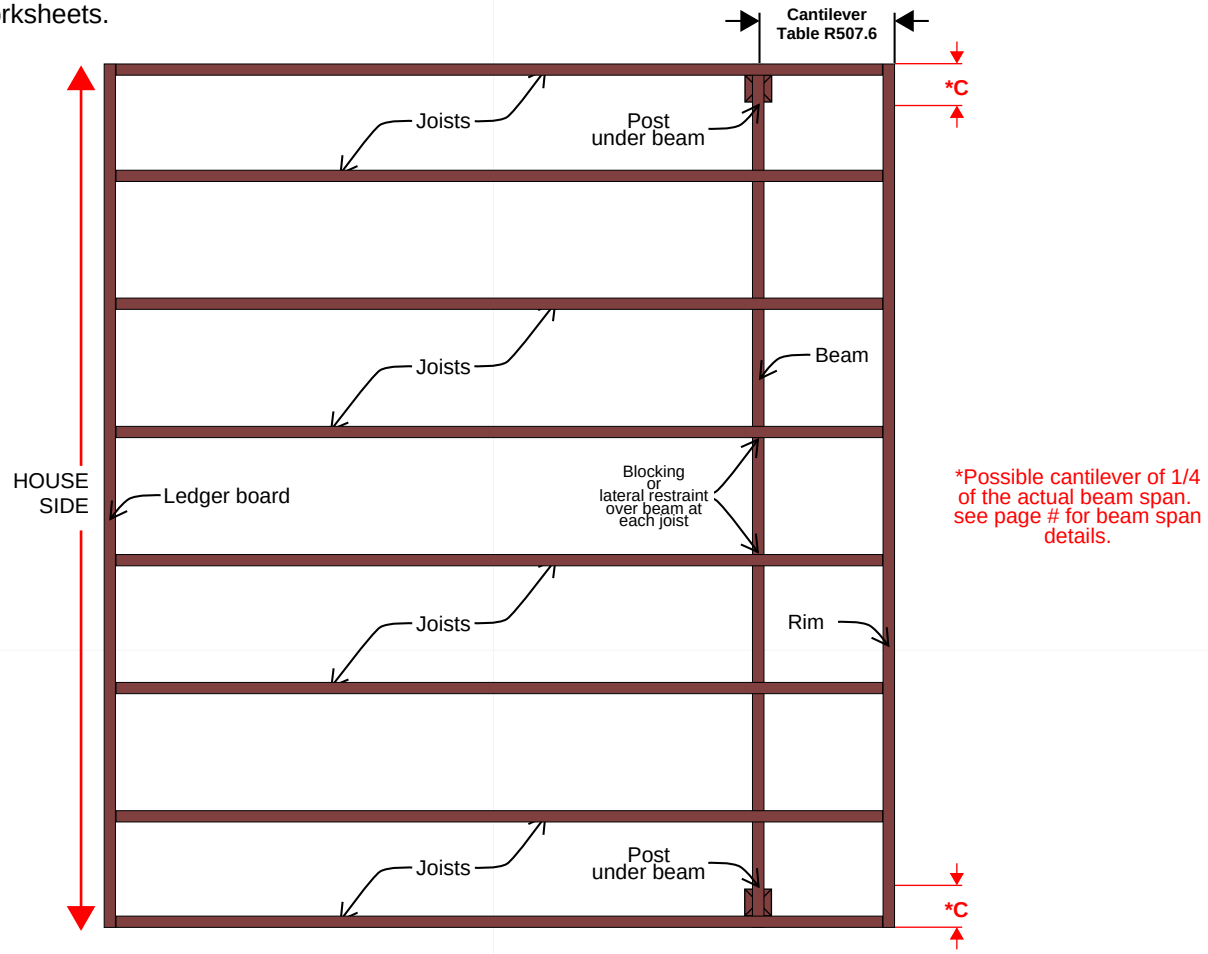
*Frost line is 42" in Billings. Footing to extend to 42" below grade level.

**above grade & sloped recommended

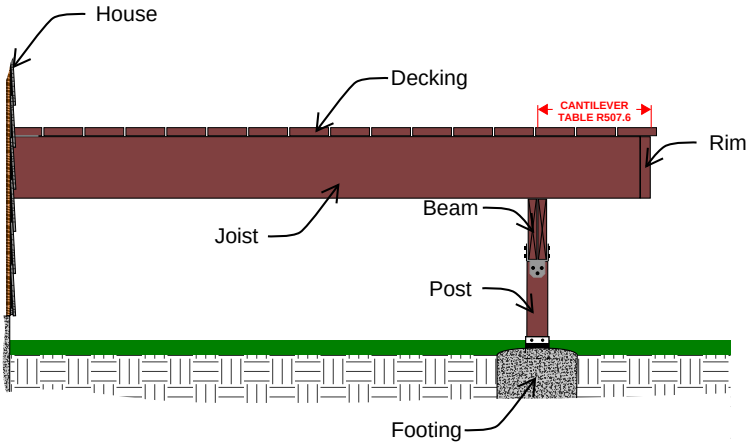
FIGURE 3

CANTILEVER DROPPED BEAM DECK

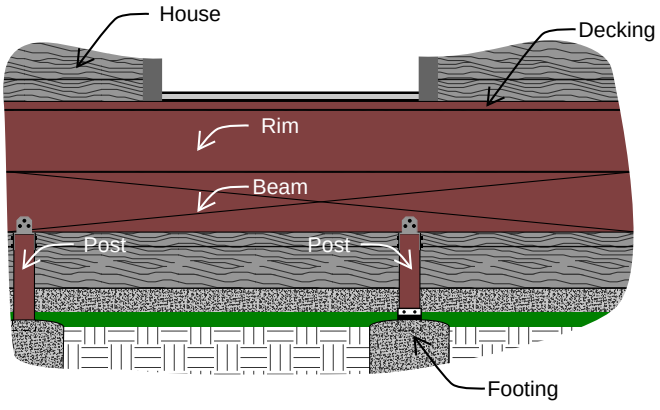
A cantilever dropped beam deck has the frame (made up of the of the ledger board, joists, and rim board) of the deck resting on top of and attached to the top of beam. The beam is attached to the posts. A cantilever past the beam, away from the house of 1' up to a maximum of 3'-10" is possible depending on the joist species, size, and back span (see Table R507.6, 50psf ground snow load must be used). In addition, a cantilever of 1/4 of the actual beam span is possible off of each end of the beam. A cantilevered dropped beam deck has seven basic components: ledger board, beam, rim, joist, post, footing, and decking. The ledger board is attached to the house. The rim is parallel to the ledger board on the opposite side of the deck from the house. The ledger board and the rim are connected by the joists. The joists are the support for the decking. The ledger board, beam, posts, and footings provide the vertical support for the deck. It is important to supply the dimensions for the ledger board, beam, rim, joists, posts, and footings on the deck worksheets.



CANTILEVERED DROPPED BEAM DECK TOP-DOWN VIEW



CANTILEVERED DROPPED BEAM DECK SIDE VIEW



CANTILEVERED DROPPED BEAM DECK FRONT VIEW

CANTILEVER DROPPED BEAM DECK BEAM & BEAM SPAN

Once the length and width of the deck are set, choose what size beam will be used. This will provide the maximum span, from post-to-post, that the chosen beam size can support. Use Table R507.5(2) to find the maximum span allowed for the chosen beam species, size and effective joist length. The effective joist length is the distance from the ledger board face to the back face of the rim (see example below). It is good practice to round the effective joist length up to the highest effective joist length measure on Table R507.5(2). For example, an effective joist length of 9'-2" would be rounded up to 10' or an effective joist length of 10'-8" would be rounded up to 12'. Once the maximum beam span is determined for the chosen beam, the post positions can be determined along the beam. For a Cantilever dropped beam deck, there will always be posts in each corner of the beam and joists. It is a good practice to start at either of the outer posts and position the remaining posts at the maximum beam span interval. For example, if the chosen beam is Southern Pine 1 - 2 × 10 and the effective joist length is 8' the maximum beam span is 5'-10". A post will be placed every 5'-10" from one post face to the next post face (see example below). For the example below, a post in the center of the beam length would suffice. However, the position of the beam and posts along the effective joist length is determined by the step on page 11.

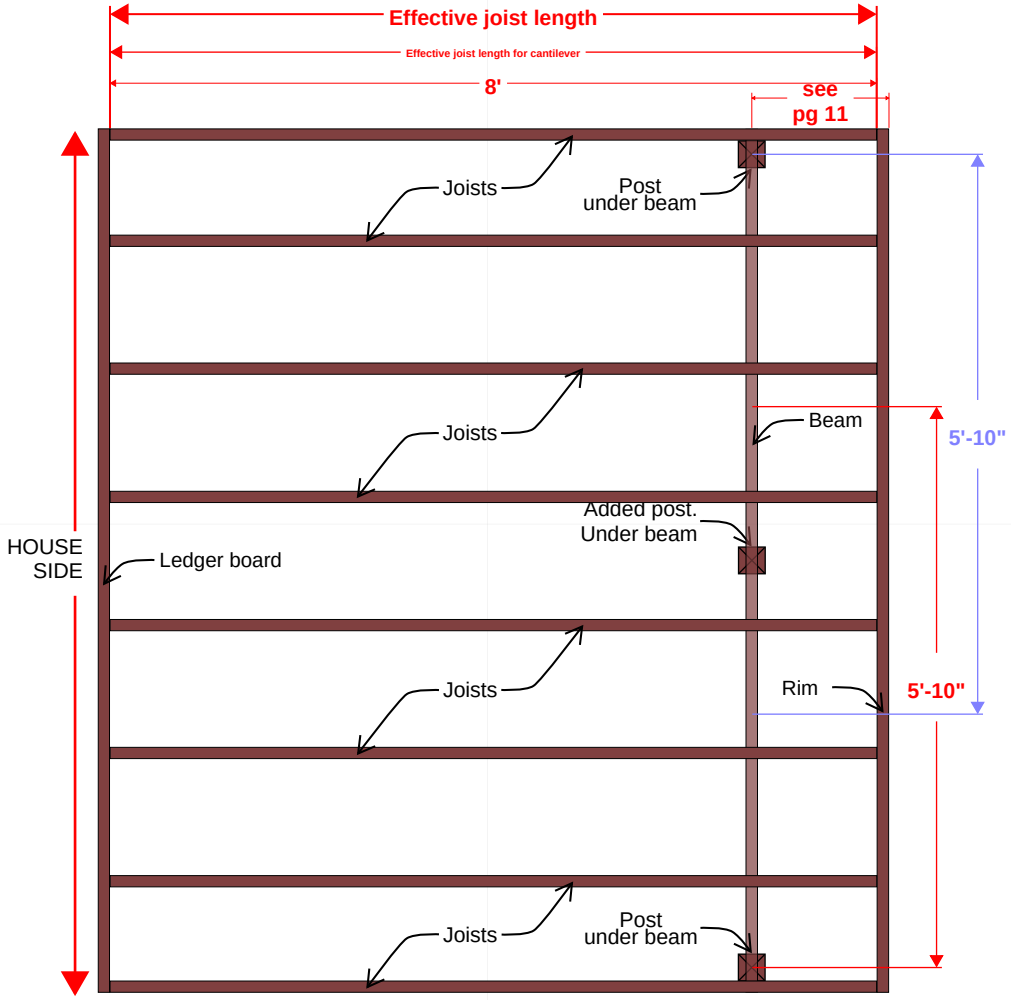


TABLE R507.5(2) MAXIMUM DECK BEAM SPAN - 50PSF GROUND SNOW LOAD

BEAM SPECIES	BEAM SIZE	EFFECTIVE DECK JOIST SPAN LENGTH (feet)						
		6	8	10	12	14	16	18
		MAMIMUM DECK BEAM SPAN LENGTH (feet-inches)						
SOUTHERN PINE	1 - 2×6	4-6	3-11	3-6	3-2	2-11	2-9	2-7
	1 - 2×8	5-9	4-11	4-5	4-0	3-9	3-6	3-3
	1 - 2×10	6-9	5-10	5-3	4-9	4-5	4-2	3-11
	1 - 2×12	8-0	6-11	6-2	5-8	5-3	4-11	4-7
	2 - 2×6	6-8	5-9	5-2	4-9	4-4	4-1	3-10
	2 - 2×8	8-6	7-4	6-7	6-0	5-7	5-2	4-11
	2 - 2×10	10-1	8-9	7-10	7-1	6-7	6-2	5-10
	2 - 2×12	11-11	10-3	9-2	8-5	7-9	7-3	6-10
	3 - 2×6	7-11	7-2	6-6	5-11	5-6	5-1	4-10
	3 - 2×8	10-5	9-3	8-3	7-6	6-11	6-6	6-2
	3 - 2×10	12-8	10-11	9-9	8-11	8-3	7-9	7-3
	3 - 2×12	14-11	12-11	11-6	10-6	9-9	9-1	8-7

CANTILEVER DROPPED BEAM DECK CANTILEVER SPAN

To position the beam and posts, the maximum cantilever amount for the joists needs to be determined. The start of the maximum cantilever amount will be the outer face of the rim board. While the end of the maximum cantilever amount will be the location of the beam. Use Table R507.6, 50 psf ground snow load, to find the maximum cantilever amount for the chosen joist species, size, spacing, and effective joist length. The effective joist length is the distance from the ledger board face to the back of the rim (same as page 10, this will give a margin of safety). The cantilever will start at the outer face of the rim and end at the middle of the beam. For example, if the chosen joists are Southern Pine 2 × 10, 16" o.c. spacing, and the effective joist length is 8' the maximum cantilever is 2'-0". The beam will be placed 2'-0" from the outer face of the rim board to the center of the beam.

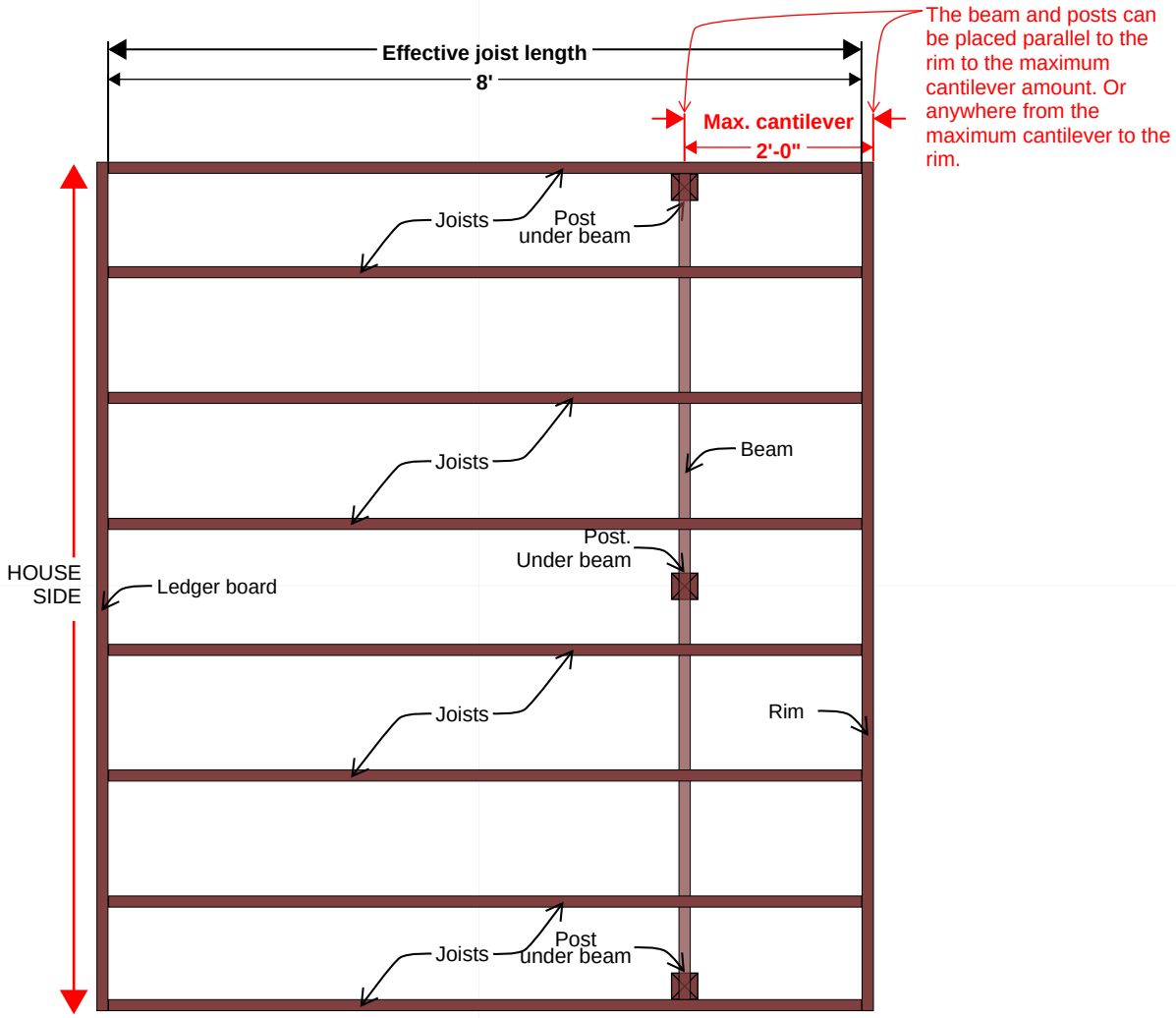
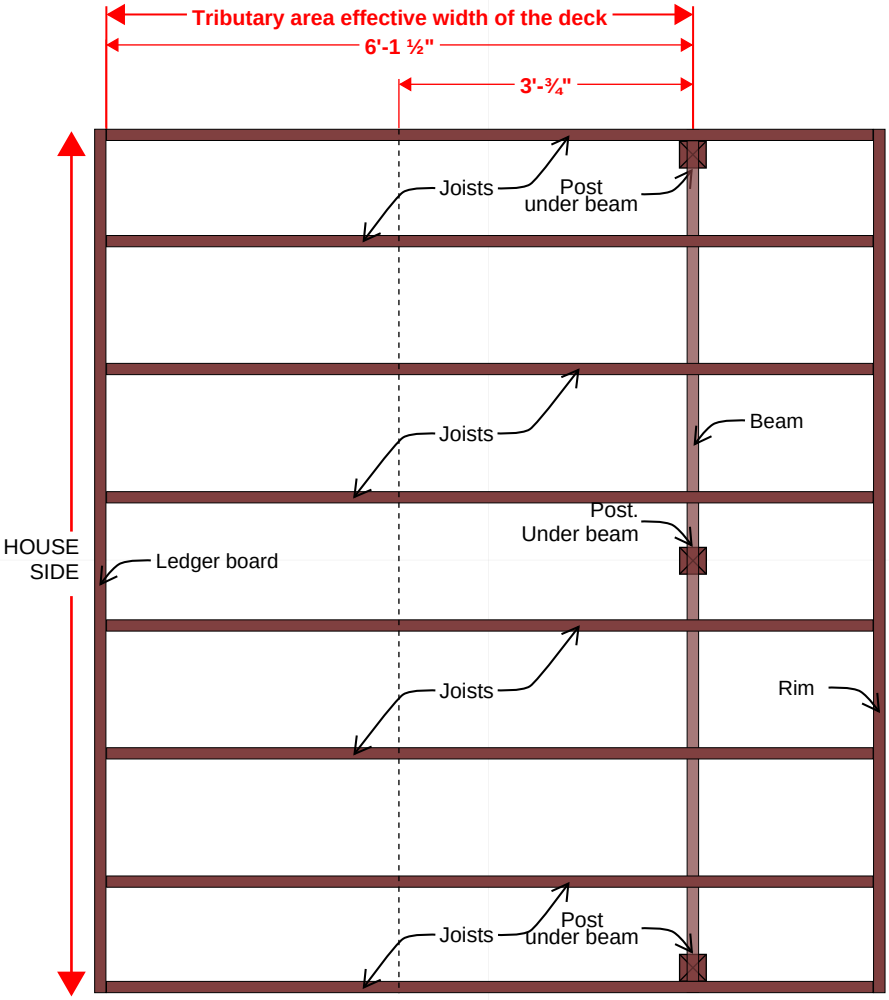


TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD (psf)	JOIST SPECIES	JOIST SIZE	ALLOWABLE JOIST SPAN (feet-inches) JOIST SPACING (inches) 12	16	24	MAXIMUM CANTILEVER (feet-inches) JOIST BACK SPAN (feet) 4	6	8	10	12	14	16	18
50 GROUND SNOW LOAD	SOUTHERN PINE	2×6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2×8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2×10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2×12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PINE-FIR	2×6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2×8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2×10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2×12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	2×6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2×8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2×10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2×12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP

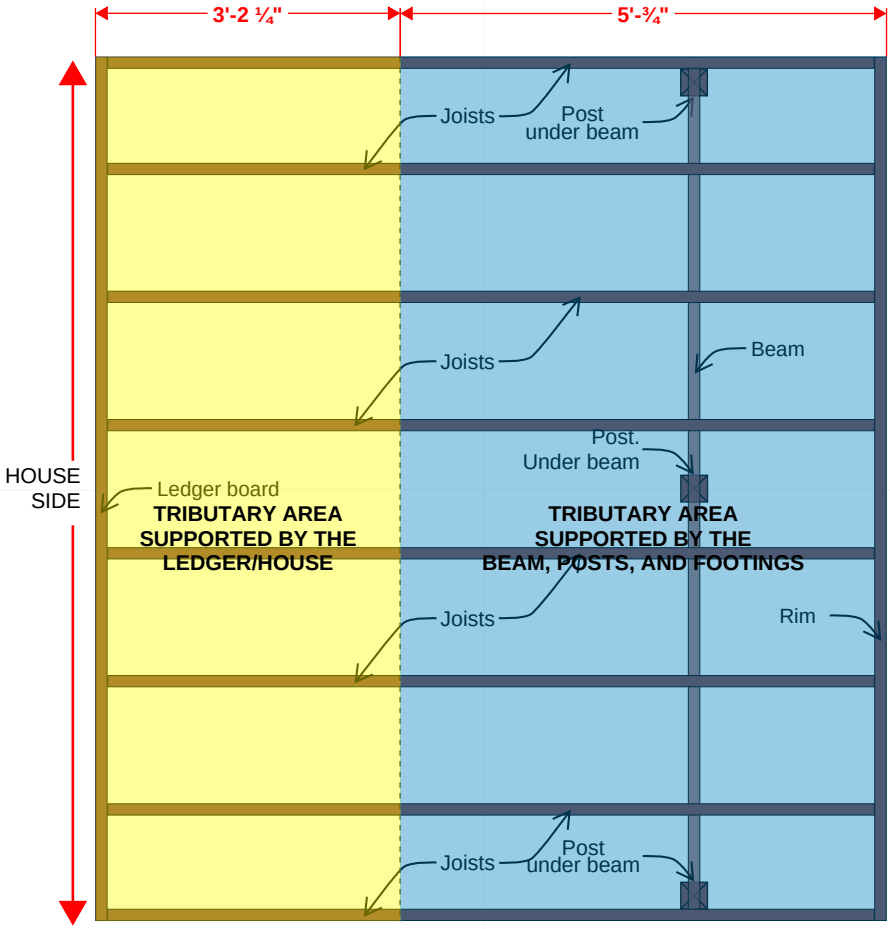
CANTILEVER DROPPED BEAM DECK TRIBUTARY AREA

After all the beam and posts are placed, the area of the deck that each post will support (tributary area) needs to be determined. To start, the tributary areas are divided into the area the ledger board will support and the area that the posts & footings will support. For the figure below, start by finding the middle point of the width of the deck measured from the ledger board to the middle of a post. Draw a line at the middle point parallel to the ledger board for the length of the deck.



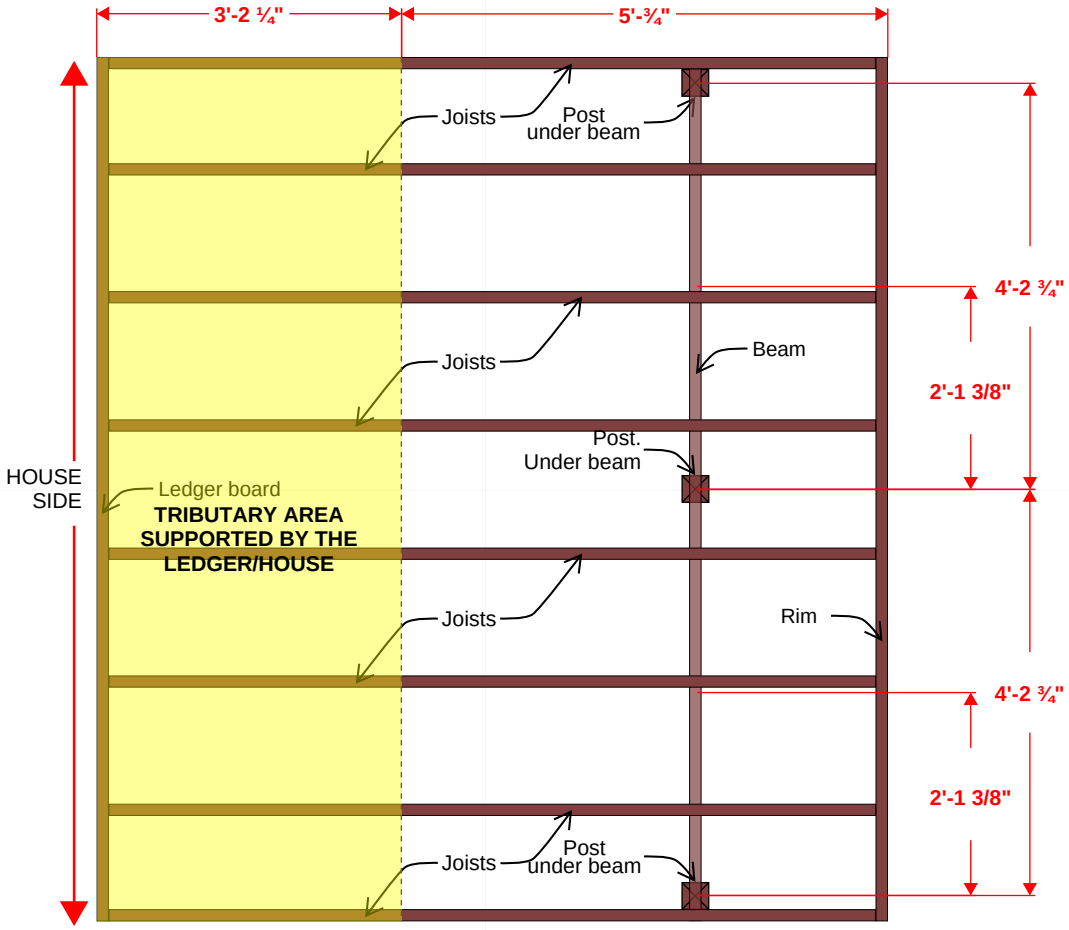
CANTILEVER DROPPED BEAM DECK
HOUSE AND BEAM & POST/FOOTING TRIBUTARY AREAS

With the deck divided in half along the tributary effective width, the house and beam & post/footing tributary areas are revealed. The ledger board attached to the house supports a portion of the deck. While the beam, posts, and footings support the other portion of the deck.



CANTILEVER DROPPED BEAM DECK
TRIBUTARY AREAS BY POST AND FOOTING

The tributary area supported by each post and footing needs to be determined in order to find the footing size. To do this, start by measuring from the center of one post to the center of the next nearest post. Then draw a line parallel to the width at each measured middle point



CANTILEVER DROPPED BEAM DECK
TRIBUTARY AREA BY POST AND FOOTING

Measure each individual tributary area length and width (figure 1). The length and width for each individual tributary area is multiplied to find the square footage that each individual post and footing will support.

Tributary area 1= 5'-¾" × 2'-4 ⅝"
Tributary area 1= 60.75" × 28.625"
Tributary area 1= 1738.97 in² ÷ 144
Tributary area 1= 12.1 ft²

Tributary area 2= 5'-¾" × 4'-2 ¾"
Tributary area 2= 60.75" × 50.75"
Tributary area 2= 3083.06 in² ÷ 144
Tributary area 2= 21.4 ft²

Tributary area 3= 5'-¾" × 2'-4 ⅝"
Tributary area 3= 60.75" × 28.625"
Tributary area 3= 1738.97 in² ÷ 144
Tributary area 3= 12.1 ft²

With the square footage for each tributary area known, the footing size can be found. Interpolated Table R507.3.1 (figure 2) can be used to find the footing size that would apply to common round concrete forms. In this example, tributary areas 1 & 3 require a 12" diameter × 6" thick footing with the bottom at 42" below grade and an 8" concrete pier to the surface (figure 3). Tributary area 2 requires a 14" diameter × 6" footing with the bottom at 42" below grade and an 8" concrete pier to the surface (figure 3).

Interpolated Table R507.3.1 to common round concrete form size

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

FIGURE 2

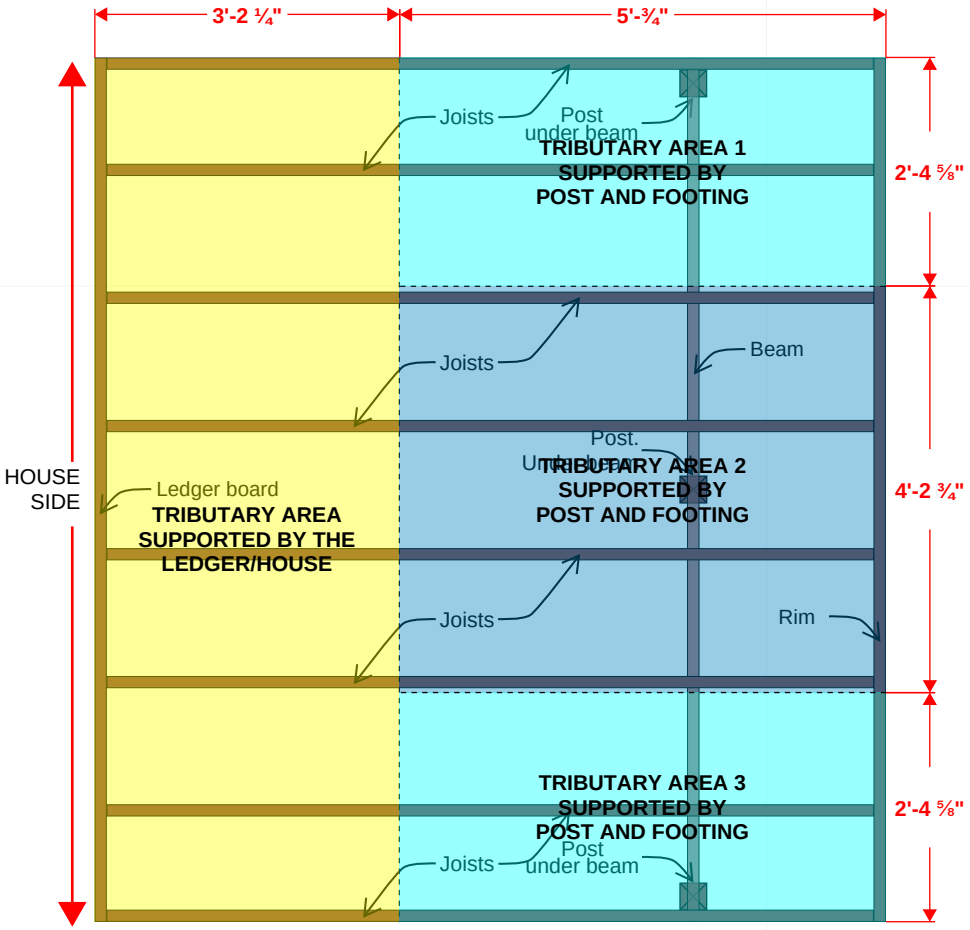
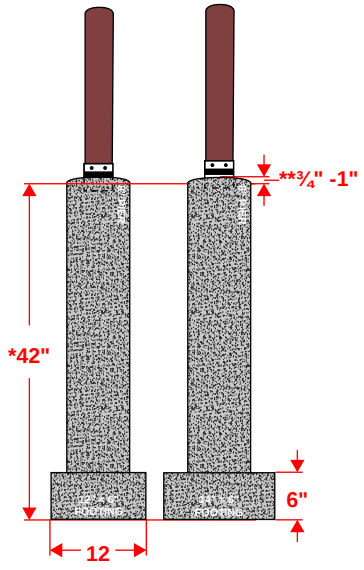


FIGURE 1



*Frost line is 42" in Billings. Footing to extend to 42" below grade level.

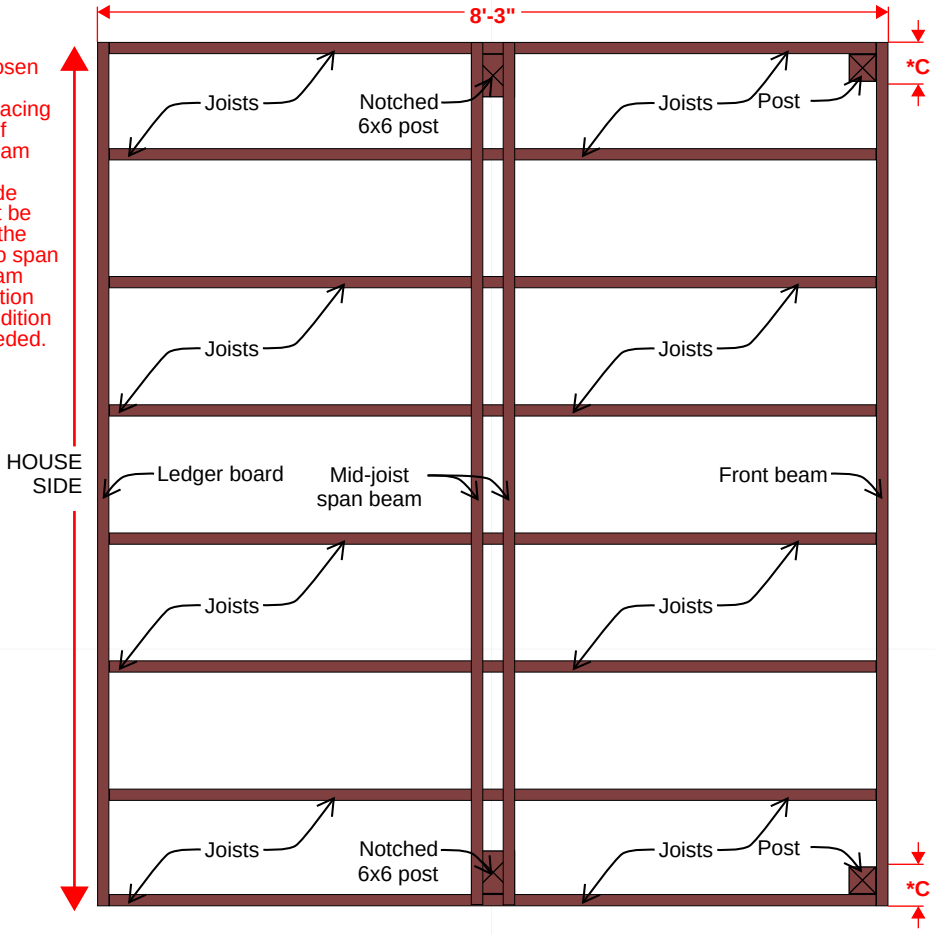
**above grade & sloped recommended

FIGURE 3

FLUSH BEAM DECK WITH MID-JOIST SPAN BEAM

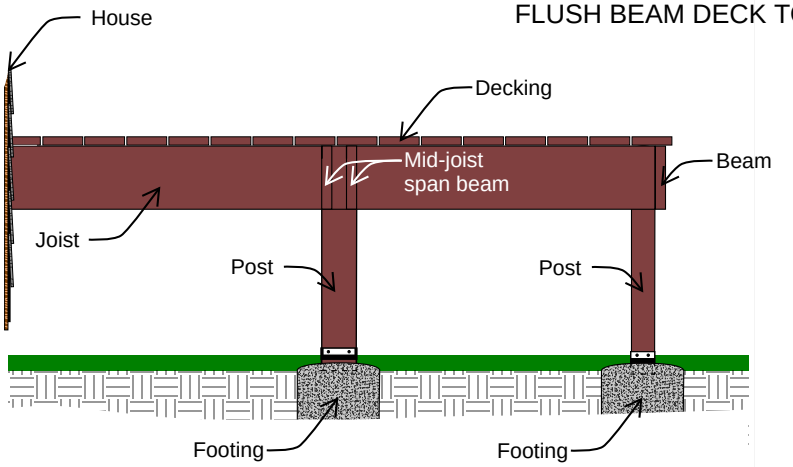
A flush beam deck has the back face of the front beam attached to the post with the addition of a mid-joist span beam. The mid-joist span beam is useful if the deck is wider than the chosen joist species and size can span or if the footings become too large to be practical. There is no cantilever past the front beam away from the house. However, a cantilever of 1/4 of the actual beam span is possible off of each corner. A flush beam deck has six basic components: ledger board, beam, joist, post, footing, and decking. The ledger board is attached to the house. The beam is parallel to the ledger board on the opposite side of the deck from the house. The ledger board and the beam are connected by the joists. The joists are the support for the decking. The ledger, beam, posts, and footings provide the vertical support for the deck. It is important to supply the dimensions for the ledger board, beam, joists, posts, and footings on the deck worksheets.

For the deck shown, if the chosen joist species and size was Redwood 2x6 with 16" o.c. spacing which can span a maximum of 7'-6", then a mid-joist span beam would be needed. Joists are assumed to span from one side only; therefore, joists shall not be attached to opposite sides of the same beam. Allowing joists to span from opposite sides of the beam without appropriate consideration could potentially lead to a condition where beam capacity is exceeded.

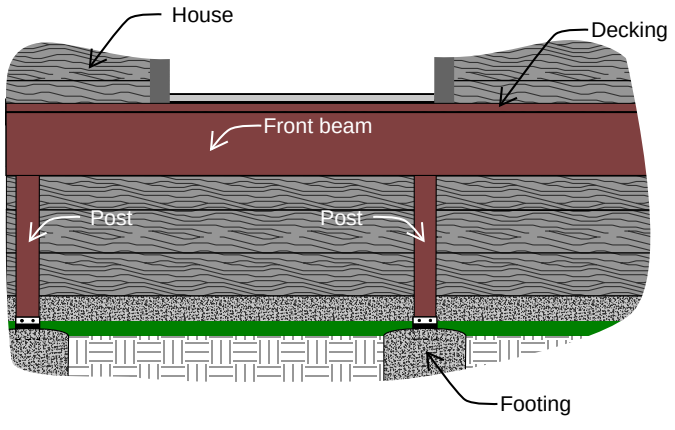


*Possible cantilever of 1/4 of the actual beam span. see page 4 for beam span details.

FLUSH BEAM DECK TOP-DOWN VIEW



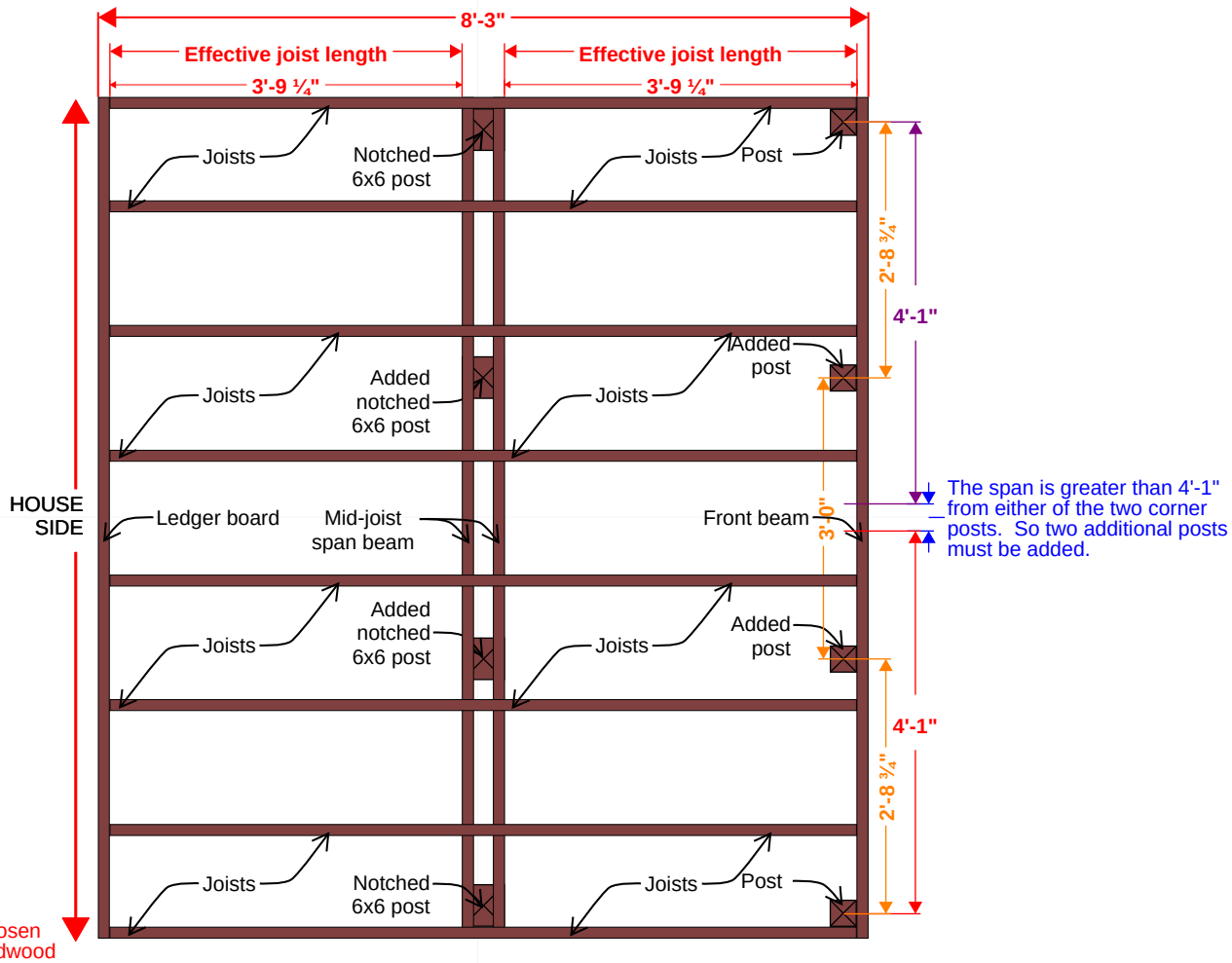
FLUSH BEAM DECK
WITH MID-JOIST SPAN BEAM
SIDE VIEW



FLUSH BEAM DECK
WITH MID-JOIST SPAN BEAM
FRONT VIEW

FLUSH BEAM DECK WITH MID-JOIST SPAN BEAM - BEAM & BEAM SPAN

Once the length and width of the deck are set, choose what size beam will be used. This will provide the maximum span, from post-to-post, that the chosen beam size can support. Use Table R507.5(2) to find the maximum span allowed for the chosen beam size and effective joist length. The effective joist length is the distance from the ledger board face to the back face of the beam (see example below). It is good practice to round the effective joist length up to the highest effective joist length measure on Table R507.5(2). For example, an effective joist length of 9'-2" would be rounded up to 10' or an effective joist length of 10'-8" would be rounded up to 12'. Once the maximum beam span is determined for the chosen beam, the post positions can be determined along the beam. For a Flush beam deck with a mid-span joist beam, there will always be posts in each corner of the mid-joist span beam and joists plus at the front beam and joists. It is a good practice to start at either of the outer posts and position the remaining posts at the maximum beam span interval. For example, if the chosen beam is Redwood 1 - 2 × 6 and the effective joist length is 6' the maximum beam span is 4'-1". A post will be placed every 4'-1", or less, from the center of one post to center of the next post (see example below). For the example below, a total of four post along each beam length would be required.



For the deck shown, if the chosen beam species and size is Redwood 2x6, the effective joist span length would be rounded up to the lowest choice of 6'

TABLE R507.5(2) MAXIMUM DECK BEAM SPAN - 50PSF GROUND SNOW LOAD

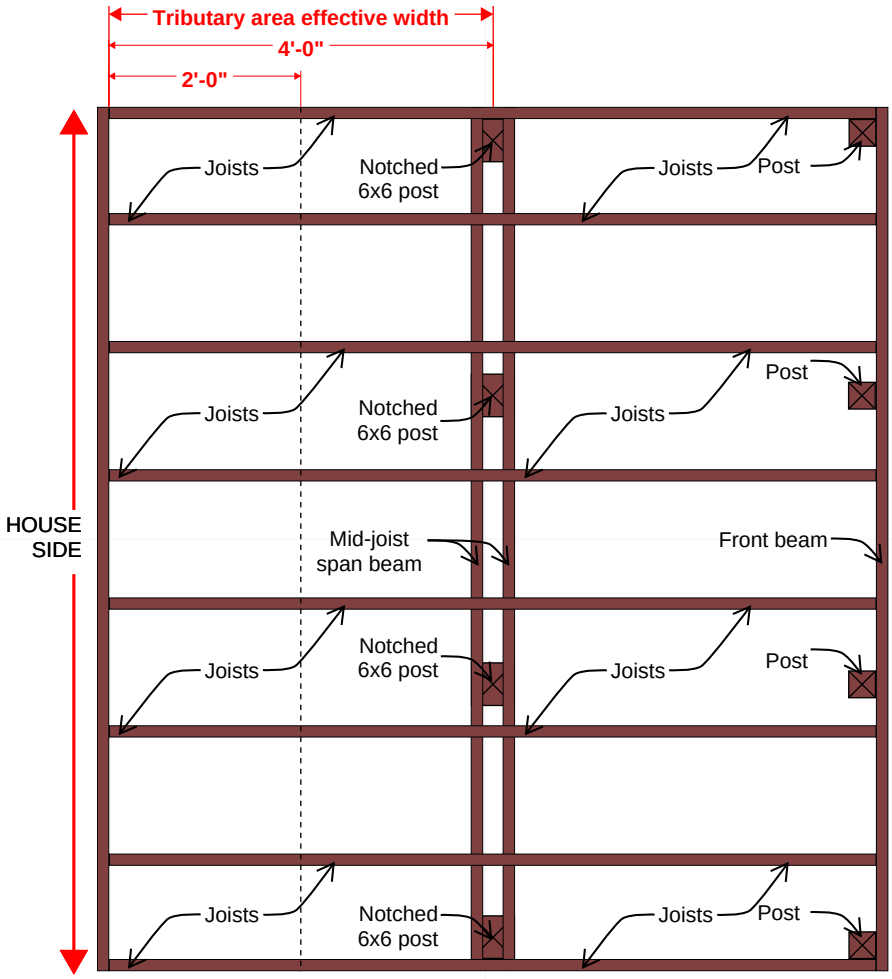
BEAM SPECIES	BEAM SIZE	EFFECTIVE DECK JOIST SPAN LENGTH (feet) MAXIMUM DECK BEAM SPAN LENGTH (feet-inches)						
		6	8	10	12	14	16	18
REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	1 - 2×6	4-1	3-6	3-0	2-8	2-5	2-3	2-1
	1 - 2×8	5-2	4-6	4-0	3-6	3-2	2-11	2-9
	1 - 2×10	6-4	5-6	4-11	4-6	4-1	3-9	3-6
	1 - 2×12	7-4	6-4	5-8	5-2	4-10	4-6	4-3
	2 - 2×6	6-1	5-3	4-8	4-4	3-11	3-6	3-3
	2 - 2×8	7-8	6-8	5-11	5-5	5-0	4-8	4-3
	2 - 2×10	9-5	8-2	7-3	6-8	6-2	5-9	5-5
	2 - 2×12	10-11	9-5	8-5	7-8	7-2	6-8	6-3
	3 - 2×6	7-1	6-5	5-11	5-5	5-0	4-8	4-5
	3 - 2×8	9-4	8-4	7-5	6-10	6-4	5-11	5-7
	3 - 2×10	11-9	10-2	9-1	8-4	7-8	7-2	6-9
	3 - 2×12	13-8	11-10	10-7	9-8	8-11	8-4	7-10

TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD (psf)	JOIST SPECIES	JOIST SIZE	ALLOWABLE JOIST SPAN (feet-inches) JOIST SPACING (inches)			MAXIMUM CANTILEVER (feet-inches) JOIST BACK SPAN (feet)							
			12	16	24	4	6	8	10	12	14	16	18
50 GROUND SNOW LOAD	SOUTHERN PINE	2×6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2×8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2×10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2×12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PINE-FIR	2×6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2×8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2×10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2×12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	2×6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2×8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2×10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2×12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP

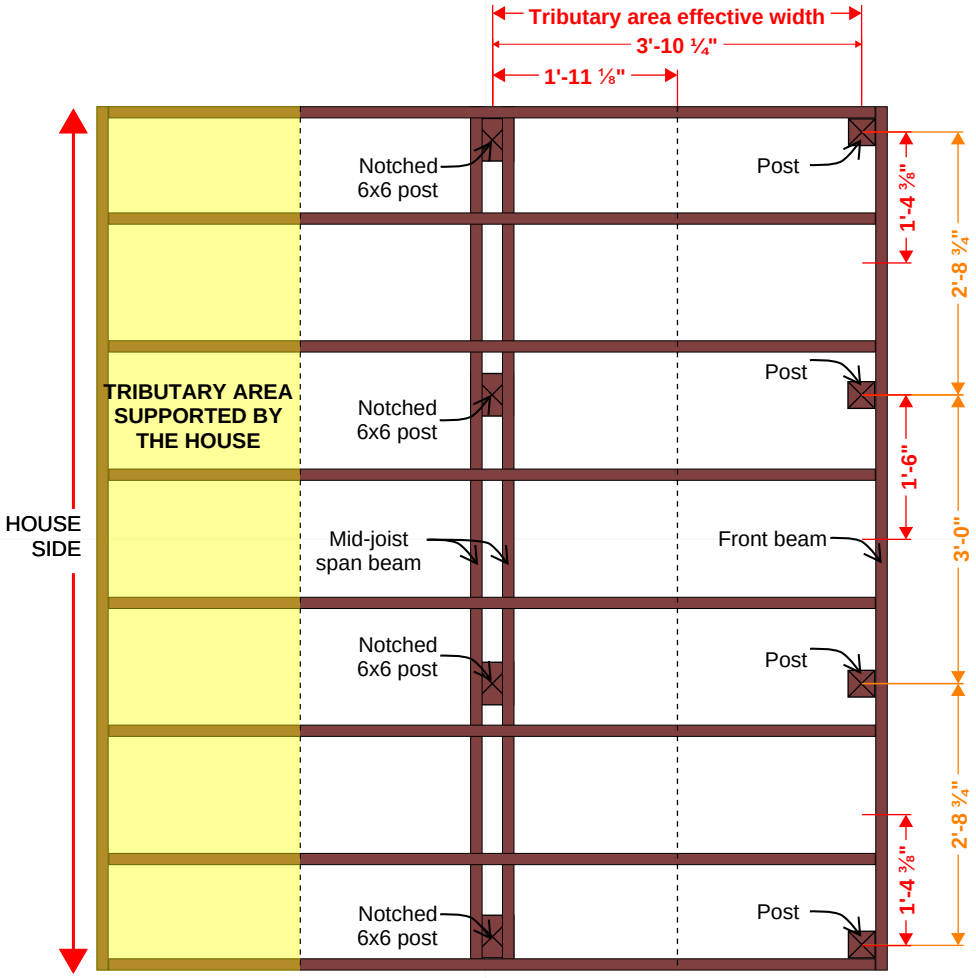
FLUSH BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREAS

After all the posts are placed along the mid-joist span beam and front beam, the area of the deck that each post will support (tributary area) needs to be determined. To start, the tributary areas are divided into the area the ledger board will support and the area that the mid-joist beam posts & footings will support. For the figure below, start by measuring from the face of the ledger board to the middle of the mid-joist span beam post. Draw a line from the middle point parallel to the ledger beam across the deck.



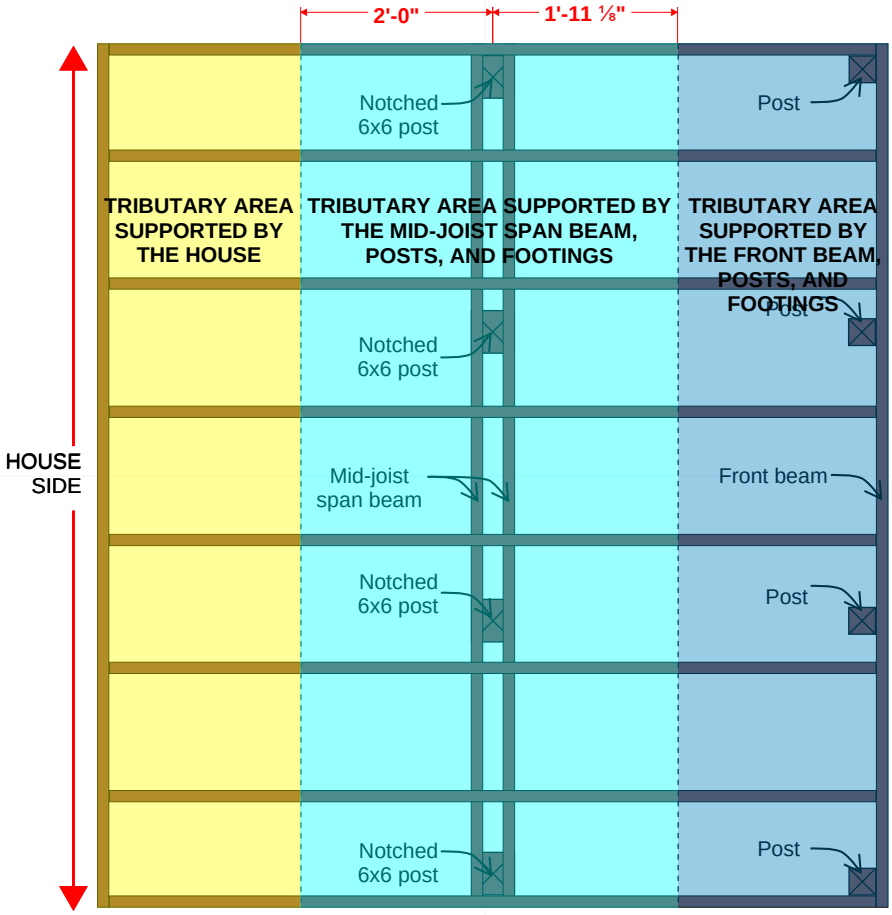
FLUSH BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREAS

Next, the tributary area between the mid-joist span beam posts & footings and the front beam posts & footings needs to be figured out. For the figure below, measure from the middle of the mid-joist span beam post to the middle of the front beam post. Draw a line from the middle point parallel to the ledger beam across the deck.



FLUSH BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREAS

With the three main tributary areas are revealed. The ledger board attached to the house supports a portion of the deck. The mid-joist span beam, posts, and footings supports another portion of the deck. While the front beam, posts and footings support the the final portion of the deck.



FLUSH BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREA BY POST AND FOOTING

Measure each individual tributary area length and width (figure 1). The length and width for each individual tributary are is multiplied to find the square footage that each individual post and footing will support.

Tributary area 1= 3'-11 ⅛" × 1'-4 ⅜"
Tributary area 1= 47.125" × 16.375"
Tributary area 1= 771.7 in² ÷ 144
Tributary area 1= 5.4 ft²

Tributary area 2= 1'-7 ⅝" × 2'-2 ½"
Tributary area 2= 19.625" × 26.5"
Tributary area 2= 520.06 in² ÷ 144
Tributary area 2= 3.6 ft²

Tributary area 3= 3'-11 ⅛" × 2'-10 ⅜"
Tributary area 3= 47.125" × 32.375"
Tributary area 3= 1525.67 in² ÷ 144
Tributary area 3= 10.6 ft²

Tributary area 4= 2'-10 ⅜" × 2'-2 ½"
Tributary area 4= 32.375" × 26.5"
Tributary area 4= 857.94 in² ÷ 144
Tributary area 4= 5.96 ft²

Tributary area 5= 3'-11 ⅛" × 2'-10 ⅜"
Tributary area 5= 47.125" × 32.375"
Tributary area 5= 1525.67 in² ÷ 144
Tributary area 5= 10.6 ft²

Tributary area 6= 2'-2 ½" × 2'-10 ⅜"
Tributary area 6= 26.5" × 32.375"
Tributary area 6= 857.94 in² ÷ 144
Tributary area 6= 5.96 ft²

Tributary area 7= 3'-11 ⅛" × 1'-4 ⅜"
Tributary area 7= 47.125" × 16.375"
Tributary area 7= 771.7 in² ÷ 144
Tributary area 7= 5.4 ft²

Tributary area 8= 1'-7 ⅝" × 2'-2 ½"
Tributary area 8= 19.625" × 26.5"
Tributary area 8= 520.06 in² ÷ 144
Tributary area 8= 3.6 ft²

With the square footage for each tributary area known, the footing size can be found. Interpolated Table R507.3.1 (figure 2) can be used to find the footing size that would apply to common round concrete forms. In this example, tributary areas 2 & 8 require an 8" diameter × 6" thick footing or an 8" diameter concrete form to 42" below grade (figure 3). Tributary areas 1, 3, 4, 5, 6, & 7 require a 10" diameter × 6" footing or a 10" diameter concrete form to 42" below grade (figure 3).

Interpolated Table R507.3.1 to common round concrete form size

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

FIGURE 2

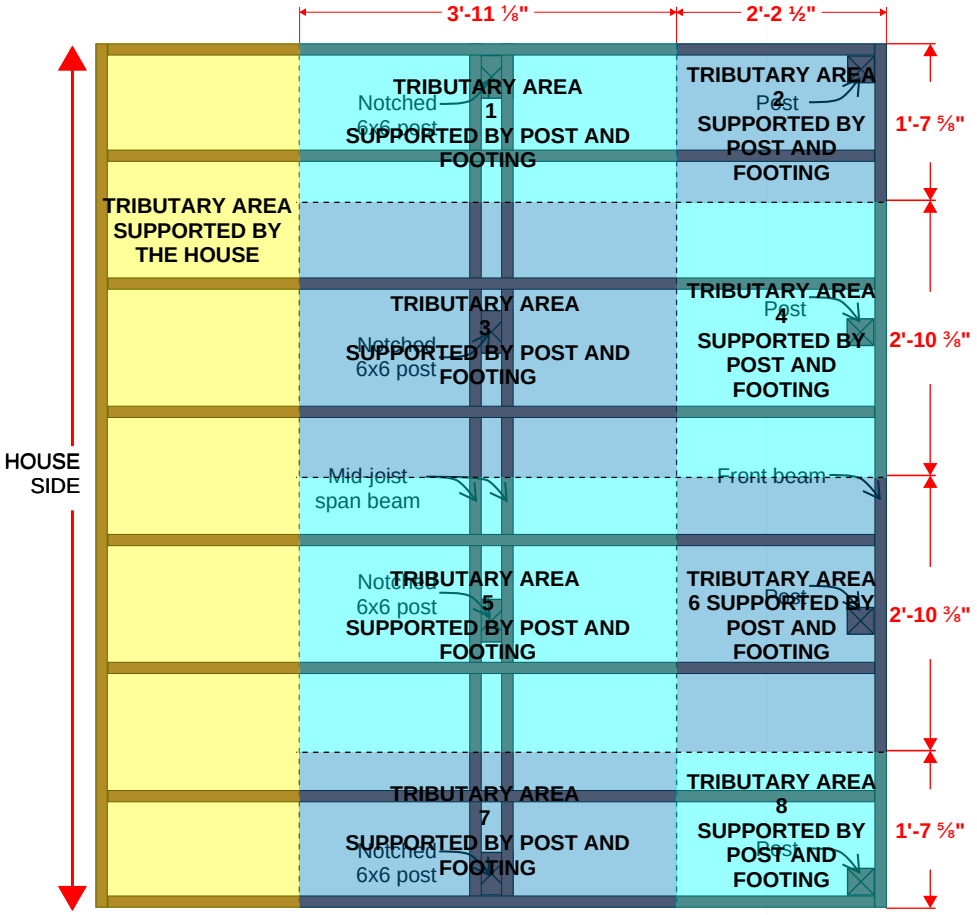


FIGURE 1

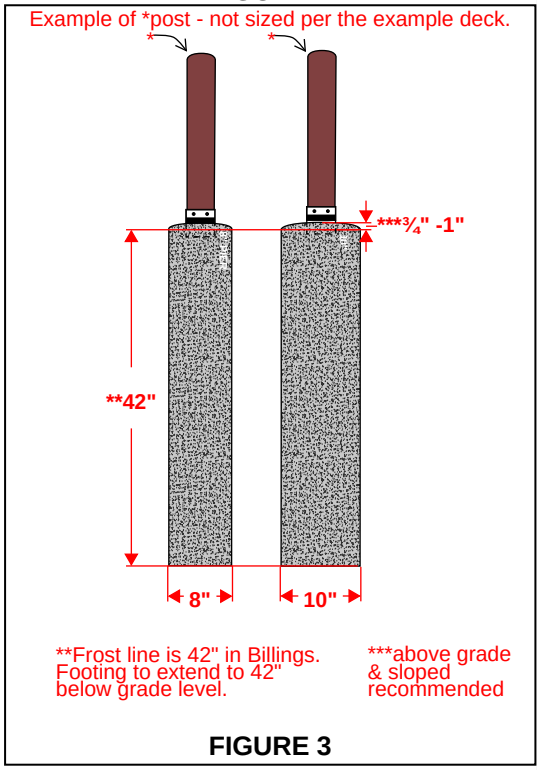
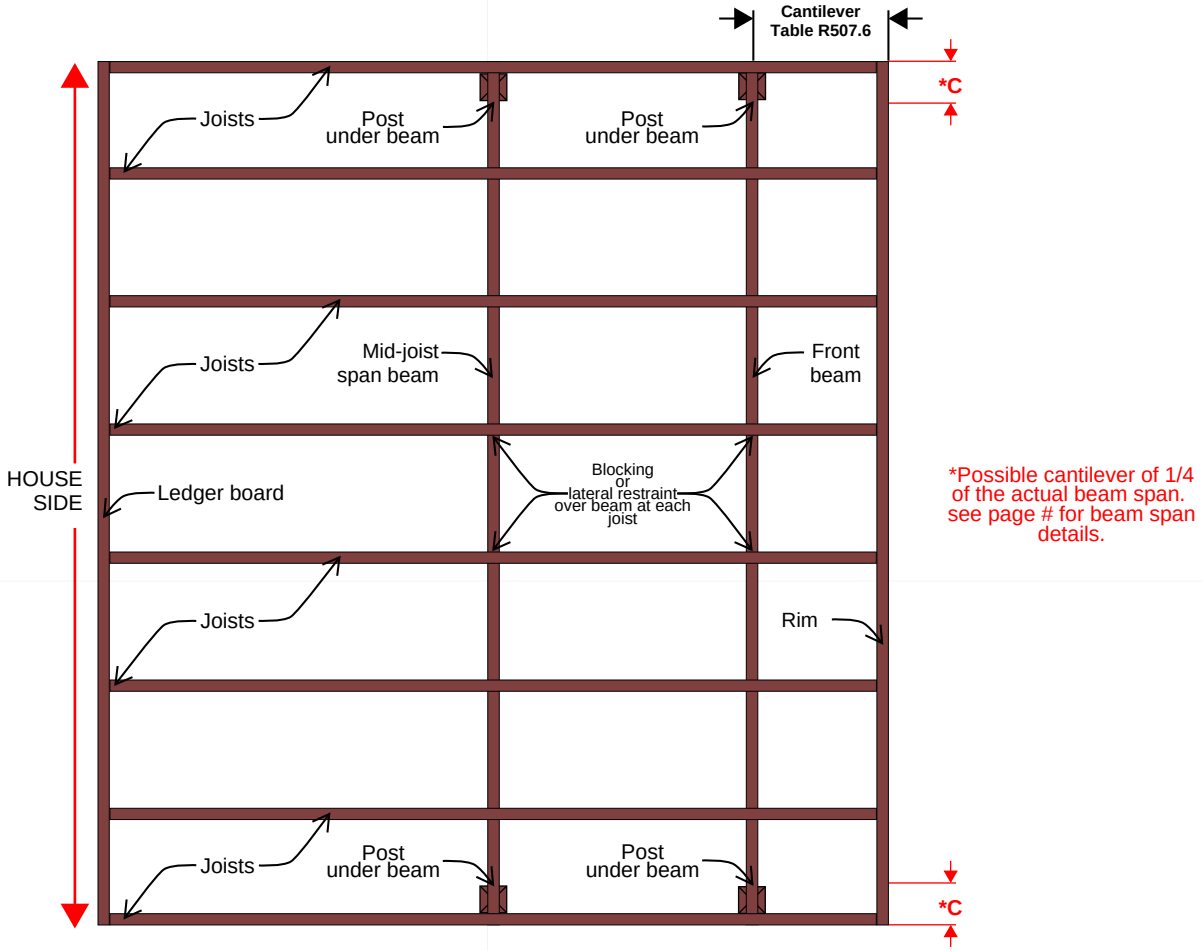


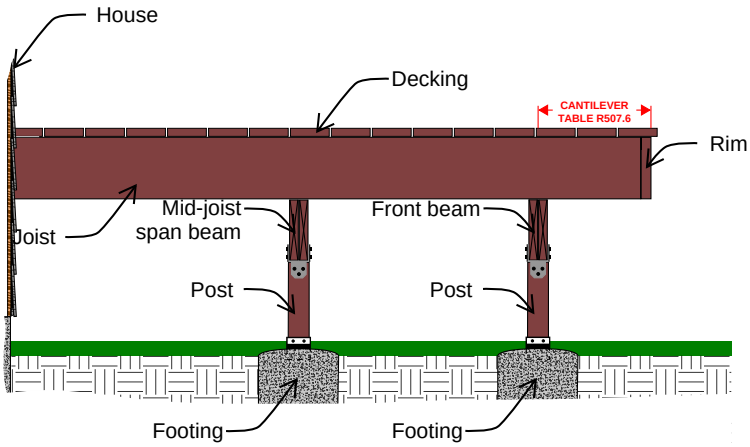
FIGURE 3

CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM

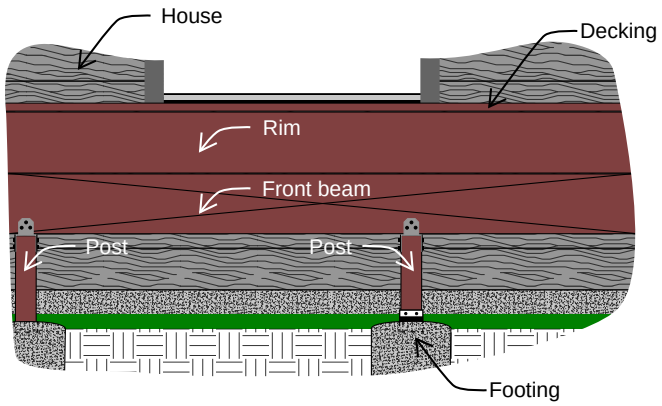
A cantilever dropped beam deck has the frame (made up of the of the ledger board, joists, and rim board) of the deck resting on top of and attached to the top of beam. The addition of a mid-joist span beam is useful if the deck is wider than the chosen joist species and size can span or if the footings become too large to be practical.The both beams are attached to the posts. A cantilever past the front beam, away from the house of 1' up to a maximum of 3'-10" is possible depending on the joist species, size, and back span (see Table R507.6, 50psf ground snow load must be used). In addition, a cantilever of 1/4 of the actual beam span is possible off of each end of the beam. A cantilevered dropped beam deck has seven basic components: ledger board, beam, rim, joist, post, footing, and decking. The ledger board is attached to the house. The rim is parallel to the ledger board on the opposite side of the deck from the house. The ledger board and the rim are connected by the joists. The joists are the support for the decking. The ledger board, beam, posts, and footings provide the vertical support for the deck. It is important to supply the dimensions for the ledger board, beam, rim, joists, posts, and footings on the deck worksheets.



CANTILEVERED DROPPED BEAM DECK TOP-DOWN VIEW



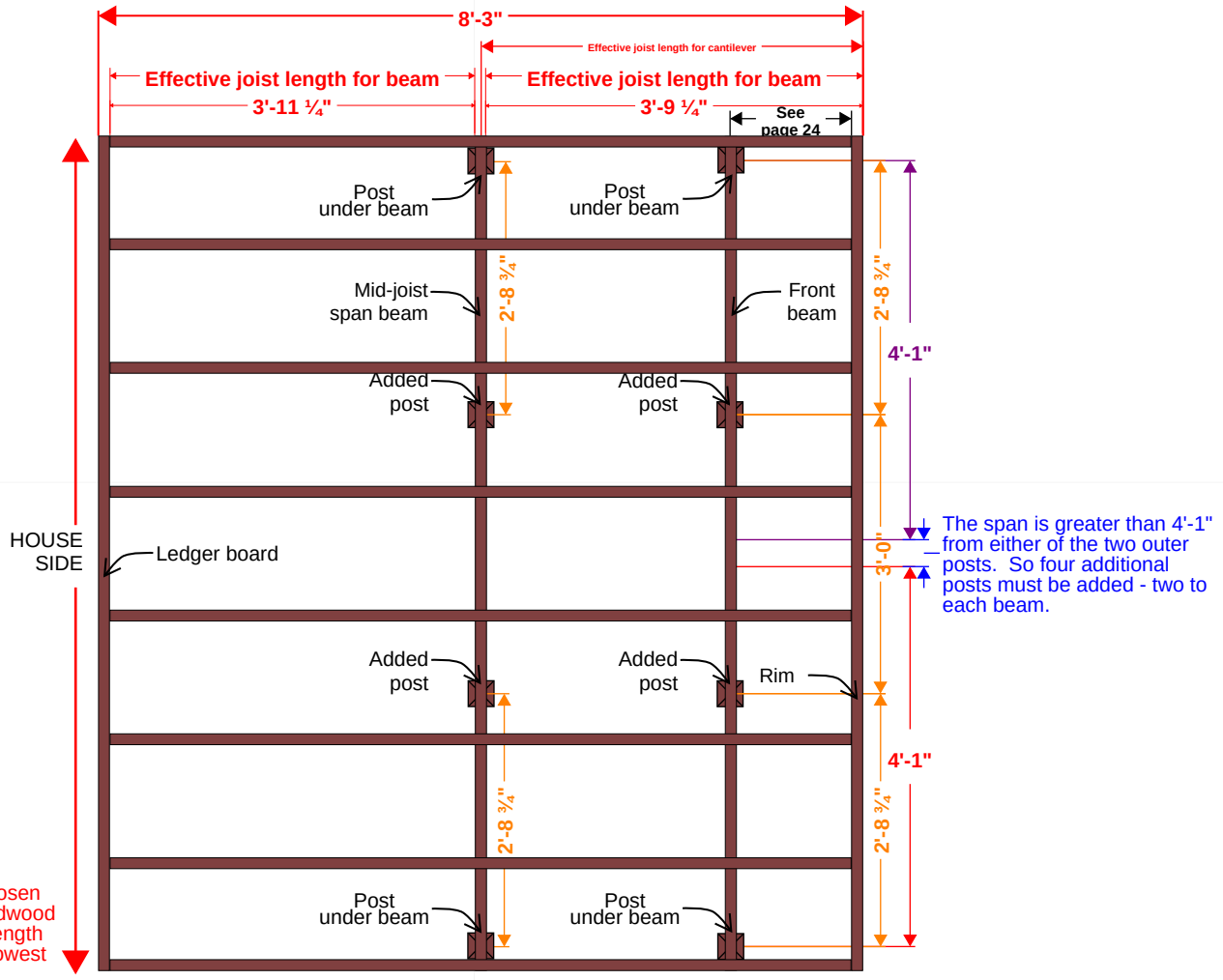
CANTILEVERED DROPPED BEAM DECK SIDE VIEW



CANTILEVERED DROPPED BEAM DECK FRONT VIEW

CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM - BEAM & BEAM SPAN

Once the length and width of the deck are set, choose what size beam will be used. This will provide the maximum span, from post-to-post, that the chosen beam size can support. Use Table R507.5(2) to find the maximum span allowed for the chosen beam species, size and effective joist length. The effective joist length is the distance from the ledger board face to the back face of the rim (see example below). It is good practice to round the effective joist length up to the highest effective joist length measure on Table R507.5(2). For example, an effective joist length of 9'-2" would be rounded up to 10' or an effective joist length of 10'-8" would be rounded up to 12'. Once the maximum beam span is determined for the chosen beam, the post positions can be determined along the beam. For a Cantilever dropped beam deck, there will always be posts in each corner of the beam and joists. It is a good practice to start at either of the outer posts and position the remaining posts at the maximum beam span interval. For example, if the chosen beam is Redwood 1 - 2 × 6 and the effective joist length is 6' the maximum beam span is 4'-1". A post will be placed every 4'-1" from the center of a post to the center of the next post (see example below). For the example below, a total of four post along each beam length would be required. However, the position of the front beam and posts in relation to the rim is determined by the step on page 24.



For the deck shown, if the chosen beam species and size is Redwood 2x6, the effective joist span length would be rounded up to the lowest choice of 6'

TABLE R507.5(2) MAXIMUM DECK BEAM SPAN - 50PSF GROUND SNOW LOAD

BEAM SPECIES	BEAM SIZE	EFFECTIVE DECK JOIST SPAN LENGTH (feet) MAXIMUM DECK BEAM SPAN LENGTH (feet-inches)						
		6	8	10	12	14	16	18
REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	1 - 2×6	4-1	3-6	3-0	2-8	2-5	2-3	2-1
	1 - 2×8	5-2	4-6	4-0	3-6	3-2	2-11	2-9
	1 - 2×10	6-4	5-6	4-11	4-6	4-1	3-9	3-6
	1 - 2×12	7-4	6-4	5-8	5-2	4-10	4-6	4-3
	2 - 2×6	6-1	5-3	4-8	4-4	3-11	3-6	3-3
	2 - 2×8	7-8	6-8	5-11	5-5	5-0	4-8	4-3
	2 - 2×10	9-5	8-2	7-3	6-8	6-2	5-9	5-5
	2 - 2×12	10-11	9-5	8-5	7-8	7-2	6-8	6-3
	3 - 2×6	7-1	6-5	5-11	5-5	5-0	4-8	4-5
	3 - 2×8	9-4	8-4	7-5	6-10	6-4	5-11	5-7
	3 - 2×10	11-9	10-2	9-1	8-4	7-8	7-2	6-9
	3 - 2×12	13-8	11-10	10-7	9-8	8-11	8-4	7-10

TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD (psf)	JOIST SPECIES	JOIST SIZE	ALLOWABLE JOIST SPAN (feet-inches) JOIST SPACING (inches)			MAXIMUM CANTILEVER (feet-inches) JOIST BACK SPAN (feet)							
			12	16	24	4	6	8	10	12	14	16	18
50 GROUND SNOW LOAD	SOUTHERN PINE	2×6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2×8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2×10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2×12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PINE-FIR	2×6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2×8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2×10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2×12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	2×6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2×8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2×10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2×12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP

CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM CANTILEVER SPAN

To position the front beam and posts, the maximum cantilever amount for the joists needs to be determined. The start of the maximum cantilever amount will be the outer face of the rim board. While the end of the maximum cantilever amount will be the location of the front beam. Use Table R507.6, 50 psf ground snow load, to find the maximum cantilever amount for the chosen joist species, size, spacing, and effective joist length. The effective joist length is the distance from the center of the mid-joist span post to the back of the rim (same as page 10, this will give a margin of safety). The cantilever will start at the outer face of the rim and end at the middle of the front beam. For example, if the chosen joists are Redwood 2 × 6, 16" o.c. spacing, and the effective joist length is 4' the maximum cantilever is 1'-0". The beam will be placed 1'-0" from the outer face of the rim board to the center of the beam.

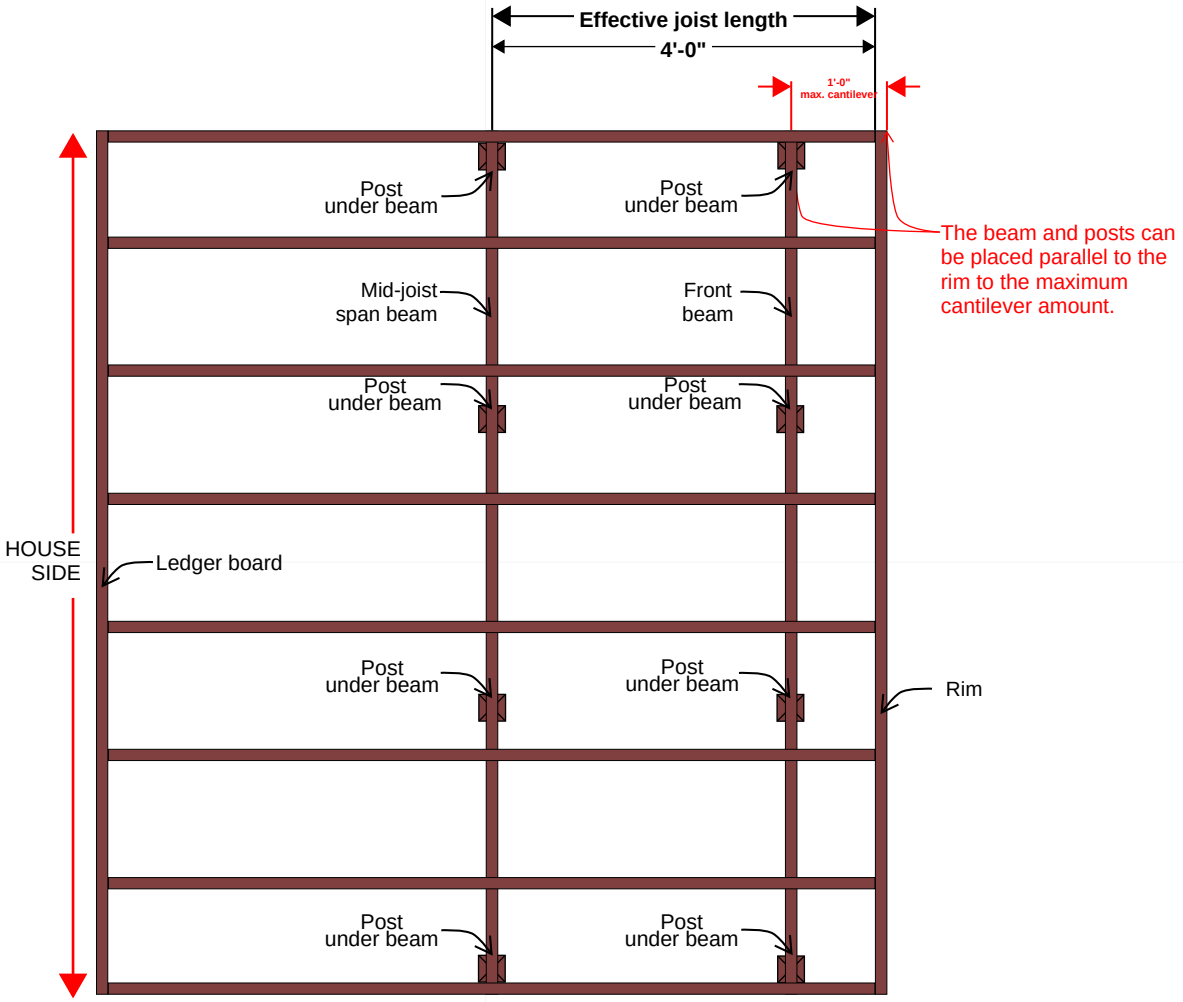
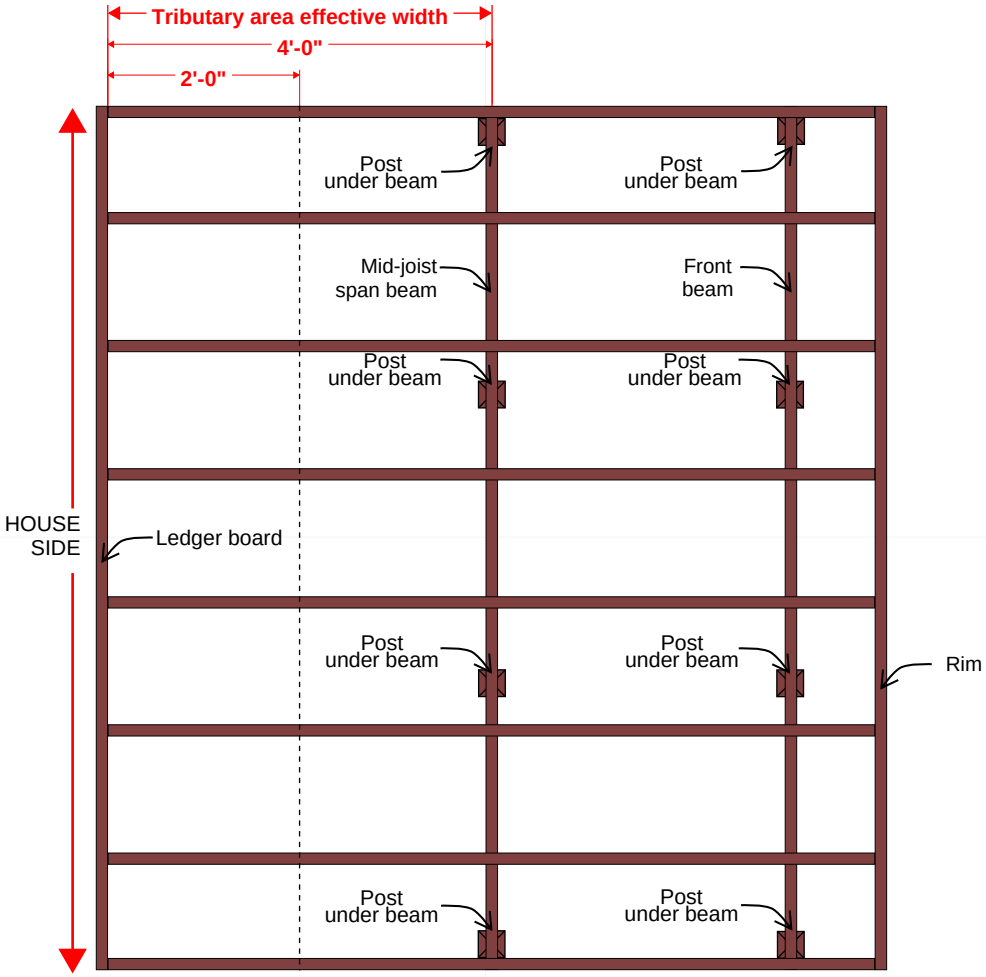


TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD (psf)	JOIST SPECIES	JOIST SIZE	ALLOWABLE JOIST SPAN (feet-inches) JOIST SPACING (inches) 12	16	24	MAXIMUM CANTILEVER (feet-inches) JOIST BACK SPAN (feet) 4	6	8	10	12	14	16	18
50 GROUND SNOW LOAD	SOUTHERN PINE	2×6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2×8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2×10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2×12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PINE-FIR	2×6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2×8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2×10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2×12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	2×6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2×8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2×10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2×12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP

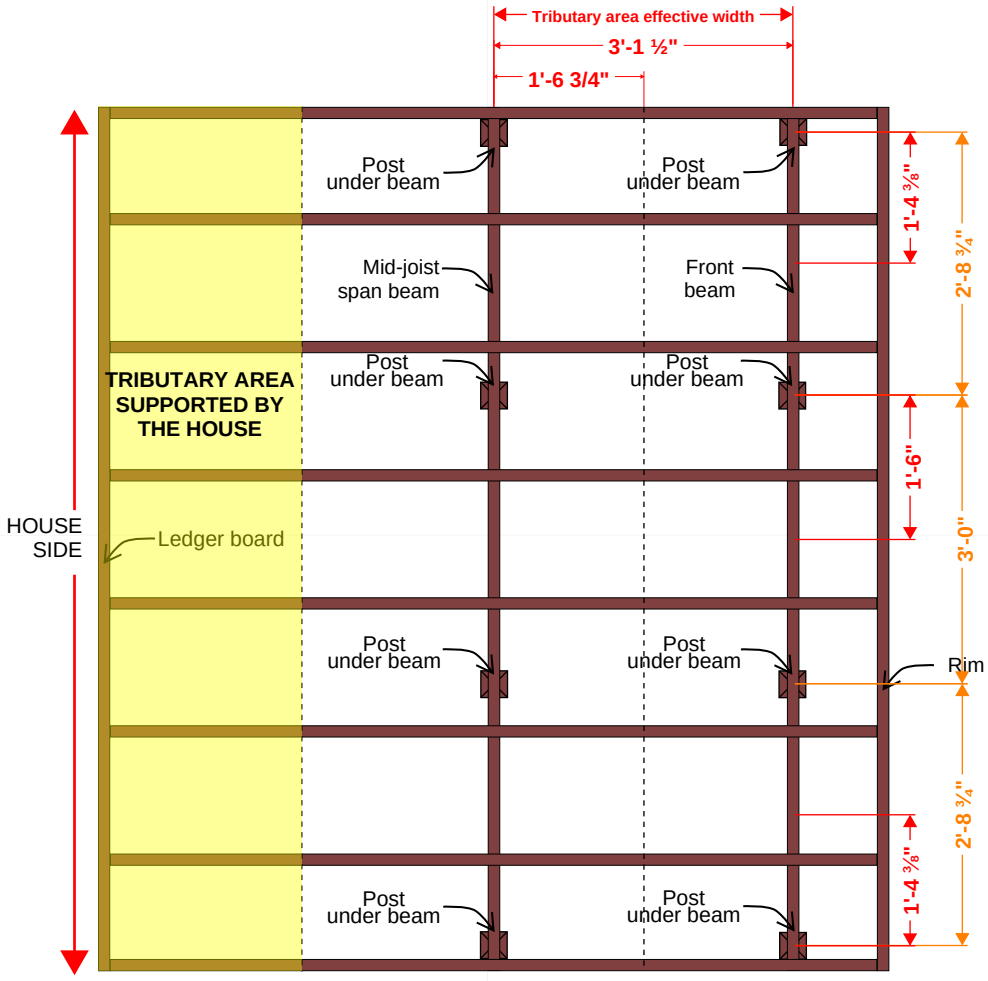
CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREAS

After all the beams and posts are placed, the area of the deck that each post will support (tributary area) needs to be determined. To start, the tributary areas are divided into the area the ledger board will support and the area that the posts & footings will support. For the figure below, start by finding the middle point of the width of the deck measured from the ledger board to the middle of the mid-joist span post. Draw a line at the middle point parallel to the ledger board for the length of the deck.



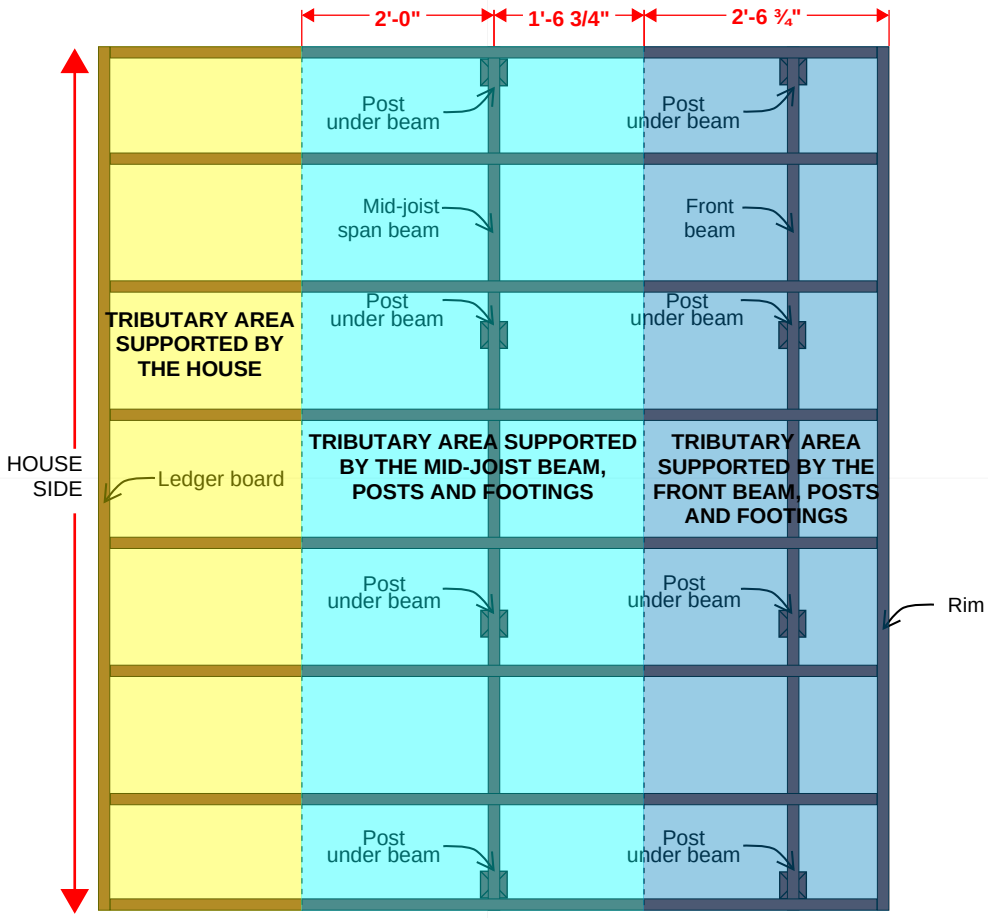
CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREAS

Next, the tributary area between the mid-joist span beam posts & footings and the front beam posts & footings needs to be figured out. For the figure below, measure from the middle of the mid-joist span beam post to the middle of the front beam post. Draw a line from the middle point parallel to the ledger beam across the deck.



CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM TRIBUTARY AREAS

With the three main tributary areas are revealed. The ledger board attached to the house supports a portion of the deck. The mid-joist span beam, posts, and footings supports another portion of the deck. While the front beam, posts and footings support the the final portion of the deck.



CANTILEVER DROPPED BEAM DECK WITH MID-JOIST SPAN BEAM TRIB. AREAS BY POST/FOOTING

Measure each individual tributary area length and width (figure 1). The length and width for each individual tributary are is multiplied to find the square footage that each individual post and footing will support.

Tributary area 1= 3'-6 ¾" × 1'-7 ⅝"
Tributary area 1= 42.75" × 19.625"
Tributary area 1= 838.97 in² ÷ 144
Tributary area 1= 5.8 ft²

Tributary area 2= 2'-6 ¾" × 1'-7 ⅝"
Tributary area 2= 30.75" × 19.625"
Tributary area 2= 603.47 in² ÷ 144
Tributary area 2= 4.2 ft²

Tributary area 3= 3'-6 ¾"" × 2'-10 ⅜"
Tributary area 3= 42.75" × 34.375"
Tributary area 3= 1469.53 in² ÷ 144
Tributary area 3= 10.2 ft²

Tributary area 4= 2'-10 ⅜" × 2'-6 ¾"
Tributary area 4= 34.375" × 30.75"
Tributary area 4= 1057.03 in² ÷ 144
Tributary area 4= 7.34 ft²

Tributary area 5= 3'-6 ¾"" × 2'-10 ⅜"
Tributary area 5= 42.75" × 34.375"
Tributary area 5= 1469.53 in² ÷ 144
Tributary area 5= 10.2 ft²

Tributary area 6= 2'-10 ⅜" × 2'-6 ¾"
Tributary area 6= 34.375" × 30.75"
Tributary area 6= 1057.03 in² ÷ 144
Tributary area 6= 7.34 ft²

Tributary area 7= 3'-6 ¾" × 1'-7 ⅝"
Tributary area 7= 42.75" × 19.625"
Tributary area 7= 838.97 in² ÷ 144
Tributary area 7= 5.8 ft²

Tributary area 8= 2'-6 ¾" × 1'-7 ⅝"
Tributary area 8= 30.75" × 19.625"
Tributary area 8= 603.47 in² ÷ 144
Tributary area 8= 4.2 ft²

With the square footage for each tributary area known, the footing size can be found. Interpolated Table R507.3.1 (figure 2) can be used to find the footing size that would apply to common round concrete forms. In this example, tributary areas 2 & 8 require an 8" diameter × 6" thick footing or an 8" diameter concrete form to 42" below grade (figure 3). Tributary areas 1, 3, 4, 5, 6, & 7 require a 10" diameter × 6" footing or a 10" diameter concrete form to 42" below grade (figure 3).

Interpolated Table R507.3.1 to common round concrete form size

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

FIGURE 2

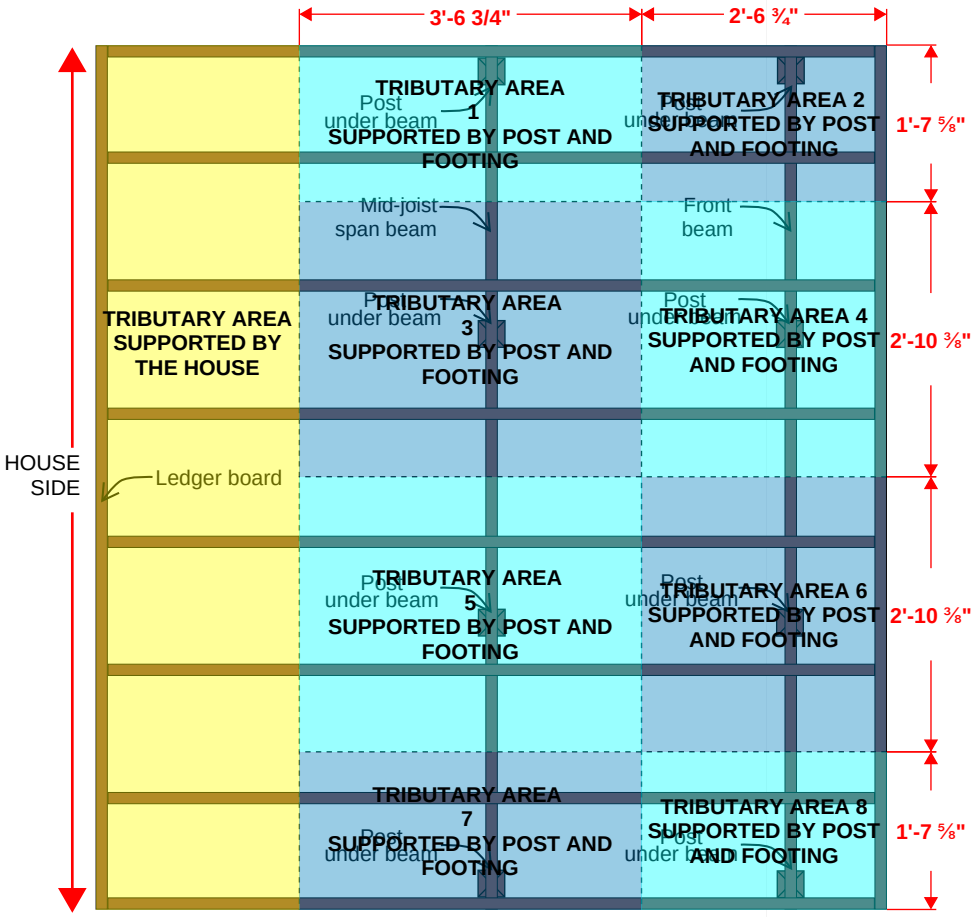


FIGURE 1

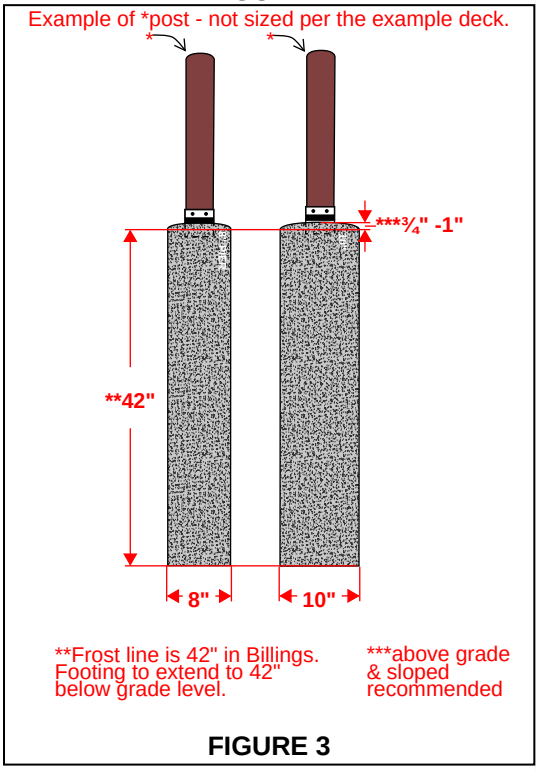
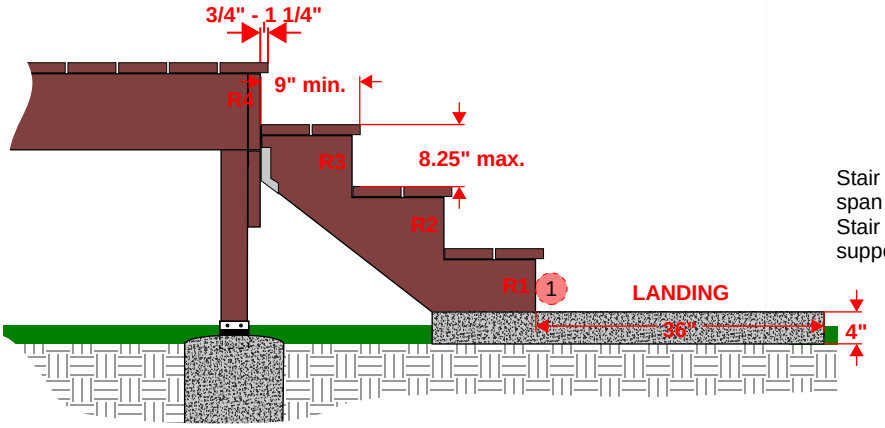
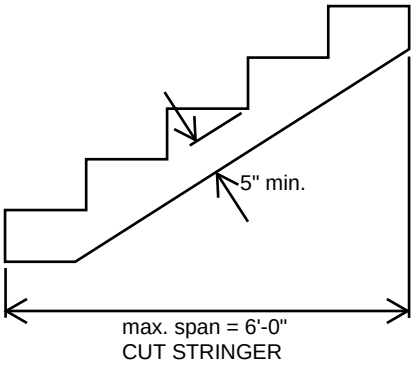


FIGURE 3

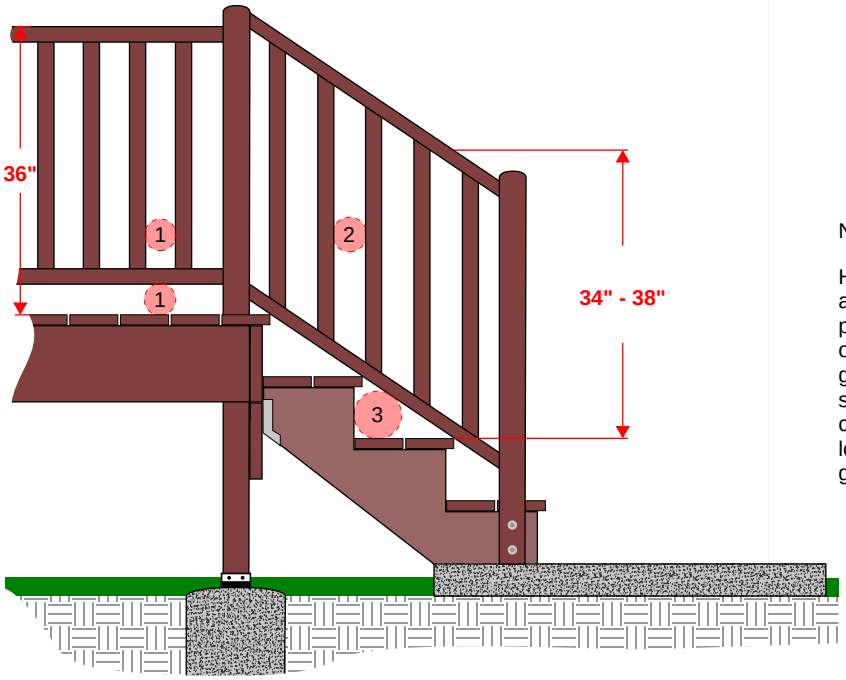
STAIRS, HANDRAILS, AND GUARDS



Stairs containing 4 or more risers (R1,R2, etc) are required to have a handrail on at least one side of the flight. The handrail must be continuous for the full length of the flight. Risers allowed to be sloped not more than 30 degrees from the vertical. Open risers allowed but must not pass a 4" diameter sphere.
A landing is required at the bottom of the stairs. The landing must be equal to the width of the stair and extend 36" in the direction of travel. The stair stringer must bear fully on the landing.



Stair shall be a minimum of 36" wide. The treads shall have a maximum span of 18" between stringers. A 36" wide stair will require three stringers. Stair stringers that have a span greater than 6' require a mid-span support.

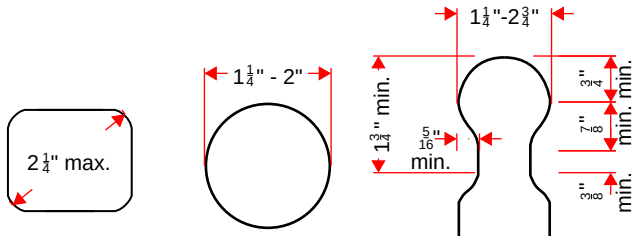


1 = Guard opening must not pass a 4" diameter sphere

2 = Stair guard must not pass a 4 ⅜" diameter sphere

3 = Intersection of bottom rail, riser, and tread must not pass a 6" diameter sphere

R311.7.8.5 GRIP SIZE



TYPE 1 TYPE 2

NONCIRCULAR CIRCULAR RECESSED

Handrails shall be graspable and shall be composed of decay-resistant and/or corrosion resistant material. Handrails shall by Type 1, Type 2 or provide equivalent grasp-ability. Type 1 shall have a perimeter dimension of at least 4" and not greater than 6 ¼". Type 2 rails with a perimeter greater than 6 ¼" sheall provide a graspable finger recess area on both sides of the profile. All shapes shall have a smooth surface with no sharp corners. Handrails shall run continuously from a point directly over the lowest riser to a point directly over the highest riser and shall return to the guard at each end.

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS 1,500 psf LOAD-BEARING VALUE OF SOILS

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

NO SOILS REPORT

LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (ft²)	LOAD-BEARING VALUE OF SOILS (psf) 1,500		
		SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)
50	5	7	8	6
	20	11	13	6
	40	15	17	6
	60	19	21	6
	80	21	24	8
	100	24	27	9
	120	26	30	10
	140	28	32	11
	160	30	34	12

TABLE R507.3.1 INTERPOLATED TO COMMON ROUND CONCRETE FORMS

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
11	10	6
17	12	6
25	14	6
35	16	6
45	18	6
55	20	6
67	22	6
80	24	8
93	26	9
106	28	10

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS 2,000 & ≥3,000 psf LOAD-BEARING VALUE OF SOILS

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

		NEED SOILS REPORT			NEED SOILS REPORT		
LIVE OR GROUND SNOW LOAD (psf)	TRIBUTARY AREA (ft²)	LOAD-BEARING VALUE OF SOILS (psf)			LOAD-BEARING VALUE OF SOILS (psf)		
		2,000			≥ 3,000		
		SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)	SIDE OF A SQUARE FOOTING (inches)	DIAMETER OF A ROUND FOOTING (inches)	THICKNESS (inches)
50	5	7	8	6	7	8	6
	20	10	11	6	8	9	6
	40	13	15	6	11	13	6
	60	16	18	6	13	15	6
	80	19	21	6	15	17	6
	100	21	23	7	17	19	6
	120	23	26	8	19	21	6
	140	25	28	9	20	23	7
	160	26	30	10	21	24	8

TABLE R507.3.1 FOR 2,000 psf LOAD-BEARING SOILS INTERPOLATED TO COMMON ROUND CONCRETE FORMS

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
15	10	6
25	12	6
35	14	6
47	16	6
60	18	6
74	20	6
90	22	7
106	24	8
120	26	8
140	28	9

TABLE R507.3.1 FOR ≥3,000 psf LOAD-BEARING SOILS INTERPOLATED TO COMMON ROUND CONCRETE FORMS

TRIBUTARY AREA (square feet)	DIAMETER OF ROUND FOOTING (inches)	THICKNESS (inches)
5	8	6
25	10	6
35	12	6
50	14	6
70	16	6
90	18	6
111	20	6
130	22	7
157	24	8
160	26	8

TABLE R507.5(2) MAXIMUM DECK BEAM SPAN - 50 psf GROUND SNOW LOAD

TABLE R507.5(2) MAXIMUM DECK BEAM SPAN - 50PSF GROUND SNOW LOAD

		EFFECTIVE DECK JOIST SPAN LENGTH (feet)						
		6	8	10	12	14	16	18
BEAM SPECIES	BEAM SIZE	MAMIMUM DECK BEAM SPAN LENGTH (feet-inches)						
SOUTHERN PINE	1 - 2×6	4-6	3-11	3-6	3-2	2-11	2-9	2-7
	1 - 2×8	5-9	4-11	4-5	4-0	3-9	3-6	3-3
	1 - 2×10	6-9	5-10	5-3	4-9	4-5	4-2	3-11
	1 - 2×12	8-0	6-11	6-2	5-8	5-3	4-11	4-7
	2 - 2×6	6-8	5-9	5-2	4-9	4-4	4-1	3-10
	2 - 2×8	8-6	7-4	6-7	6-0	5-7	5-2	4-11
	2 - 2×10	10-1	8-9	7-10	7-1	6-7	6-2	5-10
	2 - 2×12	11-11	10-3	9-2	8-5	7-9	7-3	6-10
	3 - 2×6	7-11	7-2	6-6	5-11	5-6	5-1	4-10
	3 - 2×8	10-5	9-3	8-3	7-6	6-11	6-6	6-2
	3 - 2×10	12-8	10-11	9-9	8-11	8-3	7-9	7-3
	3 - 2×12	14-11	12-11	11-6	10-6	9-9	9-1	8-7
DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PIN-FIR	1 - 2×6	4-0	3-5	2-11	2-7	2-4	2-2	2-0
	1 - 2×8	5-4	4-7	3-11	3-5	3-1	2-10	2-8
	1 - 2×10	6-7	5-8	4-11	4-5	4-0	3-8	3-5
	1 - 2×12	7-7	6-7	5-11	5-4	4-10	4-6	4-2
	2 - 2×6	6-0	5-2	4-7	4-2	3-10	3-5	3-2
	2 - 2×8	8-0	6-11	6-2	5-8	5-0	4-7	4-2
	2 - 2×10	9-9	8-5	7-7	6-11	6-4	5-10	5-4
	2 - 2×12	11-4	9-10	8-9	8-0	7-5	6-11	6-6
	3 - 2×6	7-6	6-6	5-9	5-3	4-11	4-7	4-4
	3 - 2×8	10-0	8-8	7-9	7-1	6-6	6-1	5-8
	3 - 2×10	12-3	10-7	9-6	8-8	8-0	7-6	7-0
	3 - 2×12	14-3	12-4	11-0	10-1	9-4	8-9	8-3
REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	1 - 2×6	4-1	3-6	3-0	2-8	2-5	2-3	2-1
	1 - 2×8	5-2	4-6	4-0	3-6	3-2	2-11	2-9
	1 - 2×10	6-4	5-6	4-11	4-6	4-1	3-9	3-6
	1 - 2×12	7-4	6-4	5-8	5-2	4-10	4-6	4-3
	2 - 2×6	6-1	5-3	4-8	4-4	3-11	3-6	3-3
	2 - 2×8	7-8	6-8	5-11	5-5	5-0	4-8	4-3
	2 - 2×10	9-5	8-2	7-3	6-8	6-2	5-9	5-5
	2 - 2×12	10-11	9-5	8-5	7-8	7-2	6-8	6-3
	3 - 2×6	7-1	6-5	5-11	5-5	5-0	4-8	4-5
	3 - 2×8	9-4	8-4	7-5	6-10	6-4	5-11	5-7
	3 - 2×10	11-9	10-2	9-1	8-4	7-8	7-2	6-9
	3 - 2×12	13-8	11-10	10-7	9-8	8-11	8-4	7-10

TABLE R507.6 MAXIMUM DECK JOIST SPANS - 50 psf GROUND SNOW LOAD

TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD (psf)	JOIST SPECIES	JOIST SIZE	ALLOWABLE JOIST SPAN (feet-inches)			MAXIMUM CANTILEVER (feet-inches)							
			JOIST SPACING (inches)			JOIST BACK SPAN (feet)							
			12	16	24	4	6	8	10	12	14	16	18
50 GROUND SNOW LOAD	SOUTHERN PINE	2×6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2×8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2×10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2×12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	DOUGLAS FIR-LARCH HEM-FIR SPRUCE-PINE-FIR	2×6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2×8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2×10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2×12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	2×6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2×8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2×10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2×12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP

TABLE R507.4 DECK POST HEIGHT - 50 psf GROUND SNOW LOAD

TABLE R507.4 DECK POST HEIGHT

LOAD (psf)	POST SPECIES	POST SIZE	TRIBUTARY AREA (ft²)							
			20	40	60	80	100	120	140	160
			MAXIMUM DECK POST HEIGHT (feet-inches)							
50 GROUND SNOW LOAD	SOUTHERN PINE	4×4	14-0	12-2	9-10	8-5	7-5	6-7	5-11	5-4
		4×6	14-0	14-0	12-6	10-9	9-6	8-7	7-10	7-3
		6×6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	13-4
		8×8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	DOUGLAS-FIR HEM-FIR SPRUCE-PINE-FIR	4×4	14-0	12-1	9-8	8-2	7-1	6-2	5-3	4-2
		4×6	14-0	14-0	12-4	10-7	9-4	8-4	7-7	6-11
		6×6	14-0	14-0	14-0	14-0	14-0	14-0	14-0	12-10
		8×8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	REDWOOD WESTERN CEDARS PONDEROSA PINE RED PINE	4×4	14-0	11-8	9-0	6-10	3-7	NP	NP	NP
		4×6	14-0	14-0	12-0	10-0	8-6	7-0	5-3	NP
		6×6	14-0	14-0	14-0	14-0	14-0	14-0	10-8	2-4
		8×8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

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

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

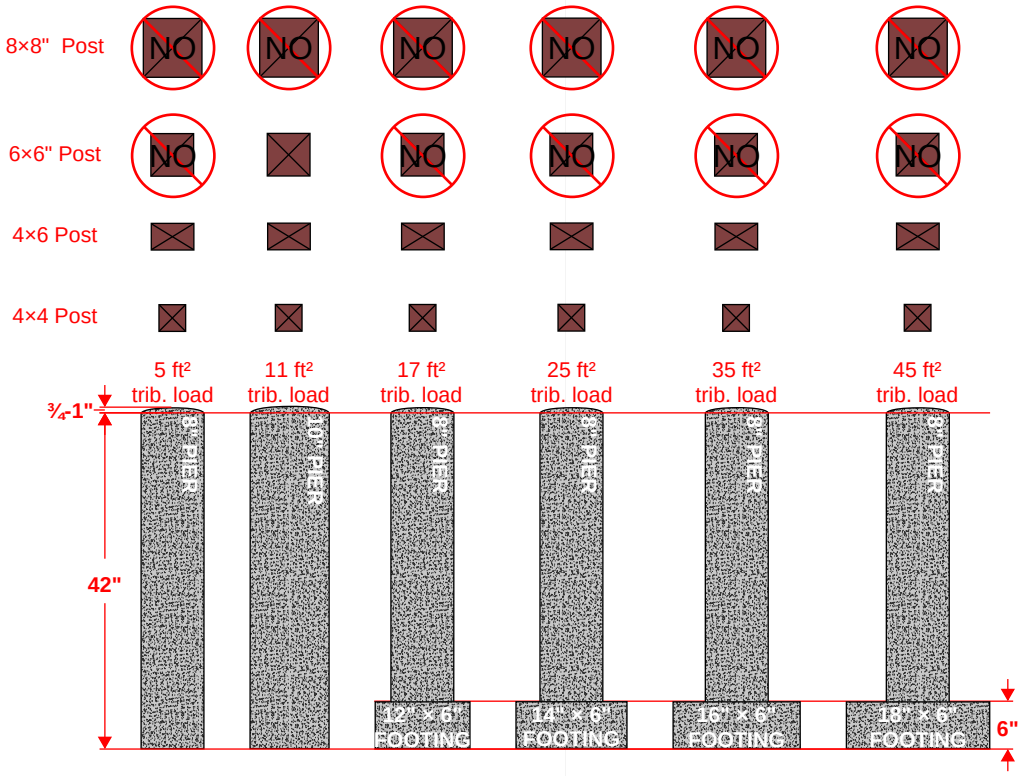
LOAD (psf)	JOIST SPAN (feet)	ON-CENTER SPACING OF FASTENERS (inches)		
		½-inch diameter lag screw with ½-inch maximum sheathing	½-inch diameter bolt with ½-inch maximum sheathing	½-inch diameter bolt with 1-inch maximum sheathing
50 GROUND SNOW LOAD	6	29	36	36
	8	22	36	35
	10	17	33	28
	12	14	27	23
	14	12	23	20
	16	11	20	17
	18	9	18	15

TABLE R507.7 MAXIMUM JOIST SPACING FOR WOOD DECKING

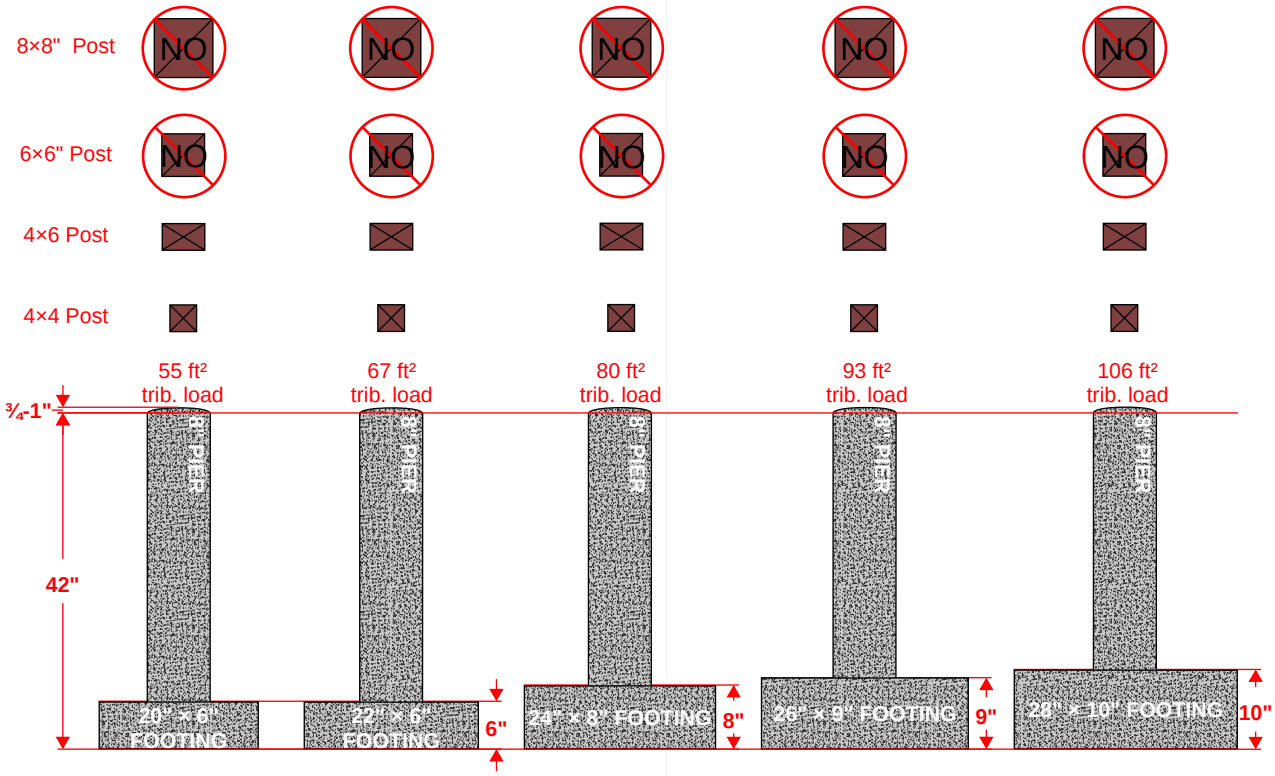
TABLE R507.7 MAXIMUM JOIST SPACING FOR WOOD DECKING

DECKING MATERIAL TYPE AND NOMINAL SIZE	DECKING PERPENDICULAR TO JOIST		DECKING DIAGONAL TO JOIST	
	SINGLE SPAN	MULTIPLE SPAN	SINGLE SPAN	MULTIPLE SPAN
	MAXIMUM ON-CENTER JOIST SPACING (inches)			
1 ¼-INCH-THICK WOOD	12	16	8	12
2-INCH-THICK WOOD	24	24	18	24

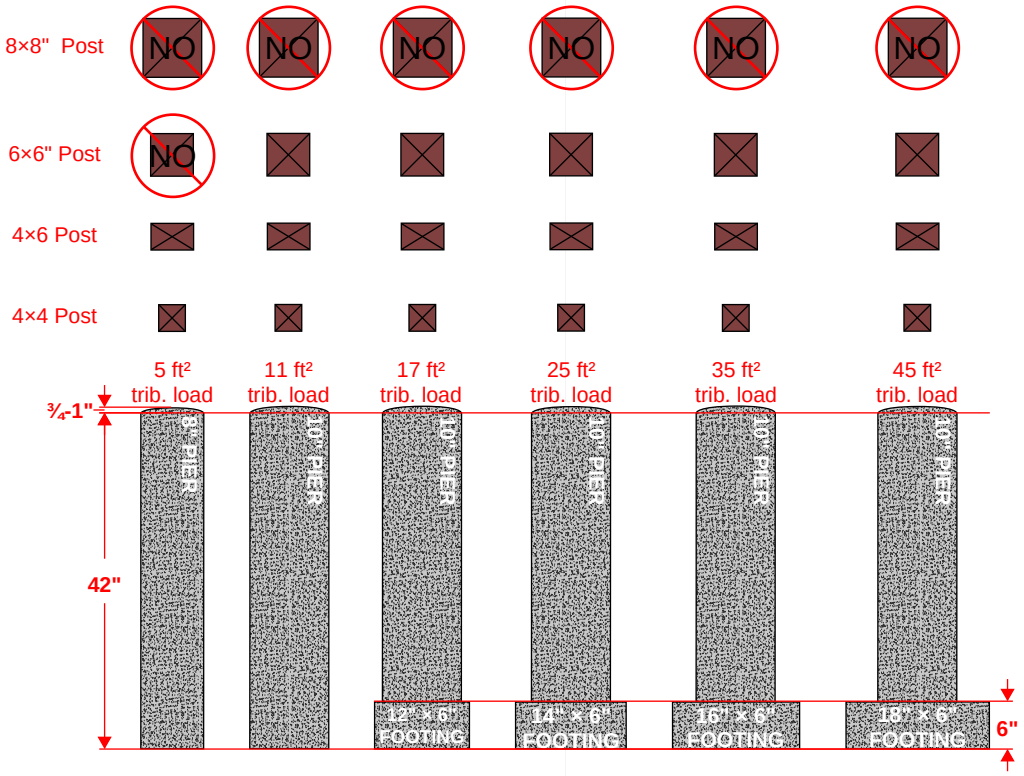
1,500 psf LOAD-BEARING SOILS POST PIER/FOOTING AND TRIBUTARY LOAD EXAMPLES



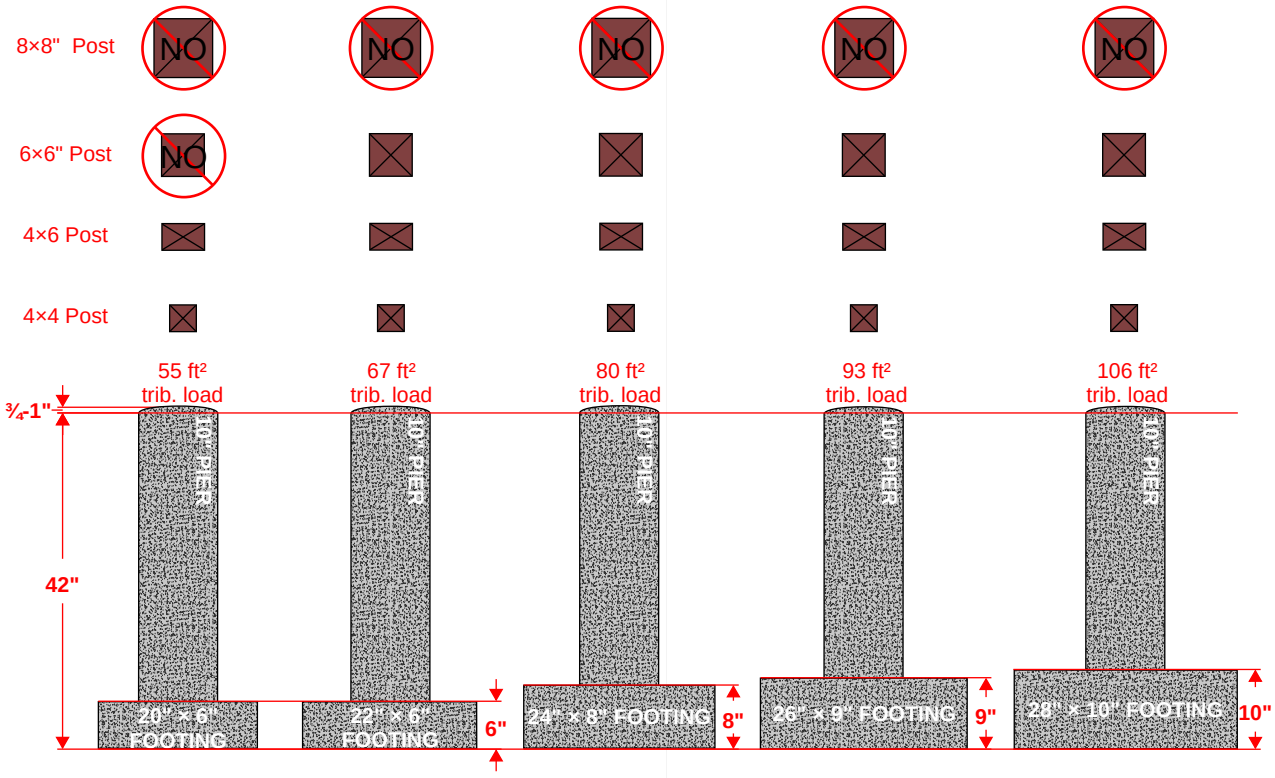
6×6" and 8×8" posts are not suitable for an 8" pier. An 8×8" post is not suitable for a 10" pier.



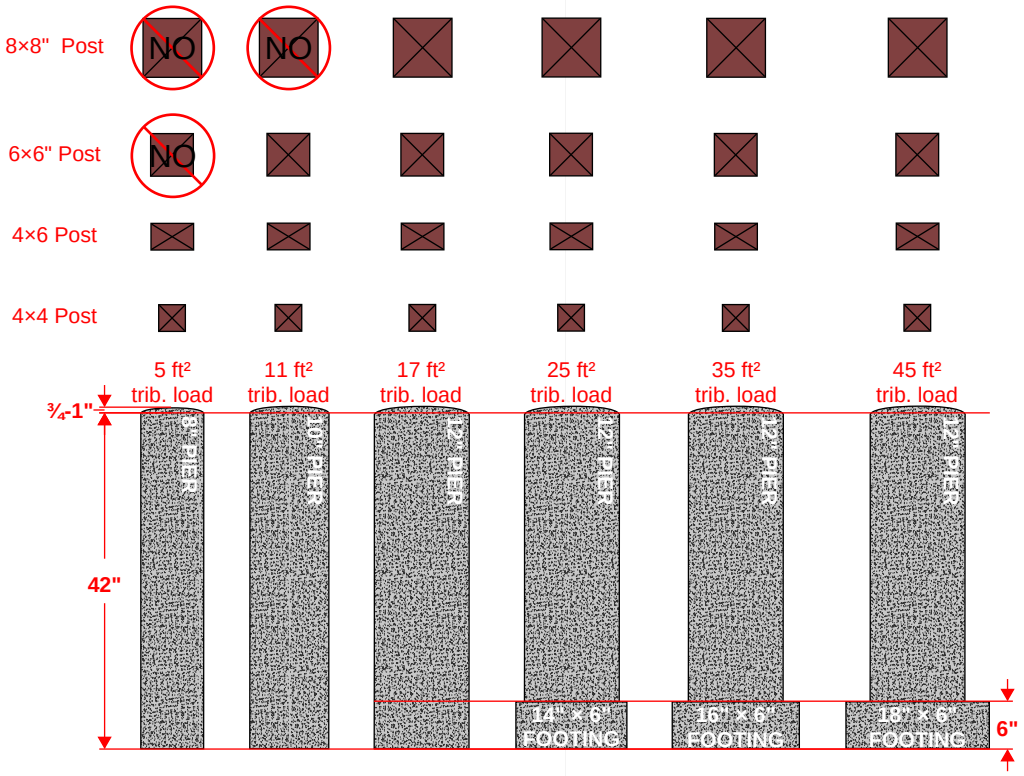
1,500 psf LOAD-BEARING SOILS POST PIER/FOOTING AND TRIBUTARY LOAD EXAMPLES



8×8" post is not suitable for an 8" or 10" pier.



1,500 psf LOAD-BEARING SOILS POST PIER/FOOTING AND TRIBUTARY LOAD EXAMPLES



8×8" post is not suitable for an 8" or 10" pier.