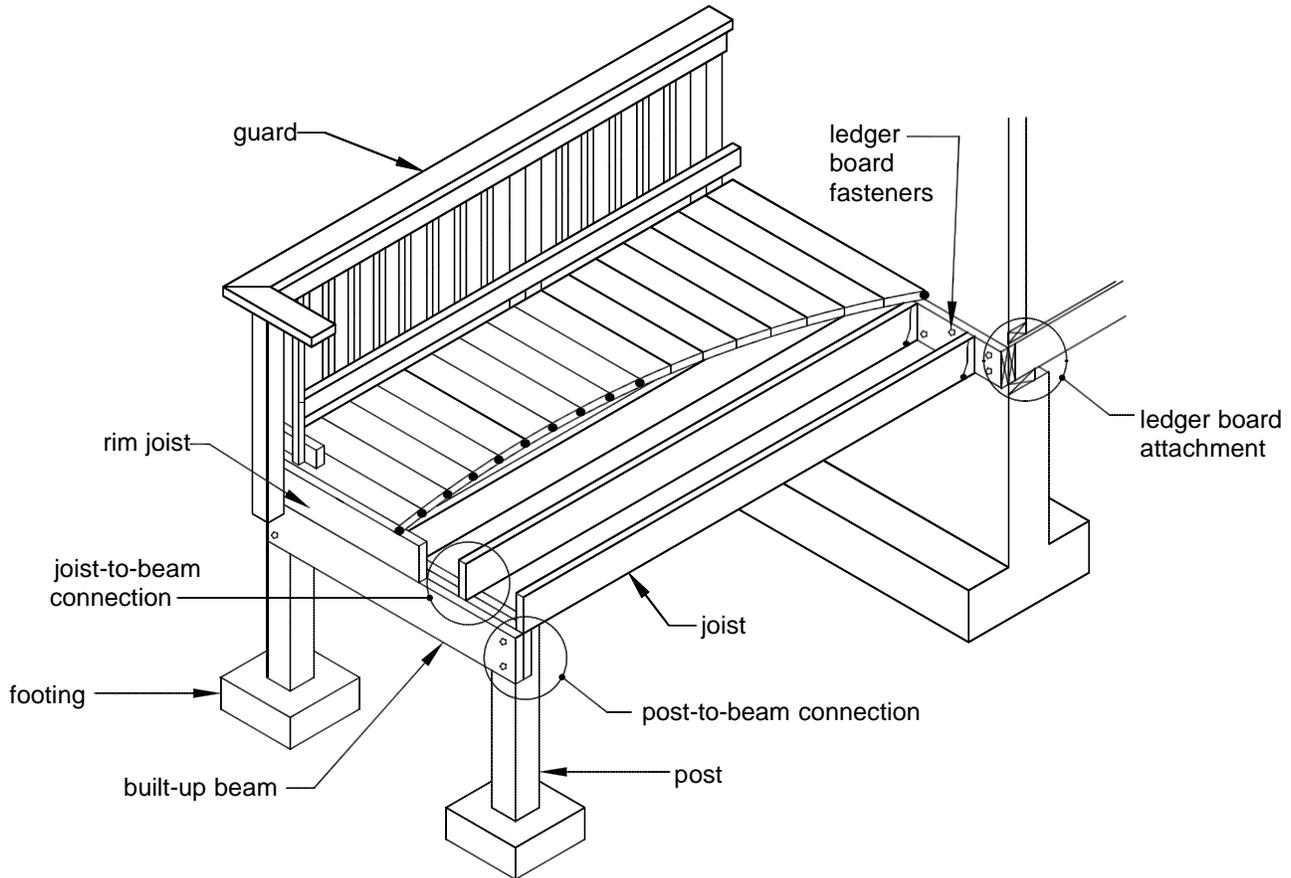


# Typical Deck Details

Based on the 2012 Virginia Uniform Statewide Building Code



## CONTENTS

General Notes .....	2	Rim Joist Requirements.....	10
Joist Size .....	3	Built-up Beam Requirements .....	10
Beam Size .....	4	Post-to-Beam Connection .....	10
Ledger Attachment Requirements .....	4	Footings .....	11
Prohibited Ledger Attachments .....	6	Guard Requirements.....	11
Ledger Board Fasteners .....	6	Stair Requirements .....	14
Free-Standing Decks .....	8	Stair Handrail Requirements .....	15
Lateral Support of Free-Standing Decks .....	8	Stairway Illumination Requirements.....	16
Joist Hangers .....	9	Framing at Chimney or Bay Window .....	16
Joist-to-Beam Connection .....	9		

**THE USE OF THIS PACKAGE IN LIEU OF SUBMITTED DRAWINGS APPLIES TO SINGLE SPAN, SINGLE LEVEL, RESIDENTIAL DECKS ONLY. DECKS MUST BE CONSTRUCTED IN STRICT CONFORMANCE WITH THE DETAILS CONTAINED HEREIN. A COPY OF THIS DECK DETAIL MUST BE ON THE JOB SITE AND AVAILABLE TO THE INSPECTOR DURING THE INSPECTION PROCESS.**



**King & Queen  
County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Revised: 04/11/2016

Sheet 1 of 16

## **GENERAL NOTES**

1. 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 for **ground contact**.
2. All nails shall be spiral or annular grooved.
3. **New pressure treatment methods use chemicals that will prematurely corrode standard fasteners, hardware, and flashing when in contact with pressure treated lumber, and, as a result, fastener and hardware requirements have changed; see below.**
  - **All screws and nails shall be hot-dipped galvanized or stainless steel.**
  - **All hardware (joist hangers, cast-in-place post anchors, 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.**
4. Decks constructed according to this handout **are not approved** for future hot tub installations.
5. Decks shall not be attached to house overhangs, bay windows, brick veneers, or chimneys.
6. Deviations from this handout and conditions which do not meet the details shown herein require a plan submission.
7. Inspections:
  - A footing, framing, and final inspection is required on all decks.
  - Footing inspections are required PRIOR to the placement of concrete.
  - Framing and final inspections may be combined if all portions of the deck framing and mechanical attachments are at least 42" above grade.
  - **Inspections are required by law. Failure to receive any and all inspections can result in the issuance of violations which may lead to legal proceedings.**
8. It is the responsibility of the permit holder or the permit holder's representative to notify the County when the stages of construction are reached that require an inspection. Inspection requests may be made by calling the County of King & Queen inspection request line (804) 785-5975 during regular working hours, Monday through Friday 8:00 am – 5:00 pm or after hours a message may be left and the inspection will be scheduled for the following day.
9. All decking material shall be composed of 2x6 or 5/4 ("five-quarter") board. Attach decking to each joist with 2-8d nails or 2-#8 screws. Decking may be placed from an angle perpendicular to the joists to an angle of 45 degrees to the joists. Decking must have a span length such that each board bears on a minimum of 4 joists.
10. **DECKS AROUND POOLS PLEASE NOTE:** There are special requirements in the building code for decks, guardrails, and other barriers around swimming pools that this guide does not cover. For complete information please refer to our "Residential Swimming Pools and Spas - Complete Details -"guide found at our website. This guide is also available at our office during normal office hours.
11. Decks shall not be used or occupied until a final inspection approval is obtained.



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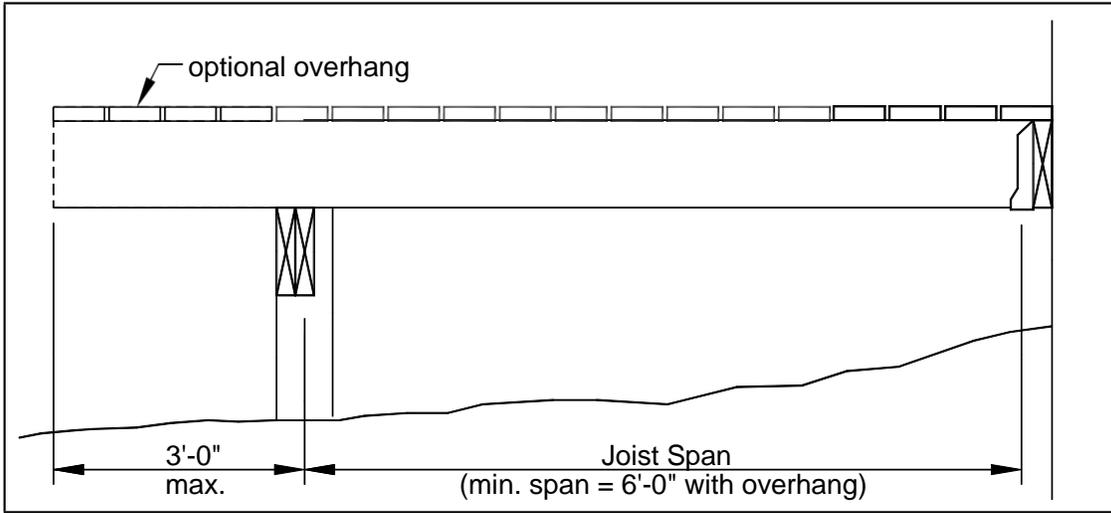
**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Revised: 04/11/2016

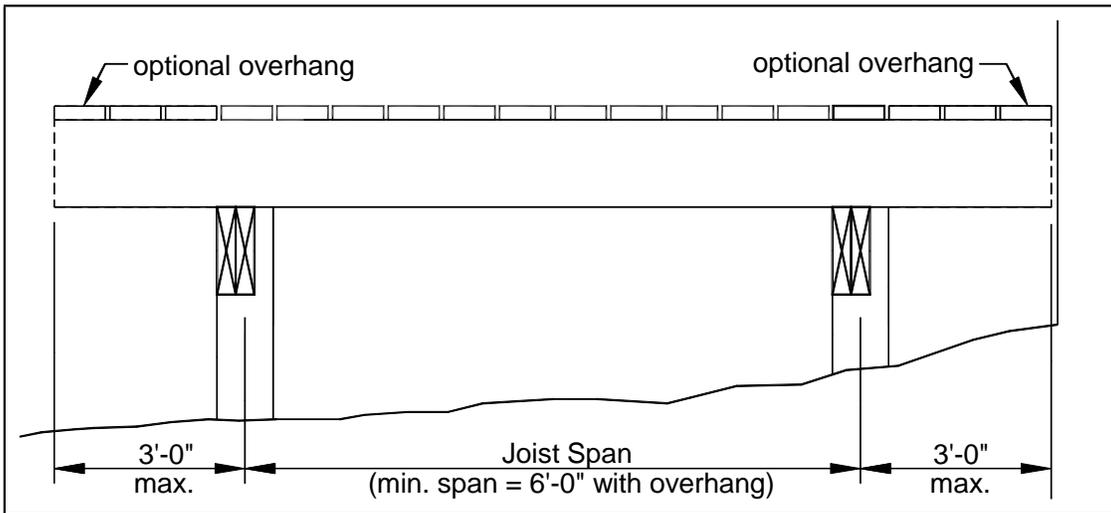
Sheet 2 of 16

**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 overhangs. Maximum joist span lengths are noted in TABLE 1. See FIGURE 1 and FIGURE 2 for joist span types.



**FIGURE 1: JOIST SPAN - DECK ATTACHED AT HOUSE (SEE FIGURE 5)**



**FIGURE 2: JOIST SPAN - FREE-STANDING DECK**

**TABLE 1: MAXIMUM JOIST SPANS**

Joist Size	Joist Spacing, on center	Joist Span <sup>1</sup> (does not include overhang)	Joist Spacing, on center	Joist Span <sup>1</sup> (including overhang)
2x6	16"	9'-0"	16"	6'-8"
2x6	24"	7'-7"	24"	6'-8"
2x8	16"	11'-10"	16"	10'-1"
2x8	24"	9'-8"	24"	9'-8"
2x10	16"	14'-0"	16"	14'-0"
2x10	24"	11'-5"	24"	11'-5"
2x12	16"	16'-6"	16"	16'-6"
2x12	24"	13'-6"	24"	13'-6"

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

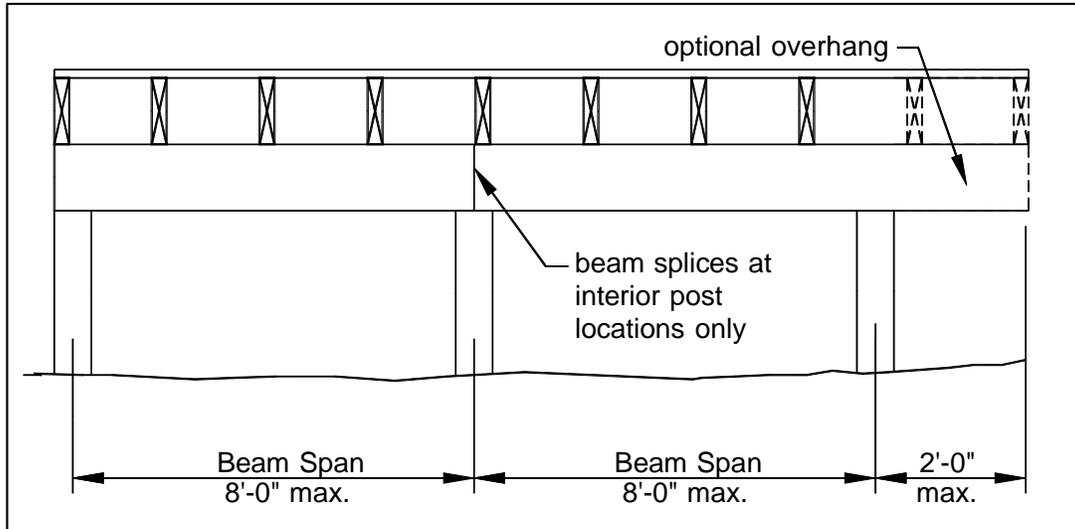


**King & Queen  
County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

## BEAM SIZE

Beam size determination is based on your joist span characteristics. Use TABLE 2 to determine your beam size (distance between posts). See FIGURE 3 for beam span types.



**FIGURE 3: BEAM SPAN TYPES**

**TABLE 2: DECK BEAM SPAN LENGTHS**

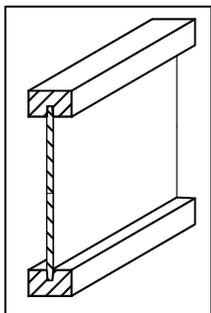
Southern Pine	JOIST SPANS IN FEET						
	6' or less joists	8' or less joists	10' or less joists	12' or less joists	14' or less joists	16' or less joists	18' or less joists
<b>2-2X6</b>	6' 11"	5' 11"	5' 4"	4' 10"	4' 6"	4' 3"	4' 0"
<b>2-2X8</b>	8' 9"	7' 7"	6' 9"	6' 2"	5' 9"	5' 4"	5' 0"
<b>2-2X10</b>	10' 4"	9' 0"	8' 0"	7' 4"	6' 9"	6' 4"	6' 0"
<b>2-2X12</b>	12' 2"	10' 7"	9' 5"	8' 7"	8' 0"	7' 6"	7' 0"

\* 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.

## LEDGER ATTACHMENT REQUIREMENTS

**GENERAL:** Ledger board attachments to the existing exterior wall shall be constructed in accordance with FIGURE 5 through FIGURE 7. When attachments are made to the existing house band board, it 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 is required. See FREE-STANDING DECKS on sheet 8. YOU MUST VERIFY THE EXISTING CONDITIONS IN THE FIELD PRIOR TO APPLYING FOR A BUILDING PERMIT. COMPLIANCE WITH ALL THE REQUIREMENTS HEREIN IS CRITICAL TO ENSURE THE STRUCTURAL STABILITY OF YOUR DECK.

**SIDING AND FLASHING:** 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).



**FIGURE 4: MWJ PROFILE**

**MANUFACTURED WOOD JOIST:** The term "MWJ" denotes manufactured wood "I" joists; see FIGURE 4. Examples of manufactured wood joists are TJI, GPI, and LPI. Many new homes constructed with MWJs include a 1-<sup>1</sup>/<sub>4</sub>" manufactured solid rim joist; see FIGURE 5. However, older homes constructed with MWJs may only include a plywood band board. In these cases a free-standing deck or a full plan submission is required.

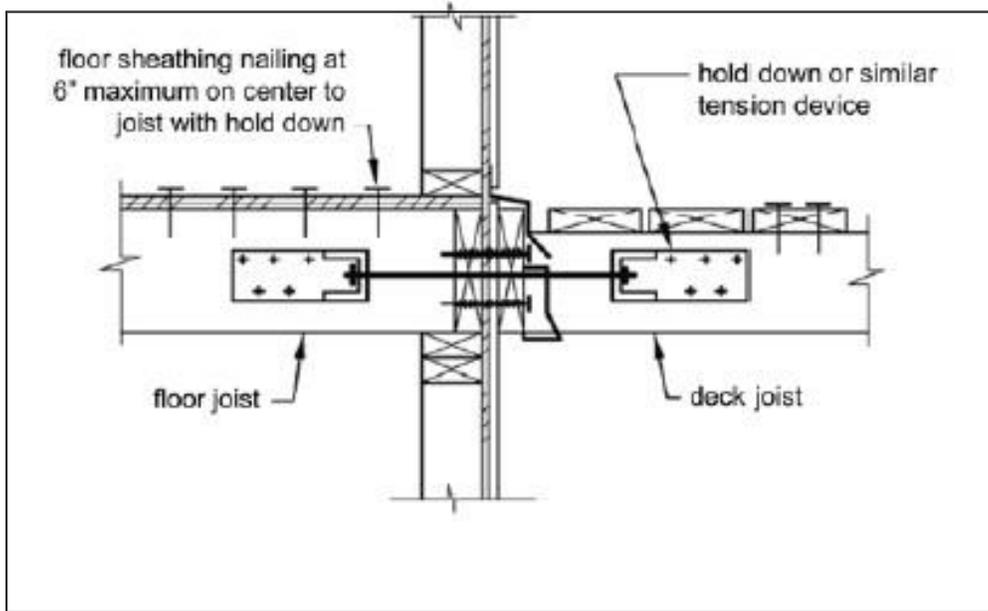


**King & Queen  
County**

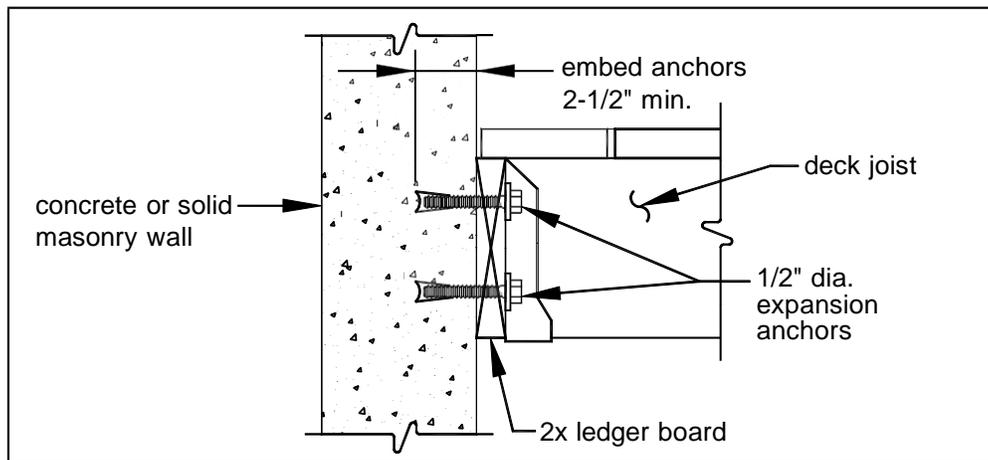
**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Revised: 04/11/2016

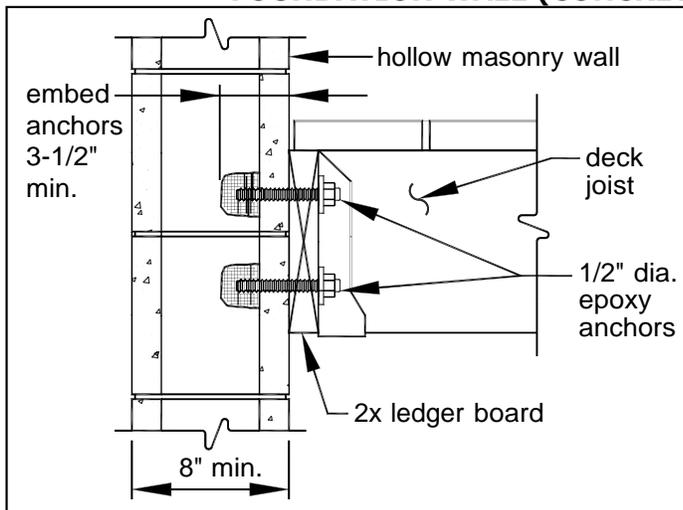
Sheet 4 of 16



**FIGURE 5: ATTACHMENT OF LEDGER BOARD-TO-BAND BOARD MINIMUM OF TWO HOLD-DOWN OR SIMILAR TENSION DEVICES REQUIRED**



**FIGURE 6: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (CONCRETE OR SOLID MASONRY)**



**FIGURE 7: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (HOLLOW MASONRY)**

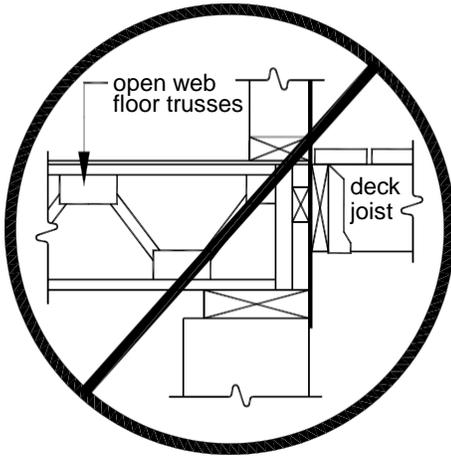


**King & Queen  
County**

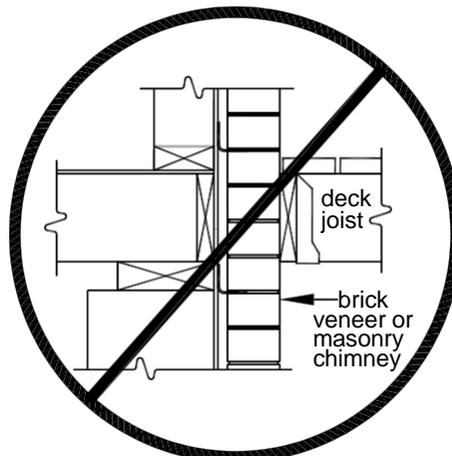
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Based on the 2012 Virginia Uniform  
Statewide Building Code

**PROHIBITED LEDGER ATTACHMENTS**

Attachments to the ends of pre-manufactured open web joists, to brick veneers, and to house overhangs/bay windows are strictly prohibited; see FIGURE 8 through FIGURE 10. In such cases the deck shall be free-standing. See FREE-STANDING DECKS on sheet 8.



**FIGURE 8: NO ATTACHMENT TO OPEN WEB TRUSSES**



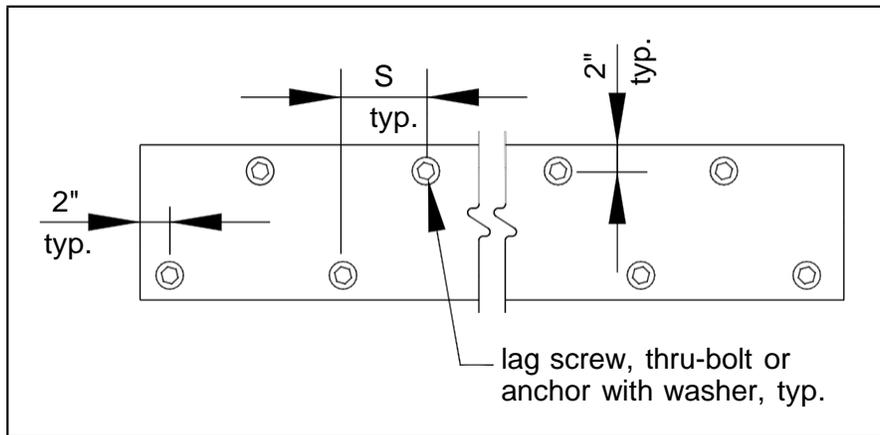
**FIGURE 9: NO ATTACHMENT TO BRICK VENEER**



**FIGURE 10: NO ATTACHMENT TO HOUSE OVERHANG**

**LEDGER BOARD FASTENERS**

All fastener types shall be spaced per TABLE 4 and installed per FIGURE 11. All fasteners shall be installed with washers and must be thoroughly tightened. **Adequacy of connections will be verified by county inspectors.** If a ladder is required to access the ledger board, one must be provided by the property owner, permit holder, or their representative.



**FIGURE 11: LEDGER BOARD FASTENER SPACING AND CLEARANCES**

**TABLE 4: LEDGER BOARD FASTENER SCHEDULE**

Joist Span	S (spacing), on center
0 - 8'	10"
8' - 10'	8"
10' - 14'	6"
14' - 18'	5"
greater than 18'	4"



**King & Queen County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform Statewide Building Code

### Thru-Bolts

Thru-bolts shall have a minimum diameter of  $\frac{1}{2}$ ". Lead (pilot) holes for thru-bolts shall be  $\frac{17}{32}$ " to  $\frac{9}{16}$ " in diameter. Thru-bolts must be equipped with washers at the bolt head as well as the nut.

### Expansion Anchors

Use expansion anchors when attaching a ledger board to a concrete or solid masonry wall as shown in FIGURE 6. Bolt diameters of the anchors shall be a minimum of  $\frac{1}{2}$ "; in some cases, this may require an anchor size of  $\frac{5}{8}$ ". Minimum embedment length shall be  $2\text{-}\frac{1}{2}$ ". Expansion anchors must have washers.

### Epoxy Anchors

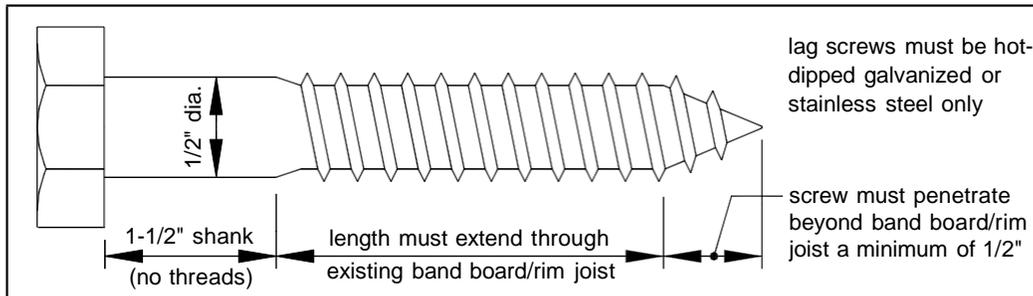
When attaching to hollow masonry, fill the cells with grout and use expansion anchors, or use one of the approved epoxy anchors listed in TABLE 5 and install as shown in FIGURE 7. Epoxy anchors shall have a minimum diameter of  $\frac{1}{2}$ " and minimum embedment length of  $3\text{-}\frac{1}{2}$ ". Installation shall be in strict conformance to the manufacturers' instructions. Epoxy anchors must have washers.

**TABLE 5: 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  $\frac{1}{2}$ " and shall be hot-dipped galvanized or stainless steel. Lag screws may be used only when the field conditions match those shown in FIGURE 5. **You must verify the existing conditions in the field prior to applying for a building permit and installing lag screws. Compliance with all the requirements herein is critical to ensure the structural stability of your deck.** See FIGURE 12 for lag screw length and shank requirements. All lag screws shall be installed with washers.



**FIGURE 12: LAG SCREW REQUIREMENTS**

**Lag screw installation requirements:** each lag screw shall have lead (pilot) holes drilled as follows: 1) drill a  $\frac{1}{2}$ " diameter hole in the ledger board, 2) drill a  $\frac{5}{16}$ " diameter hole into the solid connection material of the existing house. **DO NOT DRILL A  $\frac{1}{2}$ " DIAMETER HOLE INTO THE SOLID CONNECTION MATERIAL.**

The threaded portion of the lag screw shall be inserted into the lead 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.



**King & Queen  
County**

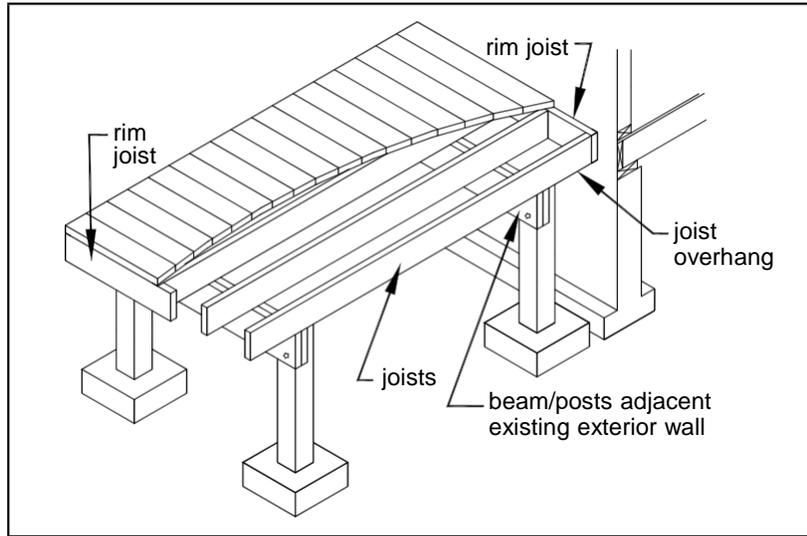
**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Revised: 04/11/2016

Sheet 7 of 16

**FREE-STANDING DECKS**

Decks which are free-standing do not utilize the exterior wall of the existing house to support vertical loads. Support at or near the house is provided by an additional beam and posts. See FIGURE 13. Beam size is determined by TABLE 2 and TABLE 3.

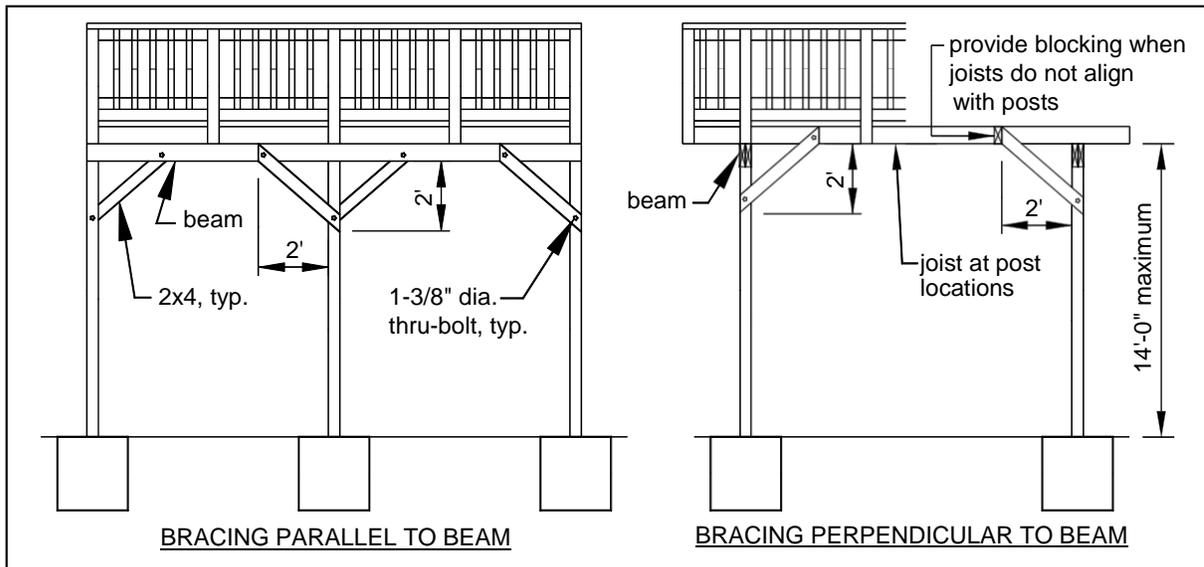


**FIGURE 13: FREE-STANDING DECK**

**LATERAL SUPPORT OF FREE STANDING DECKS**

Free standing decks greater than 2 feet above grade shall resist lateral loading and movement by one of the following methods.

1. **Diagonal Bracing:** provide diagonal bracing as shown in FIGURE 14. Bracing shall be located between posts parallel to beams and bolted to the beam and post as shown. Diagonal bracing shall also be located perpendicular to beams and, in such cases, bracing shall be bolted to the post and joist above the post location.



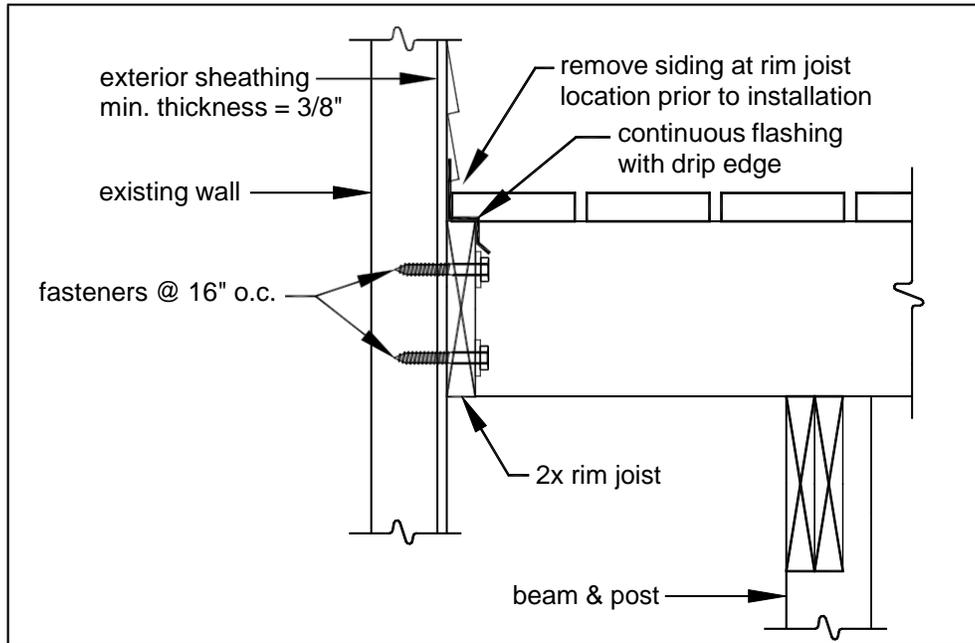
**FIGURE 14: DIAGONAL BRACING REQUIREMENTS**



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County*

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

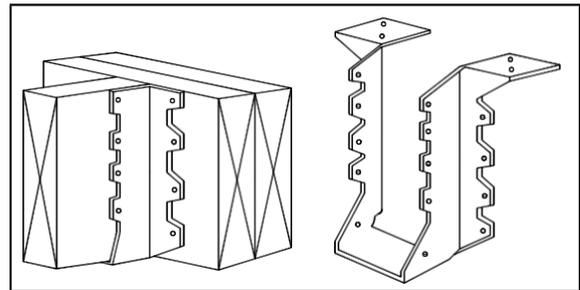
2. **Attachment To House:** lateral support is provided by the attachment of the deck rim joist to the existing house as shown in FIGURE 15. The existing exterior wall must have sheathing consisting of structural wood panels with a minimum thickness of  $\frac{3}{8}$ " , and the fasteners shall attach to an existing band board or wall stud. The deck rim joist may also attach to a masonry or concrete wall, but not to a brick veneer. YOU MUST VERIFY THIS CONDITION IN THE FIELD PRIOR TO UTILIZING THIS METHOD. Fasteners shall be 16" on center and must penetrate existing wall studs. See also the provisions noted on sheet 6. Flashing over the rim joist is required and must be installed in accordance with the flashing provisions noted on sheet 4. For rim joist size and requirements, see sheet 10.



**FIGURE 15: ATTACHMENT TO HOUSE LATERAL SUPPORT**

**JOIST HANGERS**

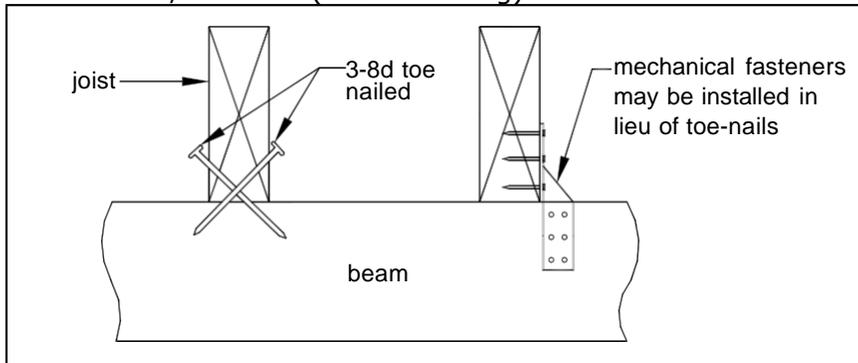
Joist hangers, as shown in FIGURE 16, shall have a minimum capacity of 1000 lbs. Joist hangers used shall be manufactured for their intended lumber size. Joist hangers shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.



**FIGURE 16: TYPICAL JOIST HANGERS**

**JOIST-TO-BEAM CONNECTION**

Each joist shall be attached to the beam as shown in FIGURE 17. Mechanical fasteners shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.



**FIGURE 17: JOIST-TO-BEAM DETAIL**

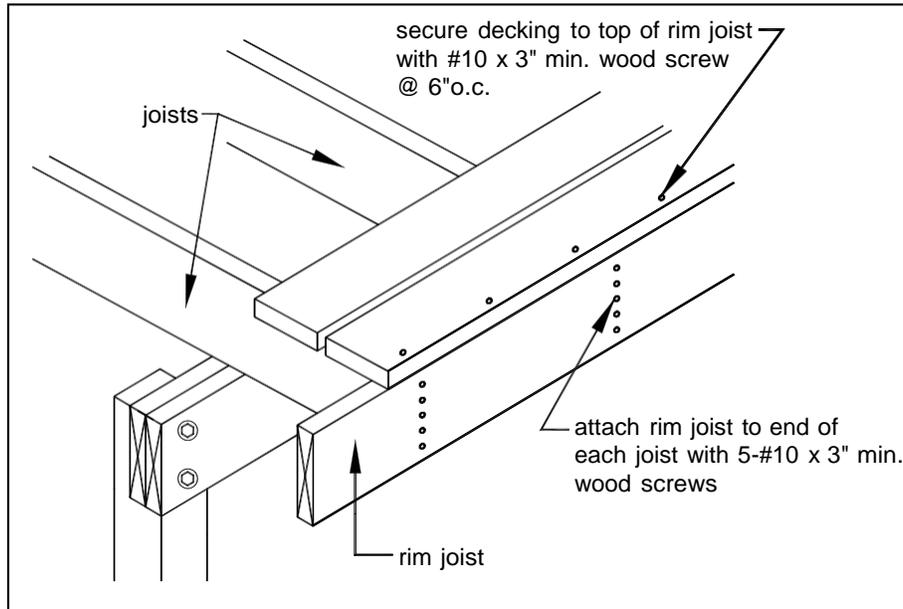


**King & Queen  
County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

## **RIM JOIST REQUIREMENTS**

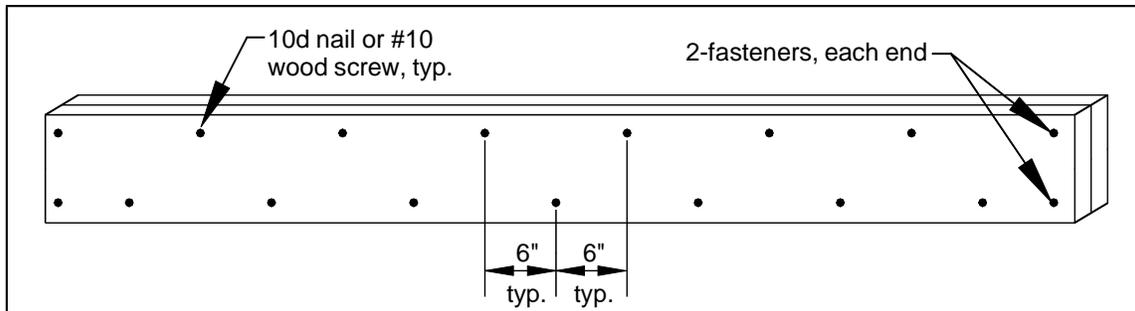
Attach a continuous rim joist to the ends of joists as shown in FIGURE 18. Please note: rim joists are required at both ends of joists associated with free-standing decks. Minimum rim joist dimensions shall be equal to the dimensions of the joist.



**FIGURE 18: RIM JOIST CONNECTION DETAILS**

## **BUILT-UP BEAM REQUIREMENTS**

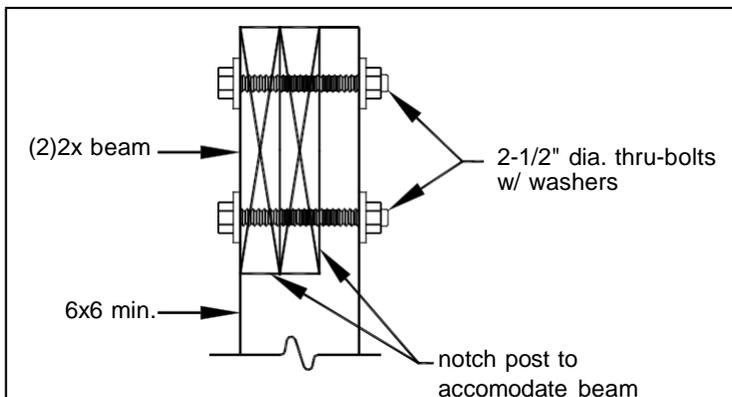
Built-up beams shall be assembled in accordance with FIGURE 19. The nailing pattern shall be staggered as shown.



**FIGURE 19: BUILT-UP BEAM DETAIL**

## **POST-TO-BEAM REQUIREMENTS**

The post-to-beam connection may be accomplished by notching the 6x6 post as shown in **FIGURE 20**. All thru-bolts shall have washers at the bolt head and nut. All post sizes shall be 6x6, and the maximum height shall be 14'-0".



**King & Queen  
County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Revised: 04/11/2016

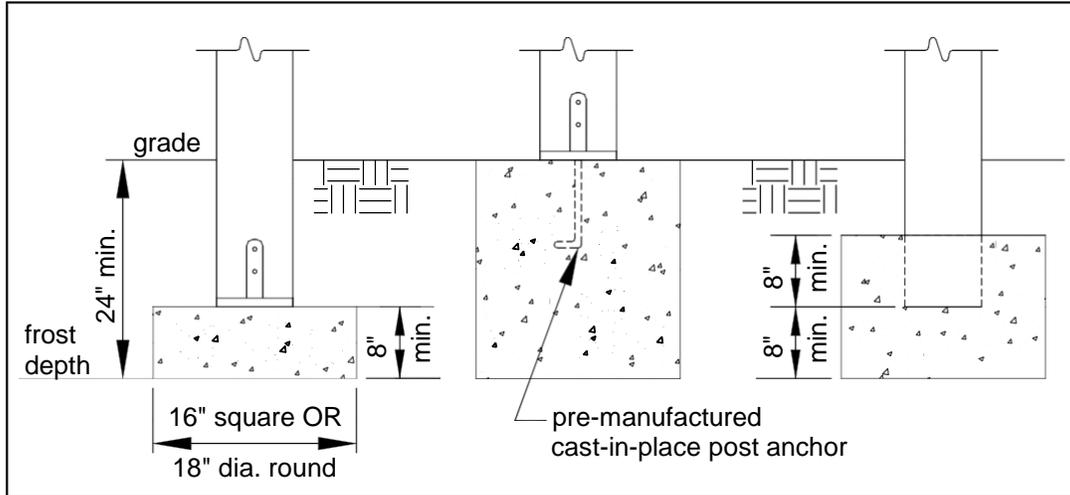
Sheet 10 of 16

**FIGURE 20: POST-TO-BEAM REQUIREMENTS**

**FOOTINGS**

See FIGURE 21 for footing size, footing thickness and post attachment options and requirements. All footings shall bear on solid ground; bearing conditions shall be verified in the field by County inspectors prior to placement of concrete. Footings closer than 5'-0" to the existing exterior house wall must bear at the same elevation as the existing wall footing. **Do not construct footings over utility lines or enclosed meters. Call Miss Utility at 1-800-552-7001 before you dig.**

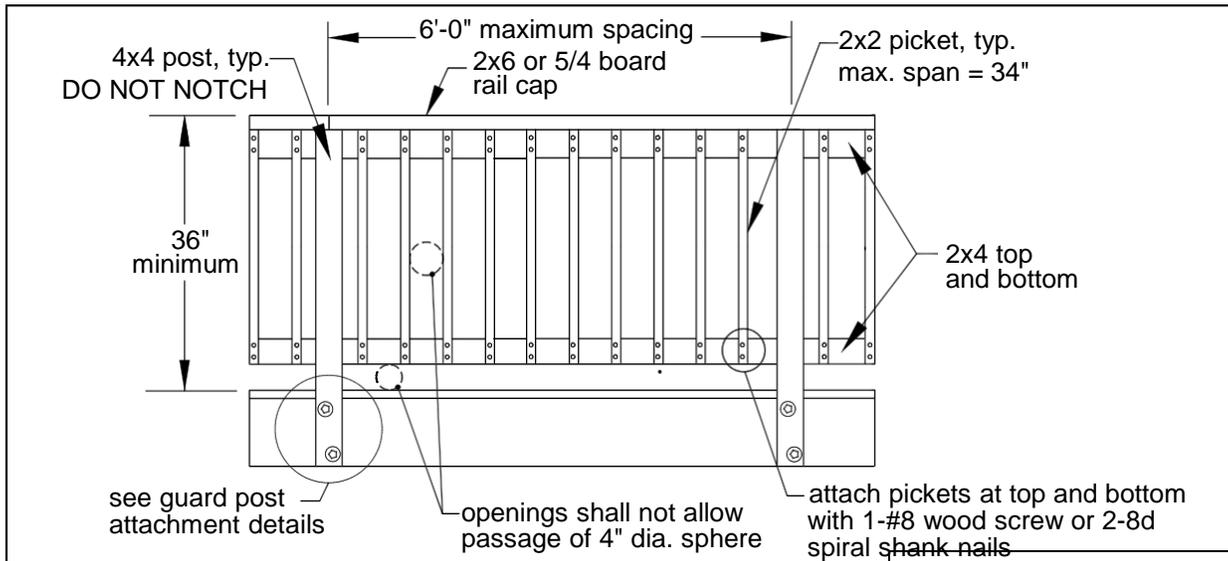
Pre-manufactured post anchors shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.



**FIGURE 21: TYPICAL FOOTING DETAILS**

**GUARD REQUIREMENTS**

Decks less than 30" above grade are not required to have a guard; however, if one is installed, it must meet these requirements. All guards shall be constructed in strict conformance with figures herein; any deviations require a plan submission.



**FIGURE 22: TYPICAL GUARD DETAIL**

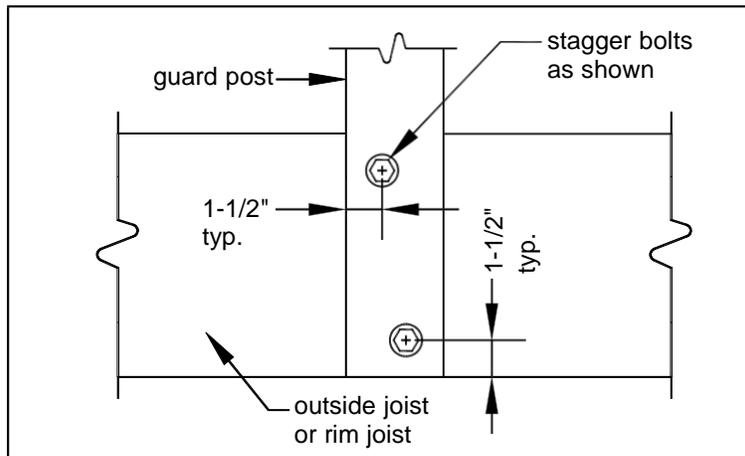


*King & Queen  
County*

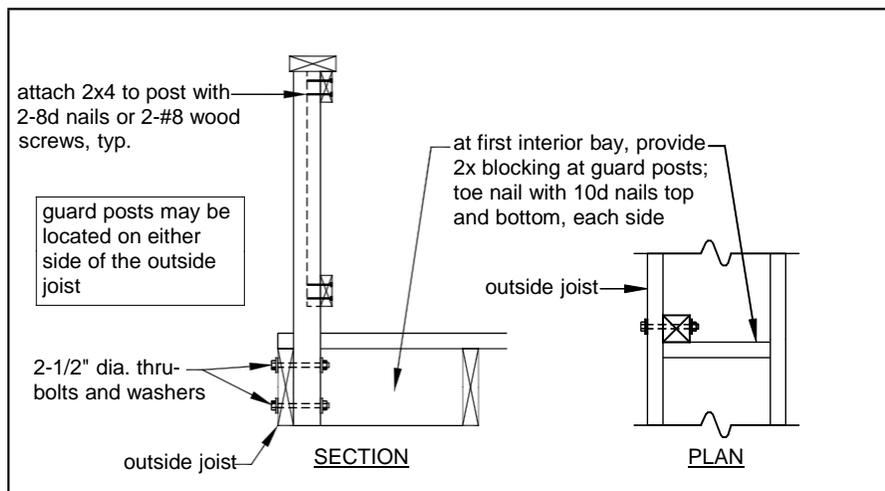
**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Any pre-fabricated wood, plastic or manufactured guard system purchased from a home center store, lumber company or similar will also require a plan submission. The rail cap is designed to withstand a concentrated load of 200 LBS anywhere along its length; the infill area is designed to withstand a horizontal load of 50 LBS on a square foot area.

**GUARD POST ATTACHMENT:** Guard posts shall be spaced per FIGURE 22 and attached per FIGURE 23 through FIGURE 26.



**FIGURE 23: GUARD POST ATTACHMENT DETAIL**

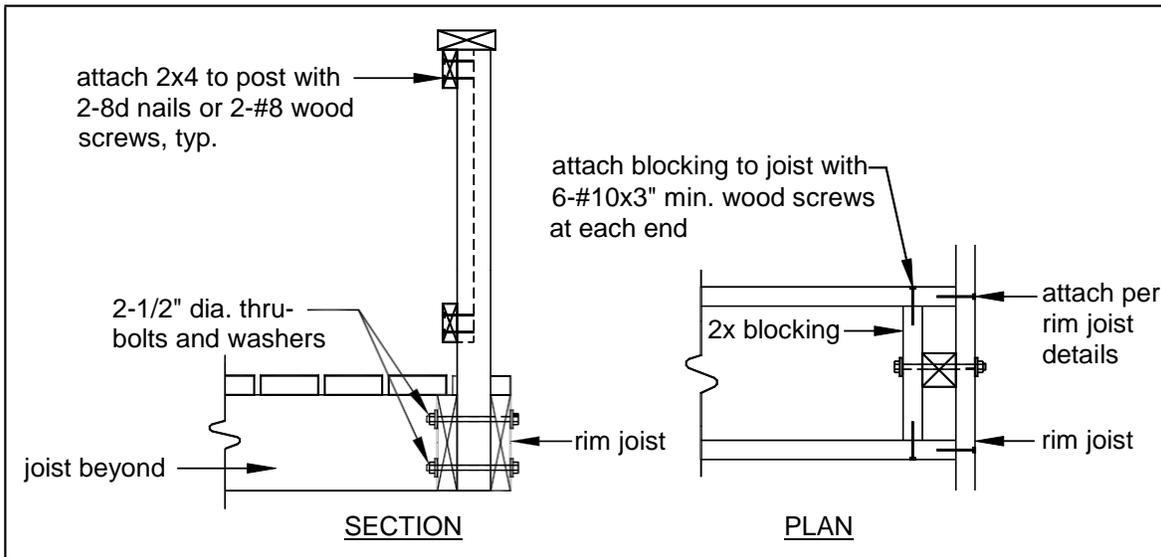


**FIGURE 24: GUARD POST TO OUTSIDE JOIST DETAIL**



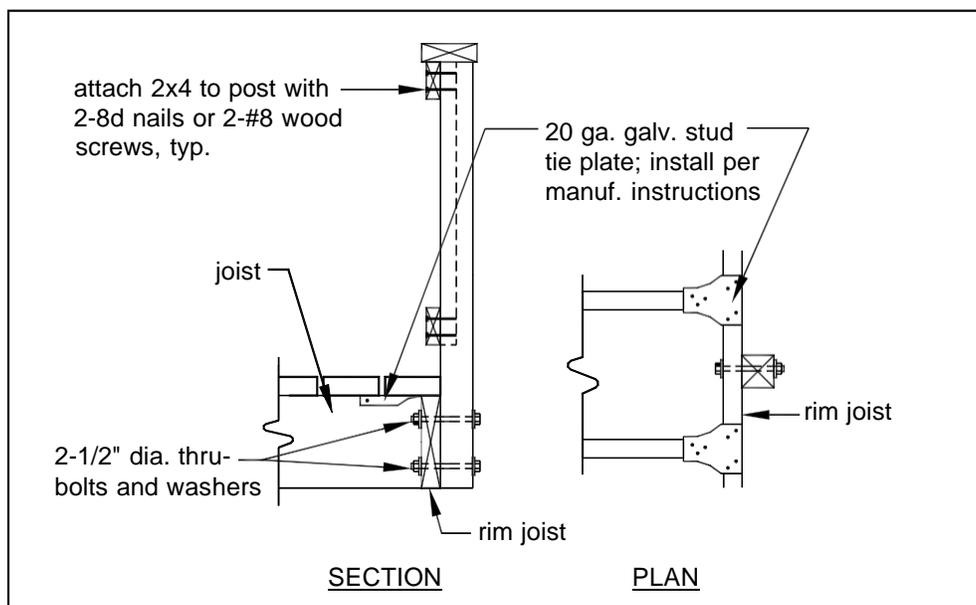
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County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code



**FIGURE 25: GUARD POST TO RIM JOIST DETAIL, OPTION 1**

As shown in FIGURE 26, guard posts may be attached to the outside face of the rim joist. However, in this condition, and in addition to the attachment requirements shown in FIGURE 18, the rim joist must be fastened to the next adjacent joists with 20 gage. *stud tie plates* attached per the manufacturer's instructions with hot-dipped galvanized or stainless steel fasteners. Stud tie plates must be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Look for model number SP1 in a Zmax coating from Simpson Strong-Tie or model number SPT22 in a Triple Zinc coating from USP. **If you are unable to use *stud tie plates* in this condition, you must follow the requirements of FIGURE 25.**



**FIGURE 26: GUARD POST TO RIM JOIST DETAIL, OPTION 2**



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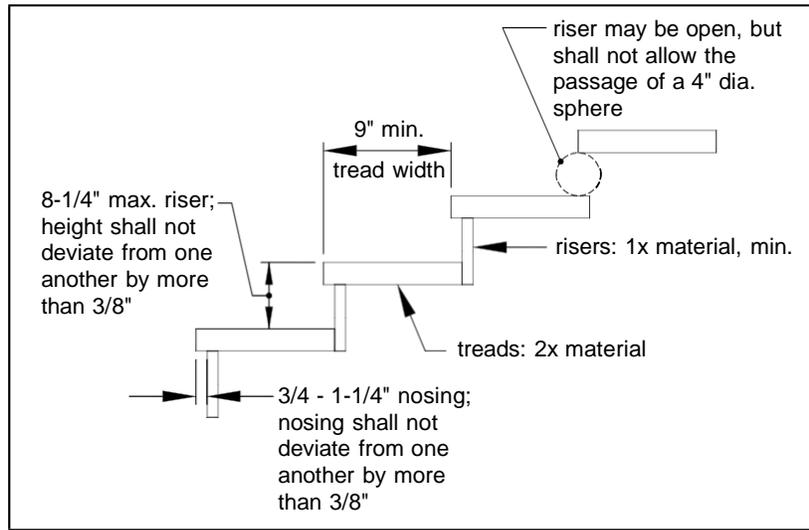
**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code

Revised: 04/11/2016

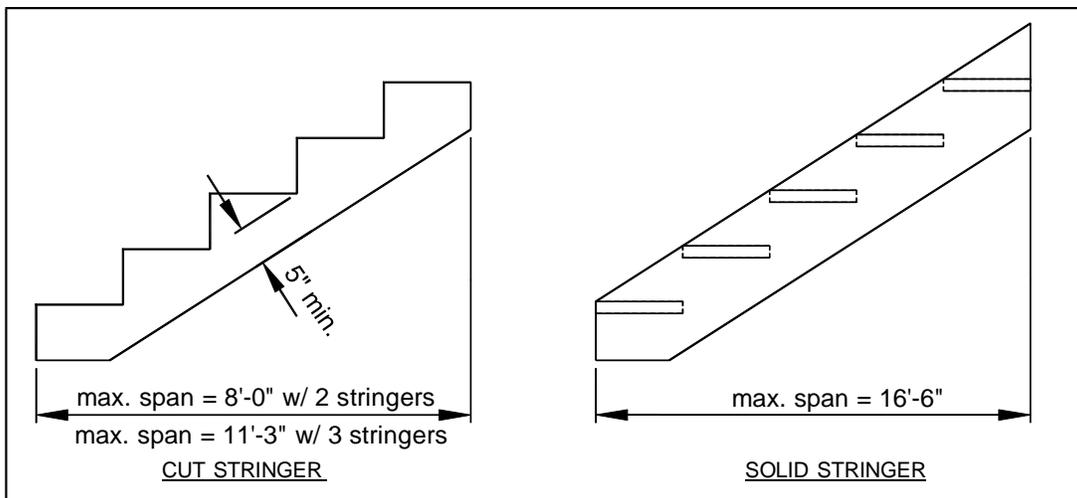
Sheet 13 of 16

**STAIR REQUIREMENTS**

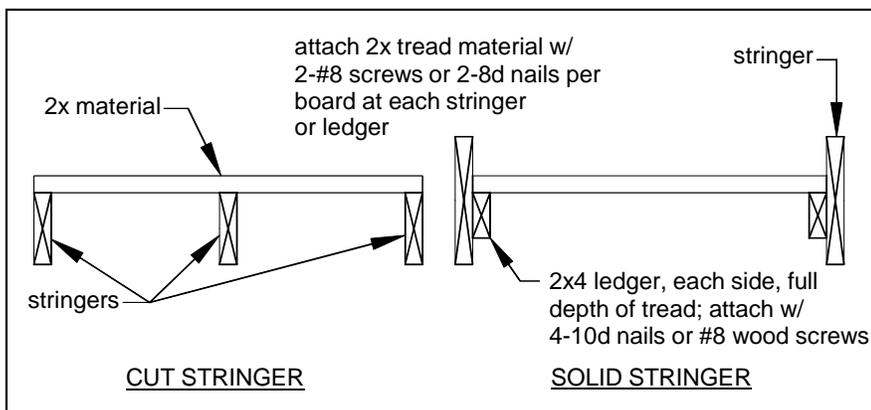
Stairs, stair stringers, and stair guard shall meet the requirements shown in FIGURE 27 through FIGURE 33. All stringers shall be 2x12.



**FIGURE 27: TREAD AND RISER DETAIL**



**FIGURE 28: STAIR STRINGER REQUIREMENTS**

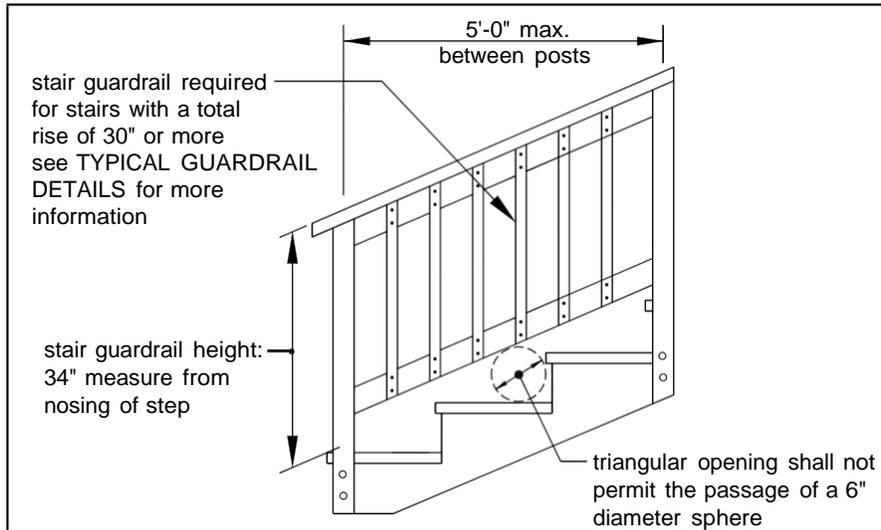


**FIGURE 29: TREAD CONNECTION REQUIREMENTS**

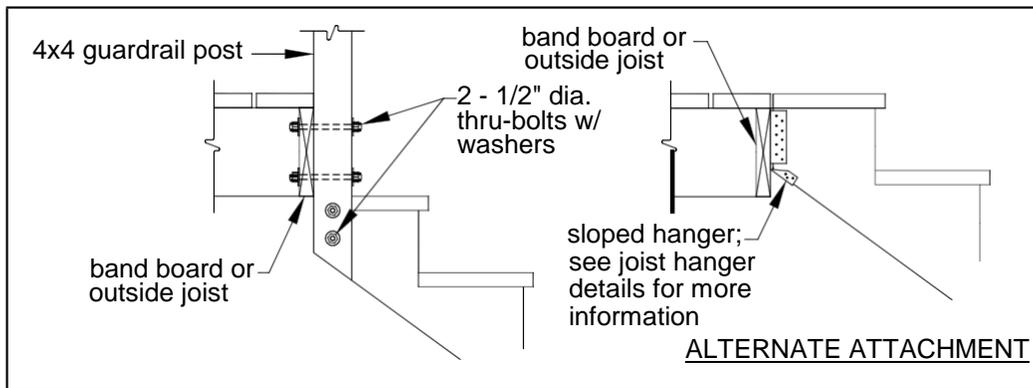


**King & Queen  
County**

**Typical Deck Details**  
Based on the 2012 Virginia Uniform  
Statewide Building Code



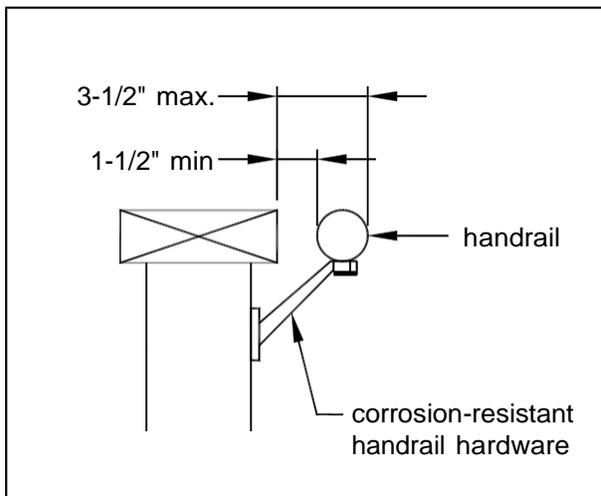
**FIGURE 30: STAIR GUARD REQUIREMENTS**



**FIGURE 31: STAIR STRINGER CONNECTION DETAIL**

**STAIR HANDRAIL REQUIREMENTS**

All stairs with 2 or more risers shall have a handrail on one side. 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 2-1/4" in cross section. Shapes other than circular shall have a perimeter dimension between 4" and 6-1/4" with a maximum cross sectional dimension of 2-1/4". 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 33. Handrails may be interrupted at guards posts only at a turn in the stair. See FIGURE 32.

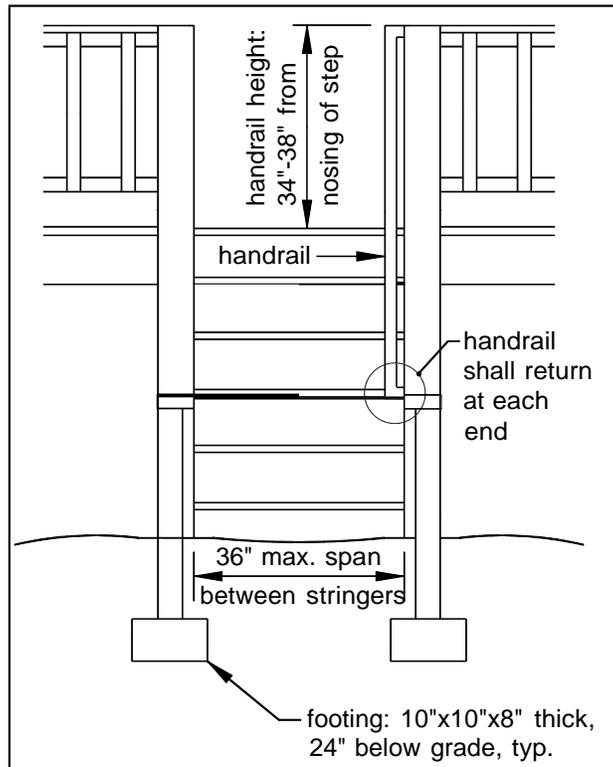


**FIGURE 32: HANDRAIL REQUIREMENTS**



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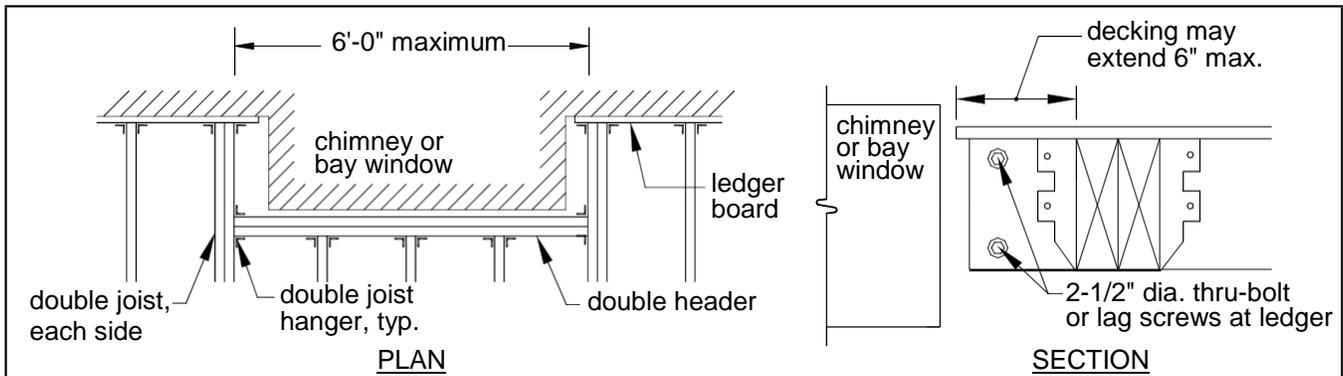
**FIGURE 33: MISCELLANEOUS STAIR REQUIREMENTS**

**STAIR ILLUMINATION REQUIREMENTS**

Stairways shall have a light source located at the top landing such that all stairs and landings are illuminated. The light switch shall be operated from inside the house.

**FRAMING AT CHIMNEY OR BAY WINDOW**

All members at a chimney or bay window shall be framed in accordance with FIGURE 34. Headers with a span length greater than 6'-0" require a plan submission.



**FIGURE 34: REQUIREMENTS FOR FRAMING AT CHIMNEY OR BAY WINDOW**



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