



COMMUNITY DEVELOPMENT DEPARTMENT

Building Safety & Inspections Division

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RESIDENTIAL DECKS AND LANDINGS

This handout is a guide only and may not contain all of the requirements of the City Ordinances. All proposed work is subject to Zoning and Building Safety code review.

BUILDING PERMITS ARE REQUIRED FOR ALL DECKS OR LANDINGS ATTACHED TO A BUILDING OR FREESTANDING MORE THAN 30 INCHES ABOVE GRADE.

PERMITS ARE STRONGLY SUGGESTED BUT NOT REQUIRED FOR FREESTANDING DECKS OR LANDINGS NOT MORE THAN 30 INCHES ABOVE ADJACENT GRADE OR NOT PART OF AN ACCESSIBLE ROUTE (STAIRS OR SIDEWALK)

NO PART OF ANY DECK OR LANDING MAY BE LOCATED ON, UNDER OR ABOVE AN EASEMENT, INCLUDING DRAINAGE AND UTILITY EASEMENTS OFTEN FOUND ALONG SIDE AND REAR LOT LINES. THIS INCLUDES FOOTINGS, OVERHANGS/EAVES, BUMP-OUTS, ETC. IF YOU DO NOT HAVE A SURVEY, WE RECOMMEND THAT YOU CHECK THE FOLLOWING RECORDS FOR EASEMENTS:

- Platted easements: You can find your property's legal description (addition name, lot & block) by entering your address at <http://www16.co.hennepin.mn.us/pins/addrsrch.jsp>, then find your addition name (plat) at <http://156.142.111.111/weblink/Browse.aspx?dbid=0&startid=376201&cr=1> to see if there are any platted easements on your lot.
- Recorded easements: Easements may not be shown on the plat but separately recorded against your property. These should be listed on your title insurance policy from when you bought the property.

SOME ZONING ORDINANCE REGULATIONS APPLICABLE TO RESIDENTIAL DECKS:

- Decks and landings located in the rear yard are considered structures for the purposes of calculating rear yard structure coverage. Please see the handout, *Minimum Green Space*, for more information.
- Decks and landings attached to the principal structure must comply with the same minimum setback requirements as the principal structure, with some exceptions:
 - Front setback is typically 30 feet, except that attached decks need only be set back 20 feet from the front lot line if their cumulative encroachment into the 30 foot front setback does not exceed 240 square feet.
 - Rear setback is typically 30 feet, except that attached decks need only be set back 20 feet from the rear lot line if their cumulative encroachment into the 30 foot front setback does not exceed 240 square feet.

- Landings cannot exceed 4 feet by 4 feet, together with necessary steps to reach grade.
- Side setback is typically 5 feet from the side lot line.
- For corner lots, the typical corner side setback is 10 feet.
- Freestanding decks or landings located in the rear yard are typically permitted within 3 feet of the rear or side lot lines.

REQUIRED INFORMATION WHEN APPLYING FOR A PERMIT:

- City of Crystal building permit application
- Two copies of a Certificate of Survey or two copies of a site plan drawn to scale, indicating:
 - ✓ lot dimensions
 - ✓ location and dimensions of existing structure(s), including all buildings, sheds, garages, decks, patios, sidewalks and driveways
 - ✓ location and dimensions of the proposed structure(s)
 - ✓ setback measurements from property lines (see site plan drawing)
- Two copies of a floor plan, drawn to scale, showing the design of proposed structure(s) and type of materials being used for construction of the structure(s), including:
 - ✓ size and spacing of floor joists
 - ✓ size of decking
 - ✓ size, location and spacing of posts
 - ✓ size of headers
 - ✓ type of lumber to be used
- Two copies of a rear or side elevation of the proposed structure, including:
 - ✓ height of structure from grade
 - ✓ diameter and depth of footings
 - ✓ guardrail height, if any
 - ✓ spacing of intermediate rails

BUILDING CODE REQUIREMENTS:

All residential decks will be designed to support a live load of 40 pounds per square foot and balconies will be designed to support a live load of 60 pounds per square foot. Some deck designs may not support the addition of a screened or 3-season porch. This should be considered when choosing construction materials and structural design.

Materials

- Decks, landings and balconies exposed to the weather will be constructed of approved wood with natural resistance to decay, such as redwood and cedar. Ledger beams will be fastened to the building structure using ½ inch diameter lag screws or approved fasteners.
- Pressure-preservative-treated wood will comply with the American Wood Preservers Association UI Standard based on exposure (exterior) and use (above ground or ground contact). The lumber must bear the quality mark (stamp or end tag) of an approved inspection agency. Designers, builders and home owners will verify that appropriate hardware (hangers, nails, brackets) is used with the particular treatment of the lumber.

- Plastic and composite materials proposed for posts, beams, joists, decking and railings require submittal with the permit application of product specific ICC-ES evaluation reports, or of test reports from an approved testing agency, for review and approval by the Building Official. Decks using unapproved materials will not receive final approval and may require removal of unapproved materials.
- All exposed connections between the deck and the building structure will be flashed. Flashing materials will be corrosion resistant and compatible with other deck materials.

Footings and Piers

- * Frost footings are required for decks and landings attached to a building or structure that has frost footings. All frost footings will be a minimum of 42 inches below finished grade.
- * Individual concrete or masonry piers shall project a minimum of 6 inches above finished grade, and project 8 inches above finished grade when supporting cedar or redwood. Cylindrical concrete pier diameters will be as listed on the Beam and Footing Sizes table. Minimum concrete pier diameter will be 8 inches.

Joists and Framing

- * Wood joists within 18 inches of finished grade or wood beams within 12 inches of finished grade and their supports shall be redwood, cedar or an approved decay-resistant material.
- * Floor joist spacing at 24 inches on center requires 2 x decking. Spacing at 16 inches on center permits 1 x decking.
- * Joists should not overhang (cantilever) beams by more than 2 feet and beams should not overhang posts by more than 1 foot.
- * Header beams and joists that frame into ledgers or beams must be supported by approved framing anchors (joist hangers) of appropriate size.

Stairways

- * If a stairway is to be provided, it must be no less than 36 inches in width. Stairways may be constructed having a 7 ¾ inch maximum rise (height) and a 10 inch minimum run (length). The dimensions of any one tread run or riser may not vary from the dimensions of any other tread run and rise by more than ⅜".
- * Stairway illumination is required by the code.
- * Open risers are permitted, provided the opening between the treads does not permit the passage of a 4 inch diameter sphere.

Guards and Handrails

- * Decks, landings, ramps, balconies and porches greater than 30 inches above grade will be protected by a guard no less than 36 inches in height. Openings in guards will be less than 4 inches. Openings for required guards on the sides of stair treads will be less than 4 3/8 inches.

Guards and Handrails continued...

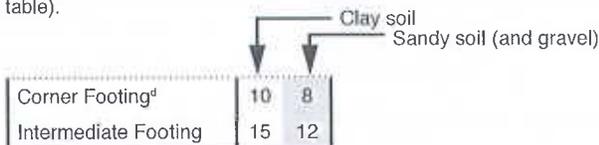
- * Handrails are required on all stairways having 4 or more risers. All required handrails shall be 1 1/4 inches minimum in diameter and not greater than 2 inches maximum.
- * Handrails shall be placed not less than 34 inches or more than 38 inches above the nosing of the stair treads. Handrails shall be continuous the full length of stairs from a point directly above the top riser of a flight to a point directly above the lowest riser of the flight.
- * Handrail ends must be returned to a wall or post.
- * The handgrip must have a smooth surface with no sharp corners; edges shall have a minimum radius of 1/8".
- * Handrails adjacent to a wall shall have a space not less than 1 1/2" between the wall and the handrail.

BEAM AND FOOTING SIZES ^{a, e, f}

Based on No. 2 or better Southern pine lumber (also known as Southern Yellow Pine)

| | | | Post spacing | | | | | | | | | | |
|---------------------------|-----------------------------------|-----------------------------------|--------------|-------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | | | 4' | 5' | 6' | 7' | 8' | 9' | 10' | 11' | 12' | 13' | 14' |
| Joist Length ^b | 6' | Beam Size | 1-2x6 | 1-2x6 | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 2-2x10 ^b |
| | | Corner Footing ^d | 8 8 | 8 8 | 8 8 | 8 8 | 9 8 | 9 8 | 10 8 | 10 8 | 10 9 | 11 9 | 11 9 |
| | | Intermediate Footing ^d | 9 8 | 10 8 | 10 9 | 11 9 | 12 10 | 13 10 | 14 11 | 14 12 | 15 12 | 15 13 | 16 13 |
| | 7' | Beam Size | 1-2x6 | 1-2x6 | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c |
| | | Corner Footing ^d | 8 8 | 8 8 | 8 8 | 9 8 | 9 8 | 10 8 | 10 8 | 11 9 | 11 9 | 12 10 | 12 10 |
| | | Intermediate Footing ^d | 9 8 | 10 8 | 11 9 | 12 10 | 13 11 | 14 11 | 15 12 | 15 13 | 16 13 | 17 14 | 17 14 |
| | 8' | Beam Size | 1-2x6 | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c |
| | | Corner Footing ^d | 8 8 | 8 8 | 9 8 | 9 8 | 10 8 | 10 8 | 11 9 | 12 9 | 12 10 | 13 10 | 13 11 |
| | | Intermediate Footing ^d | 10 8 | 11 9 | 12 10 | 13 11 | 14 11 | 15 12 | 16 13 | 16 13 | 17 14 | 18 15 | 18 15 |
| | 9' | Beam Size | 1-2x6 | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c |
| | | Corner Footing ^d | 8 8 | 8 8 | 9 8 | 10 8 | 10 9 | 11 9 | 12 10 | 12 10 | 13 10 | 13 11 | 14 11 |
| | | Intermediate Footing ^d | 10 9 | 12 10 | 13 10 | 14 11 | 15 12 | 16 13 | 17 14 | 17 14 | 18 15 | 19 15 | 20 16 |
| | 10' | Beam Size | 1-2x6 | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c |
| | | Corner Footing ^d | 8 8 | 9 8 | 10 8 | 10 8 | 11 9 | 12 10 | 12 10 | 13 11 | 14 11 | 14 12 | 15 12 |
| | | Intermediate Footing ^d | 11 9 | 12 10 | 14 11 | 15 12 | 16 13 | 17 14 | 17 14 | 18 15 | 19 16 | 20 16 | 21 17 |
| | 11' | Beam Size | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 |
| | | Corner Footing ^d | 8 8 | 9 8 | 10 8 | 11 9 | 12 9 | 12 10 | 13 11 | 14 11 | 14 12 | 15 12 | 15 13 |
| | | Intermediate Footing ^d | 12 9 | 13 11 | 14 12 | 15 13 | 16 13 | 17 14 | 18 15 | 19 15 | 20 16 | 21 17 | 22 18 |
| 12' | Beam Size | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | |
| | Corner Footing ^d | 9 8 | 10 8 | 10 9 | 11 9 | 12 10 | 13 10 | 14 11 | 14 12 | 15 12 | 15 13 | 16 13 | |
| | Intermediate Footing ^d | 12 10 | 14 11 | 15 12 | 16 13 | 17 14 | 18 15 | 19 16 | 20 16 | 21 17 | 22 18 | 23 18 | |
| 13' | Beam Size | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | 3-2x12 | |
| | Corner Footing ^d | 9 8 | 10 8 | 11 9 | 12 10 | 13 10 | 13 11 | 14 12 | 15 12 | 15 13 | 16 13 | 17 14 | |
| | Intermediate Footing ^d | 13 10 | 14 12 | 15 13 | 17 14 | 18 15 | 19 15 | 20 16 | 21 17 | 22 18 | 23 19 | 24 19 | |
| 14' | Beam Size | 1-2x6 | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | 3-2x12 | 3-2x12 | |
| | Corner Footing ^d | 9 8 | 10 8 | 11 9 | 12 10 | 13 11 | 14 11 | 15 12 | 15 13 | 16 13 | 17 14 | 17 14 | |
| | Intermediate Footing ^d | 13 11 | 15 12 | 16 13 | 17 14 | 18 15 | 20 16 | 21 17 | 22 18 | 23 18 | 24 19 | 24 20 | |
| 15' | Beam Size | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | 3-2x12 | Eng Bm ^h | |
| | Corner Footing ^d | 10 8 | 11 9 | 12 10 | 13 10 | 14 11 | 14 12 | 15 12 | 16 13 | 17 14 | 17 14 | 18 15 | |
| | Intermediate Footing ^d | 14 11 | 15 12 | 17 14 | 18 15 | 19 16 | 20 17 | 21 17 | 22 18 | 23 19 | 24 20 | 25 21 | |
| 16' | Beam Size | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | 3-2x12 | Eng Bm ^h | |
| | Corner Footing ^d | 10 8 | 11 9 | 12 10 | 13 11 | 14 11 | 15 12 | 16 13 | 16 13 | 17 14 | 18 15 | 18 15 | |
| | Intermediate Footing ^d | 14 11 | 16 13 | 17 14 | 18 15 | 20 16 | 21 17 | 22 18 | 23 19 | 24 20 | 25 21 | 26 21 | |
| 17' | Beam Size | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x8 | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | Eng Bm ^h | Eng Bm ^h | |
| | Corner Footing ^d | 11 9 | 12 10 | 13 10 | 14 11 | 15 12 | 16 13 | 17 13 | 17 14 | 18 15 | 19 15 | 19 16 | |
| | Intermediate Footing ^d | 15 12 | 17 13 | 18 14 | 19 16 | 20 17 | 22 18 | 23 19 | 24 20 | 25 20 | 26 21 | 27 22 | |
| 18' | Beam Size | 2-2x6 | 2-2x6 | 2-2x8 | 2-2x10 ^b | 2-2x10 ^b | 3-2x10 ^c | 3-2x10 ^c | 3-2x12 | 3-2x12 | Eng Bm ^h | Eng Bm ^h | |
| | Corner Footing ^d | 11 9 | 12 10 | 13 11 | 14 12 | 15 12 | 16 13 | 17 14 | 18 14 | 19 15 | 19 16 | 20 16 | |
| | Intermediate Footing ^d | 15 12 | 17 14 | 18 15 | 20 16 | 21 17 | 23 18 | 24 19 | 25 20 | 26 21 | 27 22 | 28 23 | |

- a. All footing sizes are the minimum diameters (in inches) of the footings/ supporting foundations for the support posts. The various footing diameters are listed for two soil types (see example below for use of the table).



- b. 3-2x8 may be substituted for these beams.
 c. 2-2x12 may be substituted for these beams.
 d. Minimum diameter of foundation for 6x6 posts is 10".

- e. When joists extend (cantilevers) beyond support beams by 18" or more, add 1" to the footing dimensions shown.
 f. The following requirements are for use when future construction of a 3-season porch or a screen porch (each with gable-end roofs and either flat or vaulted ceilings) is being considered:
 1. Increase corner footing size shown by 90%. (multiply size by 1.9)
 2. Increase center footing size shown by 55%. (multiply size by 1.55)
 3. Locate all footings at extremities of deck (no cantilevers).
 4. Beam sizes indicated need not be altered.
 g. The Joist Length indicated is the clear span between supporting ledgers, beams, etc.
 h. Engineered Beam required.

Joist Span

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

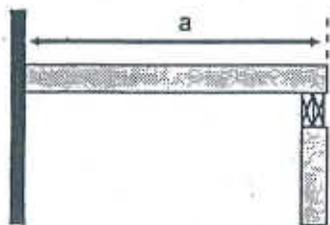
| | Ponderosa Pine | | | Southern Pine | | | Western Cedar | | |
|------|----------------|-------|-------|---------------|-------|-------|---------------|-------|-------|
| | 12"OC | 16"OC | 24"OC | 12"OC | 16"OC | 24"OC | 12"OC | 16"OC | 24"OC |
| 2x6 | 9-2 | 8-4 | 7-0 | 10-9 | 9-9 | 8-6 | 9-2 | 8-4 | 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 = $8'$



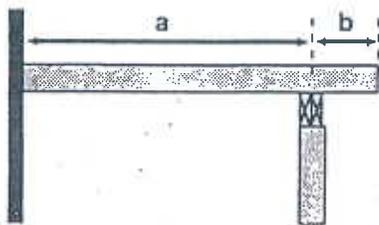
Use the **Joist Span** table to find the acceptable joist sizes for a 12' span, 2x8s at 12" O.C., 2x10s at 16" O.C. or 2x12s at 24" O.C.

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" + "b" 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 = $10'$



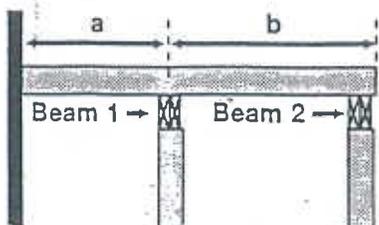
Refer to the **Joist Span** table. For an 8' joist span, either 2x8s at 24" O.C. or 2x6s at 16" O.C. are acceptable.

For sizing the beam, use a joist length of 10' ($8' + 2'$) 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 13", 11" or 10" for the corner post and 18", 15" or 13" 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. 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.

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"

LEDGER

Same size as joists. Install Lag Screws that penetrate 1 1/2" minimum into rim joist or wall studs. (Minimum two 3/8" Lag Screws every 16")

NOTE:

Joist hangers must be correct size for joist size used.

POST

6x6 Minimum

BUILDING →

POST BASE ANCHOR BRACKET

6" MIN.

FINISHED GRADE

↓

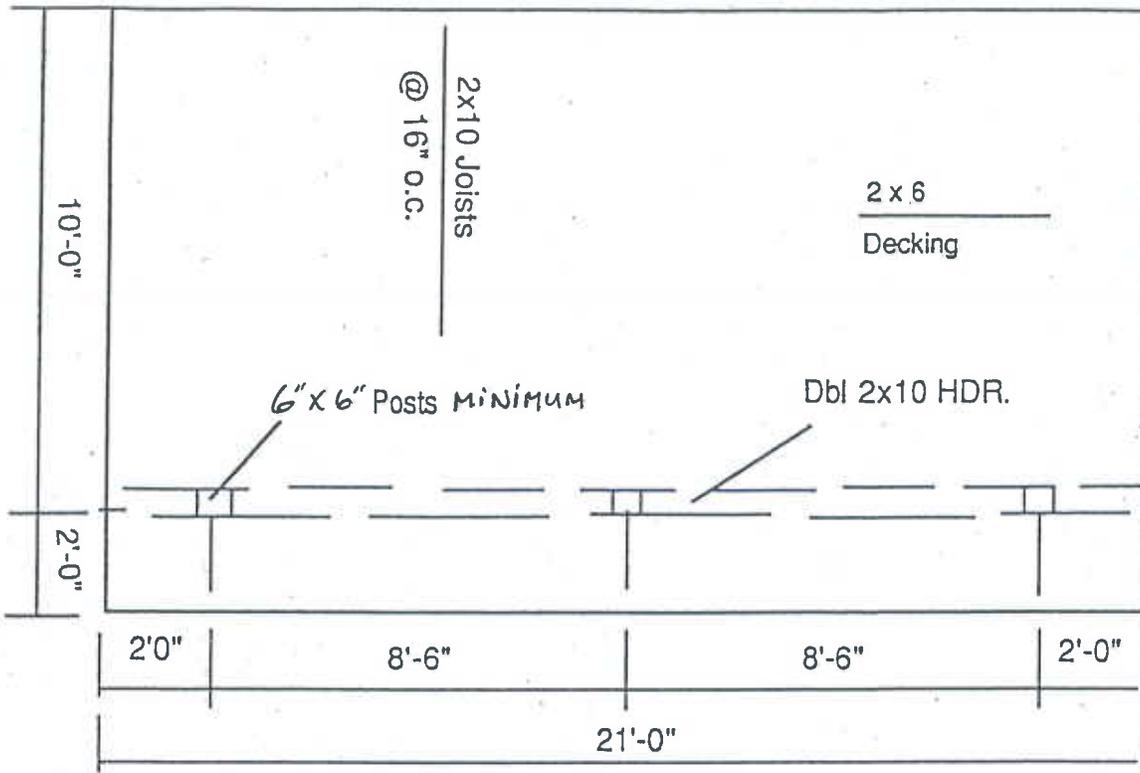
CONCRETE PIER FOOTING

8" Minimum

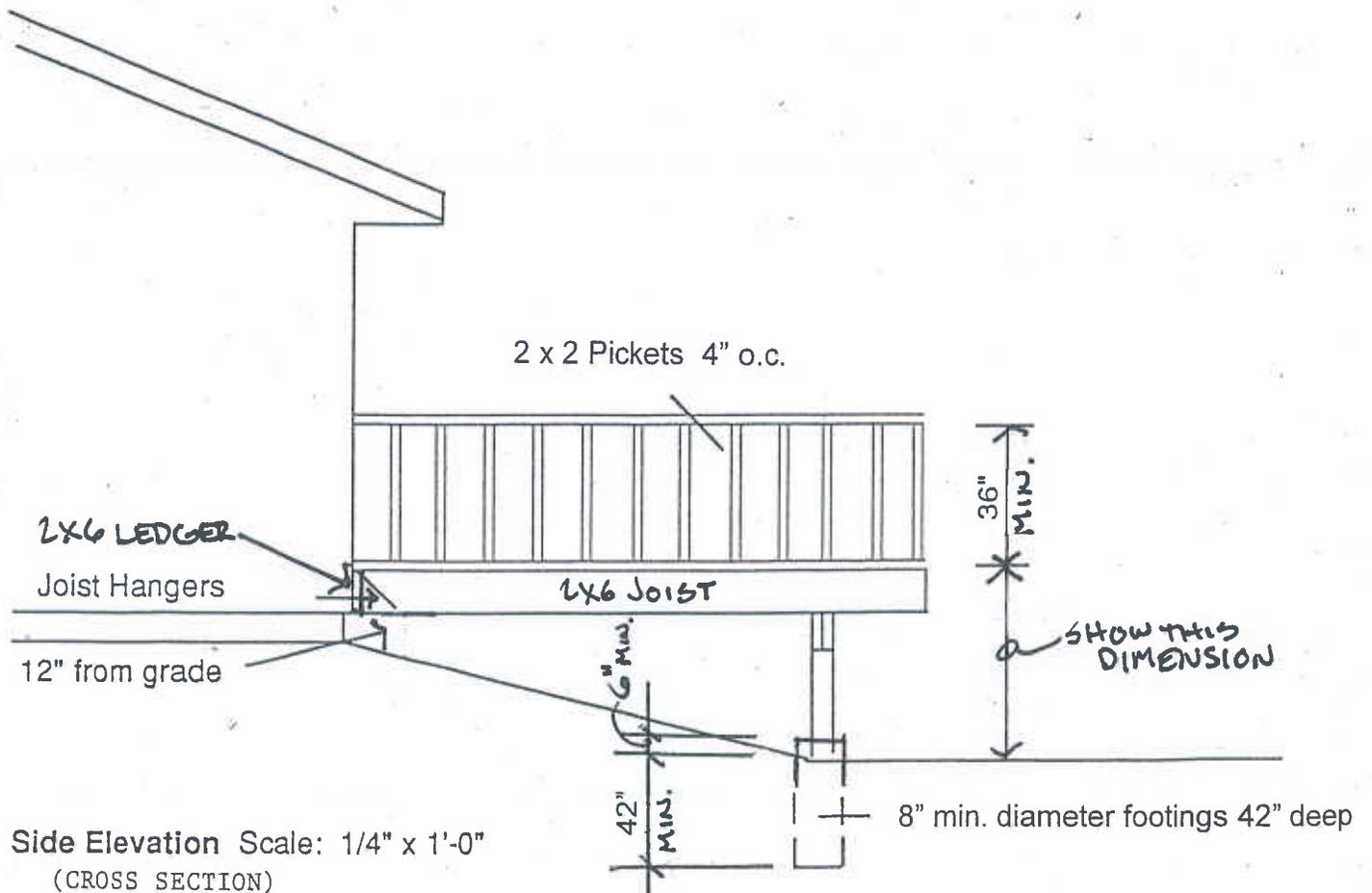
42" Minimum

See Table for Footing Size





Floor Plan Scale: 1/4" = 1'-0"
 (FLOOR PLAN)



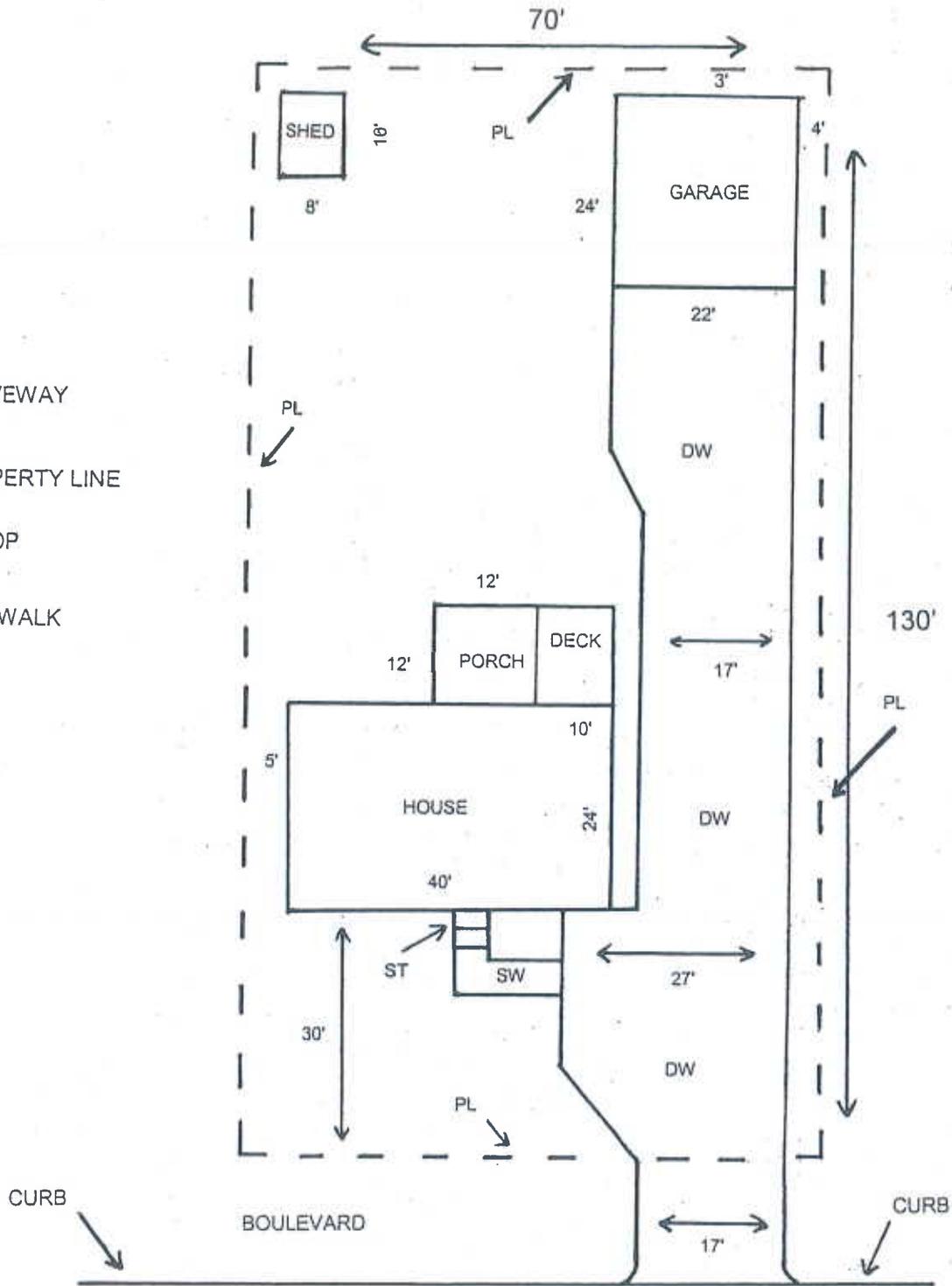
Side Elevation Scale: 1/4" x 1'-0"
 (CROSS SECTION)

DW = DRIVEWAY

PL = PROPERTY LINE

ST = STOOP

SW = SIDEWALK



NORTH →

STREET

SCALE 1" = 20'

SAMPLE SITE PLAN