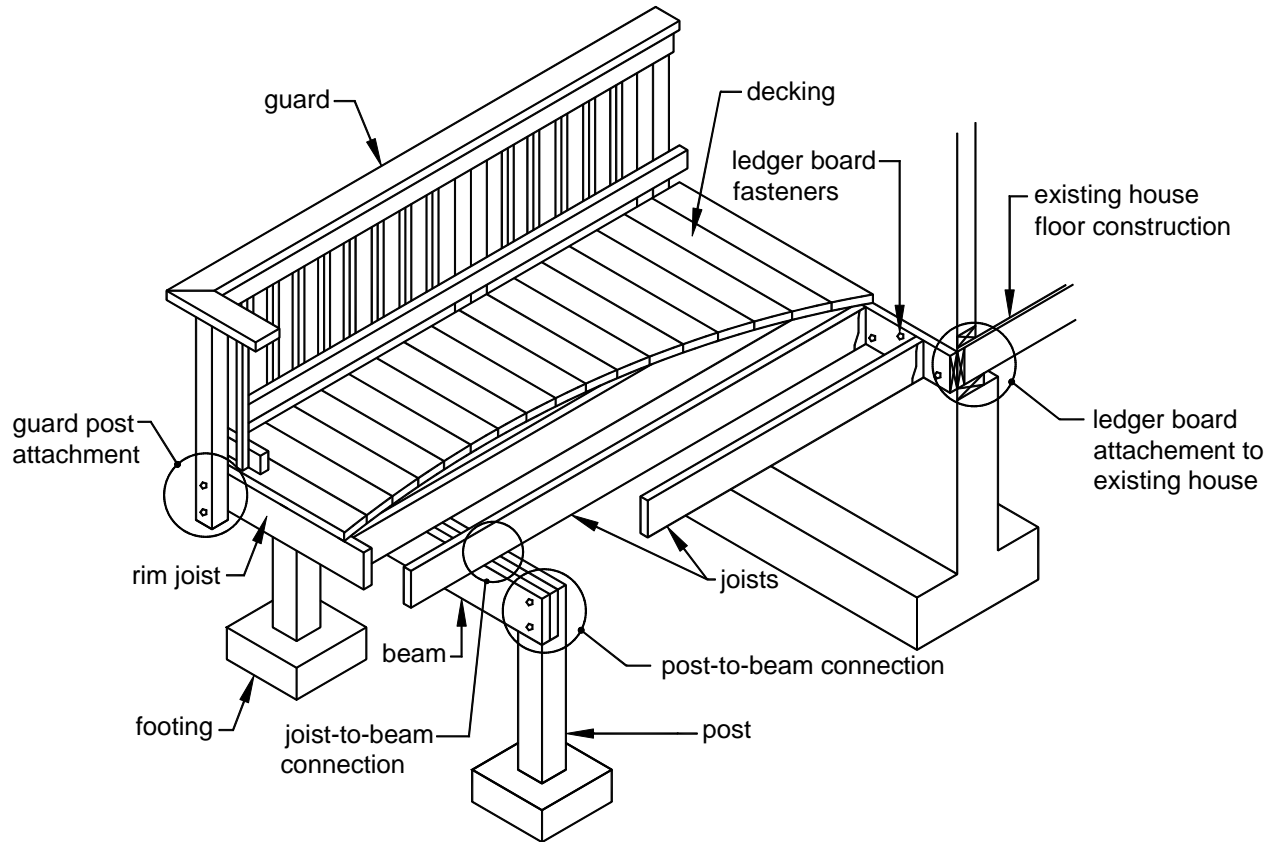


City of Hendersonville, TN

Typical Deck Details

Based primarily on the 2006 International Residential Code



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THE USE OF THESE TYPICAL DECK DETAILS ARE LIMITED TO SINGLE SPAN, SINGLE LEVEL, RESIDENTIAL DECKS.

EACH DECK AS CONSTRUCTED MUST BE IN COMPLETE CONFORMANCE WITH THESE REQUIREMENTS AND/OR OTHERWISE COMPLY WITH THE PROVISIONS CONTAINED WITHIN THE 2006 IRC. ANY VARIATION FROM THESE DETAILS MUST BE PRIOR APPROVED BY THE BUILDING & CODES DEPARTMENT.



**City of
Hendersonville,
TN**

Typical Deck Details

Based primarily on the 2006 International Residential Code

GENERAL NOTES

1. Unless noted otherwise in within these details, all lumber shall be southern pine, grade #2 or better and shall be pressure treated ACQ or CA-B in accordance with American Wood-Preservers' Association standards. All lumber in contact with the ground shall be rated as "ground-contact."
Please note: not all treated lumber is rated for ground contact.
2. All nails shall be ring-shanked or annular grooved.
3. All screws and nails shall be hot-dipped galvanized or stainless steel.
4. All hardware (joist hangers, cast-in-place post anchors, mechanical fasteners, etc.) shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Look for products such as "Zmax" from Simpson Strong-Tie or "Triple Zinc" from USP.
5. Decks constructed in accordance with these details are **not** approved for future hot tub installations.
6. Special conditions or circumstances may require and/or warrant additional requirements to be met.
7. Inspections:
 - A footing, framing, and final inspection are required on all decks.
 - Footing inspections are required PRIOR to the placement of concrete. At the time of the footing inspection, the ledger board should be attached to the existing house.
 - Framing and final inspections may be combined if all portions of the deck framing and mechanical attachments are at least 48" above grade and are visible for inspection.
 - Inspections are required and are the responsibility of the owner and/or contractor. Failure to request and satisfactorily pass all inspections can significantly increase your liability and result in possible legal remedies being pursued.
8. It is the responsibility of the permit holder and/or his representative to notify the City when the specific stages of construction are reached that would require inspection. Inspection requests may be made using one of the methods listed below; please have your address, contact phone number and other pertinent information available when scheduling an inspection. Please allow for a minimum of 24 hour notice on all inspection requests.
 - Inspection Request Line: **615-590-4642**. You can leave your inspection request twenty-four (24) hours a day, seven (7) days a week.
 - City of Hendersonville Online Permitting System (BluePrince): Contact the Building & Codes Department (615) 822-3802 about how to access this system.
 - Fax inspection requests to (615) 264-5336. Make sure to include all pertinent information including but not limited to inspection address and contact phone number.
9. Decks should not be utilized and/or occupied until a final inspection approval is obtained.

DECKING REQUIREMENTS

All decking material shall be composed of 2x6 or $\frac{5}{4}$ ("five-quarter") board. Other decking material may be used if approved by the Building & Codes Department. Attach decking to each joist with a minimum of (2) 8d nails or (2) #8 screws. See FIGURE 11 for decking connection requirements at the rim joist. Decking may be placed from an angle perpendicular to the joists to an angle of 45 degrees to the joists.

Decking composed of foreign lumber, plastic or manufactured materials may be substituted only when the product has an approved evaluation report from an accredited testing laboratory or otherwise approved by the City of Hendersonville Building & Codes Department.

The evaluation report or other acceptable documentation must be provided at permit issuance or be on the jobsite and available to the inspector during the inspection process. Failure to do so may result in avoidable delays in permit issuance or inspection approvals. Installation and span lengths of the substituted material must be in strict conformance with the evaluation report and the manufacturer's instructions. All decking products must be capable of supporting a live load of 40 pounds per square feet.

JOIST SIZE

The span of a joist is measured from the centerline of bearing at one end of the joist to the centerline of bearing at the other and does not include the length of the overhangs. Use TABLE 1 to determine your joist size based on span length and joist spacing. See FIGURE 1 through FIGURE 3 for joist span types.

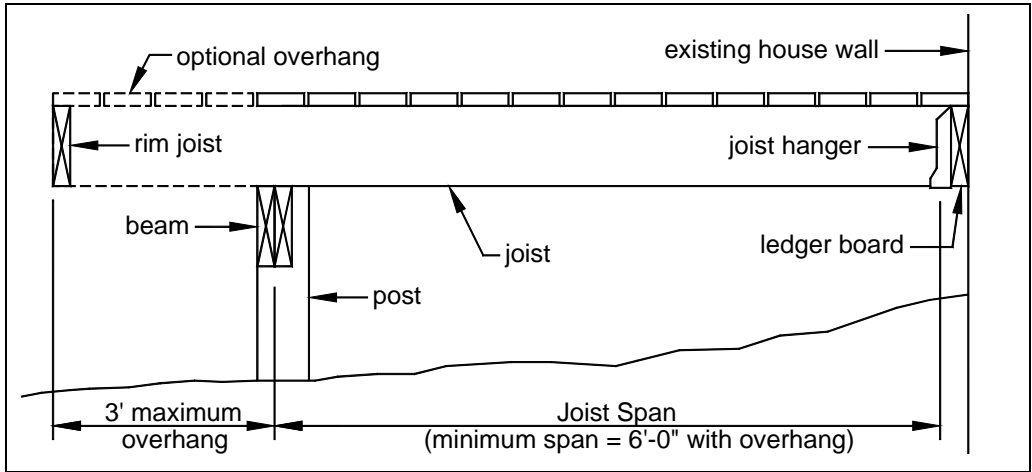


FIGURE 1: JOIST SPAN - DECK ATTACHED AT HOUSE

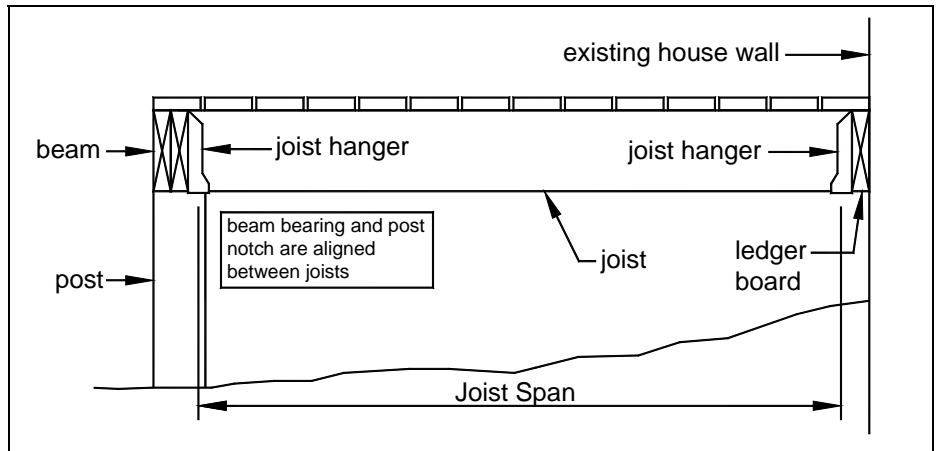


FIGURE 2: JOIST SPAN - JOISTS ATTACHED TO SIDE OF BEAM

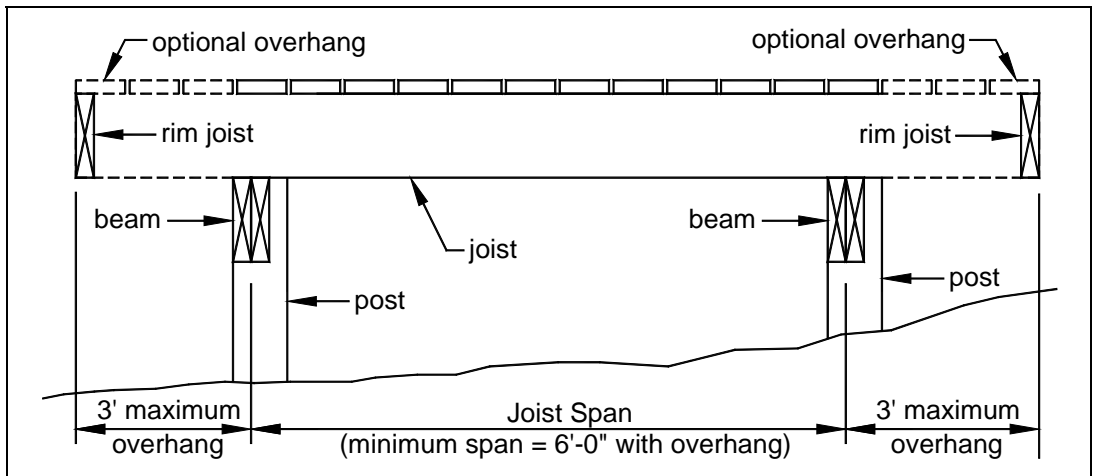


FIGURE 3: JOIST SPAN - FREE-STANDING DECK

TABLE 1: MAXIMUM JOIST SPANS¹ (excludes overhangs)

Joist Size	Joist Spacing, on center		
	12"	16"	24"
2x6	11'-1"	9'-7"	7'-10"
2x8	14'-4"	12'-4"	10'-1"
2x10	17'-10"	16'-0"	13'-1"
2x12	18'-0"	18'-0"	15'-4"

¹ Spans are based on 40 PSF live load, 10 PSF dead load, southern pine#2, normal loading duration, wet service conditions and deflection: $\Delta=l/360$.

BEAM SIZE & ASSEMBLY REQUIREMENTS

The determination of beam size is based on the characteristics of the joist, i.e., span length and overhang. Use TABLE 2 to determine your beam size; see FIGURE 4 for beam span types.

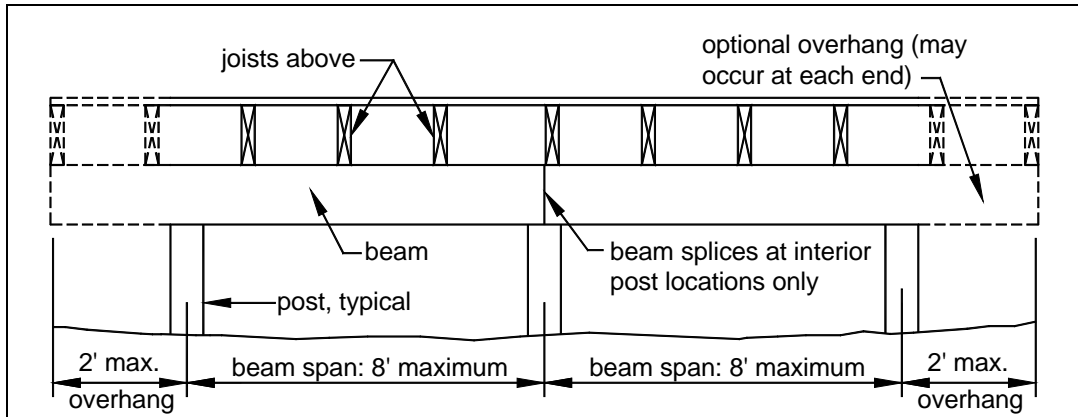


FIGURE 4: BEAM SPAN TYPES

TABLE 2: MINIMUM BEAM SIZE*

Joist Span	Beam Size	
	when joists overhang beam	when joists attach to side of beam
0 - 6'-0"	(2) 2x8	(2) 2x6
6'-1" - 11'-2"	(2) 2x10	(2) 2x8
11'-3" - 12'-8"	(2) 2x10	(2) 2x10
12'-9" - 16'-0"	(2) 2x12	(2) 2x10
16'-1" - 18'-0"	(2) 2x12	(2) 2x12

* You may substitute a larger beam size for the one shown in the table. For instance, if the table requires (2) 2x8, you may substitute a (2) 2x10 or (2) 2x12.

The beam is assembled by attaching the two members identified in the tables above in accordance with FIGURE 5.

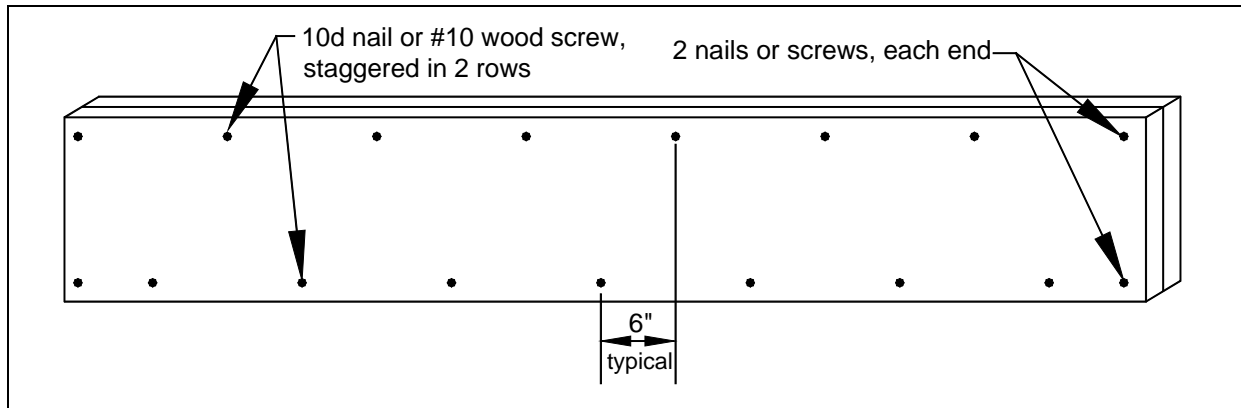


FIGURE 5: BEAM ASSEMBLY DETAIL

DECK FRAMING PLAN

A framing plan shows a bird's-eye view of the joist and beam layout; the location of the ledger board, posts and footings, and the type, size and spacing of the ledger board fasteners. See FIGURE 6 for an example of a typical deck framing plan.

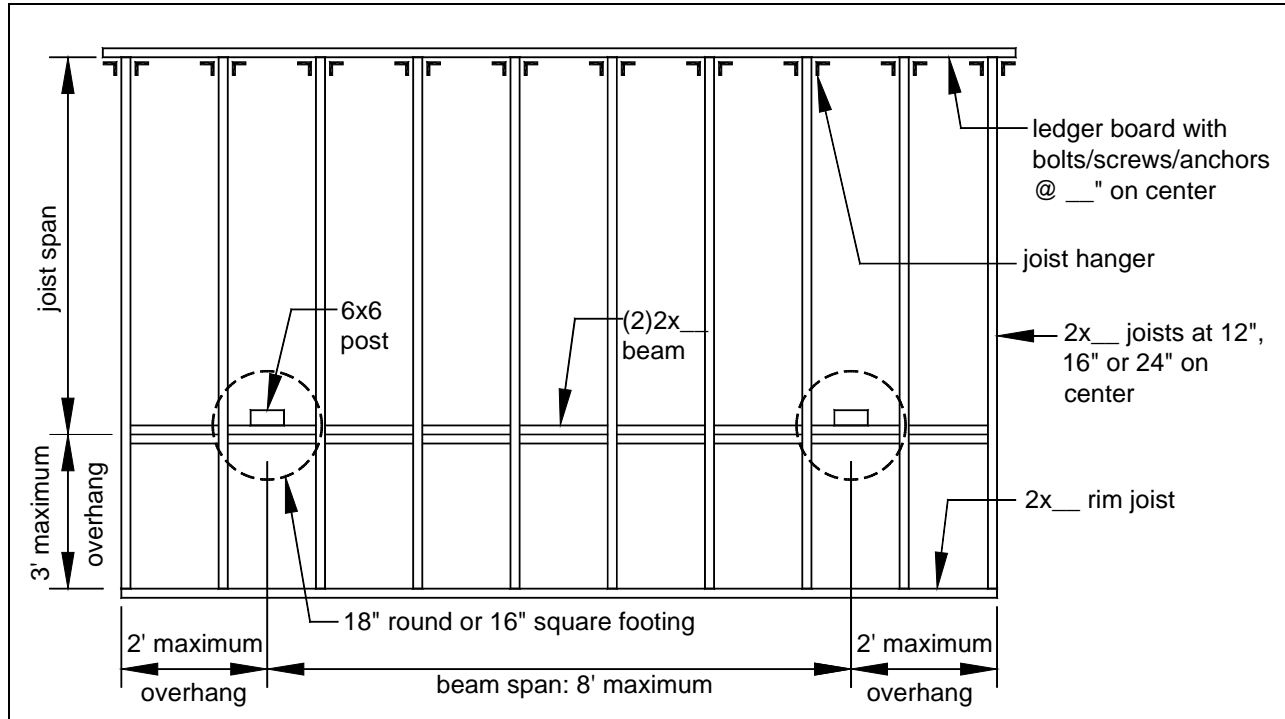


FIGURE 6: TYPICAL DECK FRAMING PLAN

JOIST-TO-BEAM CONNECTION

Each joist shall be attached to the beam as shown in FIGURE 7. Use Option 1 or Option 2 when joists bear on or overhang past the beam; see FIGURE 1 and FIGURE 3. Use Option 3 when joists attach to the side of the beam; see FIGURE 2. See JOIST HANGERS on Sheet 6 for more information.

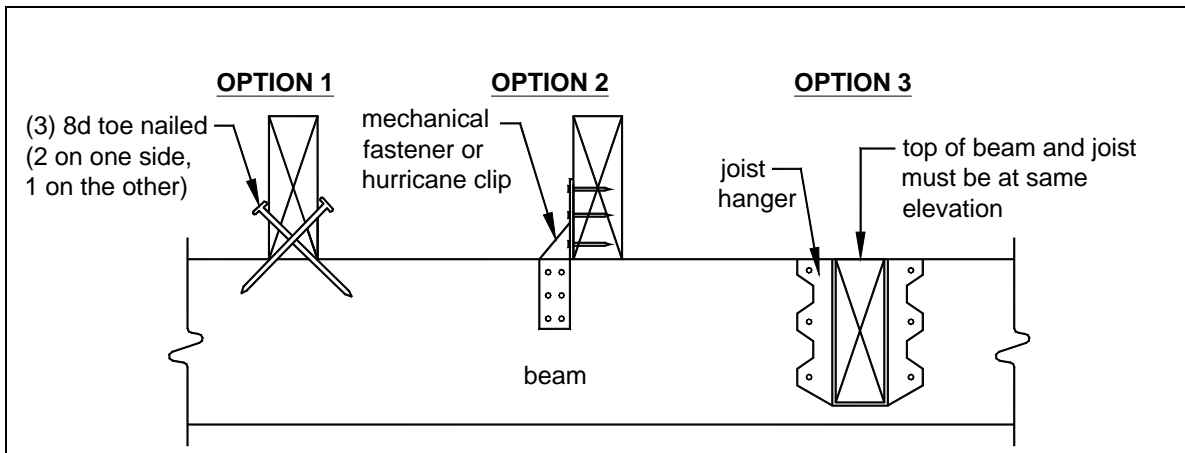


FIGURE 7: JOIST-TO-BEAM DETAIL

JOIST HANGERS

Joist hangers, as shown in FIGURE 8, shall have a minimum capacity of 1000 lbs each. The depth and width of the joist hanger shall equal the dimensions of the member it is carrying. Joist hangers shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or stainless steel.

Use joist hangers with inside flanges when clearances to the edge of the beam or ledger board dictate.

Do not use clip angles or brackets to support framing members. Do not bend hanger flanges to accommodate conditions at ledger.

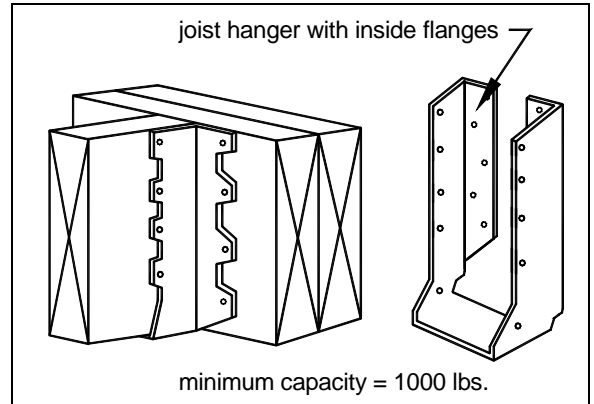


FIGURE 8: TYPICAL JOIST HANGERS

POST REQUIREMENTS

All deck post sizes shall be 6x6, and the maximum height shall be 14'-0". The beam shall be attached to the post by notching the 6x6 as shown in FIGURE 9. All through-bolts shall have washers at the bolt head and nut. Attachment of the beam to the side of the post without notching is prohibited; see FIGURE 10.

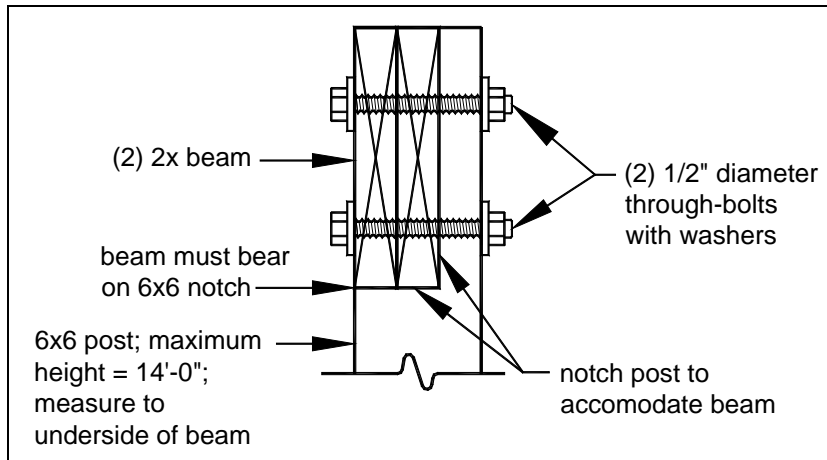


FIGURE 9: POST-TO-BEAM REQUIREMENTS

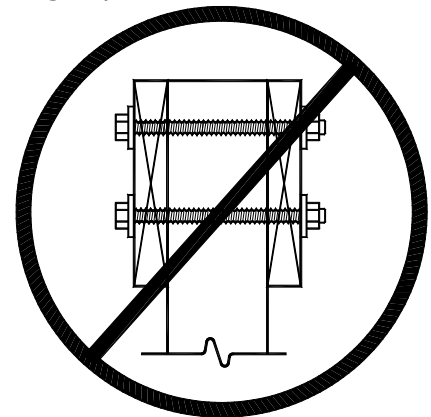


FIGURE 10: PROHIBITED POST-TO-BEAM ATTACHMENT CONDITION

RIM JOIST REQUIREMENTS

Attach a continuous rim joist to the ends of joists as shown in FIGURE 11. Attach decking to the rim joist as shown in FIGURE 11. For more decking attachment requirements, see DECKING REQUIREMENTS on Sheet 2.

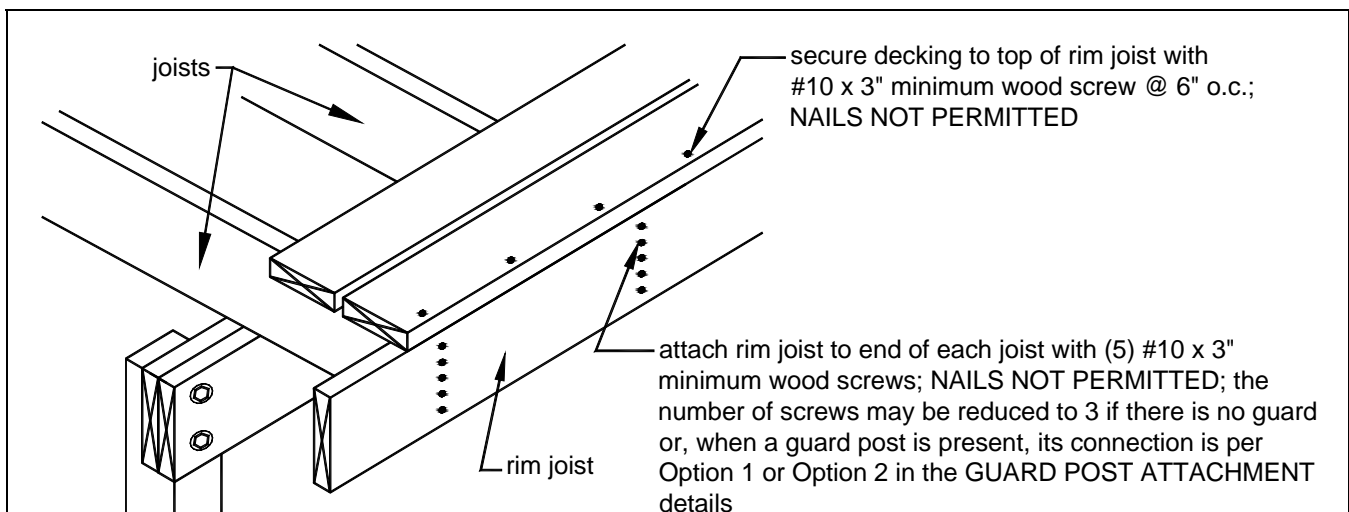


FIGURE 11: RIM JOIST CONNECTION DETAILS

FOOTINGS

See FIGURE 12 for footing size, footing thickness and post attachment options and requirements. The minimum frost depth for the City of Hendersonville is currently 12", not the recommended 24" as shown in Figure 12. All footings shall bear on solid ground; bearing conditions shall be verified in the field by the inspector prior to placement of concrete. DECK FOOTINGS CLOSER THAN 5'-0" TO AN EXISTING EXTERIOR HOUSE WALL MUST BEAR AT THE SAME ELEVATION AS THE FOOTING OF THE EXISTING HOUSE FOUNDATION.

Do not construct footings over to close to utility lines, septic tanks or field lines. For location of utility lines call Tennessee One Call at 366-1987 before you dig.

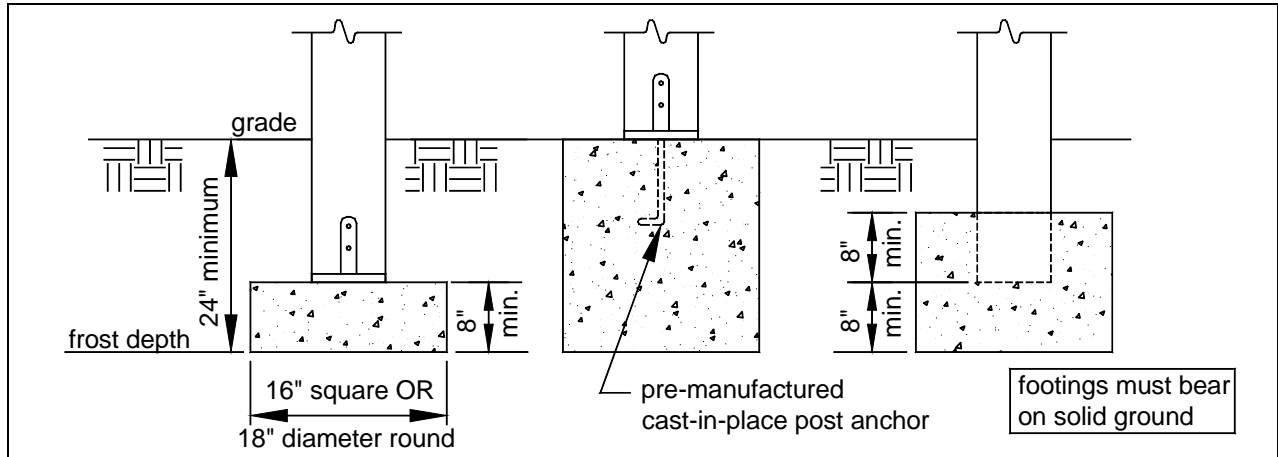


FIGURE 12: TYPICAL FOOTING DETAILS

LEDGER ATTACHMENT REQUIREMENTS

GENERAL: Attach the ledger board, which shall be greater than or equal to the joists size, to the existing exterior wall in accordance with FIGURE 14 through FIGURE 16. When attachments are made to the existing house band board, the band board shall be capable of supporting the new deck. If this cannot be verified or conditions at the existing house differ from the details herein, then a free-standing deck may be required. See FREE-STANDING DECKS on Sheet 13.

YOU SHOULD VERIFY THE EXISTING CONDITIONS IN THE FIELD PRIOR TO APPLYING FOR A BUILDING PERMIT. COMPLIANCE WITH ALL THESE REQUIREMENTS ARE CRITICAL TO ENSURING THE STRUCTURAL STABILITY OF YOUR DECK AND THE SAFETY OF YOU, YOUR FAMILY AND GUESTS.

SIDING AND FLASHING: House siding, or the exterior finish system, must be removed prior to the installation of the ledger board. Flashing is required at any ledger board connection to a wall of wood framed construction and shall be composed of copper (attached using copper nails), stainless steel, UV resistant plastic or galvanized steel coated with 1.85 oz/sf of zinc (G-185 coating). See FIGURE 14 for continuous flashing with drip edge.

WOOD I-JOISTS: Many new homes constructed with wood I-joists, see FIGURE 13, have a 1-1/4" manufactured solid band board that can support the attachment of a deck; see FIGURE 14. However, older homes constructed with wood I-joists may only have a plywood band board which cannot support a deck. In such cases a free-standing deck is required. See FREE-STANDING DECKS on Sheet 13.

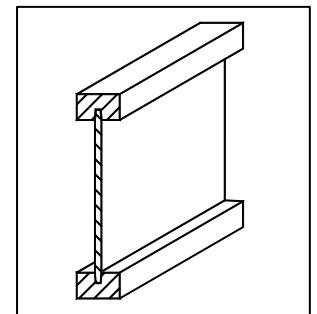


FIGURE 13: WOOD I-JOIST PROFILE

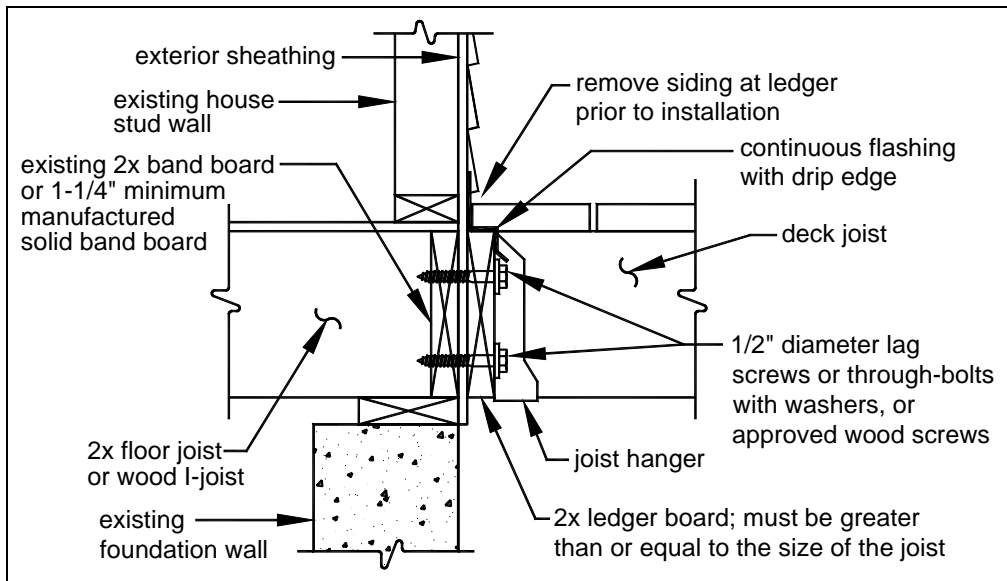


FIGURE 14: ATTACHMENT OF LEDGER BOARD-TO-BAND BOARD

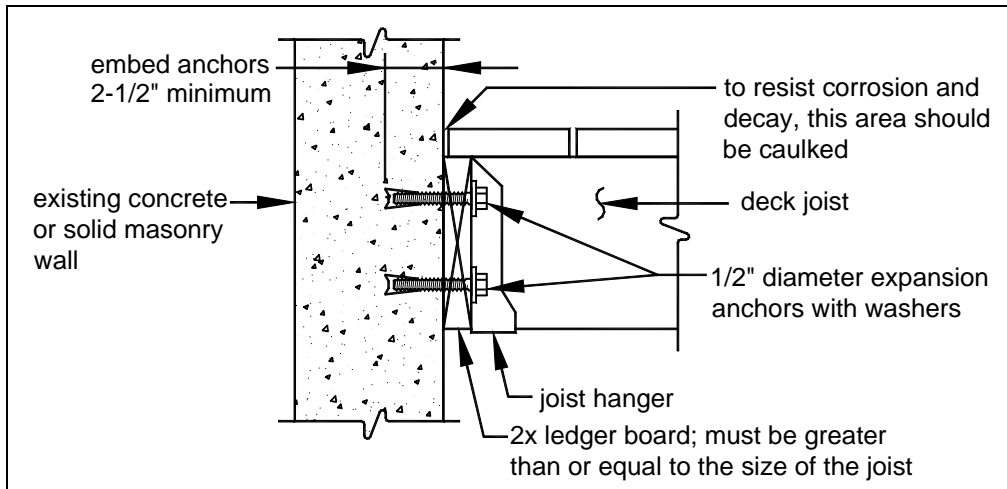


FIGURE 15: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (CONCRETE OR SOLID MASONRY)

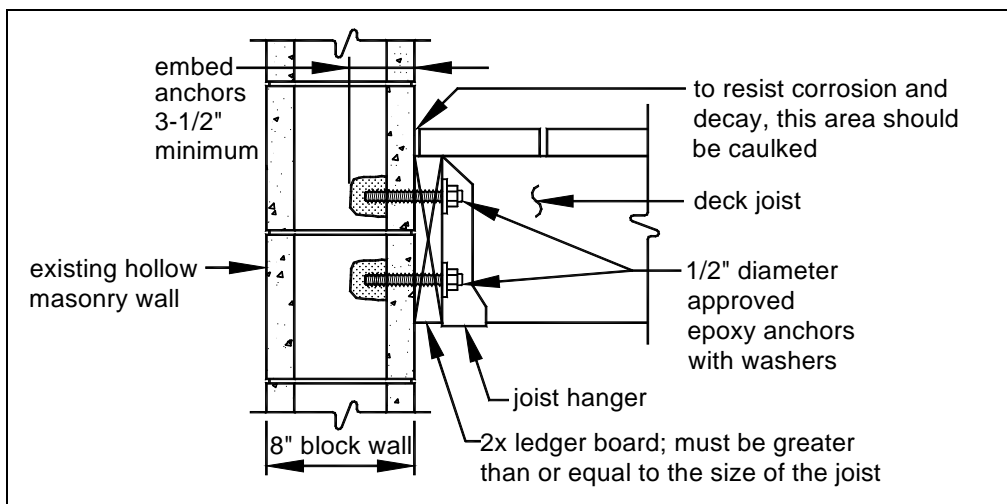


FIGURE 16: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (HOLLOW MASONRY)

PROHIBITED LEDGER ATTACHMENTS

Attachments to the ends of pre-manufactured open web joists, to brick veneers or chimneys, and to house overhangs or bay windows are strictly prohibited; see FIGURE 17 through FIGURE 19. In such cases the deck shall be free-standing. See FREE-STANDING DECKS on Sheet 13.

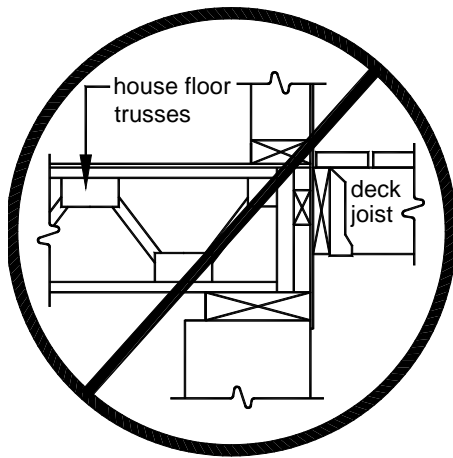


FIGURE 17: NO ATTACHMENT TO OPEN WEB TRUSSES

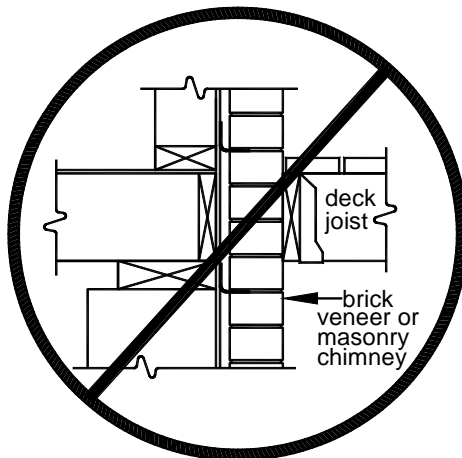


FIGURE 18: NO ATTACHMENT OR THROUGH BRICK VENEER

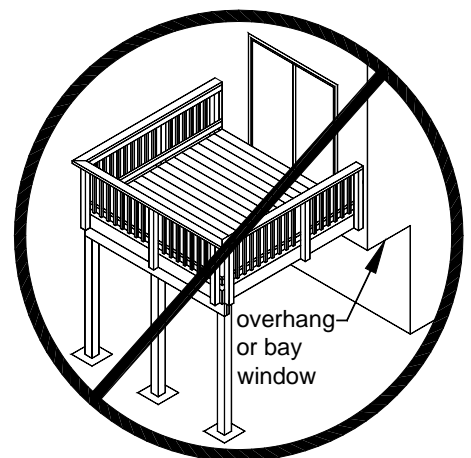


FIGURE 19: NO ATTACHMENT TO HOUSE OVERHANG

LEDGER BOARD FASTENERS

Ledger board fasteners shall be installed in accordance with FIGURE 20 and the spacing in TABLE 3. Only those fastener types noted herein are approved for use; LEAD ANCHORS ARE STRICTLY PROHIBITED. The ledger board must be installed at the time of the footing inspection; adequacy of connections will be verified by your inspector. If a ladder is required to access the ledger board, one must be provided by the property owner, permit holder, or their representative.

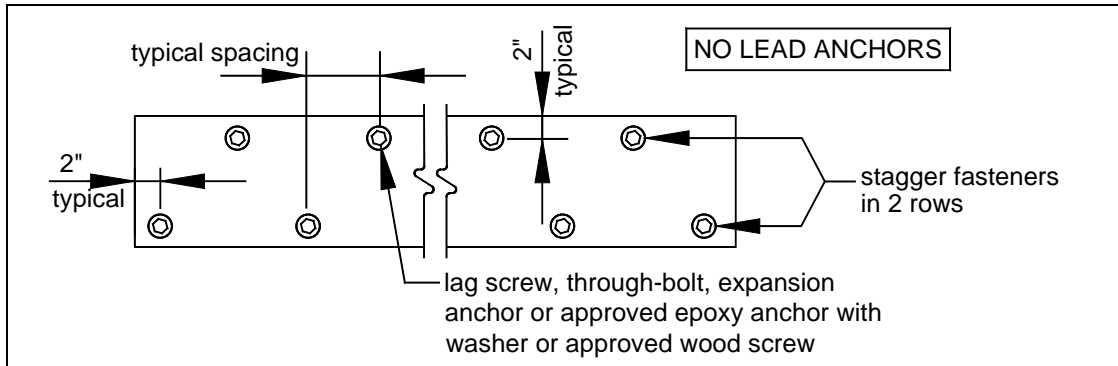


FIGURE 20: LEDGER BOARD FASTENER SPACING AND CLEARANCES

TABLE 3: LEDGER BOARD FASTENER SPACING*

Joist Span	Fastener spacing, on center			
	Lag Screws	Approved Wood Screws	Bolts, Expansion Anchors	Approved Epoxy Anchors
0 - 6'-0"	30"	12"	36"	32"
6'-1" - 8'-0"	23"	10"	36"	32"
8'-1" - 10'-0"	18"	8"	34"	32"
10'-1" - 12'-0"	15"	6"	29"	24"
12'-1" - 14'-0"	13"	6"	24"	24"
14'-1" - 16'-0"	11"	5"	21"	16"
16'-1" - 18'-0"	10"	4"	19"	16"

*See Sheet 11 for fastener specifications.

Through-Bolts

Through-bolts shall have a minimum diameter of 1/2". Pilot holes for through-bolts shall be 17/32" to 9/16" in diameter. Through-bolts must be equipped with washers at the bolt head and nut.

Expansion Anchors

Use expansion anchors when attaching a ledger board to a concrete or solid masonry wall as shown in FIGURE 15. Bolt diameters of the anchors shall be a minimum of 1/2"; in some cases, this may require an anchor size of 5/8". Minimum embedment length shall be 2-1/2". Expansion anchors must have washers. Approved epoxy anchors may be substituted for expansion anchors; see below for minimum requirements.

Epoxy Anchors

When attaching to hollow masonry use one of the approved epoxy anchors listed in TABLE 4 and install as shown in FIGURE 16. Epoxy anchors shall have a minimum diameter of 1/2" and minimum embedment length of 3-1/2". Installation shall be in strict conformance to the manufacturer's instructions. Epoxy anchors must have washers.

TABLE 4: APPROVED EPOXY ANCHORS

Manufacturer	Product
ITW Ramset/Red Head	Epcon Acrylic 7
Hilti	HY-20

Lag Screws

Lag screws shall have a minimum diameter of 1/2" and shall be hot-dipped galvanized or stainless steel. Lag screws may be used only when the field conditions match those shown in FIGURE 14. See FIGURE 21 for lag screw length and shank requirements. All lag screws shall be installed with washers.

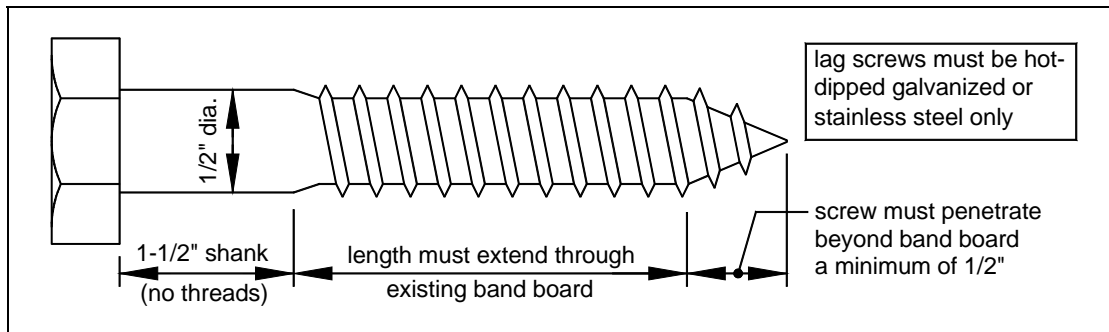


FIGURE 21: LAG SCREW REQUIREMENTS

LAG SCREW INSTALLATION REQUIREMENTS: Each lag screw shall have pilot holes drilled as follows: 1) Drill a 1/2" diameter hole in the ledger board, 2) Drill a 5/16" diameter hole into the solid connection material of the existing house. DO NOT DRILL A 1/2" DIAMETER HOLE INTO THE SOLID CONNECTION MATERIAL.

The threaded portion of the lag screw shall be inserted into the pilot hole by turning. DO NOT DRIVE WITH A HAMMER. Use soap or a wood-compatible lubricant as required to facilitate tightening. Each lag screw shall be thoroughly tightened snug, but shall not be overly tightened so as to cause wood damage.

Wood Screws

The approved wood screws listed in TABLE 4 are similar to lag screws and have an integrated washer. However, no pilot holes are required for installation. The screws shall have a minimum diameter not less than $\frac{1}{4}$ " and shall be of sufficient length to fully penetrate the existing house band board. Installation shall be in strict conformance with the manufacturer's instructions.

TABLE 5: APPROVED WOOD SCREWS

Manufacturer	Product
FastenMaster	LedgerLok
Simpson Strong-Tie	Strong-Drive Screw (SDS)

FREE-STANDING DECKS

Decks which are free-standing do not utilize the exterior wall of the existing house to support vertical loads; instead, an additional beam with posts is provided at or within 3'-0" of the existing house. THE ASSOCIATED DECK POST FOOTINGS SHALL BE PLACED AT THE SAME ELEVATION AS THE EXISTING HOUSE FOOTING. See FIGURE 3 and FIGURE 22. Beam size is determined by TABLE 2.

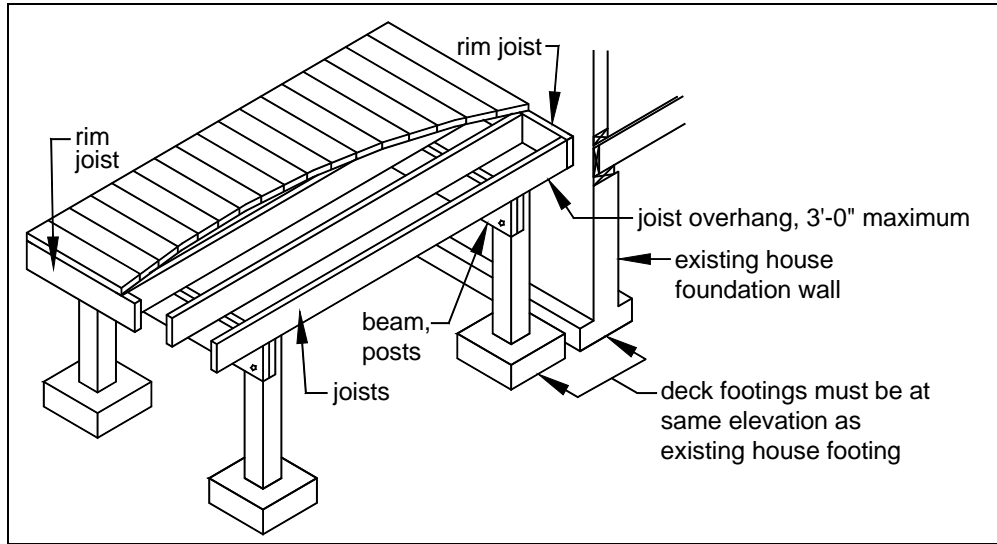


FIGURE 22: FREE-STANDING DECK

LATERAL SUPPORT OF FREE-STANDING DECKS

Free standing decks greater than 2 feet above grade shall resist lateral loading and horizontal movement by providing diagonal bracing or by attaching the deck to the exterior wall of the house.

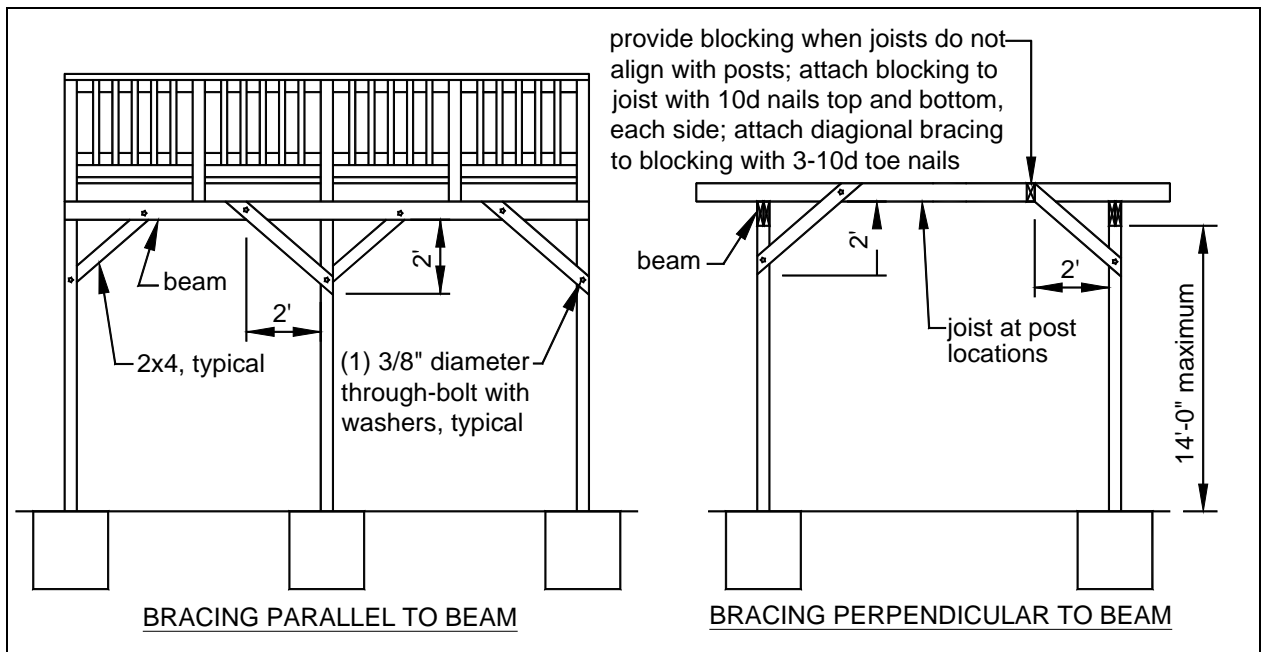


FIGURE 23: DIAGONAL BRACING REQUIREMENTS

Diagonal Bracing: Provide diagonal bracing both parallel and perpendicular to the beam at each post as shown in FIGURE 23. When parallel to the beam, the bracing shall be bolted to the post at one end and beam at the other. When perpendicular to the beam, the bracing shall be bolted to the post at one end and a joist at the other. When a joist does not align with the bracing location, provide blocking between the next adjacent joists; attach as noted in the figure.

Attachment to House: Attach the deck rim joist to the existing house exterior wall as shown in FIGURE 24. The wall must be sheathed with a minimum $\frac{3}{8}$ " structural panel sheathing. Use lag screws or through-bolts when fastening to an existing band board or wall stud; use expansion anchors or epoxy anchors when fastening to concrete or masonry. **LEAD ANCHORS ARE STRICTLY PROHIBITED. DO NOT USE THIS ATTACHMENT METHOD IF A BRICK VENEER IS PRESENT. YOU MUST VERIFY THIS CONDITION IN THE FIELD PRIOR TO UTILIZING THIS METHOD.** Fasteners shall be 16" on center and staggered in 2 rows. Flashing over the rim joist is required and must be installed in accordance with the flashing provisions on Sheet 7.

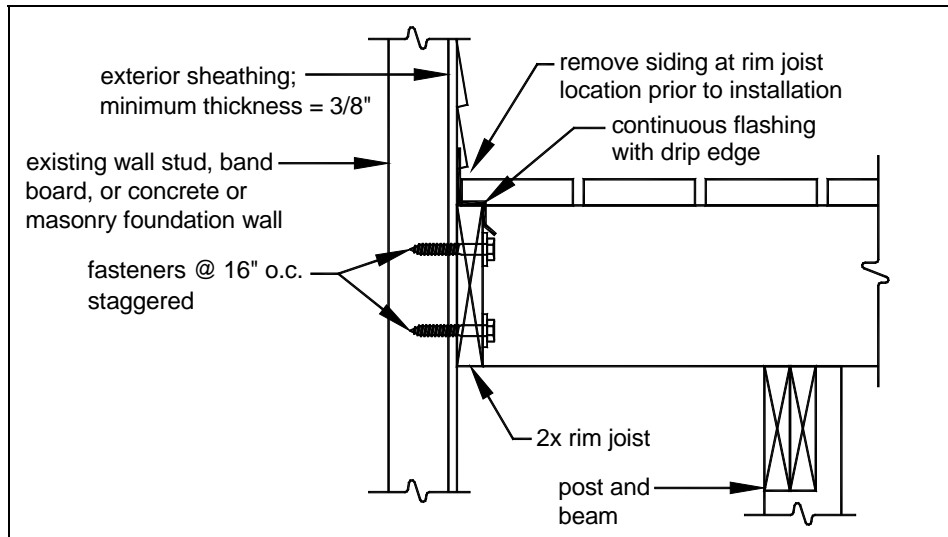


FIGURE 24: ATTACHMENT TO HOUSE LATERAL SUPPORT

GUARD REQUIREMENTS

All decks greater than 30" above grade are required to have a guard. If you are providing a guard when one is not required, it must meet these requirements. All guards shall be constructed in strict conformance with details herein; any deviations require a plan submission.

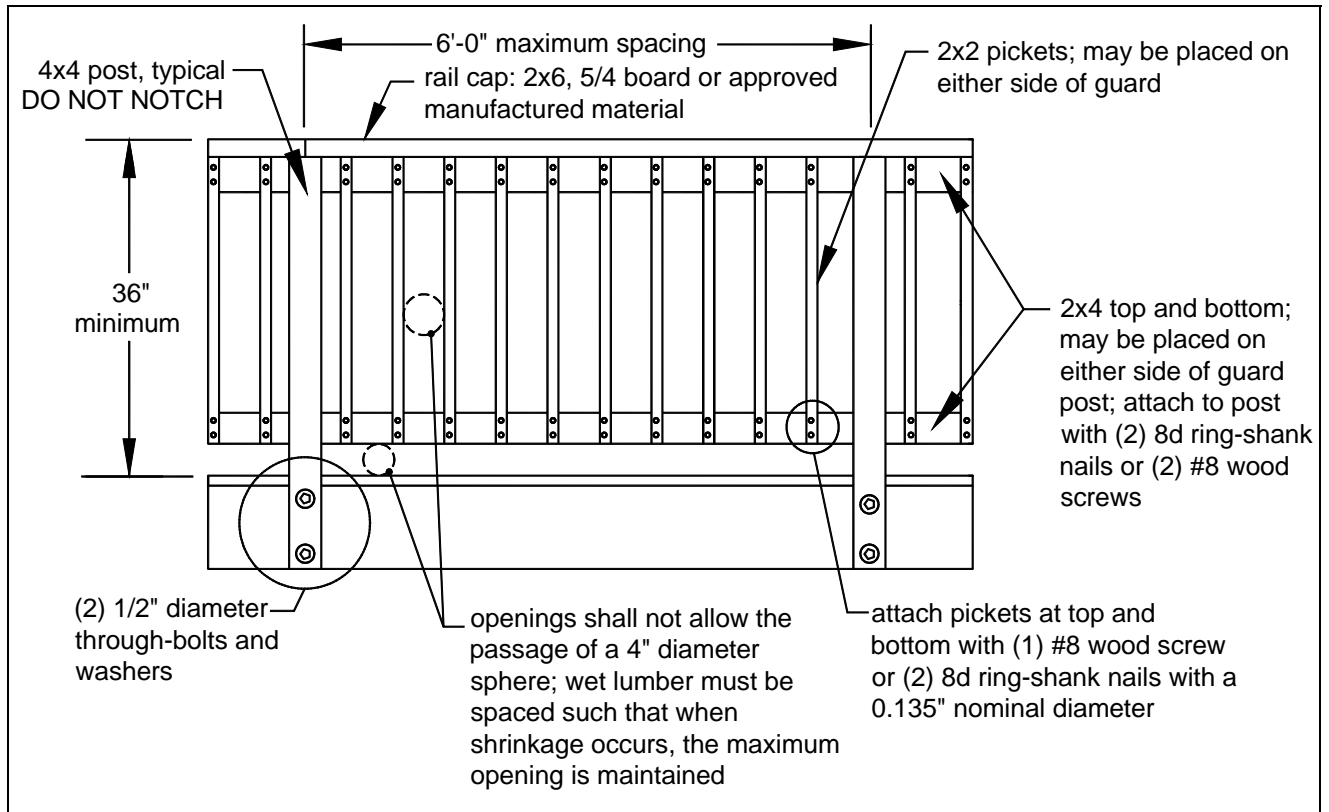


FIGURE 25: TYPICAL GUARD DETAIL

The guard cap may be composed of an approved foreign lumber, plastic or composite material provided the product has an approved evaluation report from an accredited testing laboratory or otherwise approved by the City of Hendersonville. The evaluation report or other appropriate documentation must be provided at permit issuance or must be on the jobsite and available to the inspector during the inspection process.

Any guard wholly comprised of a pre-fabricated wood, plastic, composite or manufactured guard system purchased from a home center store, lumber company or similar will require prior approval.

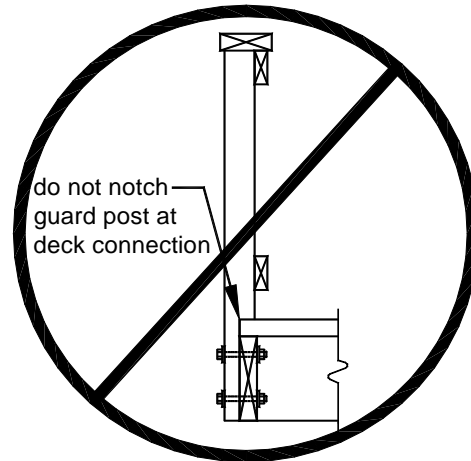


FIGURE 26: PROHIBITED NOTCHING AT GUARD POSTS

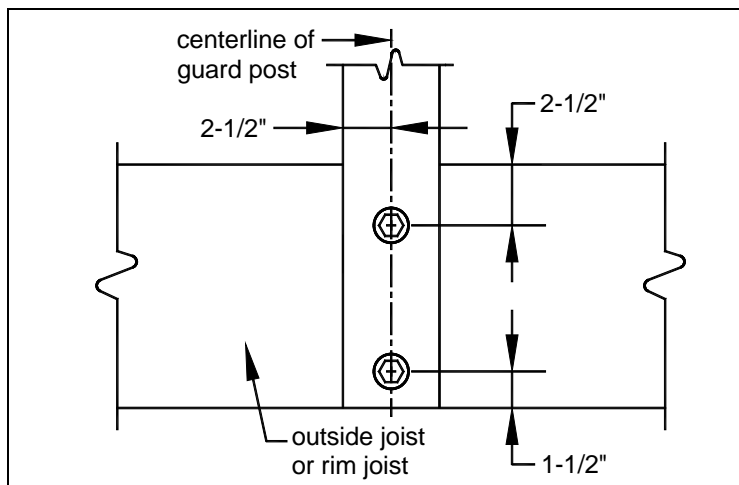


FIGURE 27: GUARD POST ATTACHMENT DETAIL

GUARD POST ATTACHMENTS

GUARD POST TO OUTSIDE-JOIST: Guard posts for guards which run parallel to the deck joists (side of deck) shall be attached to the outside-joist per FIGURE 28.

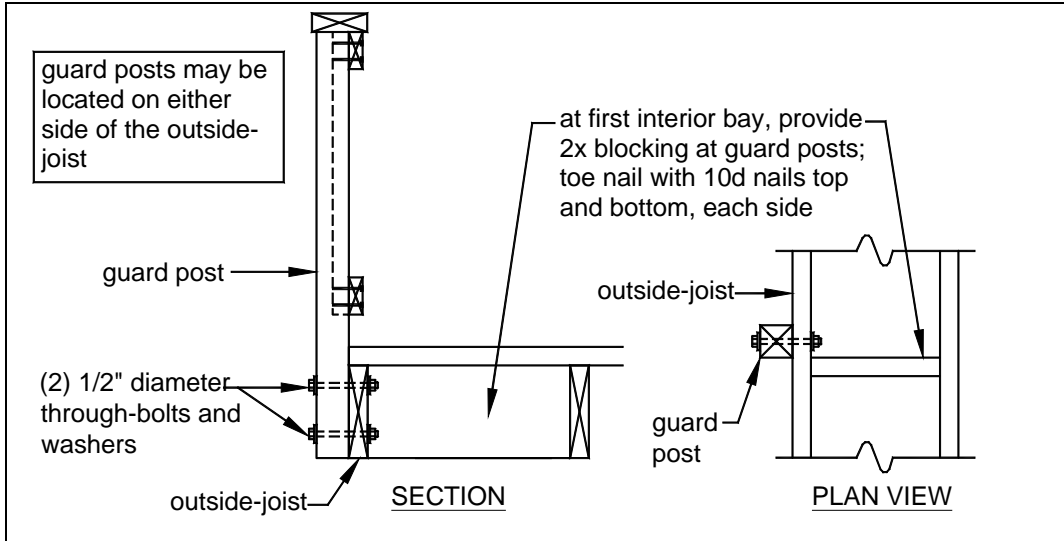


FIGURE 28: GUARD POST TO OUTSIDE JOIST DETAIL

GUARD POST TO RIM JOIST: Use one of the options shown in FIGURE 29 through FIGURE 31 to attach a guard post to a rim joist. See FIGURE 11 for rim joist-to-deck joist and decking-to-rim joist attachment requirements.

OPTION 1: As shown in FIGURE 29, guard posts are attached to the inside face of the rim joists. To attach guard post to the outside of the rim joist, see OPTION 2 or OPTION 3.

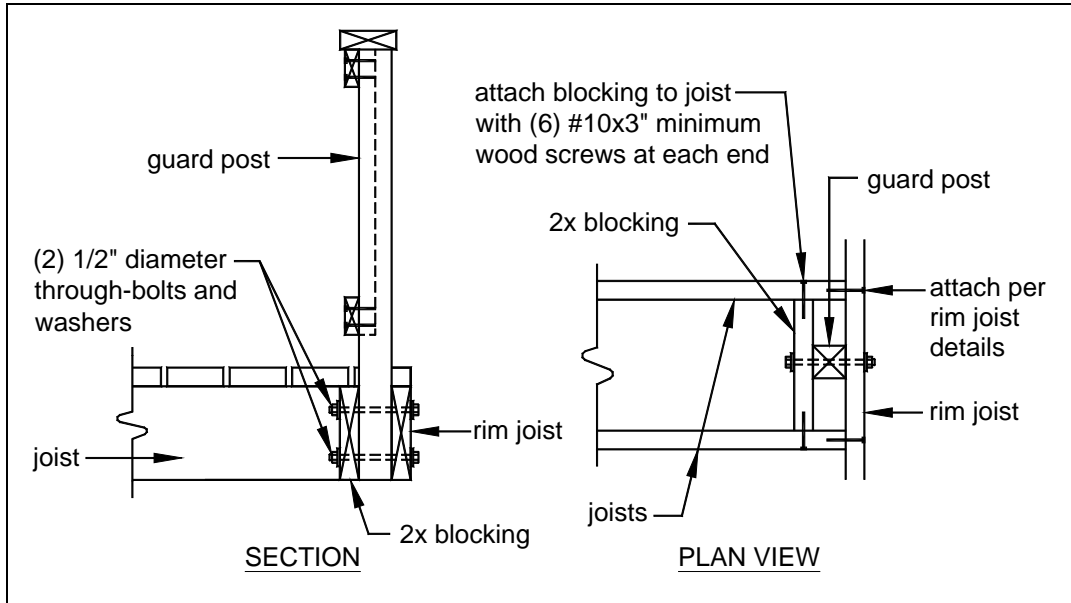


FIGURE 29: GUARD POST TO RIM JOIST DETAIL, OPTION 1

OPTION 2: As shown in FIGURE 30, *hold-down anchors* must be installed to attach the rim joist to the deck joists. There shall be a minimum of two bolts at the anchors' attachment to the joist. Look for model number HD2A in a Zmax coating from Simpson Strong-Tie, model number HD2A in a Triple Zinc coating from USP, or the hot-dipped galvanized DeckLok by Morse Technologies. Other hold-down anchor models meeting the minimum requirements may also be used.

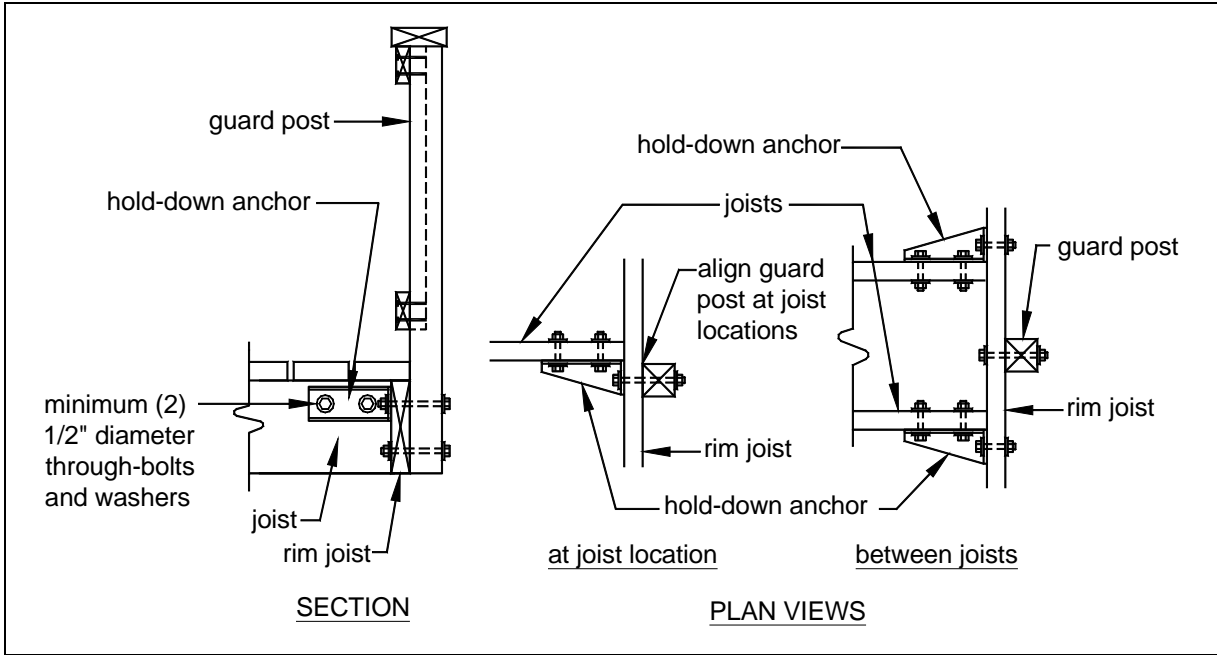


FIGURE 30: GUARD POST TO RIM JOIST DETAIL, OPTION 2

OPTION 3: As shown in FIGURE 31, the rim joist must be fastened to deck joists with two 20 gage *stud tie plates* attached per the manufacturer's instructions with hot-dipped galvanized or stainless steel fasteners. Look for model number SP1 in a Zmax coating from Simpson Strong-Tie or model number SPT22 in a Triple Zinc coating from USP. Other stud tie plate models meeting the minimum requirements may also be used.

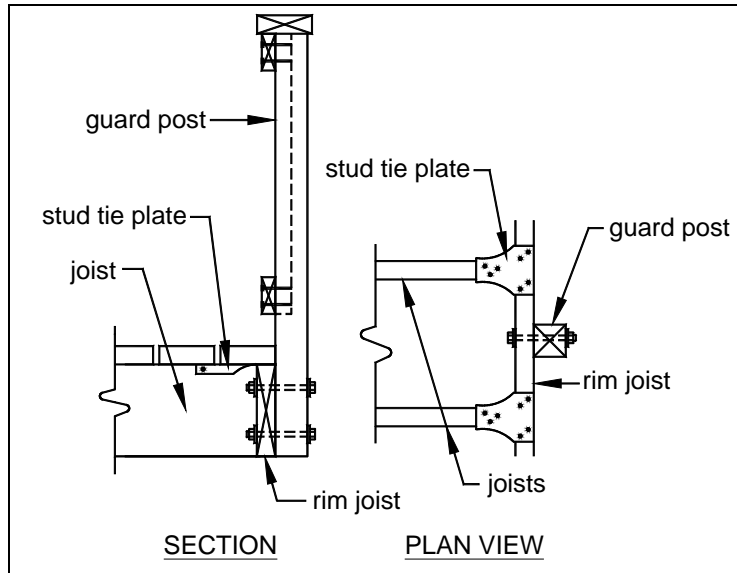


FIGURE 31: GUARD POST TO RIM JOIST DETAIL, OPTION 3

STAIR REQUIREMENTS

Stairs, stair stringers, and stair guards shall meet the requirements shown in FIGURE 32 through FIGURE 38. All stair stringers shall be 2x12 and shall not span more than the dimensions shown in FIGURE 33. If the span exceeds these dimensions, then an intermediate landing will be required. All intermediate stair landings must be designed and constructed as a free-standing deck using the details herein.

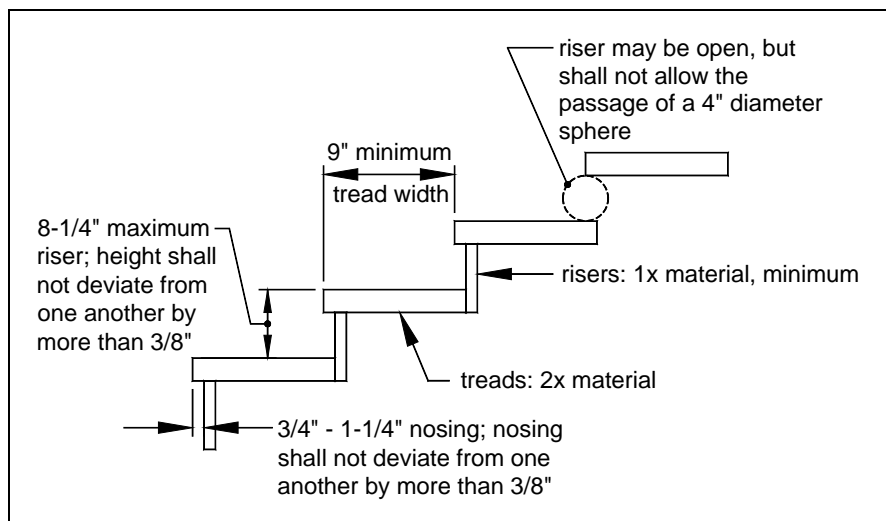


FIGURE 32: TREAD AND RISER DETAIL

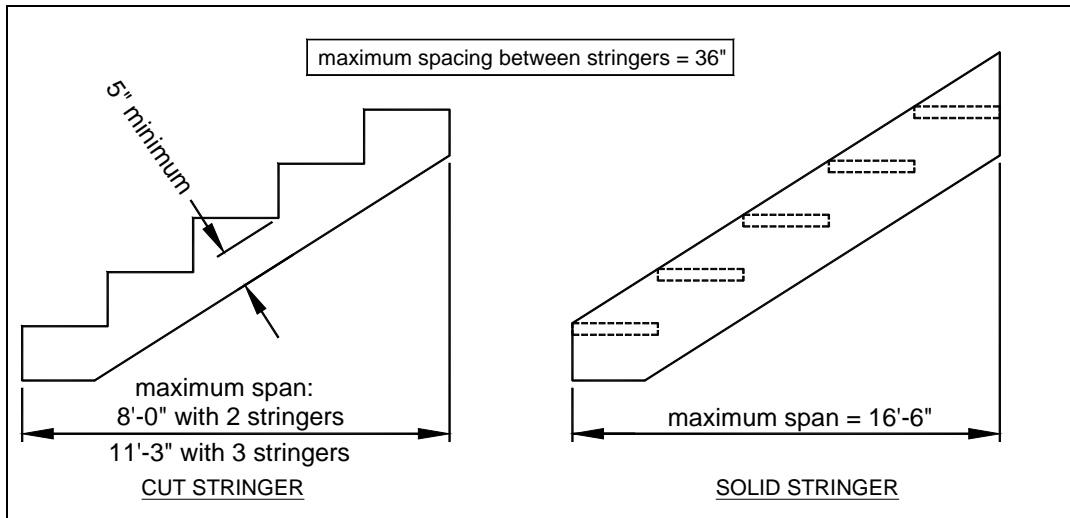


FIGURE 33: STAIR STRINGER REQUIREMENTS

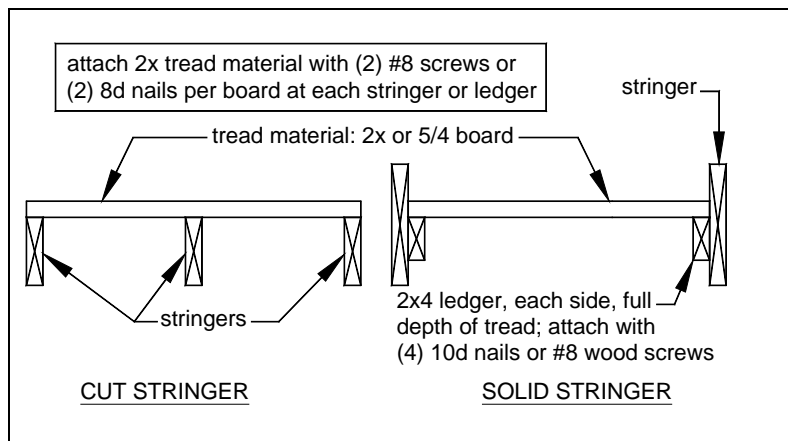


FIGURE 34: TREAD CONNECTION REQUIREMENTS

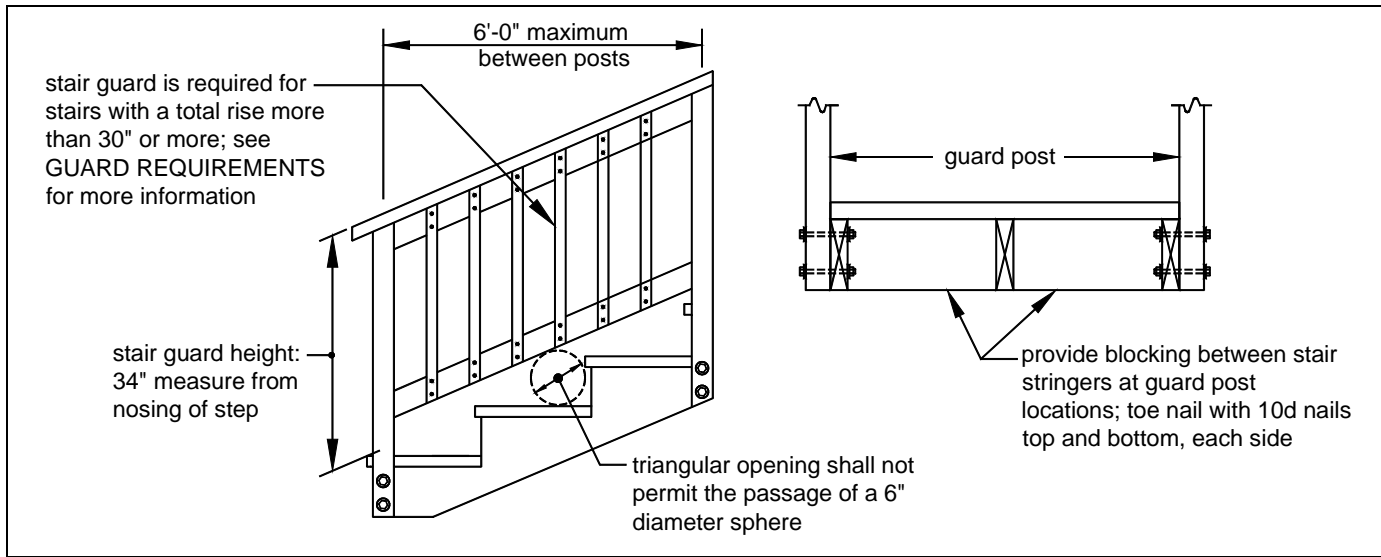


FIGURE 35: STAIR GUARD REQUIREMENTS

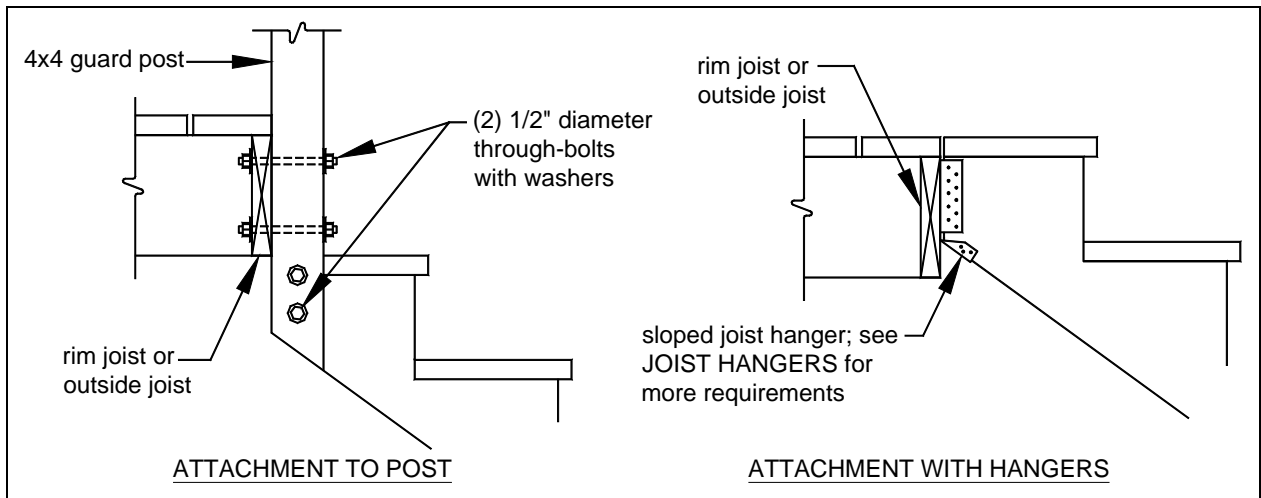
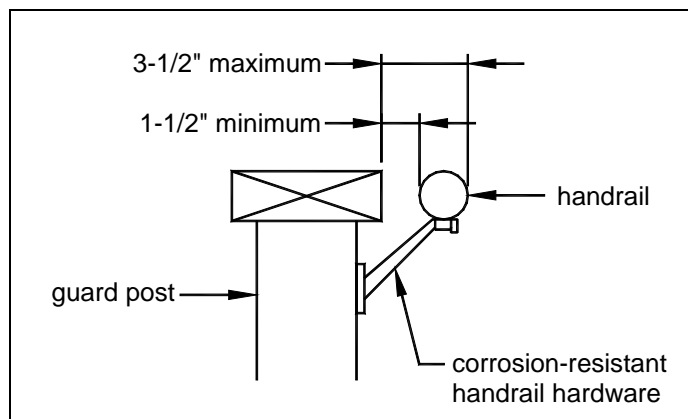


FIGURE 36: STAIR STRINGER ATTACHMENT DETAIL

STAIR HANDRAIL REQUIREMENTS

All stairs with 4 or more risers shall have a handrail on one side. See FIGURE 37. Handrails shall be graspable and shall be composed of decay-resistant and/or corrosion resistant material. The hand grip portion, if circular, shall be between 1-1/4" and 2" in diameter. Shapes other than circular shall have a perimeter dimension between 4" and 6-1/4" with a maximum cross sectional



dimension of 2". 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; see FIGURE 39. Handrails may be interrupted by guard posts only at a turn in the stair.

FIGURE 37: HANDRAIL REQUIREMENTS

STAIR FOOTING REQUIREMENTS

Where the stairway meets grade the stair stringers shall bear on a 4" concrete pad minimum. The pad size shall be of sufficient area such that all stringers have complete bearing on concrete and do not come in contact with the ground. See FIGURE 38 and FIGURE 39.

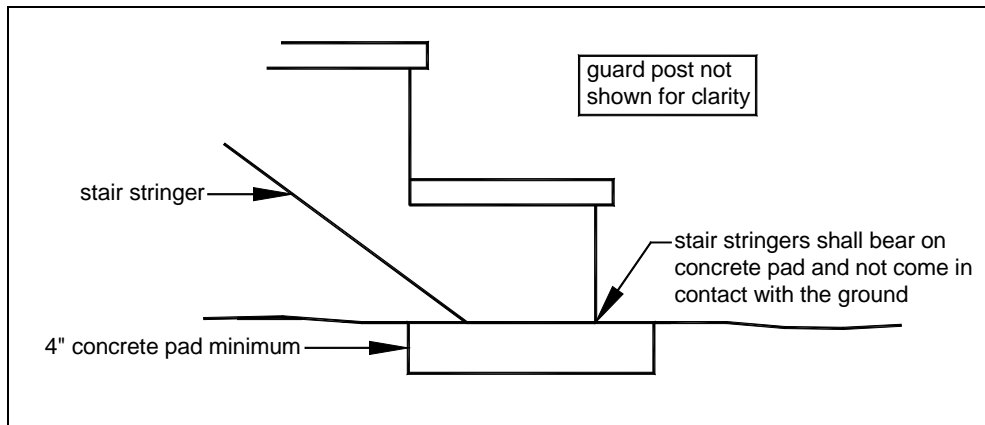


FIGURE 38: STAIR STRINGER BEARING AT GRADE

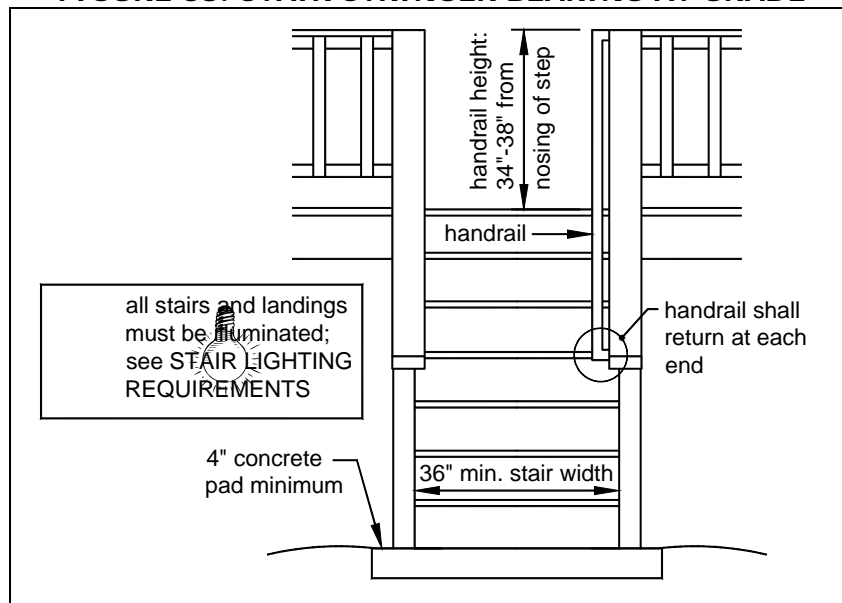


FIGURE 39: MISCELLANEOUS STAIR REQUIREMENTS

STAIR LIGHTING REQUIREMENTS

For added safety stairways should be provided with a light source located at the top landing such that all stairs and landings are adequately illuminated. A light switch operated from inside the house may be used, however, motion detected or timed switches are acceptable.

FRAMING AT CHIMNEY OR BAY WINDOW

All members at a chimney or bay window shall be framed in accordance with FIGURE 40. Headers may span a maximum of 6'-0". When a chimney or bay window is wider than 6'-0", one or more 6x6 posts may be added to reduce header spans to less than 6'-0". In such cases, the post footing must meet the requirements on Sheet 7. Headers with a span length greater than 6'-0" require a plan submission.

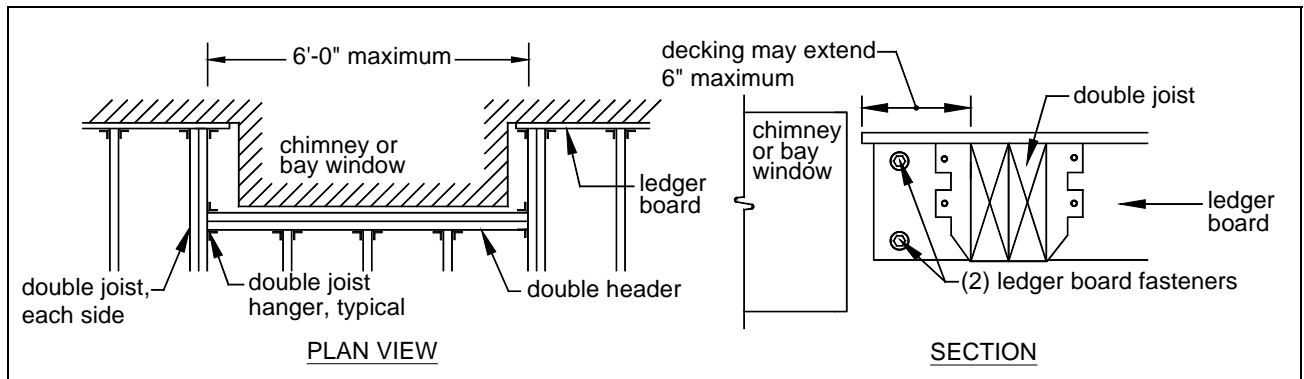


FIGURE 40: REQUIREMENTS FOR FRAMING AT CHIMNEY OR BAY WINDOW

The City of Hendersonville is committed to a policy of nondiscrimination in all City programs, services and activities. For questions or comments about these requirements please call (615)-822-3802, or write or come by the Department of Building and Codes, 101 Maple Drive North, Hendersonville, TN 37075. You may also contact this office by email from the City's webpage at www.Hvilletn.org.