# RESIDENTIAL DECKS

City of Covington
Community Development
Building Division
16720 SE 271st Street, Suite 100
Covington, WA 98042
(253)480-2400

## WORKSHEET INSTRUCTIONS

The intent of this form is to provide a set of design instructions and pre-designed construction elements that comply with the International Residential Code (IRC) for use in designing a residential deck. Any deviations from the design guidelines of the handout will be reviewed on a case-by-case basis and depending on the issue may require additional details and/or plans provided by a licensed structural engineer. The provisions contained herein are based on the current IRC, and other adopted Covington Municipal Code (CMC) regulations. This handout does not replace code requirements. This handout is applicable only for single level wood framed decks not more than 10' above grade and without a roof.

**HOW TO USE THIS FORM;**

**Sheet 1 - Minimum Requirements for Deck Construction Drawings.** This sheet should be used as a checklist in designing the required elements of the deck.

**Sheet 2 - Typical Site Plan.** The first step in designing a deck is to determine the desired and proper placement for it, while keeping in mind that there are places on the property were a deck cannot be built, such as within a utility easement or within the required front, rear and side yard setbacks. The purpose of the site plan is to show compliance with the zoning requirements and that the deck is not being constructed in a prohibited location.

**Sheet 3 - Site Plan.** Provided is a blank sheet of graph paper that can be used to draw the required site plan for the permit. Larger properties will need to use a larger plan sheet to show the deck location at the required scale.

**Sheet 4 - Deck Framing/Foundation Plan.** This should be used to develop the deck framing/foundation plan. A deck framing plan shows the floor framing of the deck, and the makeup of the beams, joists and other horizontal members, and their connections, using a simplified system of symbols and drafting. Use the tables on Sheets 4 and 6 to develop the framing/foundation plan.

**Sheet 5 - Typical Deck Section.** This should be used as a checklist for deck materials by filling in the boxes with the information from the hardware manufacturer and the tables on Sheet 6. Contact a local home improvement store for a copy of the design manual from the hardware manufacturer.

**Sheet 6 - Span Table Footing Schedule.** This sheet contains the design tables for determining the proper joist and beam spans, footing type and size, and framing connections.

**Sheet 7 - Ledger Connection Details.** This sheet contains details of how to connect the deck ledger to the home and how to install the lateral load device. Specific manufacturer part numbers should be noted for the permit.

**Sheet 8 - Guard Post Connection Details.** This sheet contains details of how to construct guard posts and how to connect the guard post system to the deck structure. Specific manufacturer part numbers should be noted for the permit.

**Sheet 9 - Stair, Guard and Handrail Details.** This sheet contains details of a typical stair framing cross section and shows the various guard post and handrail opening dimensions.

**Sheet 10 - Knee Brace and Post Details.** This sheet contains details of how to install knee bracing for lateral support and cantilevering details for deck joists.

**Sheet 11 - Basic Building Code Requirements.** Provided is a list of basic code requirements for decks.

**EXCEPTION;**

Under the 2012 International Residential Code, building permits are not required for decks not exceeding 200 square feet in area that are not more than 30" above grade at any point, are not attached to a dwelling and do not serve the exit door required by IRC Section R311.2. Permits are required and must be obtained for any decks that do not meet all of these conditions. Exemption from permit requirements of the IRC shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of the IRC or any other laws or ordinances of the City of Covington.

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## MINIMUM REQUIREMENTS FOR DECK CONSTRUCTION DRAWINGS

Please provide:

- ☐ 3 copies of site plan.
- ☐ 2 copies of construction drawings.

### Site Plan Checklist

- ☐ Provide scale and north arrow. Use an Engineering scale, Maximum 1"= 40' (Preferred scale 1" = 20', or 1" = 40') .
- ☐ Show dimensions of property lines.
- ☐ Show the sizes, locations, and uses of existing and proposed buildings.
- ☐ Show dimensions of setbacks of structure(s) from all property lines.
- ☐ Show the location of utilities (water, sewer, gas, and electricity) for new buildings or additions.
- ☐ Identify any existing structures, or portions thereof, that are to be removed or demolished.
- ☐ Indicate the location and dimensions of driveways and describe paving materials.
- ☐ Show stairs, if applicable.
- ☐ Show all easements.

### Typical Deck Section Checklist

- ☐ Show finish grade elevations in relation to structure.
- ☐ Specify material: decay-resistant wood, cedar, pressure treated or engineered wood product.
- ☐ Where post and beam or girder construction is used, the design shall provide positive connections to ensure against uplift and lateral displacement.
- ☐ Knee braces are required if height from grade to top of post exceeds 4'. See Knee Brace Details, Sheet 10.
- ☐ If egress from the existing building passes under the proposed deck, or if there is an existing patio under the proposed deck, 6'-8" minimum clearance is required.
- ☐ Show deck guard attachment detail.

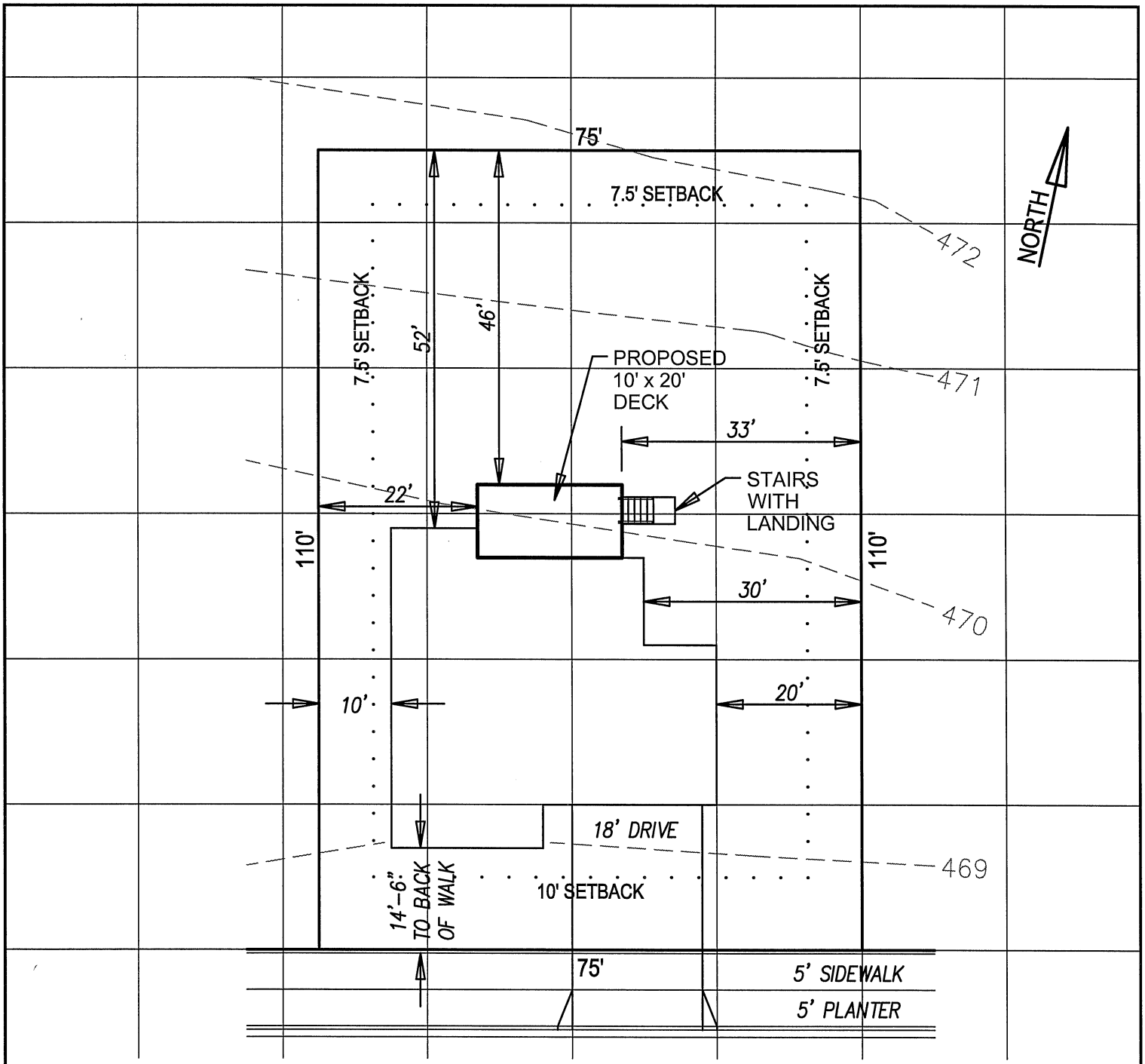
### Framing & Foundation Plan Checklist

- ☐ Provide scale (1/4" or 1/8") and north arrow.
- ☐ Specify project area (square footage).
- ☐ Provide the sizes, species, grades, spacing and spans of all framing members including posts, lateral bracing, and guards (formerly known as "guardrails"). Show sizes of concrete footings.
- ☐ Show dimensions of perimeter foundation, isolated footings and/or piers, and depth of footings.
- ☐ Show all connections.
- ☐ Wood permanently exposed to weather must be decay-resistant heart wood of redwood, black locust, cedar, black walnut, pressure treated, or manufactured wood.
- ☐ Blocking, bridging, straps, approved framing anchors or mechanical fasteners shall be installed to provide continuous ties from the deck to the foundation system.
- ☐ Show on the drawings the numbers and sizes of nails connecting wood members. Connections that resist seismic forces shall be completely and clearly detailed on the drawings. Show the locations and specify the brand names and model numbers of all framing connectors.
- ☐ Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Toenails or nails subject to withdrawal may not be used. Where positive connection to primary structure can not be verified by inspection, deck must be self-supporting.
- ☐ Show dimensions of stairs treads & risers. Maximum riser height shall be 7-3/4" and minimum tread depth shall be 10".
- ☐ Show landings for stairways.
- ☐ Stairways shall be not less than 36" wide at all points above the handrail which may project no more than 4-1/2" into the stairway.
- ☐ Decks more than 30" above grade shall have guards not less than 36" in height. The open sides of stairs with a total rise of more than 30" above grade shall have guards not less than 34" in height measured vertically from the nosing of the treads. The guards shall have intermediate rails or an ornamental pattern such that a sphere 4" in diameter cannot pass through.
- ☐ Guards and handrails must be capable of resisting a concentrated minimum live load of 200 psf at their top.

CONTACT NAME: _____ PHONE: _____

ADDRESS: _____ PARCEL No.: _____

SIGNATURE: _____ DATE: _____ PERMIT No.: _____




13579 SE 246TH STREET

SCALE: 1" = 20'

SITE PLAN CHECKLIST:

- ☐ Provide scale and north arrow. Use an Engineering scale. Preferred scale 1" = 20' (Maximum 1"= 40').
- ☐ Show dimensions of property lines.
- ☐ Show the sizes, locations and uses of existing and proposed buildings.
- ☐ Show dimensions of setbacks of structure(s) from all property lines.
- ☐ Show the location of utilities (water, sewer, gas, and electricity) for new buildings or additions.
- ☐ Identify any existing structures, or portions thereof, that are to be removed or demolished.
- ☐ Indicate the location and dimensions of driveways and describe paving materials.
- ☐ Show contours.
- ☐ Show all easements.

# TYPICAL SITE PLAN



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SCALE: 1" = 20'

SITE
PLAN

Sheet 3 of 11

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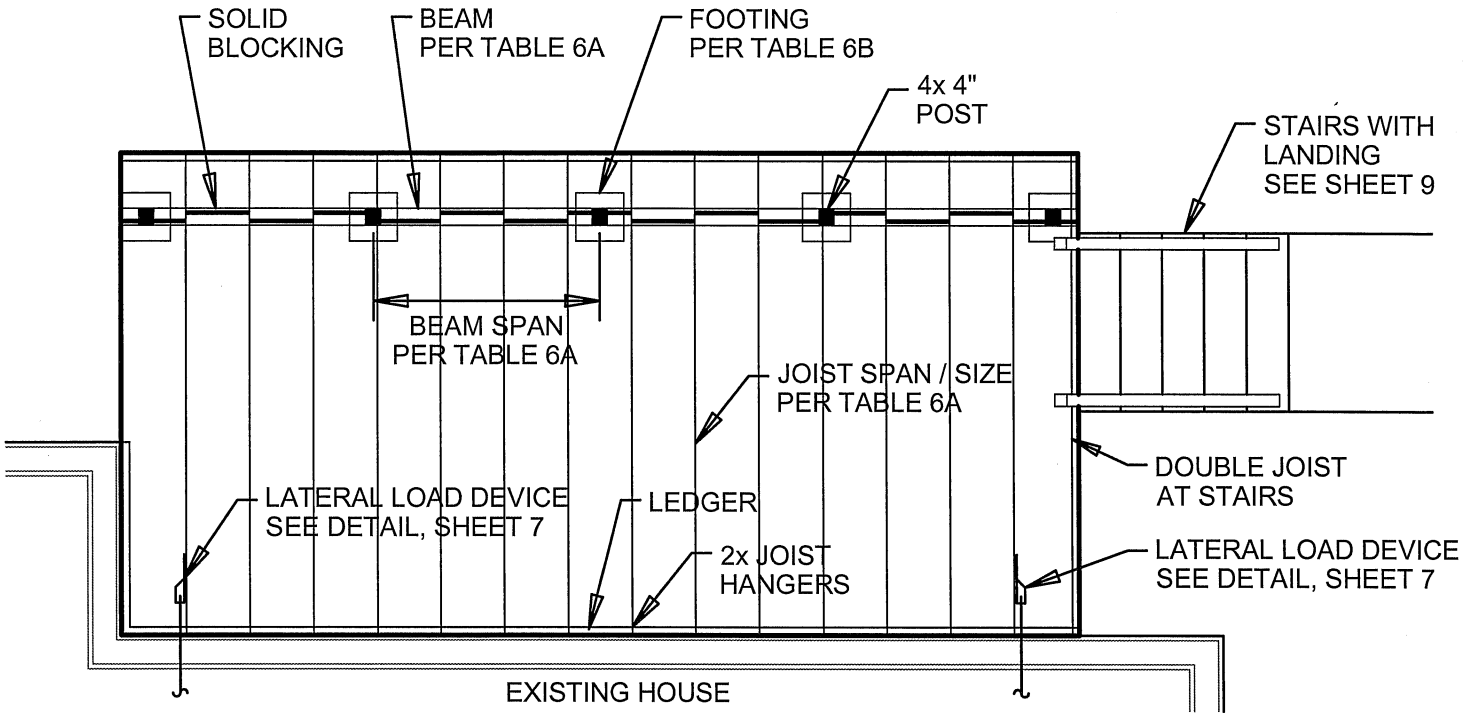



SCALE: 1/4" = 1'

FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER AND A 2-INCH NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST [c,f,g]

(Deck live load = 40 psf. Deck dead load = 10 psf)

**Table 4A**

| JOIST SPAN | 6' and less | 6'1" to 8' | 8'1" to 10' | 10'1" to 12' | 12'1" to 14' | 14'1" to 16' | 16'1" to 18' |
|---|---|---|---|---|---|---|---|
| Connection Details | On-Center Spacing of Fasteners (inches) [d,e] | | | | | | |
| 1/2" diameter Lag Screw with 15/32" maximum sheathing | 30 | 23 | 18 | 15 | 13 | 11 | 10 |
| 1/2" diameter Bolt with 15/32" maximum sheathing | 36 | 36 | 34 | 29 | 24 | 21 | 19 |
| 1/2" diameter Bolt with 15/32" maximum sheathing and 1/2" stacked washers [b,h] | 36 | 36 | 29 | 24 | 21 | 18 | 16 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm. 1 pound per square foot = 0.0479 kPa.

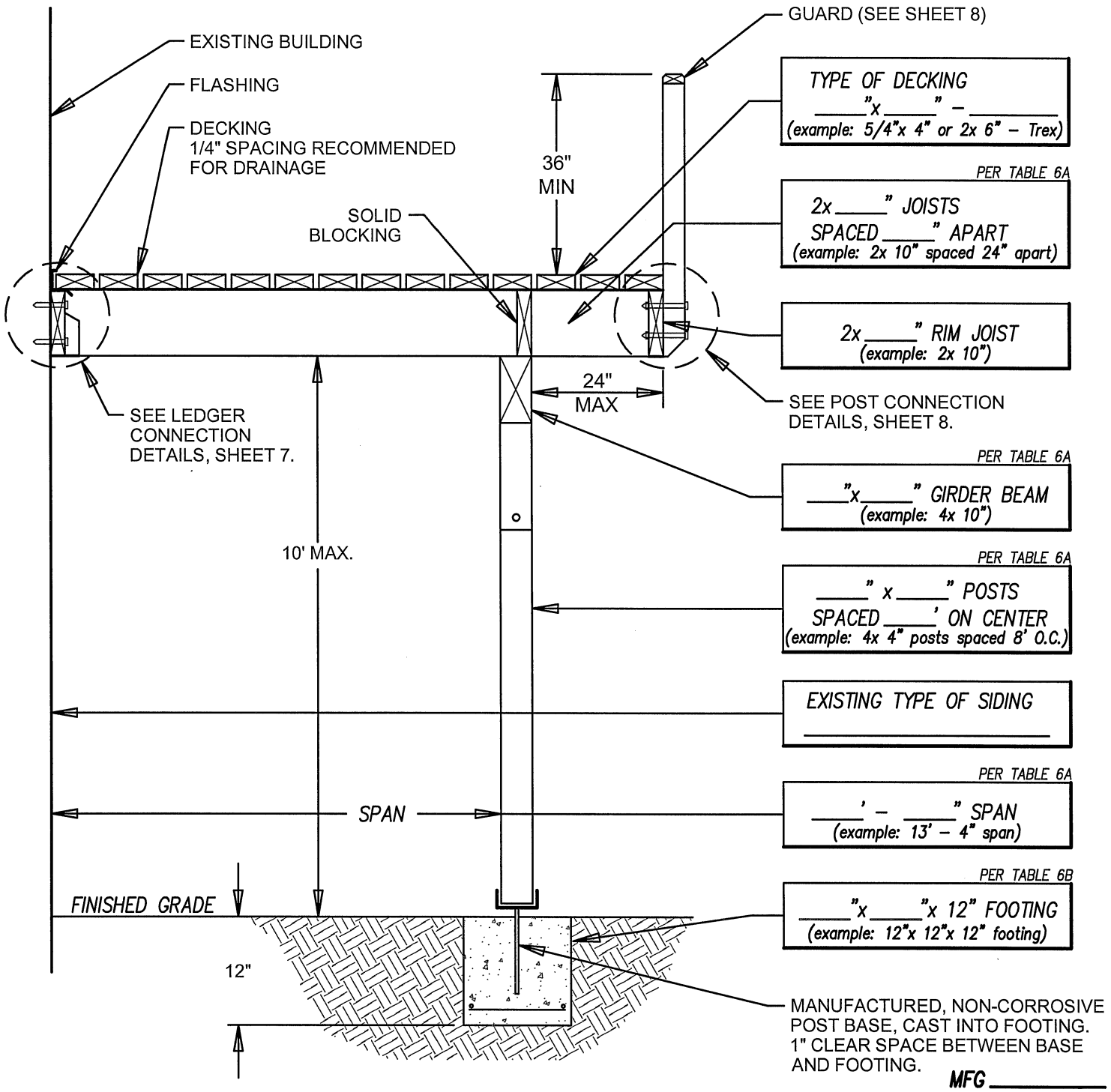
a. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
b. The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2".
c. Ledgers shall be flashed to prevent water from contacting the house band joist.
d. Lag screws and bolts shall be staggered in accordance with Section R502.2.2.1.1.
e. Deck ledger shall be minimum 2x 8" pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.
f. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1" thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
g. A minimum 1 × 91/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2" nominal band joist.
h. Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1" in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1".

**Table 4B** PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

| | MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS (inches) | | | |
|---|---|---|---|---|
| | TOP EDGE | BOTTOM EDGE | ENDS | ROW SPACING |
| Ledger [a] | 2 [d] | 3/4 | 2 [b] | 1 5/8 [b] |
| Band Joist [c] | 3/4 | 2 [e] | 2 [b] | 1 5/8 [b] |

For SI: 1 inch = 25.4 mm

a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.2.1(1).
b. Maximum 5".
c. For engineered rim joists, the manufacturer's recommendations shall govern.
d. The minimum distance from bottom row of lag screws to the top edge of the ledger shall be in accordance with Figure R507.2.1(1).
e. The 2" may be reduced to 3/4" when the band joist is directly supported by a mudsill, a header or by double top wall plates.




## Typical Deck Section Checklist

- ☐ Show finish grade elevations in relation to structure.
- ☐ Specify material: decay-resistant wood, cedar, pressure treated, or engineered wood product.
- ☐ Where post and beam or girder construction is used, the design shall provide positive connections to ensure against uplift and lateral displacement.
- ☐ Knee braces are required if height from grade to top of post exceeds 4'. See Guard Post Connection Details, Sheet 8.
- ☐ If egress from the existing building passes under the proposed deck, or if there is an existing patio under the proposed deck, 6'-8" minimum clearance is required.

# TYPICAL DECK SECTION



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SPANS BASED ON USE OF No. 2 HEM-FIR OR BETTER
50 P.S.F. LOADING (10 P.S.F. DEAD LOAD + 40 P.S.F. LIVE LOAD)
BEAM SPANS AND FOOTINGS ASSUME MAXIMUM 24" OVERHANG

**Table 6A**

| JOIST SIZE | JOIST SPACING (O.C.) | **JOIST SPAN** (MAX) | 1/2"Ø x 4-1/2" LAG SCREW MAX. SPACING ON 2x LEDGER | MAXIMUM SPAN OF GIRDER **BEAMS** BETWEEN POSTS PER FOOTING TYPE | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 4x 6" | FOOTING | 4x 8" | FOOTING | 4x 10" | FOOTING |
| 2x 6" | 12" | 10' - 0" | SEE TABLE 4A | 5' - 5" | B | 7' - 2" | B | 8' - 10" | C |
| | 16" | 9' - 1" | | 5' - 8" | B | 7' - 6" | B | 9' - 2" | B |
| | 24" | 7' - 11" | | 6' - 1" | B | 8' - 0" | B | 9' - 10" | B |
| 2x 8" | 12" | 12' - 6" | SEE TABLE 4A | 4' - 11" | B | 6' - 6" | B | 8' - 0" | B |
| | 16" | 11' - 1" | | 5' - 2" | A | 6' - 11" | B | 8' - 5" | C |
| | 24" | 9' - 1" | | 5' - 7" | B | 7' - 5" | B | 9' - 1" | B |
| 2x 10" | 12" | 15' - 8" | SEE TABLE 4A | 4' - 7" | B | 6' - 0" | B | 7' - 5" | C |
| | 16" | 13' - 7" | | 4' - 10" | B | 6' - 5" | B | 7' - 10" | C |
| | 24" | 11' - 1" | | 5' - 3" | A | 6' - 11" | B | 8' - 5" | B |

NOTE: 2x 8" MINIMUM LEDGER.

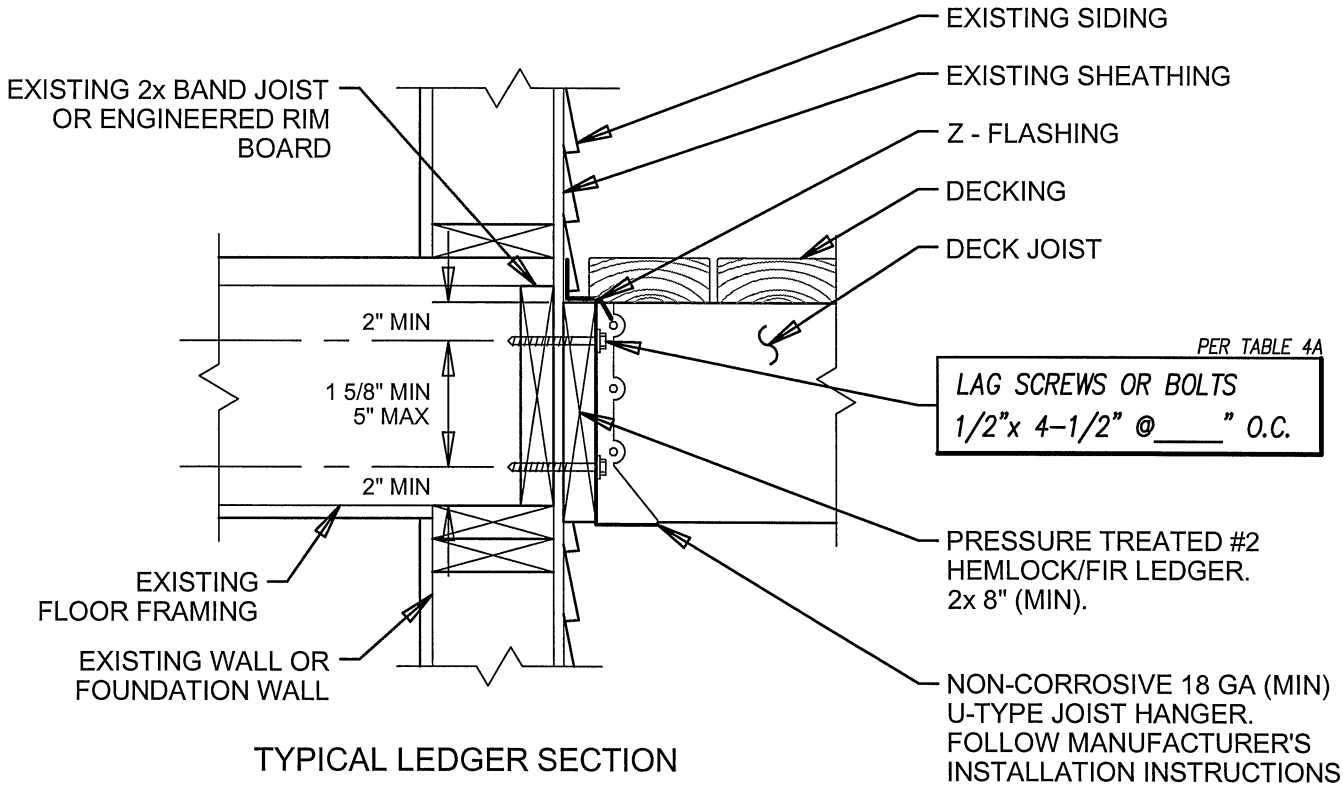
FOOTING TYPE

**Table 6B**

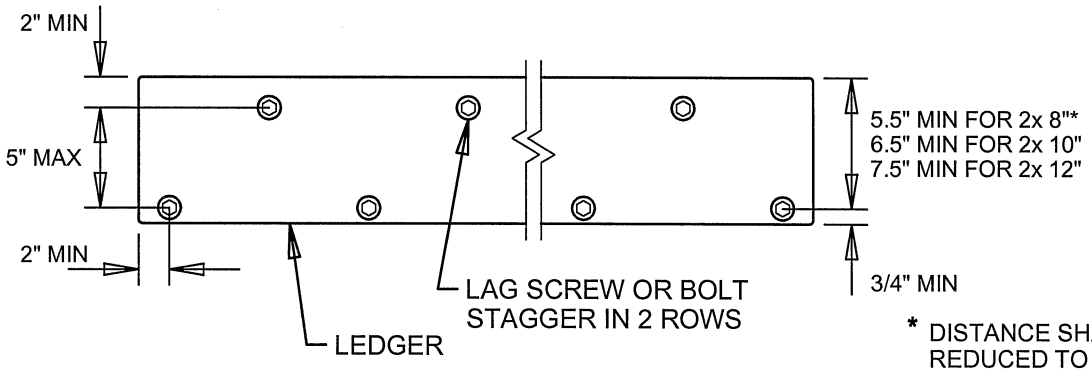
| TYPE | SIZE | NOTES: |
|---|---|---|
| A | 12" x 12" x 12" | - FOOTINGS SHALL BE CONSTRUCTED OF 3,000 P.S.I. CONCRETE WITH (2) #4 REBAR EACH WAY, 3" CLEAR TO BOTTOM OF FOOTING. FOOTING TO BEAR ON UNDISTURBED EARTH. NO SPECIAL INSPECTION REQUIRED.<br>- FOOTING SIZES BASED ON ASSUMED SOIL BEARING PRESSURE OF 1,500 P.S.F. CONTACT THE BUILDING DEPARTMENT FOR ADDITIONAL RESTRICTIONS. |
| B | 16" x 16" x 12" | |
| C | 18" x 18" x 12" | |

DECK CONSTRUCTION CONNECTIONS

| CONNECTION | NAILING | NOTES: |
|---|---|---|
| JOIST ON DECK BEAM; TOENAIL EACH END | (3) 8d | - ALL FASTENERS, NAILS, BOLTS, SCREWS, ETC. SHALL BE CORROSION RESISTANT.<br>- FOLLOW MANUFACTURER'S INSTRUCTIONS FOR TIMBER CONNECTORS. |
| BRIDGING OR BLOCKING TO JOIST; TOENAIL EA SIDE, EA END | (3) 8d | |
| 2x DECKING TO JOIST OR DECK BEAM; BLIND AND FACE NAIL | (2) 16d | |

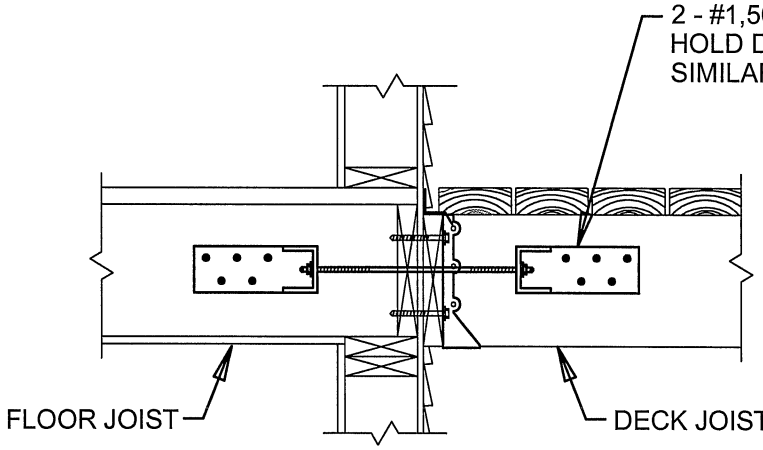



TYPICAL LEDGER SECTION




PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS

* DISTANCE SHALL BE PERMITTED TO BE REDUCED TO 4.5" IF LAG SCREWS ARE USED OR BOLT SPACING IS REDUCED TO THAT OF LAG SCREWS TO ATTACH 2x 8" LEDGERS TO 2x 8" BAND JOISTS.




LATERAL LOAD DEVICE EXAMPLE

LEDGER CONNECTION NOTES:

1. ATTACH LEDGER TO EXISTING BUILDING WITH NON-CORROSIVE LAG BOLTS SPACED PER TABLES 4A AND 4B.
2. LEDGER ATTACHMENT TO VENEERS AND CANTILEVERS WILL REQUIRE ENGINEERING DESIGN.
3. DECKS NOT MORE THAN 30" ABOVE GRADE AT ANY POINT MAY OMIT LATERAL LOAD CONNECTIONS.

# LEDGER CONNECTION DETAILS



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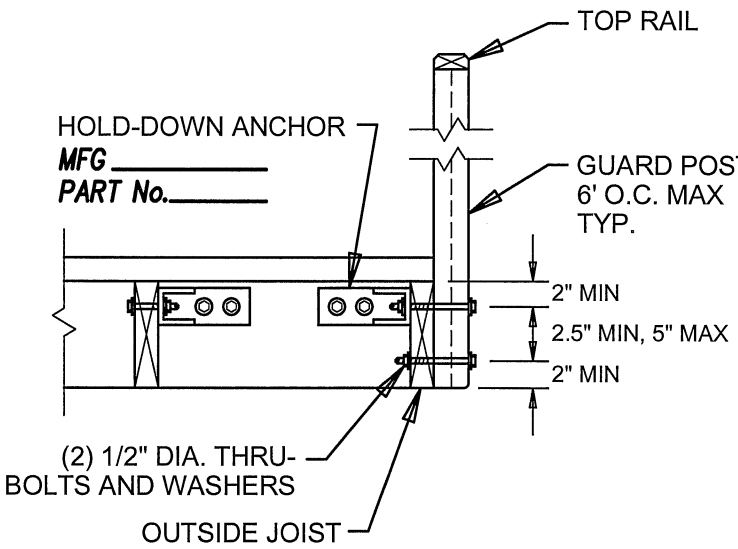
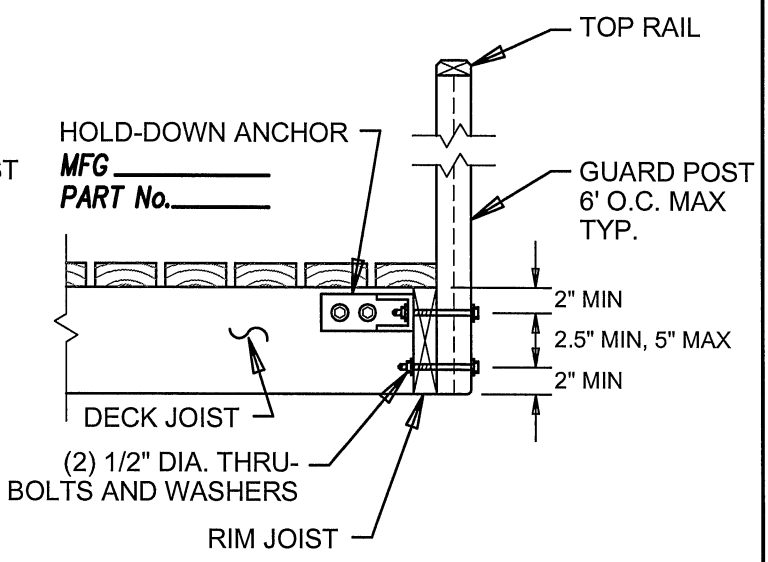
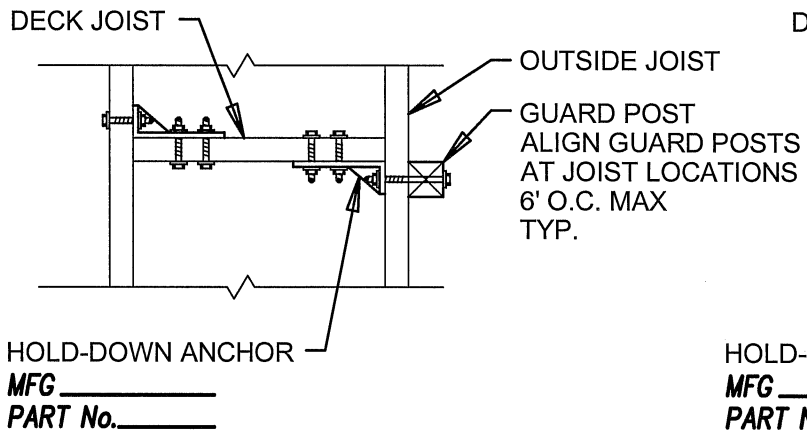



GUARD POST TO OUTSIDE JOIST

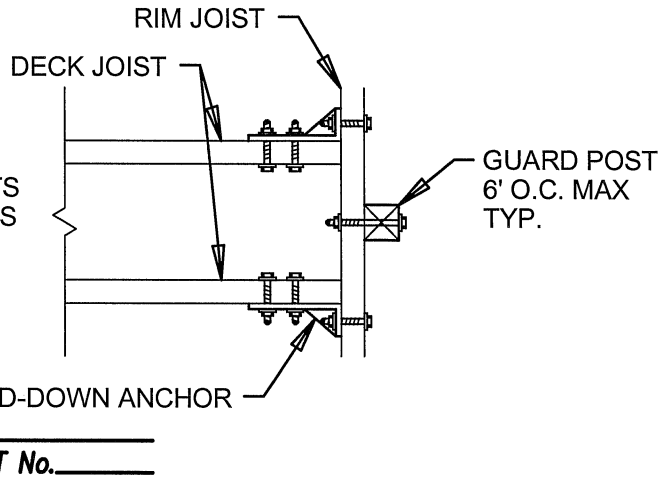



GUARD POST TO RIM JOIST

## TYPICAL SECTIONS




AT JOIST

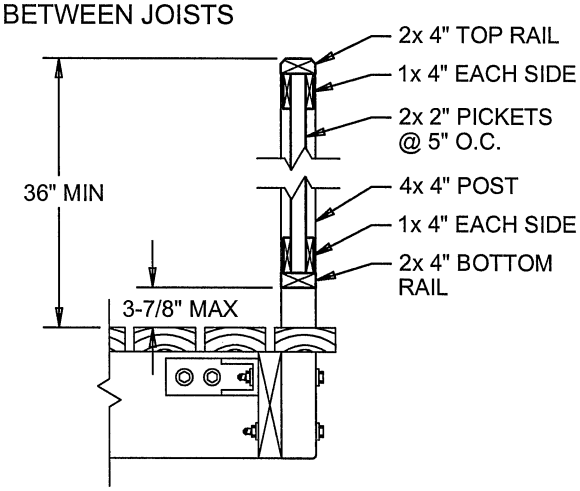



BETWEEN JOISTS

## PLAN VIEWS

GUARD POST CONNECTION AND RAILING NOTES:

1. AT THE FIRST INTERIOR BAY, PROVIDE 2x BLOCKING AT GUARD POSTS WITH HOLD-DOWN ANCHORS; ATTACH BLOCKING WITH 10d NAILS TOP AND BOTTOM, EACH SIDE.
2. GUARD POSTS MAY BE INSTALLED BETWEEN JOISTS IF BLOCKING IS INSTALLED WITHIN 12" OF EACH SIDE OF THE POST, AS SHOWN ABOVE.
3. GUARD SHALL BE 36" MINIMUM ABOVE DECK WITH INTERMEDIATE RAILS SPACED SO THAT A 4" DIAMETER SPHERE CANNOT PASS THROUGH.
4. ALL RAILING MATERIALS SHALL BE APPROVED OUTDOOR MATERIALS.




RAILING DETAIL

# GUARD POST CONNECTION DETAILS



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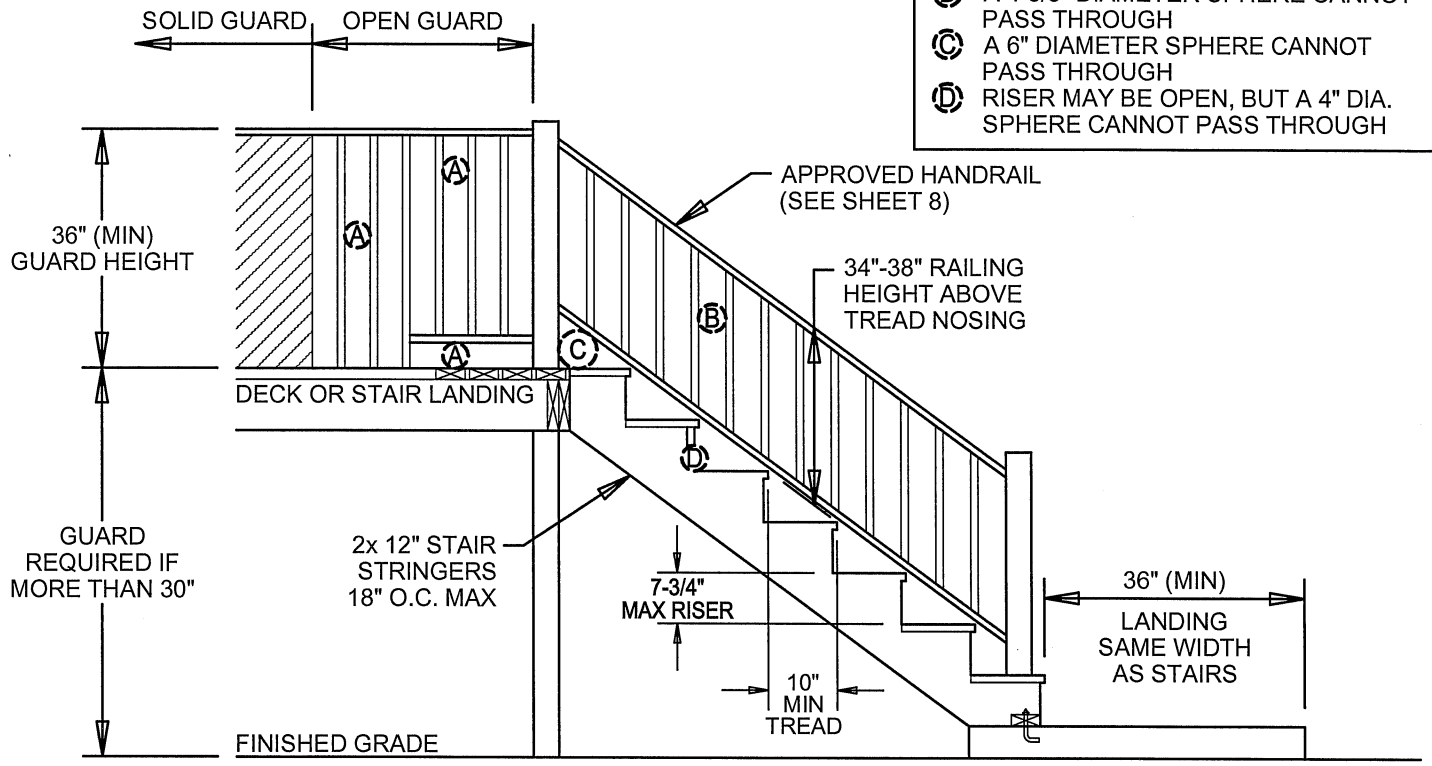
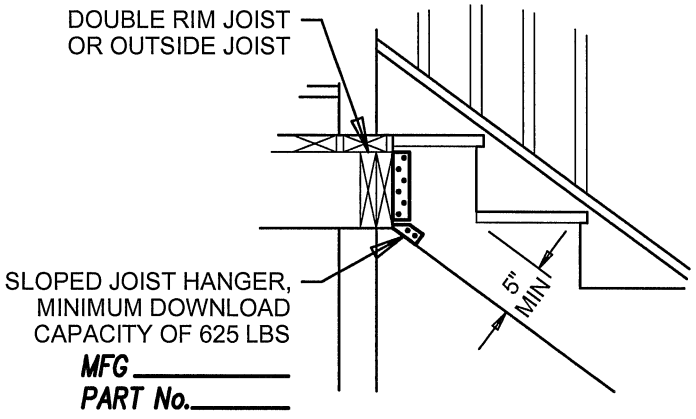
Building Division

NEW OR EXISTING LIGHT REQUIRED

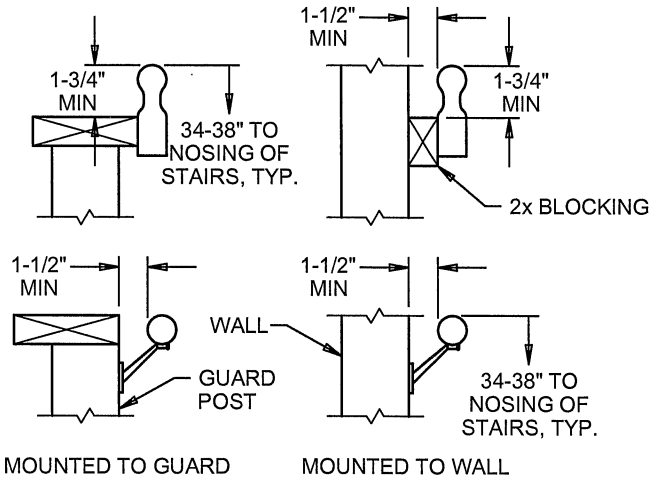
RAILING OPENING LIMITS:
- (A) A 4" DIAMETER SPHERE CANNOT PASS THROUGH
- (B) A 4-3/8" DIAMETER SPHERE CANNOT PASS THROUGH
- (C) A 6" DIAMETER SPHERE CANNOT PASS THROUGH
- (D) RISER MAY BE OPEN, BUT A 4" DIA. SPHERE CANNOT PASS THROUGH




STAIR DETAIL



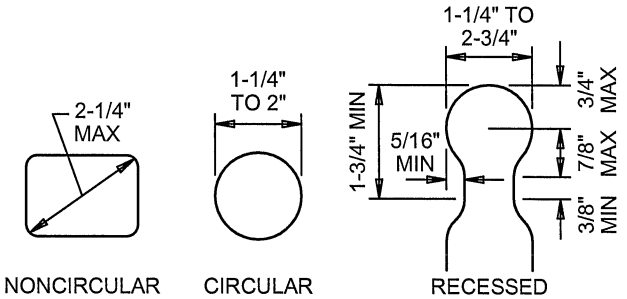

STAIR STRINGER ATTACHMENT DETAIL




HANDRAIL MOUNTING EXAMPLES

STAIR, GUARD AND HANDRAIL NOTES:

1. RESIDENTIAL HANDRAILS MUST RETURN TO THE WALL OR TERMINATE IN A BALLUSTER OR POST AT EACH END.
2. OPEN GUARD SHALL CONSIST OF GUARD POSTS SPACED 6' O.C. W/ INTERMEDIATE RAILS AT 3-7/8" MAX. SPACING.
3. STAIRWAYS SHALL NOT BE LESS THAN 36" IN WIDTH.
4. MANUFACTURED STAIR TREADS SHALL BE SUPPORTED PER MANUFACTURERS REQUIREMENTS.




HANDRAIL GRIP SIZE

# STAIR, GUARD AND HANDRAIL DETAILS



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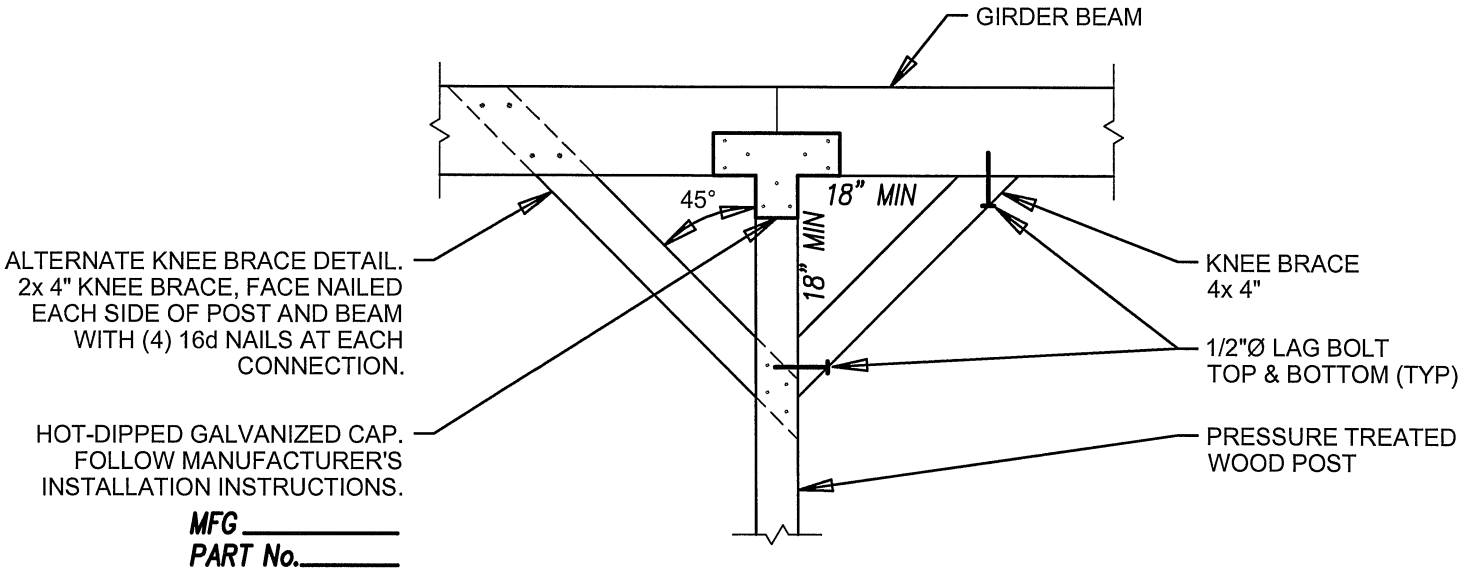
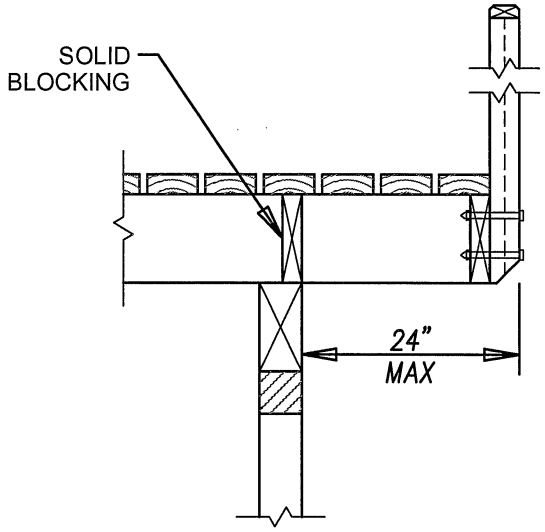
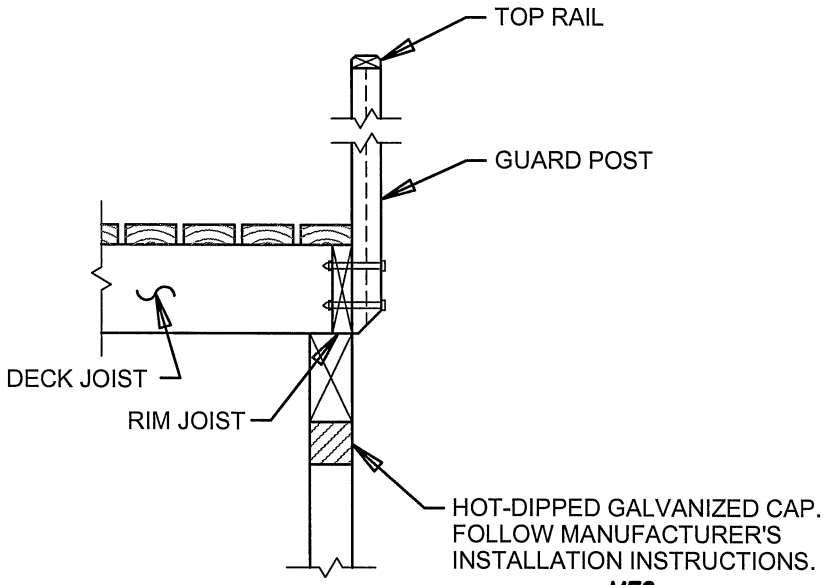



KNEE BRACE DETAIL




MAX CANTILEVER




POSTS UNDER RIM JOIST

KNEE BRACE NOTES:

1. KNEE BRACES ARE REQUIRED IF THE HEIGHT FROM GRADE TO TOP OF POST EXCEEDS 4'.

# KNEE BRACE AND POST DETAILS



City of Covington
Community Development
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# RESIDENTIAL DECKS

City of Covington
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16720 SE 271st Street, Suite 100
Covington, WA 98042
(253)480-2400

## BASIC BUILDING CODE REQUIREMENTS

1. The bottom of the footing must be 12" minimum below finish grade. Footings shall have rebar reinforcement installed prior to the footing inspection.

2. Beam-ends and splices must be directly over posts, minimum of 1-1/2" bearing.

3. Deck ledger boards must be secured to the structure per Table 4A on Sheet 4 of deck worksheet.

4. Screws shall be positively anchored to the primary structure and designed for both vertical and horizontal loads. Floor system manufacturers are to provide connection details.

5. Joist hangers are required wherever joists do not have at least 1-1/2" of bearing. (Exception: cantilevered ends.)

6. Guards are required on all decks more than 30" above grade or a lower deck. Guards must be 36" minimum in height. Open guards must have intermediate rails or an ornamental pattern that a 4" diameter sphere cannot pass through. Guard posts shall be placed no more than 6' apart.

7. Stairways must be 36" clear width at all points above required handrail height and below required headroom height. The maximum rise is 7-3/4"; the minimum run is 10". Treads, risers and nosings shall be consistent within 3/8". Open risers for stairways with a total rise of more than 30" are not permitted to allow the passage of a 4" diameter sphere. A tread nosing not less than 3/4", or greater than 1-1/4", shall be provided on stairways with solid risers, a nosing is not required if tread depth is a minimum of 11".

8. Stairways with treads more than 30" above the grade or floor below require a guard not less than 34" from the nose of the treads. Open guards shall have intermediate rails or an ornamental pattern such that a sphere 4-3/8" in diameter may not pass through. The triangular openings formed by the riser, tread and bottom rail of guards shall be such that a sphere 6" in diameter may not pass through.

9. Approved handrails are required on stairways with four or more stair risers.

10. Wooden structural members of exterior decks must be cedar, redwood, treated wood, approved composite material or an approved outdoor wood.

11. All bolts, washers, nuts, hangers, strapping, nails, and other fasteners in contact with treated materials shall be hot dipped galvanized, stainless steel or listed for direct contact with treated materials.

12. Handrails must have a continuous, graspable surface and be 34" to 38" above the tread nosing and run the full length of the stairway with ends returned to wall or guard. Handrails shall have a space of not less than 1-1/2" between the handrail and the wall or guard. Handrail options are shown on Sheet 9. All edges shall be smooth.

13. If pre-manufactured pier blocks are used, they must be connected to a footing to prevent lateral displacement and uplift.

14. Deck stairways shall be provided with a source of illumination at the top landing controlled from within the dwelling or by an automatic means.