



Deck Design Guide

The Municipality of Trent Lakes
Building and Planning Department
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Trent Lakes, ON, K0M 1A0
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DECK GUIDE

DEFINITIONS

A Deck is a raised uncovered platform that is either freestanding or attached to a dwelling.

A Porch is a covered structure that usually forms part of the entrance of a dwelling. It may be enclosed or unenclosed.

A Patio is an uncovered platform at grade level that is usually constructed of concrete or stone.

A Deck or Porch will require a building permit if:

- it is attached to the dwelling or other structure,
- it has a walking surface greater than 24" above grade,
- Forms part of the principal entrance of a building, or
- it is greater than 10 m² (107 Sq.Ft.) in area.

A Patio generally does not require a permit, unless it interferes with an existing structure.

NOTE: All Decks, Porches, and Patios must conform to the Zoning By-Law requirements.

IMPORTANT NOTES

A Deck is a floor system, the same as that within the dwelling unit, and must be designed accordingly.

The design and construction of the Deck must conform to the requirements of the current amended version of the Ontario Building Code as well as all other applicable by-laws.

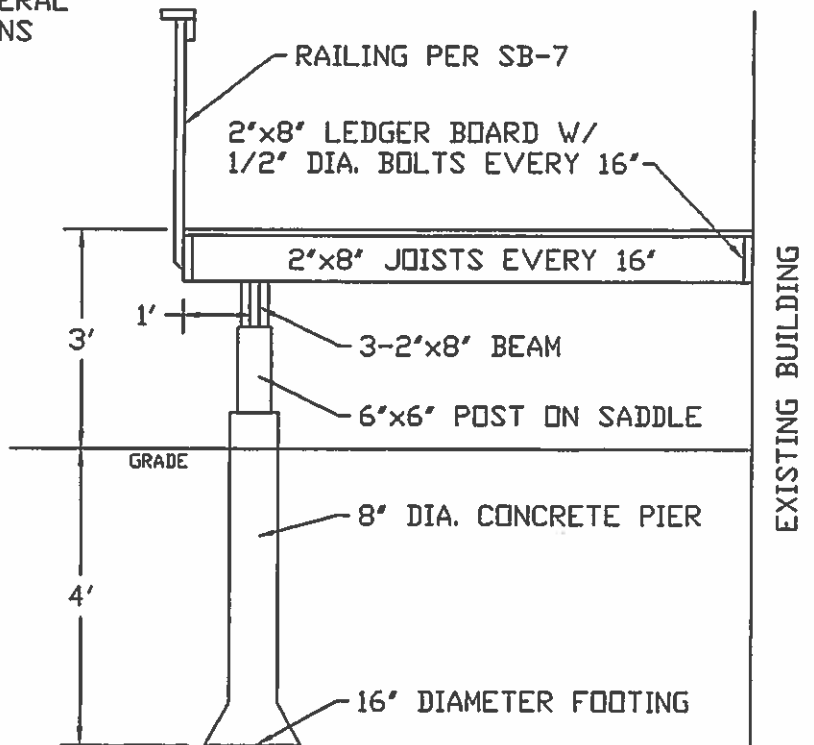
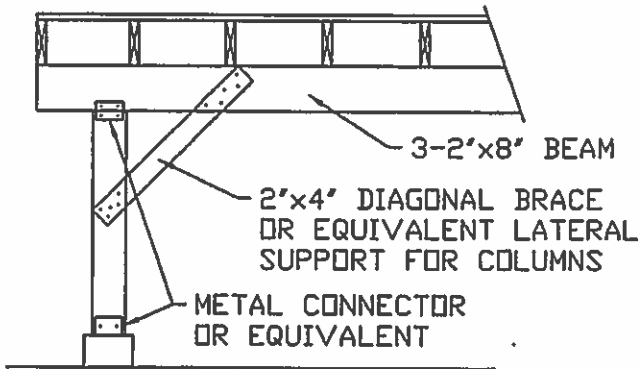
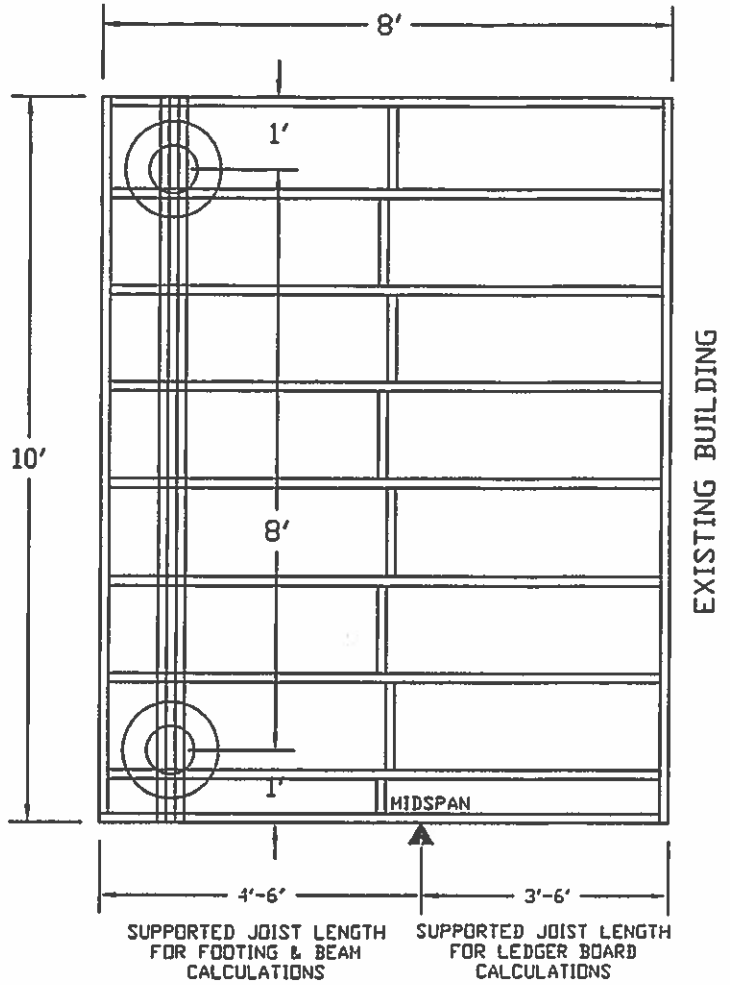
Special consideration must be taken if the Deck is to be used to support a hot tub or similar structure due to the increased load.

This guide is for informational purposes only. It is the responsibility of the Applicant/Designer to review the building code to ensure all information is complete, accurate, and up to date.

EXAMPLE DRAWING

-THIS EXAMPLE DRAWING CONTAINS THE MINIMUM REQUIRED INFORMATION FOR BUILDING PERMIT SUBMISSION.

-THIS DRAWING IS AN EXAMPLE ONLY AND ALL SUBMISSIONS MUST CONFORM TO THE CURRENT VERSION OF THE ONTARIO BUILDING CODE.



EXISTING BUILDING

EXISTING BUILDING



STREET

GENERAL INFORMATION

EXEMPTIONS FOR LOW DECKS

Where a deck meets the following criteria, certain exemptions may apply:

- Is less than 600 mm (23-5/8") above grade,
- Less than 55 m² (592 Sq. Ft.) in area,
- Does not support a roof, and
- Is not attached to another structure.

List of Exemptions

- Handrails: 9.8.7.1.(3)(b)
- Guards: 9.8.8.1.(1)(a)
- Foundation Depth: 9.12.2.2.(6)(b)
- Anchorage: 9.23.6.2.(3)

FOUNDATION (PIERS)

General:

- Piers shall be not less than 8" in diameter, to properly support a 6" x 6" post or 3-ply beam.
- Piers and footings must be shaped to prevent frost uplift

NOTE: Under most circumstances it may be preferable to expand the lower portion of a smaller pier to achieve the required bearing area rather than use a large pier size.

Size: Table 9.15.3.4.

Minimum Footing Size = 0.40 (4.3 ft²) where; the supported joist length is 4.90 (16'), the pier spacing is 3.00 (10'), and the soil bearing capacity is 75 kPa (10.9 psi). Minimum size specified may be adjusted based on the specific supported joist length, pier spacing, and soil bearing capacity.

NOTE: The minimum required bearing area must be doubled where the soil bearing capacity is affected by a high water table.

Where the foundation rests on bedrock the footings must be pinned with a minimum 10M rebar with 100 mm (4") embedment.

| MINIMUM REQUIRED BEARING AREA [ft ²] (Typical Bearing Dimensions) | | | | | | | |
|--|-----|---|---|---|---|---|---|
| 75kPa Soil Bearing Capacity | | Beam Length / Pier Spacing (ft) | | | | | |
| | | 4' | 6' | 8' | 10' | 12' | 14' |
| Supported Joist Length (ft) (Refer to Illustration) | 4' | 0.43 ft ² (10" Ø or 8"x8") | 0.65 ft ² (12" Ø or 10"x10") | 0.86 ft ² (14" Ø or 12"x12") | 1.08 ft ² (14" Ø or 13"x13") | 1.29 ft ² (16" Ø or 14"x14") | 1.51 ft ² (18" Ø or 15"x15") |
| | 6' | 0.65 ft ² (12" Ø or 10"x10") | 0.97 ft ² (14" Ø or 12"x12") | 1.29 ft ² (16" Ø or 14"x14") | 1.61 ft ² (18" Ø or 16"x16") | 1.94 ft ² (20" Ø or 17"x17") | 2.26 ft ² (22" Ø or 19"x19") |
| | 8' | 0.86 ft ² (14" Ø or 8"x8") | 1.29 ft ² (16" Ø or 14"x14") | 1.72 ft ² (18" Ø or 16"x16") | 2.15 ft ² (20" Ø or 18"x18") | 2.58 ft ² (22" Ø or 20"x20") | 3.01 ft ² (24" Ø or 21"x21") |
| | 10' | 1.08 ft ² (14" Ø or 13"x13") | 1.61 ft ² (18" Ø or 16"x16") | 2.15 ft ² (20" Ø or 18"x18") | 2.69 ft ² (24" Ø or 20"x20") | 3.23 ft ² (N/A Ø or 22"x22") | 3.76 ft ² (N/A Ø or 24"x24") |
| | 12' | 1.29 ft ² (16" Ø or 14"x14") | 1.94 ft ² (20" Ø or 17"x17") | 2.58 ft ² (22" Ø or 20"x20") | 2.82 ft ² (24" Ø or 21"x21") | 3.87 ft ² (N/A Ø or 24"x24") | 4.52 ft ² (N/A Ø or 26"x26") |
| | 14' | 1.51 ft ² (18" Ø or 15"x15") | 2.26 ft ² (22" Ø or 18"x18") | 3.01 ft ² (24" Ø or 21"x21") | 3.76 ft ² (N/A Ø or 24"x24") | 4.52 ft ² (N/A Ø or 26"x26") | 5.27 ft ² (N/A Ø or 28"x28") |
| | 16' | 1.72 ft ² (18" Ø or 16"x16") | 2.58 ft ² (22" Ø or 20"x20") | 3.44 ft ² (N/A Ø or 23"x23") | 4.30 ft ² (N/A Ø or 25"x25") | 5.16 ft ² (N/A Ø or 28"x28") | 6.02 ft ² (N/A Ø or 30"x30") |

Piers: 9.3.1.6.(1)

-Piers shall consist of poured concrete with a minimum compressive strength of 15 MPa (2200 psi after 28 days)

Depth: 9.12.2.2.

-Where a deck is attached to a dwelling unit or requires a guard the piers must extend a minimum of 1.2m (3'-11") below grade.

Height: 9.15.2.3.(3)

-Piers shall not extend more than 3 times their width above grade.

Design Loads: 9.4.2.3.(1)

COLUMNS

Size: 9.17.4.1.(2)

-Wood columns shall be not less than 184 (7-1/4") for round columns and 140 x 140 (6"x6" nominal) for rectangular columns.

-Columns shall be laterally braced to prevent horizontal movement.

ANCHORAGE

Anchorage: 9.23.6.2.

-Deck components shall be directly fastened to their supporting and supported members to resist uplift.

LEDGER BOARD

Size and Attachment: 9.20.17.5

-A Ledger Board shall have the same dimensions as the floor joists it supports.

-Anchor Bolts shall be embedded at least 100mm (4") into solid concrete, concrete filled masonry, or suitable structural lumber. *NOTE: The anchor bolts shall not be attached to hollow masonry or brick veneer.*

| Supported Length, m (ft) | Maximum Anchor Bolt Spacing, mm (in) | |
|--------------------------|--|--------------------------------------|
| | Staggered 12.7mm (1/2") Ø Anchor Bolts | Staggered 16mm (5/8") Ø Anchor Bolts |
| 1.22 (4'-0") | 450 (17-3/4") | 500 (20") |
| 1.50 (4'-9") | 400 (16") | 450 (17-3/4") |
| 2.00 (6'-6") | 300 (12") | 400 (16") |
| 2.50 (8'-2") | 275 (11") | 325 (12-3/4") |

BEAMS

9.23.4.2.(3) Table A-8

| Supported Length (m) (1) | Maximum Span (m) | | |
|--------------------------|--------------------|---------------------|---------------------|
| | 3-38x184 (3-2"x8") | 3-38x235 (3-2"x10") | 3-38x286 (3-2"x12") |
| 2.40 (7.87') | 3.07 (10'-0") | 3.92 (12'-10") | 4.57 (14'-11") |
| 3.00 (9.84') | 2.85 (9'-4") | 3.52 (11'-6") | 4.09 (13'-5") |
| 3.60 (11.8') | 2.63 (8'-7") | 3.22 (10'-6") | 3.73 (12'-2") |
| 4.20 (13.7') | 2.44 (8'-0") | 2.98 (9'-9") | 3.46 (11'-4") |
| 4.80 (15.7') | 2.28 (7'-5") | 2.79 (9'-1") | 3.23 (10'-7") |
| 5.40 (17.7') | 2.15 (7'-0") | 2.63 (8'-7") | 3.05 (10'-0") |
| 6.00 (19.6') | 2.04 (6'-8") | 2.49 (8'-2") | 2.89 (9'-5") |

(1) Supported length means half the sum of the joists spans on both sides of the beam.

*Spruce-Pine-Fir No.1 or No.2 Grade

Bearing: 9.17.4.1. & 9.23.8.1.

-Beams shall have a bearing surface on each of their supporting member of not less than their width and not less than 89 (3.5") in length.

Built-up wood: 9.23.8.3.

-Where individual members are butted together to form a joint, the joint shall occur over a support.

-Built up beams shall be nailed together with a double row of nails not less than 89 (3.5") in length, not more than 450 (18") apart, and not more than 100 (4") from the end.

JOISTS

Size & Spacing: 9.23.4.2.(1) & Table A-1

| Joist Size | Maximum Span (m) | | |
|-----------------|------------------|----------------|----------------|
| | 300 (12") o.c. | 400 (16") o.c. | 600 (24") o.c. |
| 38x140 (2"x6") | 3.14 (10'-3") | 2.85 (9'-4") | 2.49 (8'-2") |
| 38x184 (2"x8") | 3.81 (12'-6") | 3.58 (11'-9") | 3.27 (10'-8") |
| 38x235 (2"x10") | 4.44 (14'-6") | 4.17 (13'-8") | 3.92 (12'-10") |
| 38x286 (2"x12") | 5.01 (16'-5") | 4.71 (15'-5") | 4.42 (14'-6") |

*Spruce-Pine-Fir No.1 or No.2 Grade with Bridging

*The use of floor joists less than 38x184 (2"x8") is not recommended as it does not allow for the proper attachment of railings.

Cantilever: 9.23.9.9.

-38x184 (2"x8") may not be cantilevered more than 400 (16")

-38x235 (2"x10") or larger may not be cantilevered more than 600 (24")

Bearing: 9.23.9.1. – 9.23.9.3., 9.23.3.4.(1)

-Floor joists may be supported on the tops of beams or may be supported with proper metal joist hangers.

-The floor joists must be mechanically fastened to the supporting member with two 82 (3-1/4") nails.

Bridging: 9.23.9.4.(2), 9.23.3.4.(1)

-Bridging shall consist of 19 x 64 (1"x3") cross bridging, 38 x 38 (2"x2") cross bridging or solid blocking the same dimension as the supported floor joists.

-Bridging shall be located not more than 2100 (6'-11") from each support or other rows of bridging.

-Bridging shall be fastened with two 57 (2-1/4") nails at each end.

DECKING

Requirements: Table 9.23.14.5.A., 9.23.3.5.(1)

-Decking less than or equal to 184mm (7-1/4") wide shall be fastened with two 51mm (2") common/spiral nails or two 45mm (1-3/4") Screws at each support.

-Decking shall consist of solid lumber at least 17.0mm (11/16") thick when joists are spaced 400mm (16") or less and at least 19.0mm (3/4") when joists are spaced more than 400mm (16").

FASTENERS

-All fasteners used must be properly treated/coated to prevent corrosion.

-Equivalent screws may be used in lieu of nails

STAIRS

Stairs shall conform to Section 9.8 of the Ontario Building Code

RAILING

Railings shall conform to Section 9.8 and Supplementary Standard SB-7 of the Ontario Building Code (see attached) or a pre-engineered system certified by an Ontario Engineer and installed in conformance with the manufacturer's instructions.

GUARDS

9.8.8.3. Height of Guards

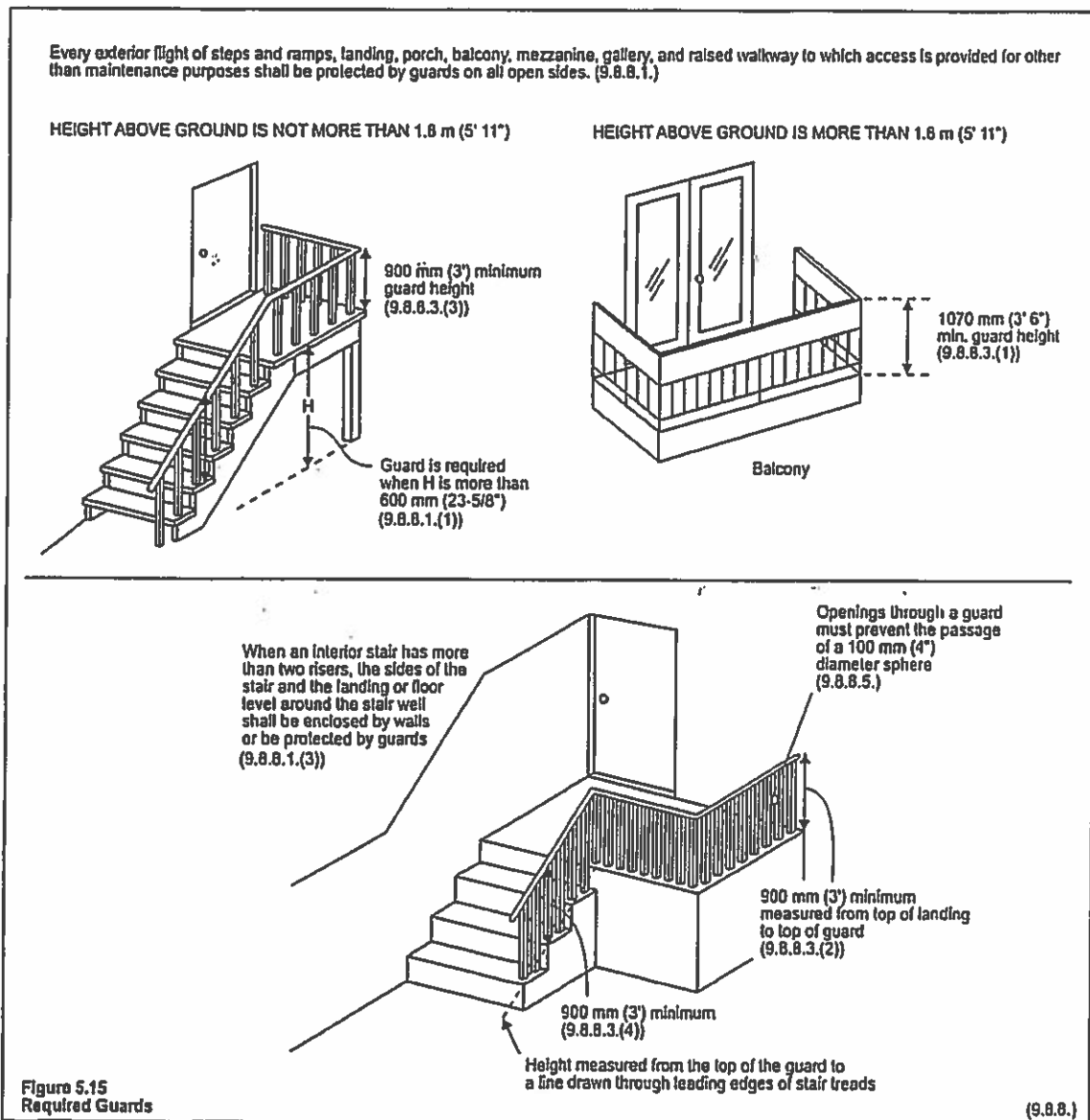
-Exterior guards serving not more than one dwelling unit shall be not less than 900 mm (36") high where the walking surface served by the guard is not more than 1 800 (5'-11") mm above the finished ground level, otherwise the guards shall be not less than 1 070 mm (42") high. If a bench is incorporated into a guard the required height is measured above the bench surface.

9.8.8.5. Openings in Guards

-Openings through a guard shall be of a size that will prevent the passage of a spherical object having a diameter of 100 mm (4").

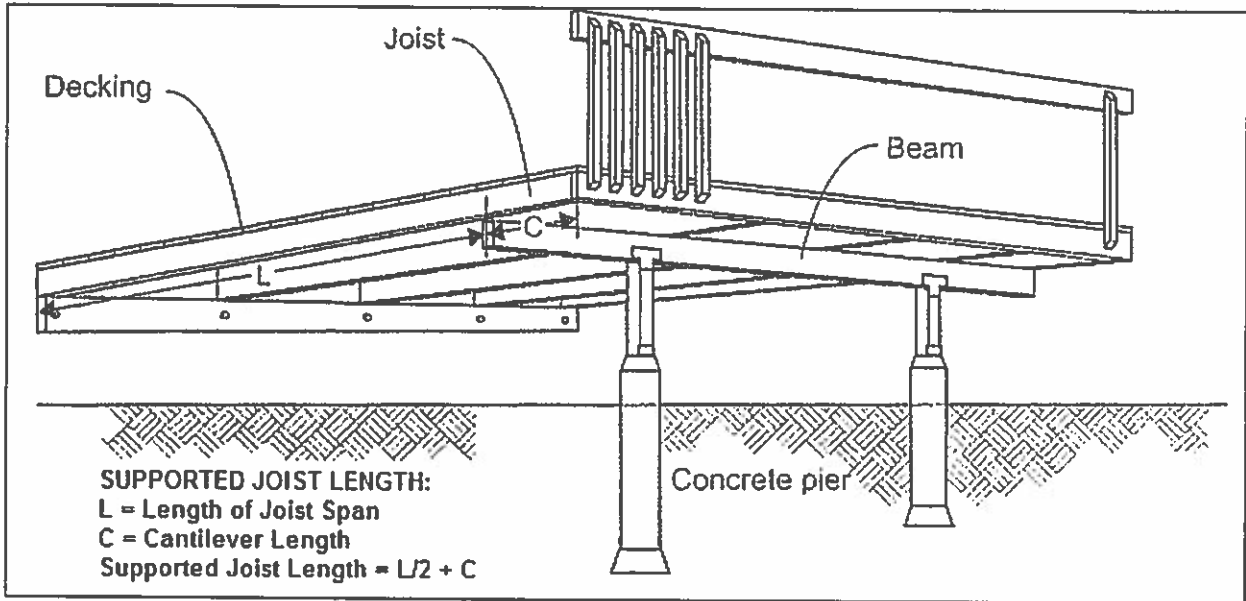
9.8.8.6. Design to Prevent Climbing

-Guards shall be designed so that no member, attachment, or opening will facilitate climbing.



ILLUSTRATIONS

FROM THE "CODE AND CONSTRUCTION - GUIDE FOR HOUSING"



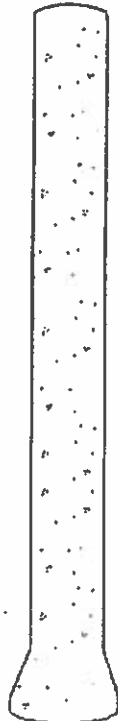
PIERS

EXAMPLE: Where Require Bearing Area = 1.29 Sq. Ft.

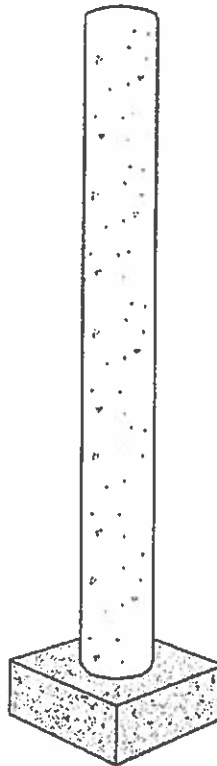
NOTE: REFER TO PIER TABLE FOR REQUIRED SIZES



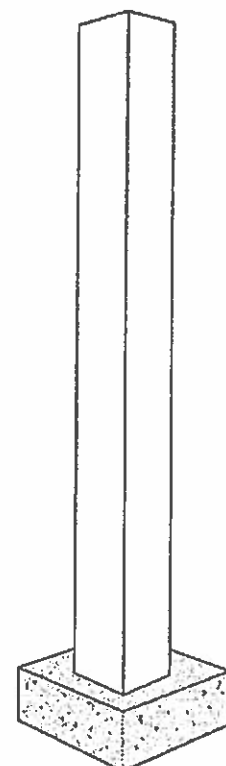
16" Dia. Concrete Pier
Without Footing



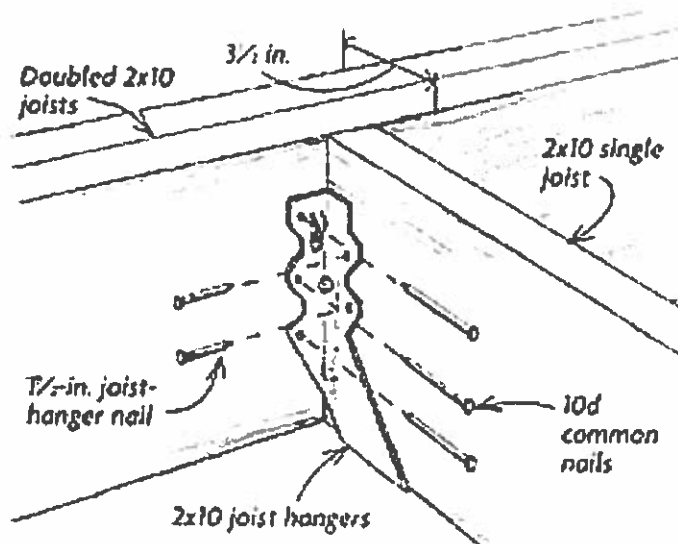
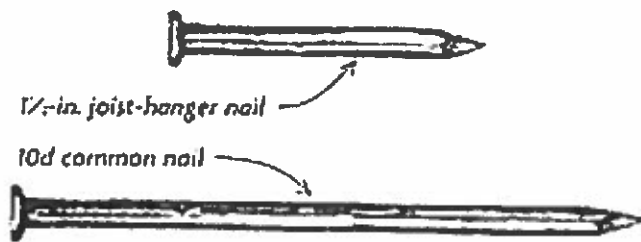
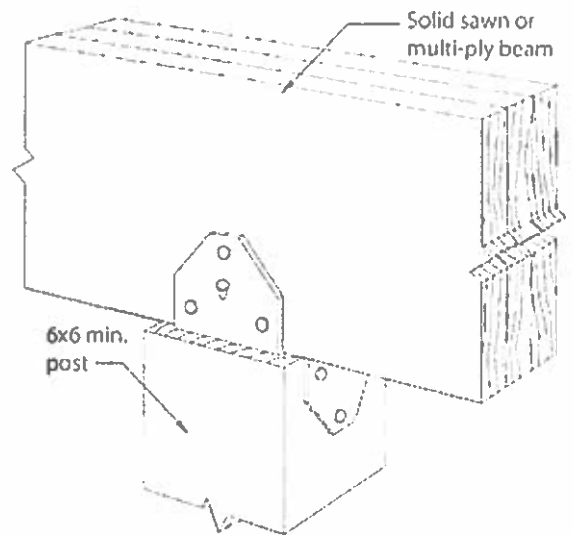
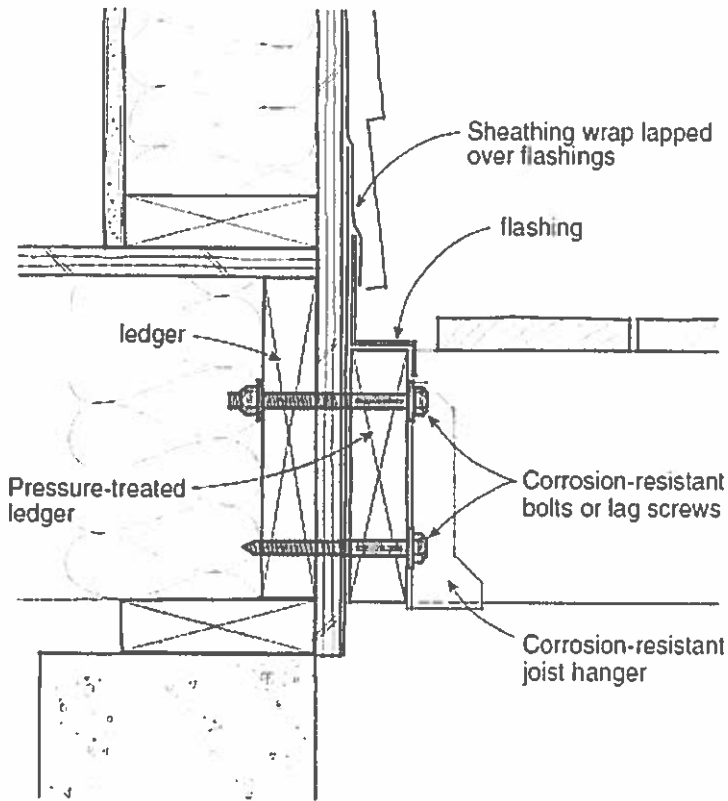
8" Dia. Concrete Pier
With Base Expanded
To 16" Dia.

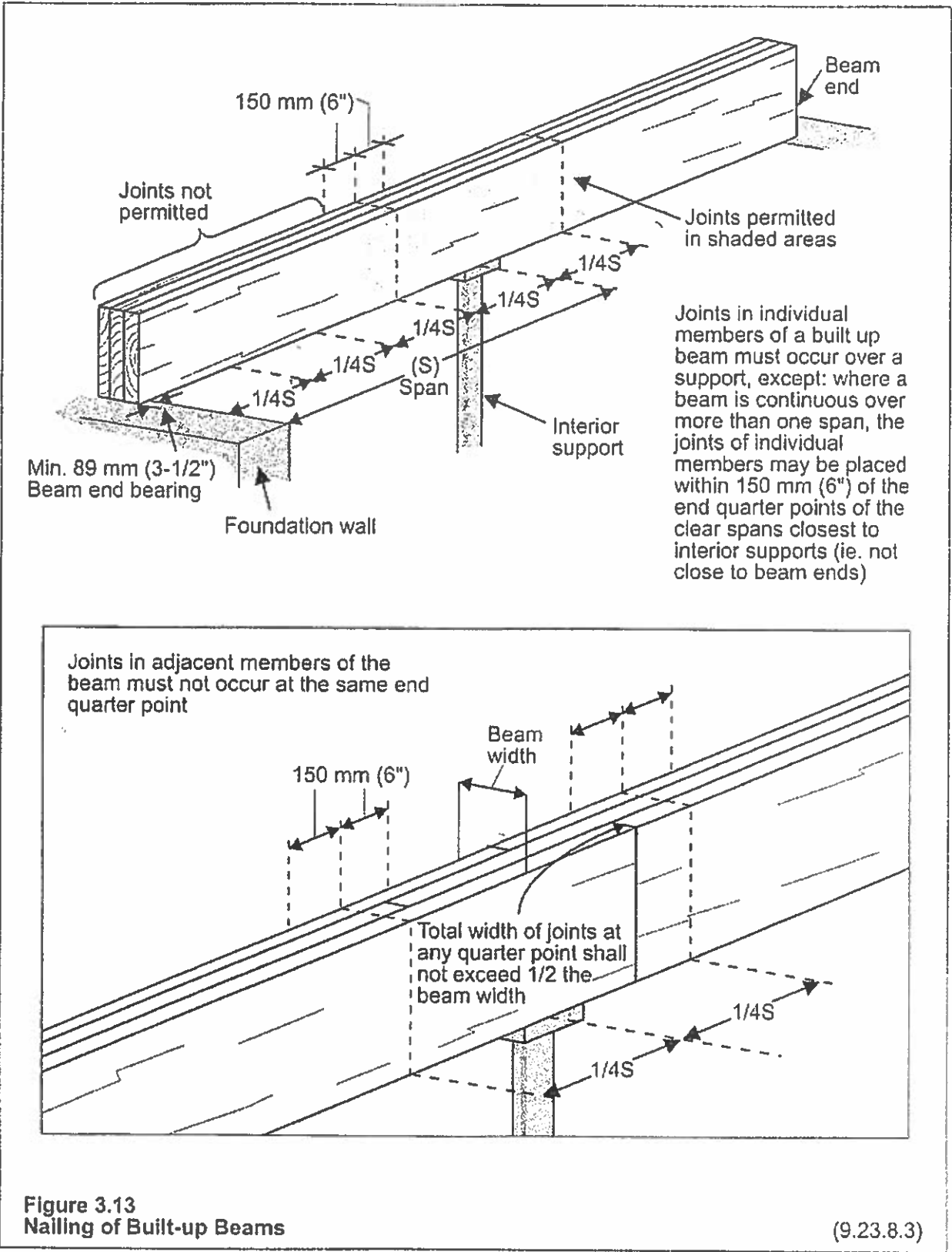


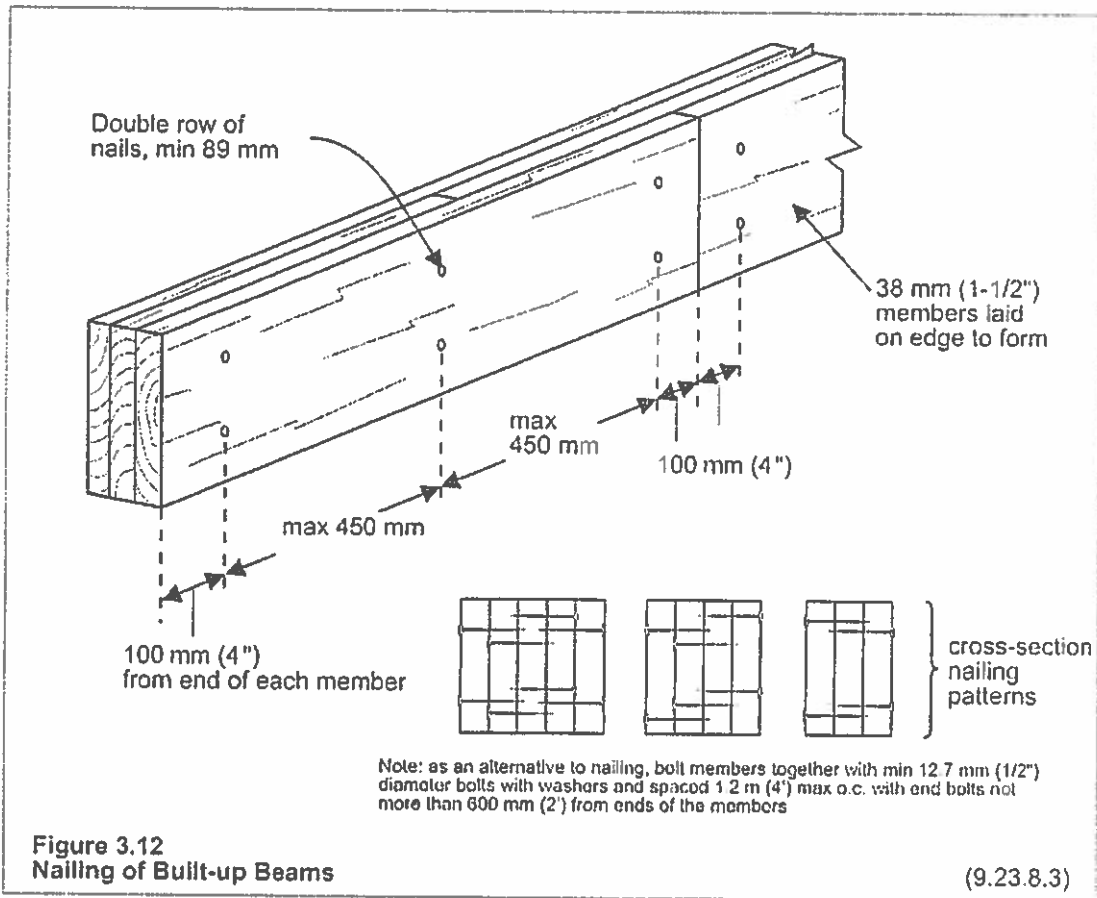
8" Dia. Concrete Pier
On 14" x 14"
Concrete Footing



6" x 6" PT Wood Post
On 14" x 14"
Concrete Footing





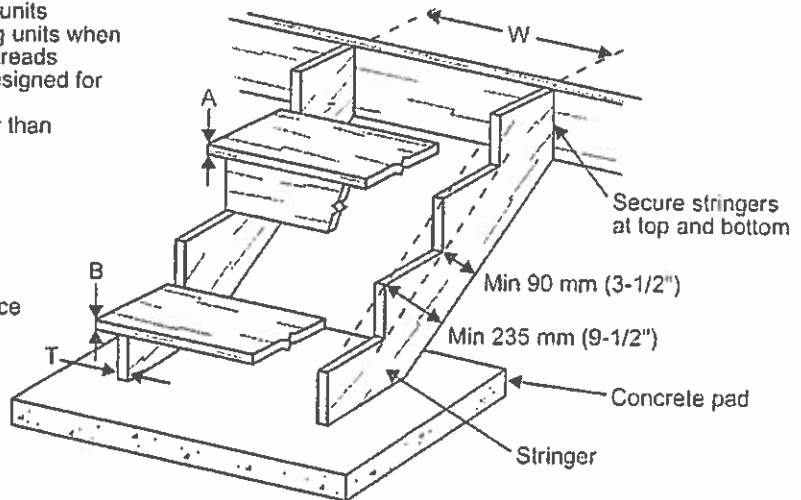


WOOD STAIRS

- W = max 900 mm (35") in dwelling units
- W = max 1200 mm (47") in dwelling units when risers support the front of the treads unless stringers and treads designed for wider spacing
- W = max 600 mm (23-1/2") in other than dwelling units

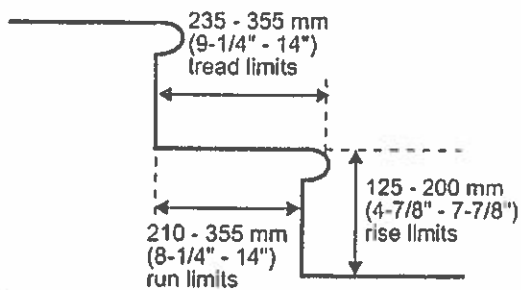
Tread thickness:

- A = min 25 mm (1") when risers support front of tread
- B = min 38 mm (1-1/2") when tread unsupported at front and distance between stringers is no greater than 750 mm (30")

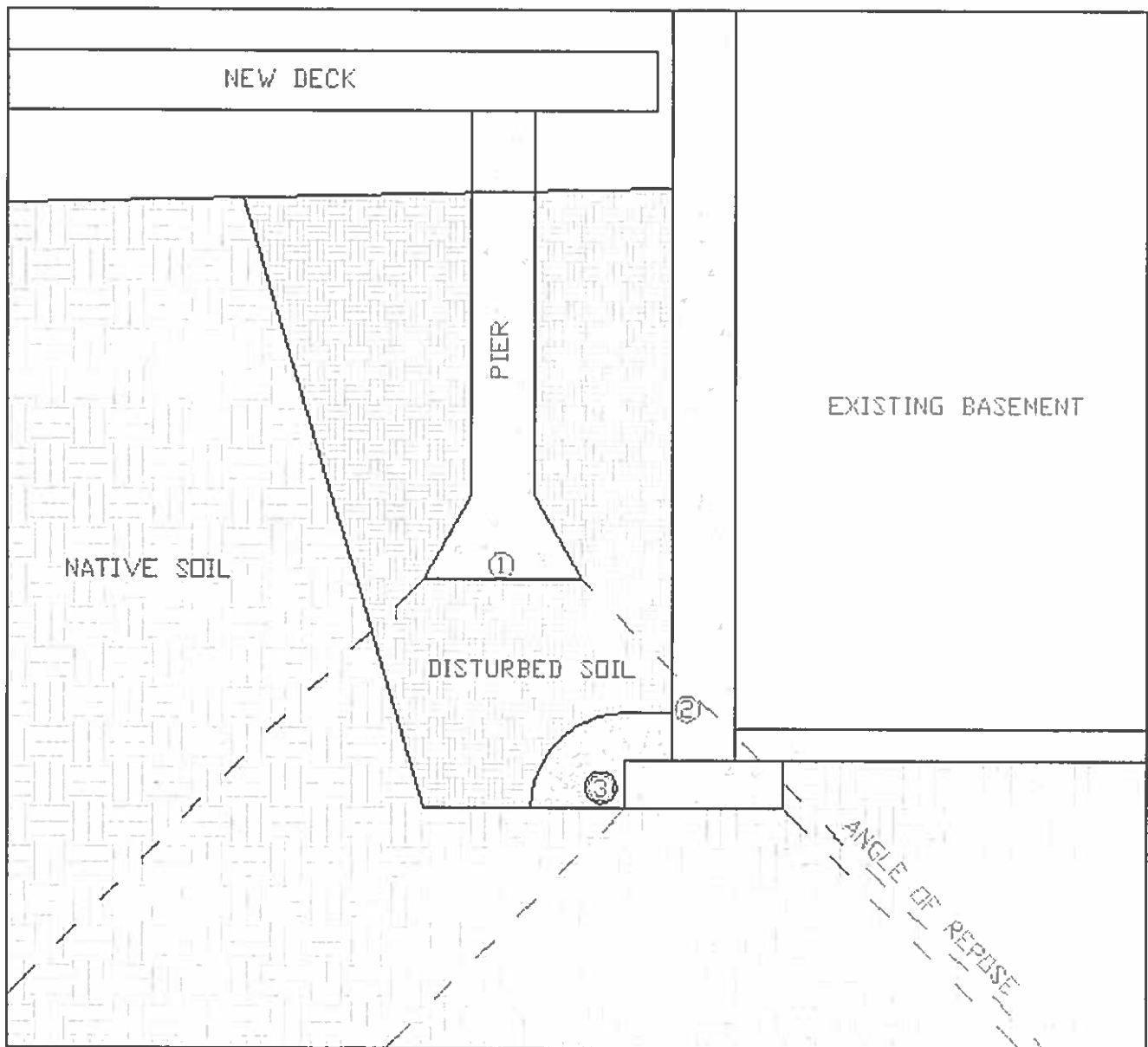


SINGLE DWELLING UNIT INTERIOR AND EXTERIOR STAIRS

Stair dimensions as shown:
(9.8.3.1)



UNACCEPTABLE INSTALLATION



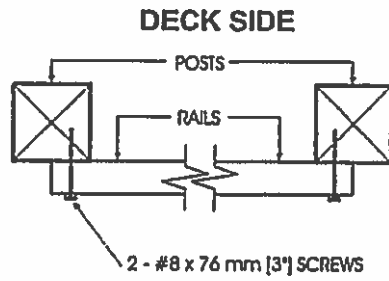
- 1) FOUNDATIONS MUST REST ON UNDISTURBED NATIVE SOIL.
- 2) FOUNDATIONS WITHIN THE ANGLE OF REPOSE REQUIRE THE SERVICES OF A PROFESSIONAL ENGINEER.
- 3) NEW FOUNDATIONS MUST NOT INTERFERE WITH EXISTING FOUNDATION DRAINAGE SYSTEMS.

Table 2.2.1.
Exterior Post and Rail System Connection Details

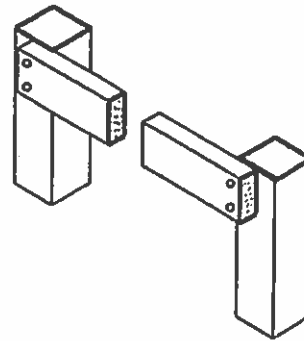
| Connection Detail | Detail Number | Description |
|---|---------------|---|
| Top Rail to Post and / or Bottom Rail to Post | EA-1 | Top rail nailed to post |
| | EA-2 | Top/bottom rail skew nailed to post with 76 mm (3") nails |
| | EA-3 | Top/bottom rail skew nailed to post with 63 mm (2½") nails |
| | EA-4 | Top/bottom rail face nailed or screwed to post |
| | EA-5 | Top/bottom rail fastened to post with framing anchors |
| Post to Floor | EB-1 | Post nailed to rim joist |
| | EB-2 | Post screwed to rim joist |
| | EB-3 | Post bolted to floor joist with 8 mm (5/16") machine bolts |
| | EB-4 | Post bolted to floor joist with 9.5 mm (3/8") machine bolts |
| | EB-5 | Post bolted to 2 floor joists |
| | EB-6 | Post fastened to floor, where guard is parallel to floor joists |
| Infill Picket | EC-1 | Picket nailed to endcap; endcap screwed to rail |
| | EC-2 | Picket nailed to rail |
| | EC-3 | Picket screwed to rail |
| | EC-4 | Picket screwed to top rail and rim joist |
| Column 1 | 2 | 3 |

Table 2.2.2.
Exterior Cantilevered Picket System Connection Details

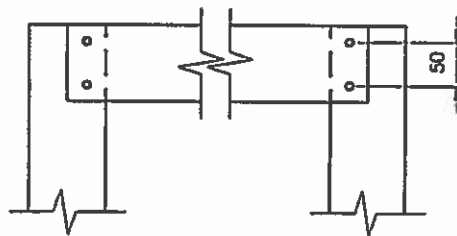
| Connection Detail | Detail Number | Description |
|---|---------------|---|
| Cantilevered Picket (Douglas Fir-Larch, Spruce-Pine-Fir, Hem-Fir Species) | ED-1 | Picket screwed to rim joist |
| | ED-2 | Picket screwed to rim joist, where guard is parallel to floor joists |
| Cantilevered Picket (Northern Species) | ED-3 | Picket screwed to rim joist and deck |
| | ED-4 | Picket screwed to rim joist and deck, where guard is parallel to floor joists |
| Cantilevered Picket (Douglas Fir-Larch, Spruce-Pine-Fir, Hem-Fir Species, Northern Species) | ED-5 | Corner |
| Column 1 | 2 | 3 |



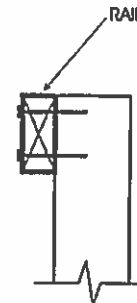
PLAN



AXONOMETRIC



FRONT ELEVATION



SIDE ELEVATION

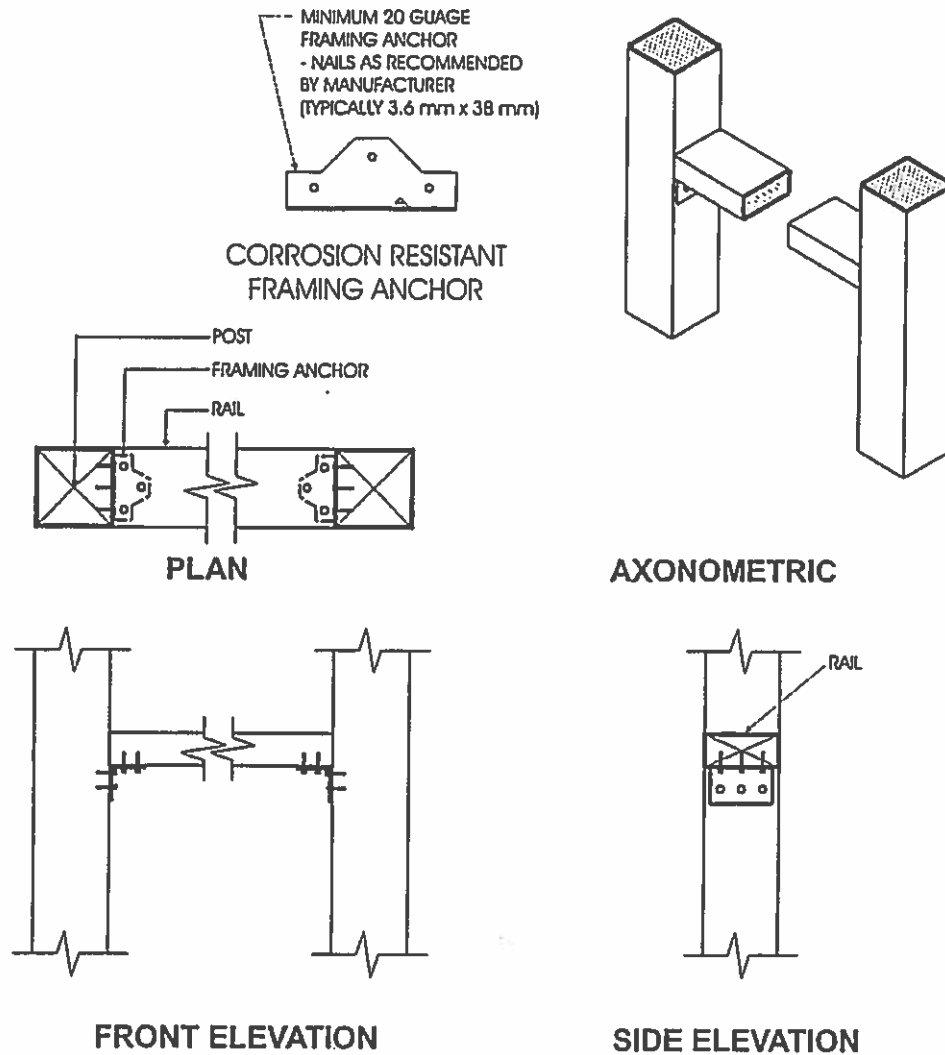
Detail EA-4

Exterior Connection: Top/Bottom Rail Face Nailed or Screwed to Post

Notes:

1. If the rails are located on the deck side of the posts, 76 mm (3") nails may be used in place of the screws.
2. Where the top rail is continuous, the top rail may be fastened to each post with 3 - #8 x 76 mm (3") screws.
3. Dimensions shown are in mm unless otherwise specified.

| MAXIMUM SPAN OF RAIL BETWEEN POSTS | |
|---|-------------------------|
| Species | Maximum Span, m (ft-in) |
| Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir | 1.77 (5'-10") |
| Northern Species | 1.41 (4'-8") |
| Column 1 | 2 |



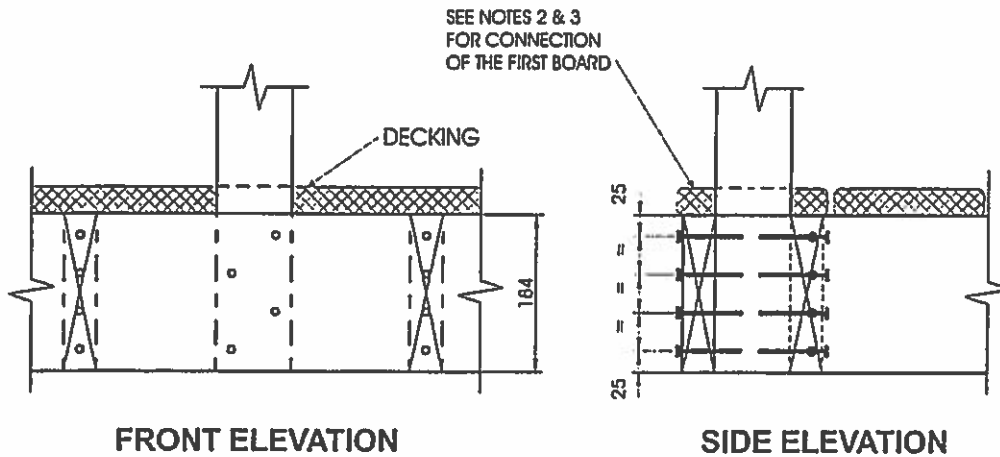
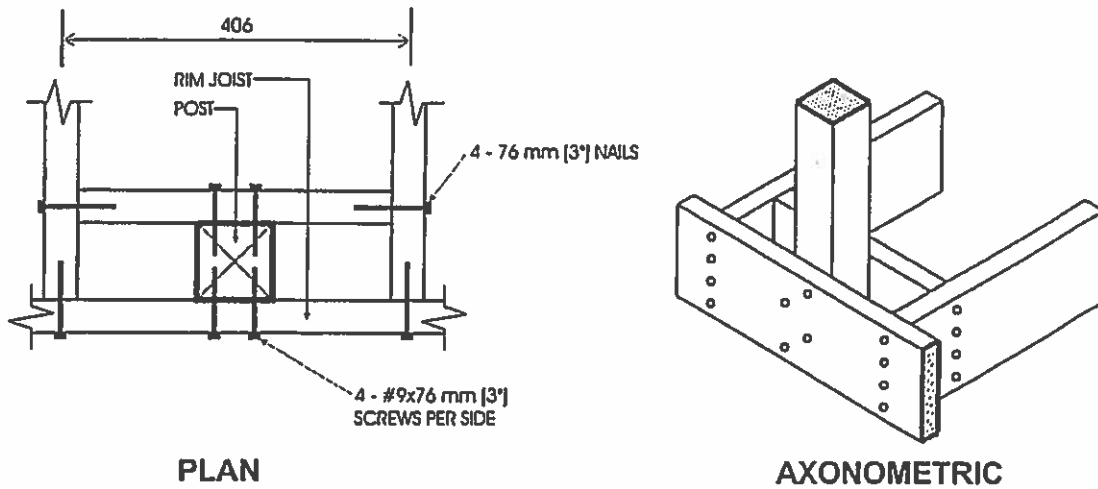
Detail EA-5

Exterior Connection: Top/Bottom Rail Fastened to Post with Framing Anchors

Notes:

1. Provide support to bottom rail at intervals not more than 2.0 m (6'-7").
2. The bottom rail may be bevelled as detailed in Figure 2.1.2.
3. Dimensions shown are in mm unless otherwise specified.

| MAXIMUM SPAN OF RAIL BETWEEN POSTS | |
|---|-------------------------|
| Species | Maximum Span, m (ft-in) |
| Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir | 2.72 (8'-11") |
| Northern Species | 2.18 (7'-2") |
| Column 1 | 2 |

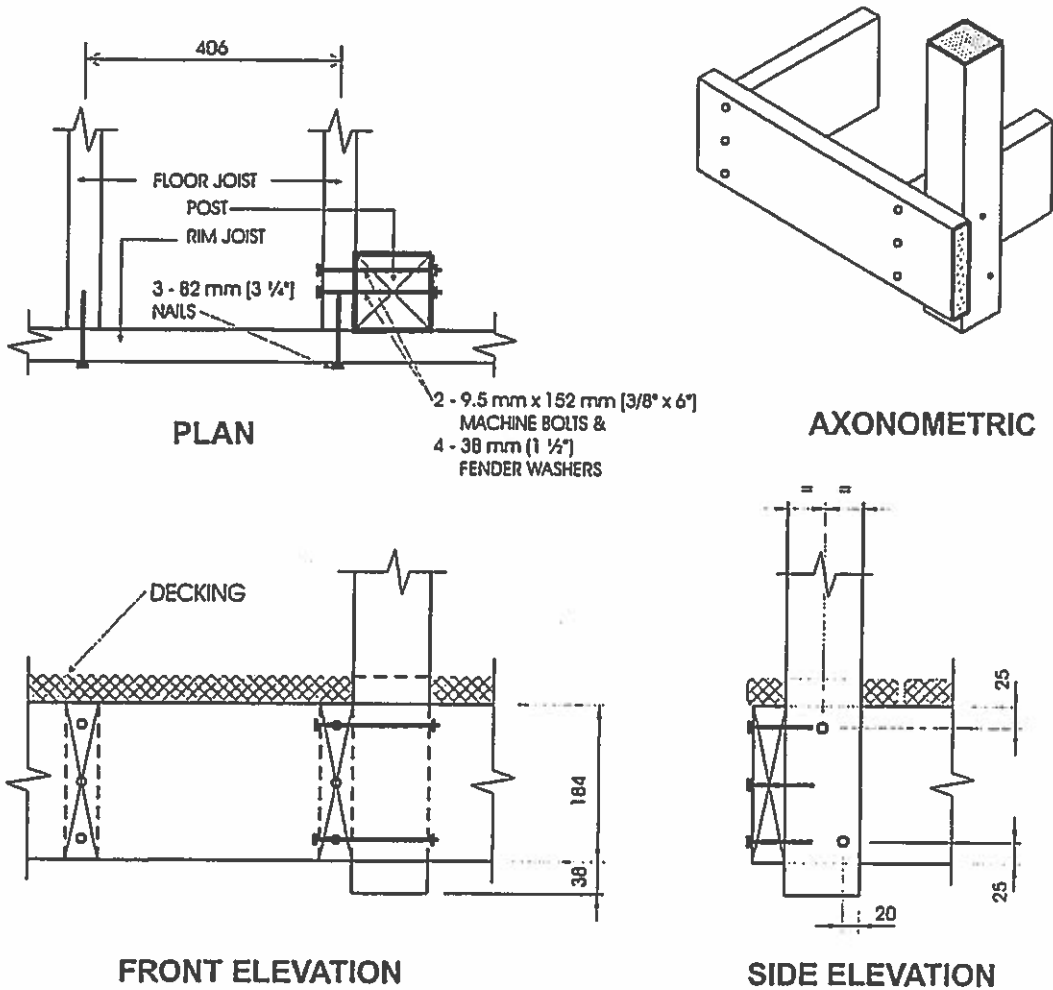


Detail EB-2
Exterior Connection: Post Screwed to Rim Joist

Notes:

1. Decking is omitted from the plan view and the axonometric view for clarity.
2. Fasten 25 mm x 140 mm (5/4" x 6" nominal) outer deck board to rim joist with 63 mm (2 1/2") nails at 300 mm (12").
3. Fasten 25 mm x 140 mm (5/4" x 6" nominal) outer deck board to floor joist with 1 - 63 mm (2 1/2") nail at each joist.
4. The post may be positioned anywhere between the joists.
5. #9 screws may be replaced by #8 screws if the maximum spacing between posts is not more than 1.20 m (3'-11").
6. Dimensions shown are in mm unless otherwise specified.

| MAXIMUM SPAN OF RAIL BETWEEN POSTS | |
|---|-------------------------|
| Species | Maximum Span, m (ft-in) |
| Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir | 1.56 (5'-1") |
| Northern Species | 1.20 (3'-11") |
| Column 1 | 2 |

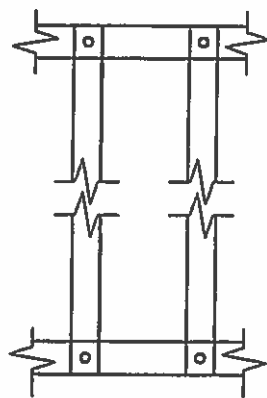
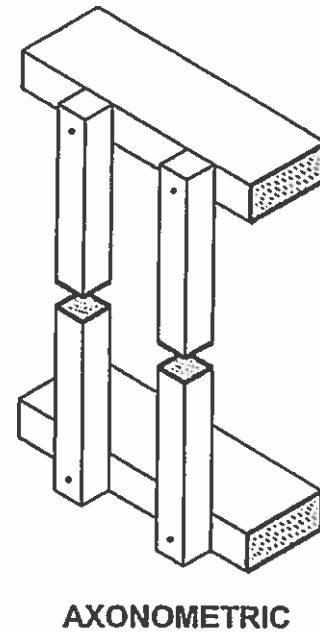
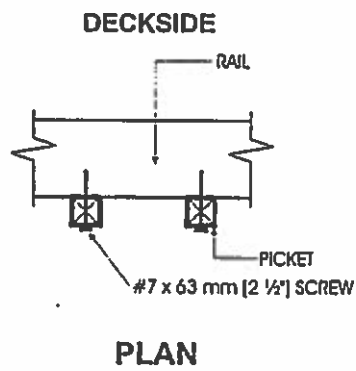


Detail EB-4
Exterior Connection: Post Bolted to Floor Joist - 9.5 mm (3/8") Bolts

Notes:

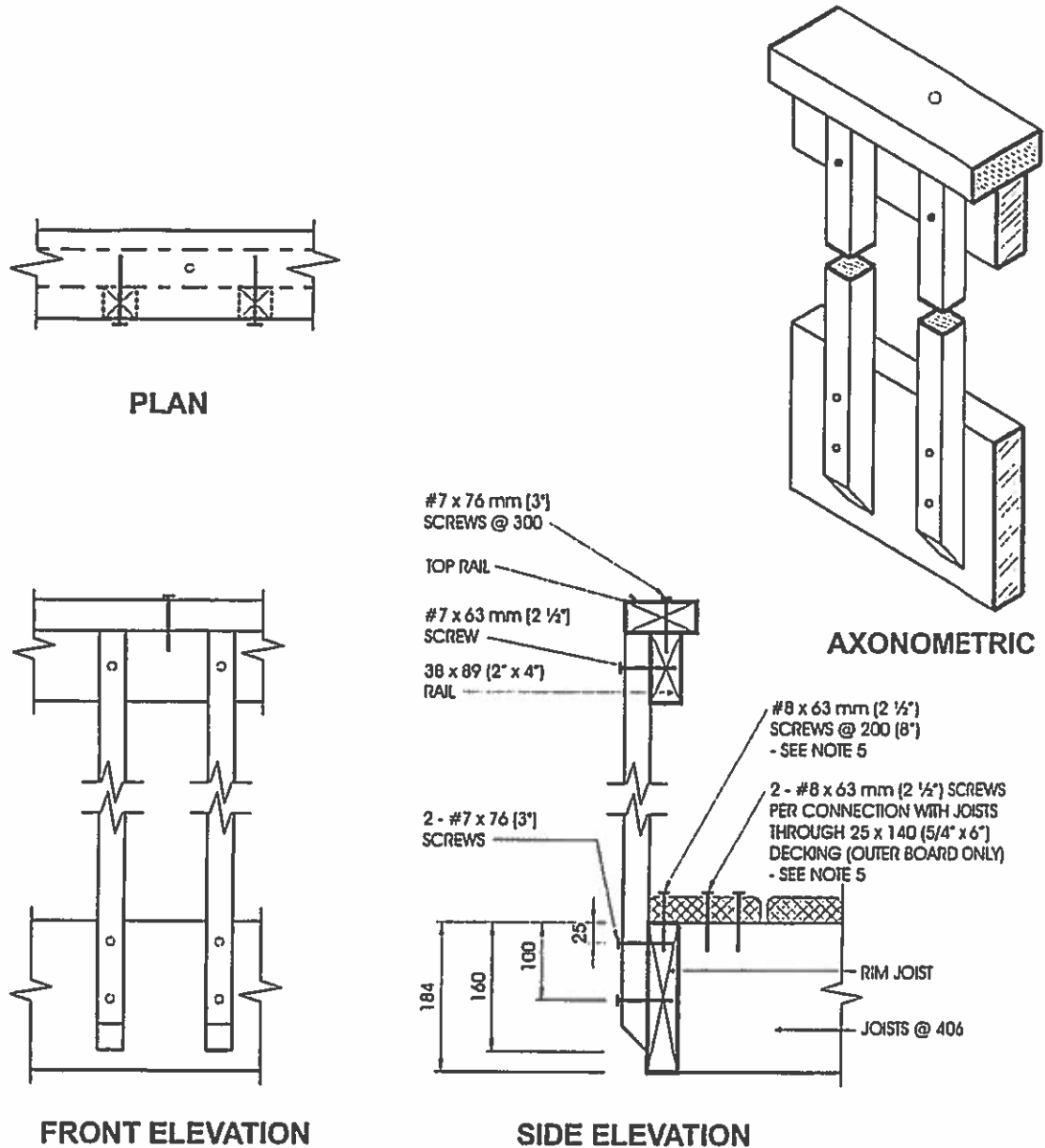
1. Decking is omitted from the plan view and the axonometric view for clarity.
2. 38 mm (1 1/2") post projection is not required where the maximum spacing between posts does not exceed 1.20 m (3'-11").
3. Joists may be spaced at 610 mm (24") o.c. or 406 mm (16") o.c.
4. Where floor joists are spaced at 610 mm (24") o.c., decking shall have a minimum thickness of 38 mm (1 1/2") and shall be fastened to the floor with 2 - 76 mm (3") nails.
5. Dimensions shown are in mm unless otherwise specified.

| MAXIMUM SPACING BETWEEN POSTS | |
|---|-------------------------|
| Species | Maximum Span, m (ft-in) |
| Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir | 1.49 (4'-11") |
| Northern Species | 1.20 (3'-11") |
| Column 1 | 2 |



Detail EC-3

Exterior Connection: Infill Picket Screwed to Rail

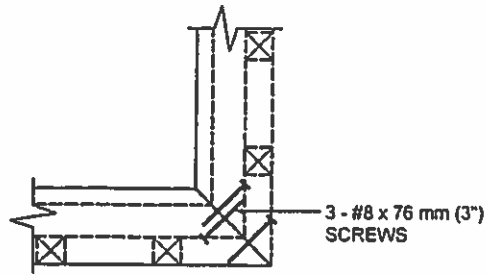


Detail ED-1

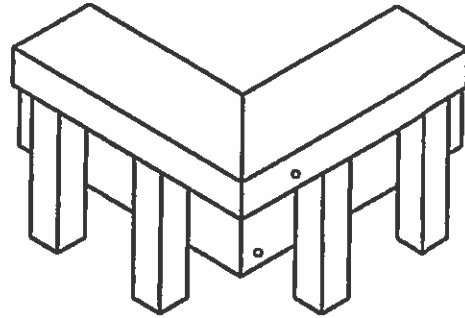
Exterior Connection: Cantilevered Picket Screwed to Rim Joist

Notes:

1. Provide a suitable post, return, or solid support at each end of the guard.
2. Wood for cantilevered pickets shall be Douglas Fir-Larch, Spruce-Pine-Fir, or Hem-Fir Species.
3. Fasten rim joist to each floor joist with 3 - 82 mm (3 1/4") nails.
4. Dimensions shown are in mm unless otherwise specified.
5. The outer deck board shall not be less than 140 mm (6" nominal) wide. Where 38 mm (2" nominal) thick boards are used, the length of the wood screws shall be not less than 76 mm (3").

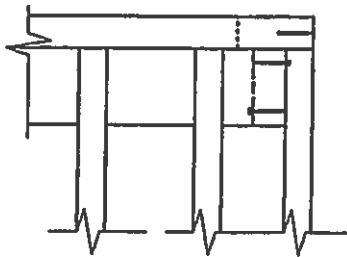


PLAN TOP RAIL

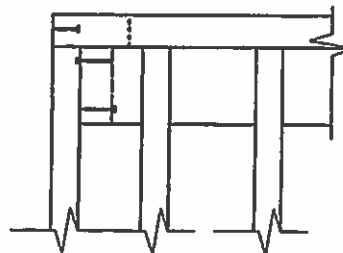


AXONOMETRIC

ONE FASTENER IN HORIZONTALLY ORIENTATED PORTION OF TOP RAIL
AND TWO IN VERTICALLY ORIENTATED PORTION.



FRONT TOP RAIL



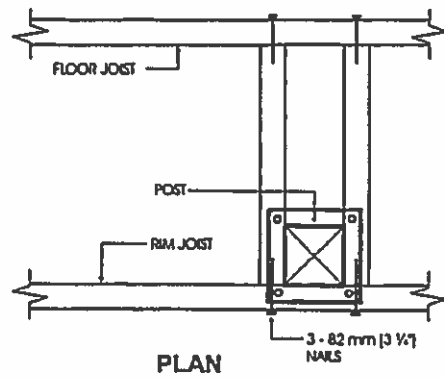
SIDE TOP RAIL

Detail ED-5

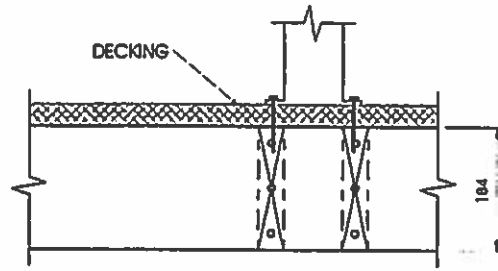
Exterior Connection: Corner Joint

Notes:

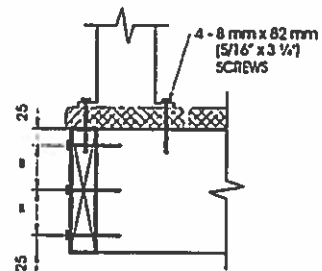
1. Screws fastening pickets are omitted for clarity.
2. Provide a minimum of 10 pickets beyond the return if end restraint of the guard is provided by this return detail only.



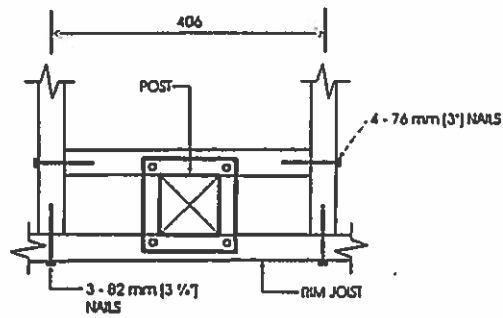
PLAN



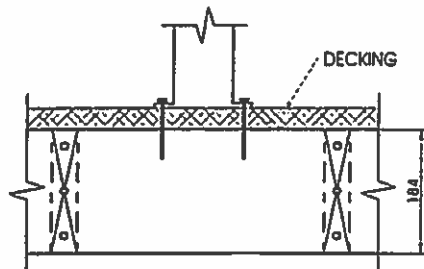
FRONT ELEVATION



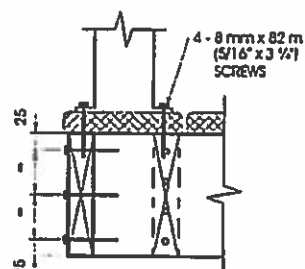
SIDE ELEVATION



PLAN



FRONT ELEVATION



SIDE ELEVATION

TACBOC
STANDARD DETAIL

TRF
WOOD DECK
CONSTRUCTION DETAILS,
PLAN & SECTION

DRG. NO.

DOIF

03-2012