City of Zimmerman
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Zimmerman, MN 55398
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Residential Decks Information Sheet

Building Permits

Building permits are required for all decks that are attached or adjacent (within 6 feet) to a building and the grade is 30 inches or more below the walking surface of the deck. A building permit must be issued prior to construction. It is necessary to allow 5-10 business days for review before the permit is ready to be picked up. With your permit you will be given a copy of the approved plan which must be kept on site for inspections. Please be aware that changes to your plan must also be approved prior to scheduling an inspection.

Plan Submittal

Site plans showing deck size and location. Building plans showing construction details, decking material, including footing size, framing material size and spacing.

Structural Design

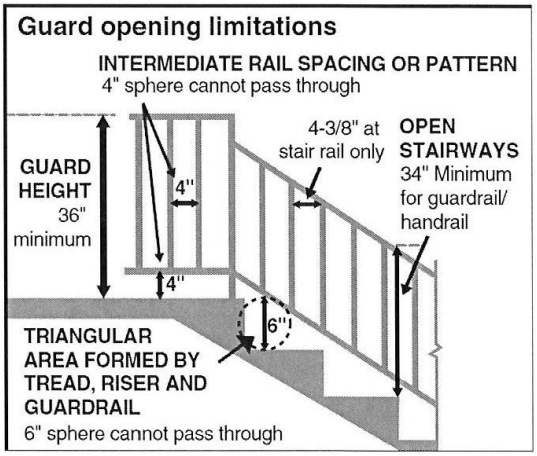
All decks shall be designed to support a live load of 40 pounds and a dead load of 10 pounds per square foot minimum.

Footings

Frost Footings are required for any deck attached to a dwelling, porch or garage. Footings must be frost protected horizontally and vertically to a minimum depth to the base of the footing is 42 inches. To achieve the required protection depth, measure horizontally from edge of hole out 42 inches to lowest grade point. Then measure the vertical difference at lowest grade point to that of grade at the hole and add the difference to the hole to achieve required frost protection.

Guardrails

Guardrails are required on all decks more than 30 inches above grade. The guardrail must be a minimum of 36 inches high and spindle spacing must be designed so a 4-inch sphere cannot pass through the opening. Open guards must have intermediate rails or an ornamental pattern where a 4 inch sphere cannot pass through. A 4 3/8 inch sphere cannot pass through the opening on sides of stair treads.



Handrails at Stairs

Handrails are required for stairs with 4 or more risers. The top of rail shall be placed not less than 34 inches or more than 38 inches in height and measured from the nosing of the stair. Ends shall be returned or terminated at the top and bottom. See attached diagram for profiles.

All required handrails shall be continuous for the full length of the stairs from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight.

Fasteners

All nails, screws and other connectors must be hot-dipped galvanized, stainless steel or of other approved corrosion resistance. Note: If joist hangers are stainless steel, the nails in contact with hangers must be of the same material. The same would apply to any galvanized products.

Framing

Deck ledger board must be lagged to house. (Minimum 2 ½ inch diameter bolts/screws or equivalent, staggered every 16 inches) Header beams and joists that frame into ledgers or beams shall be supported by approved framing anchors such as joist hangers.

Joist hangers are required if joists do not have at least 1 ½ inch of bearing. Joist hangers require one nail per hole. USE ONLY STAINLESS STEEL, HIGH STRENGTH ALUMINUM OR HOT_DIPPED GALVANIZED NAILS. Install lag screws or other approved anchors that penetrate 1 ½ inches into rim joist or wall studs. Where proper anchoring/support cannot be verified, a self-supporting deck will be required.

Joists should not overhang beams by more than 2 feet and beams should not overhang posts by more than 1 foot unless designed by a licensed structural engineer.

Decks should only be attached to a cantilevered area of a house if the area has been structurally designed to carry the additional weight load. If it has not been designed to carry this additional weight load, the cantilevered area will have to be framed around. A cantilever is the area of the house that projects out from the foundation wall and does not have a foundation directly under its floor.

Flashing

All connections between the deck and dwelling shall be flashed with an approved material. Any cuts or penetrations into the existing structure must be flashed and caulked in an approved manner. Aluminum shall not be used in contact with pressure preservative treated wood. This means the ledger flashing and other materials in contact with treated lumber shall be galvanized, stainless steel or vinyl.

Wood Required

All wood exposed to weather conditions is required to be naturally resistant to decay (redwood, black locust, cedar, etc.) or approved treated wood. This includes posts, beams, joists, decking and railings. Cedar or redwood posts need an eight (8) inch separation from the ground. Any composite or plastic decking materials must be approved prior to installation.

Cantilevers: Overhanging joists and beams

Joists should not overhang beams by more than two feet, nor should beams overhang posts by more than one foot unless a special design is approved.

Stairs

Stairs must be at least 36 inches wide. Maximum rise is 7-3/4 inches; minimum run is 10 inches with tread run and riser height not to exceed the smallest by more than 3/8 inches. Stairs having four or more risers must have approved handrails. Openings in risers must be less than 4 inches at risers for stairs to a platform greater than 30 inches in height.

Special Design Note

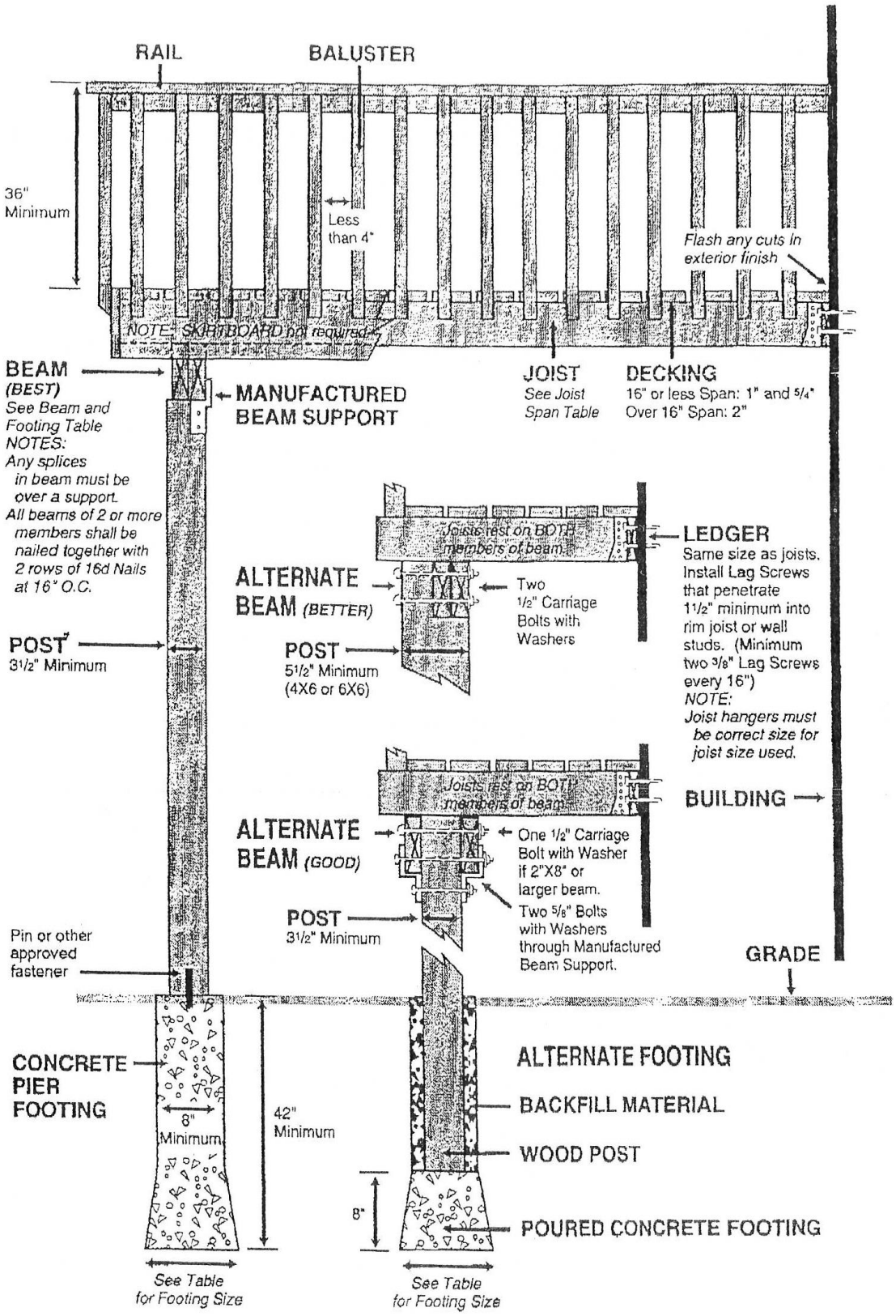
Some deck designs may not be suitable for a future screen or 3-season porch. Setbacks and structural support may vary. Please indicate on the site and building plans if future considerations include a porch.

Safety

BEFORE digging, call Gopher State One Call excavation notification center at (651) 454-0002 to locate utilities. All utilities (gas, electric, phone, cable TV, etc.) will be located free of charge.

Required Inspections

Call for a footing inspection AFTER the holes are dug but BEFORE pouring concrete. Call for a framing inspection to be done after all framing, blocking and required hardware is in place (only if the deck is less than 48 inches off the ground) BEFORE the decking boards are installed. Call for a final inspection when the deck is completely finished, all decking, handrails and guardrails are in place. Call the building department to schedule and in section. The phone number is 763-479-1720. Footing-after the holes are dug, but prior to placing concrete; framing-to be done after all framing, blocking and required hardware are in place. This inspection can be completed at the time of Final Inspection provided the deck is at least 3 feet above grade. Final-after all decking, handrails and guardrails are in place.


RAIL
BALUSTER
36" Minimum
Less than 4"
Flash any cuts in exterior finish
NOTE: SKIRTBOARD not required
BEAM (BEST)
See Beam and Footing Table
NOTES:
Any splices in beam must be over a support.
All beams of 2 or more members shall be nailed together with 2 rows of 16d Nails at 16" O.C.
MANUFACTURED BEAM SUPPORT
JOIST
See Joist Span Table
DECKING
16" or less Span: 1" and 5/4"
Over 16" Span: 2"
POST
3½" Minimum
Joists rest on BOTH members of beam
ALTERNATE BEAM (BETTER)
Two ½" Carriage Bolts with Washers
POST
5½" Minimum (4X6 or 6X6)
LEDGER
Same size as joists. Install Lag Screws that penetrate 1½" minimum into rim joist or wall studs. (Minimum two ⅜" Lag Screws every 16")
NOTE:
Joist hangers must be correct size for joist size used.
BUILDING
Joists rest on BOTH members of beam
ALTERNATE BEAM (GOOD)
One ½" Carriage Bolt with Washer if 2"X8" or larger beam.
Two ⅝" Bolts with Washers through Manufactured Beam Support.
POST
3½" Minimum
Pin or other approved fastener
GRADE
CONCRETE PIER FOOTING
8" Minimum
42" Minimum
See Table for Footing Size
ALTERNATE FOOTING
BACKFILL MATERIAL
WOOD POST
8"
POURED CONCRETE FOOTING
See Table for Footing Size

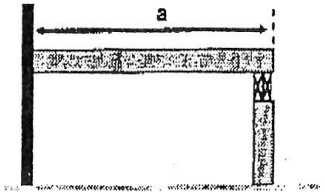
Joist Span

Based on No. 2 or better wood grades.
(Design Load = 40#LL + 10#DL, Deflection= L/360)

	Ponderosa Pine			Southern Pine			Western Cedar		
	12"OC	16"OC	24"OC	12"OC	16"OC	24"OC	12"OC	16"OC	24"OC
2x6	9-2	8-4	7-0	10-9	9-9	8-6	9-2	8-4	7-3
2x8	12-1	10-10	8-10	14-2	12-10	11-0	12-1	11-0	9-2
2x10	15-4	13-3	10-10	18-0	16-1	13-5	15-5	13-9	11-3
2x12	17-9	15-5	12-7	21-9	19-0	15-4	18-5	16-0	13-0

Sample Calculations for Using Joist Span, Beam Size and Footing Size Tables

CASE I SOLUTION:



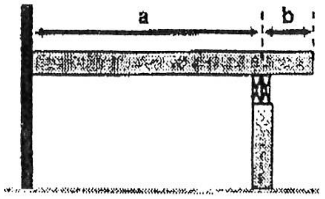
Refer to tables for joist, beam and footing size requirements.

Example: a = 12'; Post Spacing = 8'

Use the **Joist Span** table to find the acceptable joist sizes for a 12' span, 2x8s at 12" O.C., 2x10s at 16" O.C. or 2x12s at 24" O.C.

Use the **Beam and Footing Sizes** table and find the 8' post spacing column. With a 12' deck span, the beam may be either two 2x8s or two 2x10s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 12", 10" or 9" for the corner post and 17", 14" or 12" for *all* intermediate posts.

CASE II SOLUTION:



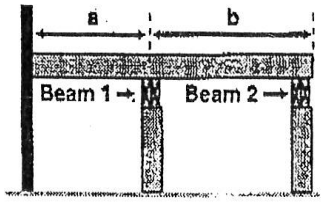
Use "a" to determine joist size and "a" + "2b" to determine beam and footing sizes. The length of "b" is restricted by both the length of "a" and the size of the joists.

Example: a = 8', b = 2', Post Spacing = 10'

Refer to the **Joist Span** table. For an 8' joist span, either 2x8s at 24" O.C. or 2x6s at 16" O.C are acceptable.

For sizing the beam, use a joist length of 12' (8' + 4') and a post spacing of 10'. The **Beam and Footing Sizes** table indicates that the beam may be either two 2x10s or two 2x12s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 15", 12" or 11" for the corner post and 20", 17" or 15" for all intermediate posts. Note that because of the 2' cantilever all footing sizes were increased by 1" as required by footnote 2 at the end of the table.

CASE III SOLUTION:



Use "a" or "b", whichever is greater, to determine joist size. Use "a" + "b" to determine the size of Beam 1 and the post footing size for the posts supporting Beam 1. Use joist length "b" to determine both the size of Beam 2 and the post footing size for the posts supporting Beam 2.

Example: a = 6', b = 7', Post Spacing = 9'

Joist size is determined by using the longest span joist (7'). The **Joist Span** table indicates that 2x6s at 24" O.C. would be adequate for this span.

For Beam 1 and footings, use a joist length of 13' (6' + 7') and a post spacing of 9'. The **Beam and Footing Sizes** table indicates that the beam may be two 2x10s or two 2x12s, depending on the wood used. Depending on the type of soil, the footing diameters for Beam 1 posts shall be 13", 11" or 9" for the corner (outside) post and 19", 15" or 13" for all intermediate posts. For Beam 2 and footings use a joist length of 7' and post spacing of 9'. The beam may be two 2x8s or two 2x10s, depending on wood used. Depending on the type of soil, the footing diameters for Beam 2 shall be 10", 8" or 7" for the corner posts, and 14", 11" or 10" for all intermediate posts

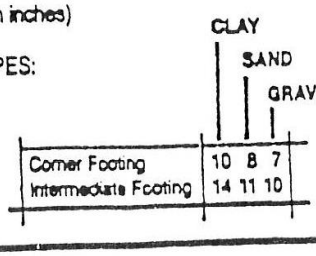
Beam and Footing Sizes

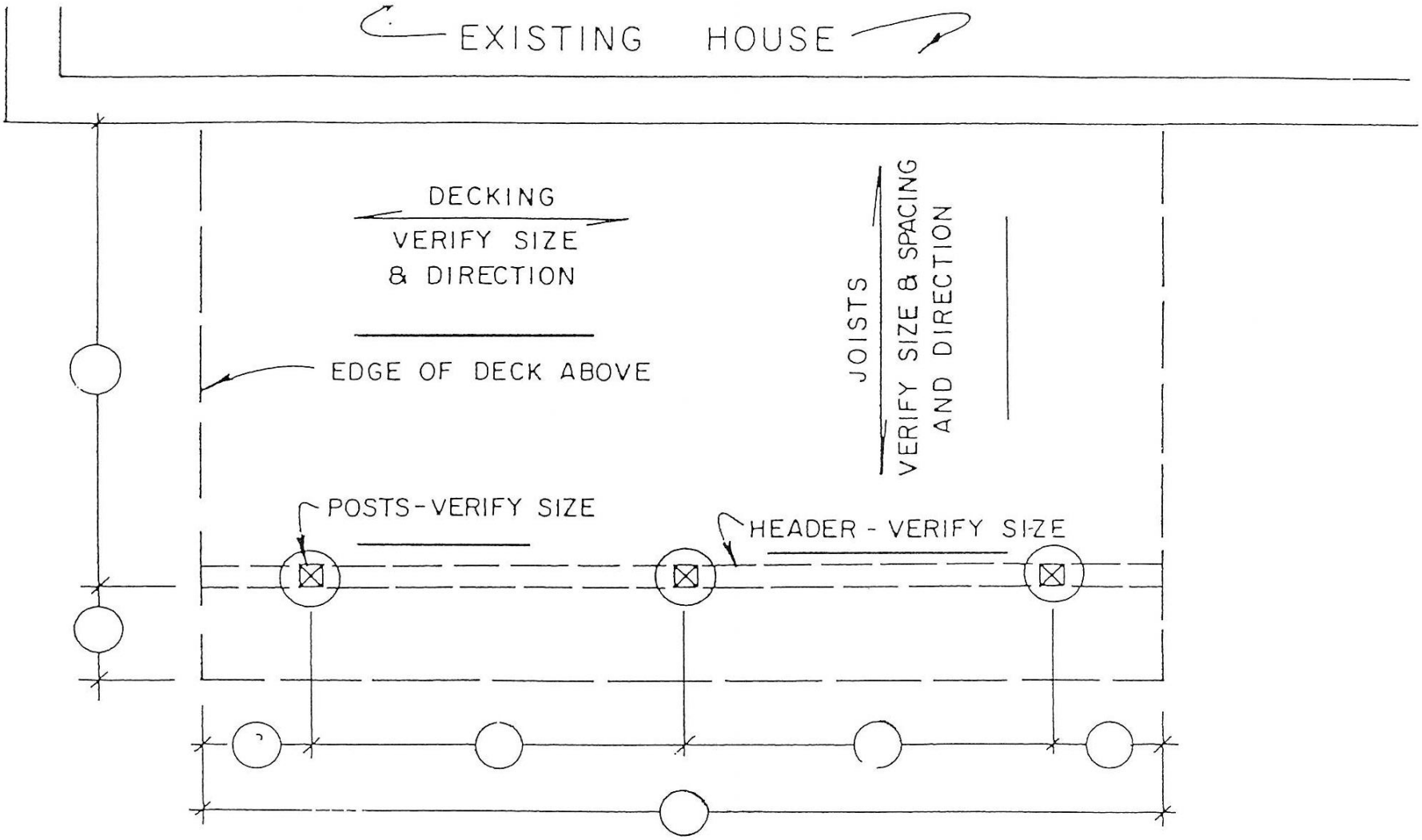
Based on No. 2 or better Ponderosa Pine and Southern Pine
(Treated for weather and/or ground exposure)

Joist Length			Post Spacing										
			4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
	6'	Southern Pine Beam	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10
		Ponderosa Pine Beam	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10
		Corner Footing	6 5 4	7 6 5	7 6 5	8 7 6	9 7 6	9 7 6	10 8 7	10 8 7	10 9 7	11 9 8	11 9 8
		Intermediate Footing	9 8 7	10 8 7	10 9 7	11 9 8	12 10 9	13 10 9	14 11 10	14 12 10	15 12 10	15 13 11	16 13 11
	7'	Southern Pine Beam	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	2-2x12
		Ponderosa Pine Beam	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	2-2x12	3-2x10	3-2x10
		Corner Footing	7 5 5	7 6 5	8 7 6	9 7 6	9 8 7	10 8 7	10 8 7	11 9 8	11 9 8	12 10 9	12 10 9
		Intermediate Footing	9 8 7	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	15 13 11	16 13 11	17 14 12	17 14 12
	8'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12
		Ponderosa Pine Beam	1-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12
		Corner Footing	7 6 5	8 6 6	9 7 6	9 8 7	10 8 7	10 8 7	11 9 8	11 9 8	12 10 9	13 10 9	13 11 9
		Intermediate Footing	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	16 13 11	16 13 12	17 14 12	18 15 13	18 15 13
	9'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10
		Ponderosa Pine Beam	1-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12
		Corner Footing	7 6 5	8 7 6	9 7 6	10 8 7	10 9 7	11 9 8	12 10 8	12 10 9	13 10 9	13 11 9	14 11 10
		Intermediate Footing	10 9 7	12 10 8	13 10 9	14 11 10	15 12 10	16 13 11	17 14 12	17 14 12	18 15 13	19 15 13	20 16 14
	10'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x10
		Ponderosa Pine Beam	1-2x6	1-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Corner Footing	8 6 6	9 7 6	10 8 7	10 8 7	11 9 8	12 10 8	12 10 9	13 11 9	14 11 10	14 12 10	15 12 10
		Intermediate Footing	11 9 8	12 10 9	14 11 10	15 12 10	16 13 11	17 14 12	17 14 12	18 15 13	19 16 14	20 16 14	21 17 15
	11'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Corner Footing	8 7 6	9 7 6	10 8 7	11 9 8	12 9 8	12 10 9	13 11 9	14 11 10	14 12 10	15 12 10	15 13 11
		Intermediate Footing	12 9 8	13 11 9	14 12 10	15 12 10	16 13 11	17 14 12	17 14 12	18 16 13	19 16 14	20 16 14	21 17 15
	12'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x10	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x12	3-2x12	Eng Bm	Eng Bm
		Corner Footing	9 7 6	10 8 7	10 9 7	11 9 8	12 10 9	13 10 9	14 11 10	14 12 10	15 12 10	15 13 11	16 13 11
		Intermediate Footing	12 10 9	14 11 10	15 12 10	16 13 11	17 14 12	18 15 13	19 16 14	20 16 14	21 17 15	22 18 15	23 18 16
	13'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x6	2-2x8	2-2x10	2-2x12	2-2x12	2-2x12	3-2x12	3-2x12	Eng Bm	Eng Bm
		Corner Footing	9 7 6	10 8 7	11 9 8	12 10 8	13 10 9	13 11 9	14 12 10	15 12 10	15 13 11	16 13 11	17 14 12
		Intermediate Footing	13 10 9	14 12 10	15 13 11	17 14 12	18 15 13	19 15 13	20 16 14	21 17 15	22 18 15	23 19 16	24 19 17
	14'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm	Eng Bm	Eng Bm
		Corner Footing	9 8 7	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	15 13 11	16 13 11	17 14 12	17 14 12
		Intermediate Footing	13 11 9	15 12 10	16 13 11	17 14 12	18 15 13	20 16 14	21 17 15	22 18 15	23 18 16	24 19 17	24 20 17
	15'	Southern Pine Beam	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Ponderosa Pine Beam	2-2x6	2-2x8	2-2x8	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12	Eng Bm	Eng Bm	Eng Bm
		Corner Footing	10 8 7	11 9 8	12 10 8	13 10 9	14 11 10	14 12 10	15 12 11	16 13 11	17 14 12	17 14 12	18 15 13
		Intermediate Footing	14 11 10	15 12 11	17 14 12	18 15 13	19 16 14	20 17 14	21 17 15	22 18 16	23 19 17	24 20 17	25 21 18
	16'	Southern Pine Beam	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Ponderosa Pine Beam	2-2x6	2-2x8	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12	Eng Bm	Eng Bm	Eng Bm
		Corner Footing	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	16 13 11	16 13 12	17 14 12	18 15 13	18 15 13
		Intermediate Footing	14 11 10	16 13 11	17 14 12	18 15 13	20 16 14	21 17 15	22 18 16	23 19 16	24 20 17	25 21 18	26 21 18

Notes:

1. Joist length is total length of joist, including any cantilevers.
2. When joist extends (cantilevers) beyond support beam by 18" or more, add 1" to footing dimensions shown.
3. Footing size must be increased if the deck will be used for a porch in the future.
4. All footing sizes above are base diameters (in inches) and are listed for THREE SOIL TYPES:





Unless specifically engineered, decks cannot be attached to cantilever floors.

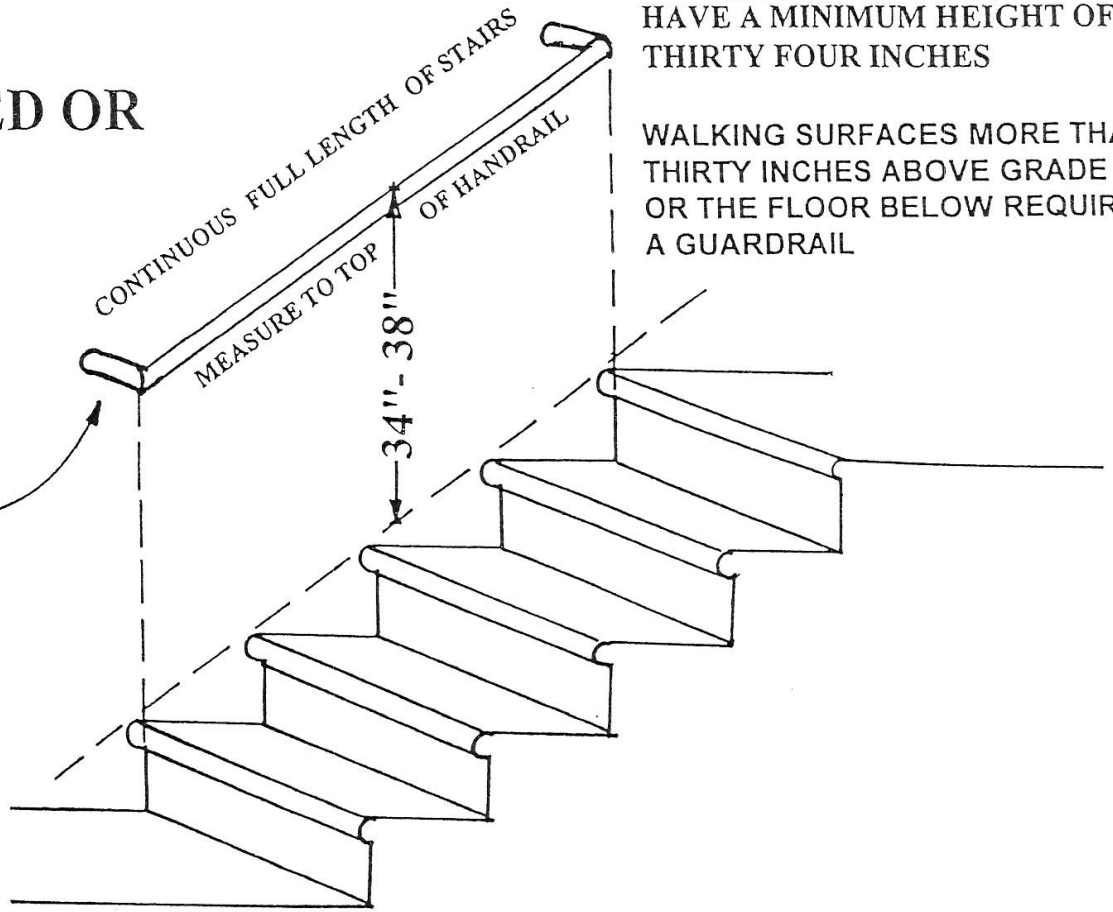
STAIR HANDRAILS

HANDRAIL REQUIRED ON ONE SIDE ONLY.
HANDRAIL NOT REQUIRED ON STAIRWAYS HAVING LESS THAN FOUR RISERS.

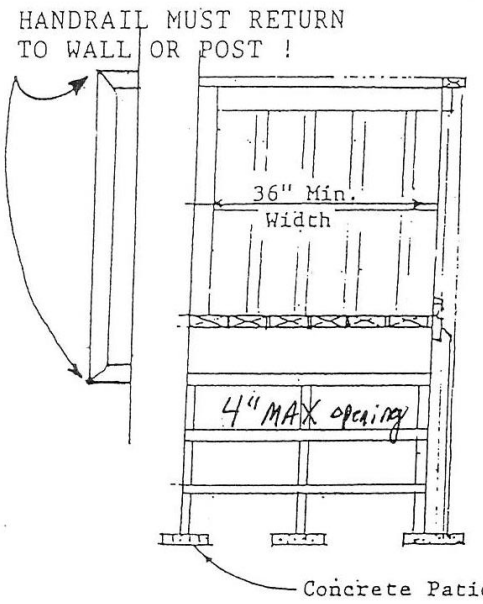
THE TOP OF GUARDRAILS FOR STAIRWAYS ONLY MAY HAVE A MINIMUM HEIGHT OF THIRTY FOUR INCHES

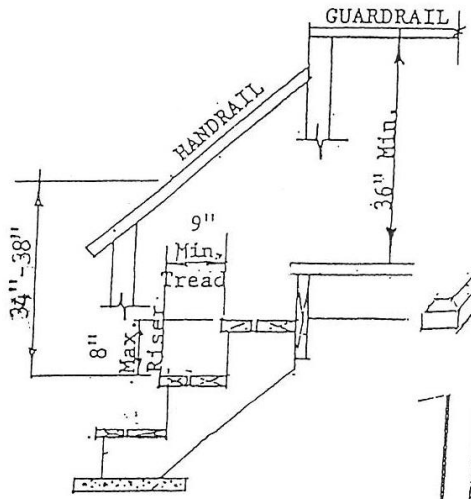
WALKING SURFACES MORE THAN THIRTY INCHES ABOVE GRADE OR THE FLOOR BELOW REQUIRE A GUARDRAIL

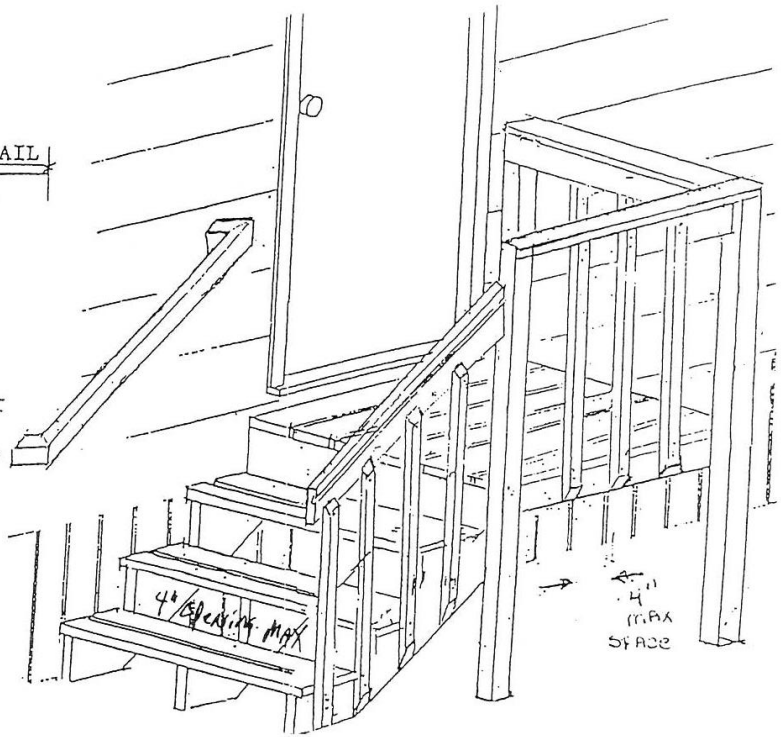
ENDS RETURNED OR TERMINATE IN A NEWELL POST OR SAFETY TERMINAL.



STEP AND LANDING REQUIREMENTS







GENERAL BUILDING CODE REQUIREMENTS

1. Stairways shall be supported on concrete or pressure treated lumber footings

2. Pressure treated lumber or equivalent shall be used.

3. Stairways shall have a minimum width of thirty-six (36) inches. The stairways shall have an eight (8) inch maximum rise and nine (9) inch minimum run.

4. A stairway with four (4) or more risers shall have a handrail thirty-four (34) inches to thirty-eight (38) inches above the nose of the tread.

5. When a stairway is open on both sides and more than thirty (30) inches above grade, a guardrail shall be required on each open side.

6. The handgrip portion of a handrail shall have a smooth surface and shall be continuous the full length of the stairway. The handgrip on handrails shall not be less than 1 ¼ " or more than 2 5/8 " and must be continuous and returned to the wall or post.

7. Open guardrail, stair railings and risers shall have vertical or diagonal rails such that a sphere our (4) inches in diameter cannot pass through. Decks which are more that thirty (30) inches above grade shall be protected by a guardrail not less than thirty-six (36) inches in height.

8. A minimum 36" x 36" landing size is required at top and bottom of stairs.