Building Department – Code Guideline
Part 9 – Decks and Exterior Platforms Serving Dwelling Units

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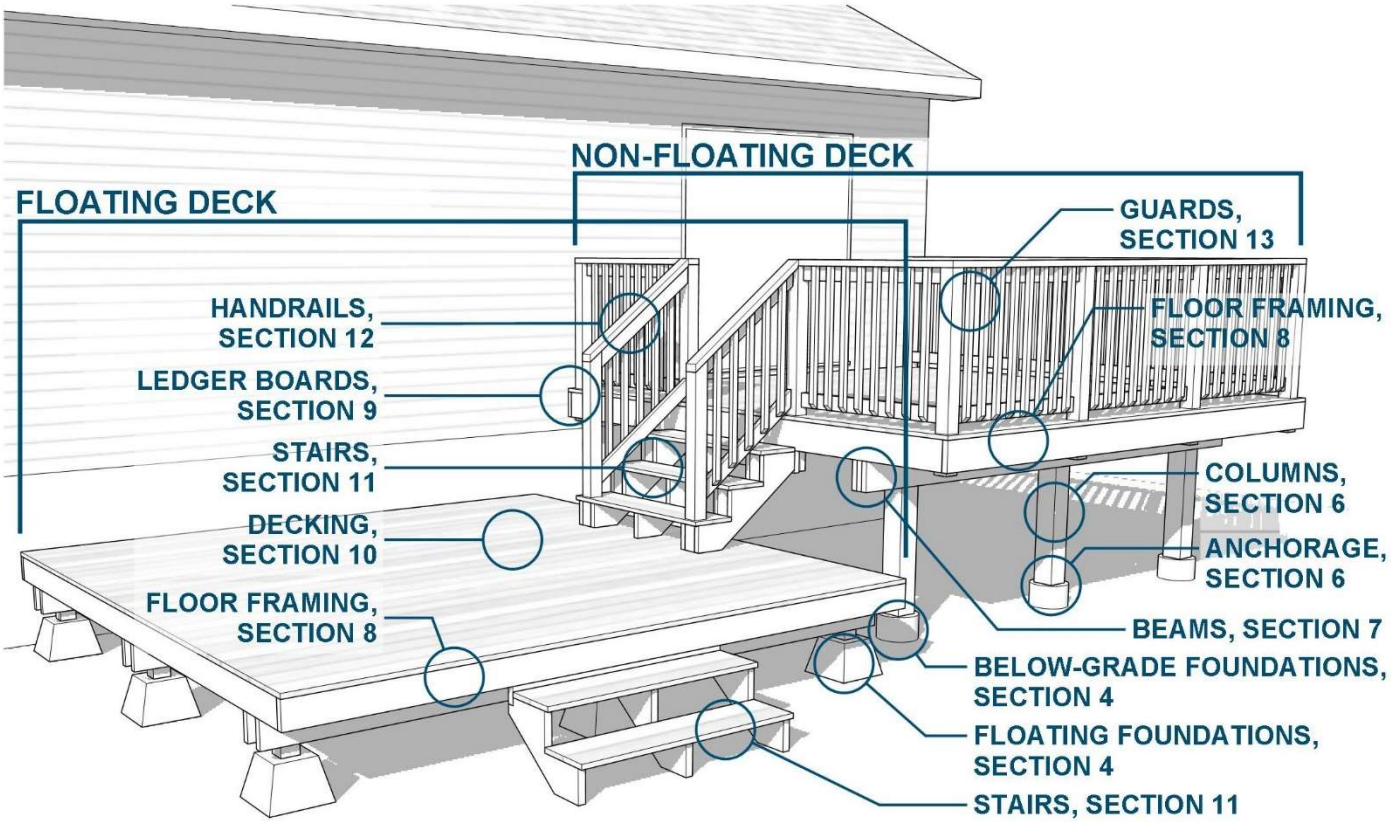


Carleton PLACE

Building Department – Code Guideline
Part 9 – Decks and Exterior Platforms Serving Dwelling Units

1. PURPOSE AND SCOPE OF THIS GUIDELINE

- This code guideline is intended as an educational reference document to provide builders, designers, property owners, and Town staff with an improved understanding of the application of Part 9 of the Ontario Building Code for the design and construction of wood framed decks and other exterior platforms serving residential dwelling units.
- This guideline focuses on the requirements for one storey wood framed decks with no roof, for both floating decks constructed on the ground, and non-floating decks constructed with foundations below grade, that serve a house or an individual dwelling unit.
- Various other design and construction options available for decks are not covered by this guideline, such as covered decks, roof framing, enclosed or screened-in decks, or multi-storey decks.
- This guideline is also limited to standard residential structural live loads of 1.9 kPa (39.7 lbs/ft²), and the structural aspects of this guideline cannot be used for increased loads, or other special loading scenarios, such as hot tubs.

2. FLOATING VS NON-FLOATING DECKS (Code Article 9.12.2.2.)

- Wood framed decks can be classified as either a floating deck constructed on-grade, or a non-floating deck with below grade foundations.
- In order for a deck to be classified as a floating deck, all of the following criteria below must be met:
  - Not more than 55 m² (592 ft²) in area, not more than 1 storey, and not supporting a roof,
  - Height from grade to the underside of the floor joists is not more than 600 mm (23 5/8”), and
  - Not attached to another structure or building unless it can be demonstrated by a qualified professional that differential movement will not adversely affect the performance of the structure.
- While a non-floating deck requires the additional support of below-grade foundations, it is less restricted than a floating deck in that it is permitted to be more than 1 storey, support a roof structure, larger in area, greater in height above grade, and be attached to and supported on another building.
- The key characteristics of Floating and Non-floating decks can be summarized as follows:

Key Characteristics of a Floating Deck:

- Limited to maximum 55 m² (592 ft²) in area,
- Maximum 1 storey (1 floor level),
- Not supporting a roof structure,
- Not attached to another structure,
- Limited to maximum height of 600 mm (23 5/8") from the grade to the underside of the floor joists,
- Foundations may be supported on the ground, no need to extend below grade,
- No need for anchorage to the foundations.

Key Characteristics of a Non-floating Deck:

- Not limited in size or floor height,
- May be multiple storeys (up to 3 floor levels),
- May support a roof structure,
- May be supported on another structure,
- Foundations are required to extend below grade either to a minimum depth of 1.2 m (3'-11 1/4"), or supported directly on sound bedrock,
- Deck structure and columns require anchorage to the foundation.

3. EXCAVATION AND DEPTH OF FOUNDATIONS (Code Subsections 9.12.1. and 9.12.2.)

- Where non-floating deck foundations are not supported on sound bedrock, the foundations require a minimum depth of 1.2 m (3’-11 1/4”) measured from finished grade down to the underside of footing.
- If the foundation is bearing on sound bedrock that is not susceptible to frost movement, then the minimum depth does not apply and the foundations may be supported directly on the bedrock.

- If the minimum depth or support on sound bedrock cannot be achieved for non-floating deck foundations, as noted above, alternative methods of frost protection, such as insulation, shall be designed by a qualified professional.
- If a deck is classified as a floating deck, then the depth of excavation and foundation noted above does not apply and the deck is permitted to be constructed on-grade.
- Prior to placement of below grade foundations, excavations shall be free of all organic matter, top-soil, and standing water, and shall extend to undisturbed soil.
- For floating decks, prior to placement of on-grade foundations, any top-soil or organic matter below the foundations shall be removed, and they shall be placed on undisturbed soil, rock, or compacted granular fill.

4. FOUNDATIONS (Code Section 9.15.)

- All decks and platforms require foundations and footings to transfer loads to supporting soil or rock, whether they are supported on-grade, or below grade.
- Footings must be adequately sized to support the loads from the deck, and can be sized according to **Figure 1** below where the allowable soil bearing pressure is a minimum of 75 kPa.
- Where the footing spacing and supported joist span exceeds what is listed in **Figure 1**, the footings shall be sized in accordance with Article 9.15.3.4. of the Code.
- Where the allowable soil bearing pressure is less than 75 kPa, the size of the footings shall be designed by a qualified professional under Section 4.2. of the Code.

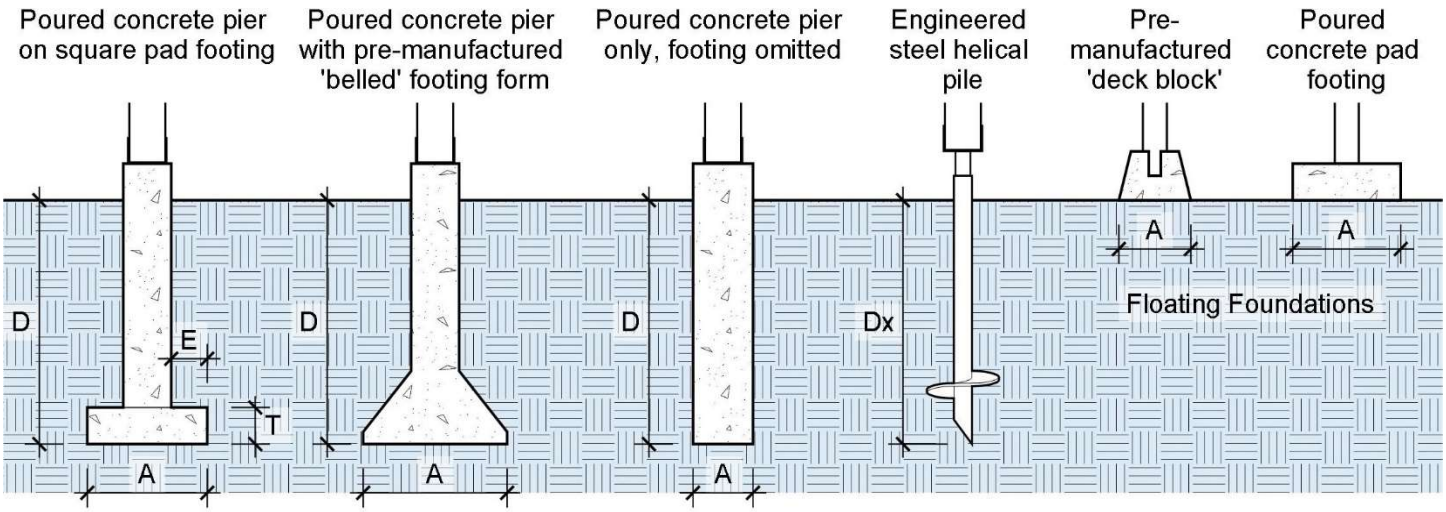
Figure 1 – Minimum area of bottom of footings, allowable soil bearing pressure of 75 kPa

Maximum Footing Spacing, m (ft-in)	Minimum Footing Area, m² (ft²)					
	Maximum Supported Joist Span, m (ft-in)					
	1.2 m (3'-11")	1.5 m (4'-11")	1.8 m (5'-11")	2.1 m (6'-11")	2.4 m (7'-10")	3.0 m (9'-10")
1.2 m (3'-11")	0.05 m² (0.5 ft²)	0.06 m² (0.6 ft²)	0.07 m² (0.7 ft²)	0.08 m² (0.9 ft²)	0.09 m² (1.0 ft²)	0.11 m² (1.2 ft²)
1.5 m (4'-11")	0.06 m² (0.6 ft²)	0.07 m² (0.8 ft²)	0.09 m² (0.9 ft²)	0.10 m² (1.1 ft²)	0.11 m² (1.2 ft²)	0.14 m² (1.5 ft²)
1.8 m (5'-11")	0.07 m² (0.7 ft²)	0.09 m² (0.9 ft²)	0.10 m² (1.1 ft²)	0.12 m² (1.3 ft²)	0.14 m² (1.5 ft²)	0.17 m² (1.9 ft²)
2.1 m (6'-11")	0.08 m² (0.9 ft²)	0.10 m² (1.1 ft²)	0.12 m² (1.3 ft²)	0.14 m² (1.5 ft²)	0.16 m² (2.0 ft²)	0.20 m² (2.2 ft²)
2.4 m (7'-10")	0.09 m² (1.0 ft²)	0.11 m² (1.2 ft²)	0.14 m² (1.5 ft²)	0.16 m² (1.7 ft²)	0.18 m² (2.0 ft²)	0.23 m² (2.5 ft²)
2.7 m (8'-10")	0.10 m² (1.1 ft²)	0.13 m² (1.4 ft²)	0.16 m² (1.7 ft²)	0.18 m² (1.9 ft²)	0.21 m² (2.2 ft²)	0.26 m² (2.8 ft²)
3.0 m (9'-10")	0.11 m² (1.2 ft²)	0.14 m² (1.5 ft²)	0.17 m² (1.9 ft²)	0.20 m² (2.2 ft²)	0.23 m² (2.5 ft²)	0.29 m² (3.1 ft²)

Footnotes:
- Supported Joist Span means half the sum of floor joists on both sides of the beam/footing, and where joists are cantilevered the Supported Joist Span shall include the entire length of the cantilever.
- For floating decks, foundations can be achieved using concrete footings poured on-grade or by use of a similar pre-manufactured product such as concrete deck-blocks. Examples of typical floating foundations are shown in **Figure 2**.

- Footings and piers for below grade foundations can be formed on-site, or by a using pre-manufactured 'belled' footing form and pier poured as a single unit, Examples of typical below grade foundations are shown in **Figure 2**.
- Other types of foundations, such as metal helical piles, that are not covered in Part 9 of the Code shall be designed by a qualified professional under Part 4 of the Code.

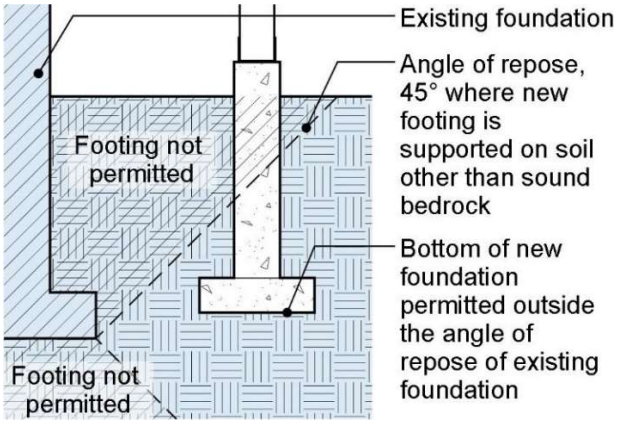
Figure 2 – Examples Typical Foundations and Footings



A = Area of bottom of footing/pier, minimum area required per Figure 1
D = Depth of footing, minimum 1.2 m (3'-11 1/4") where supported on soils other than sound bedrock
Dx = Depth of steel helical pile foundation, as per helical pile engineer design
T = Thickness of footing, at least the same as 'E', but in no case less than 100 mm (4")
E = Extension of footing beyond edge of pier, equal on all sides of pier, dimension is dependant on the required area 'A'

- The thickness of footings shall be at least the same dimension as the horizontal extension of the footing beyond the edge of the pier, as shown in **Figure 2**, but in no case shall the thickness of a footing be less than 100 mm (4”).
- Concrete piers shall be sufficiently sized to support the size of column above, such that the column is centered above the pier and the column does not protrude over the edges of the pier.
- Where concrete piers are less than 230 mm (9”) Ø or less than 200 mm x 200 mm (7 7/8” x 7 7/8”) in size, the concrete piers shall not extend above grade by more than 3 times their width.
- Where below grade foundations are supported on other than sound bedrock, the new footings shall not be placed within the angle of repose of any existing foundations, as shown in **Figure 3**.

Figure 3 – Angle of Repose for Below Grade Footings



5. LUMBER, GRADING, AND FASTENERS (Code Subsections 9.3.2., 9.23.3., and 9.23.5.)

- Lumber used for floor joists, beams, wall and roof framing shall be graded and identified by an NLGA grade stamp as determined by the NLGA “Standard Grading Rules for Canadian Lumber”.
- Any structural wood elements that are within 150 mm (6”) of the ground, or that are in contact with the ground shall be either treated with a preservative to resist decay or be a species of wood known to resist decay, such as cedar.

- No structural wood components shall be buried below grade unless the treatment is suitable for below grade use.
- Unless the lumber is treated or decay resistant, wood columns or other lumber supported on concrete that is contact with the ground shall be separated from the concrete by 6 mil polyethylene or Type S roll roofing.
- Where treated lumber is cut, the cut ends shall be treated with a site-applied preservative to prevent decay.
- Except where permitted in the Code and elsewhere in this guideline, wood members shall be fastened with common steel wire nails or common spiral nails, with the minimum length and diameter as specified in 9.23.3.1. the Code.
- Where screws are used in lieu of nails, the screws shall be demonstrated to have equivalent structural capacity as common nails, and shall have at least the same length and diameter as that for the required nail size. Non-structural general construction screws will not be permitted except where specifically noted (such as in SB-7 guard details).
- Fasteners shall be installed in a manner that minimizes splitting of wood members, such as by staggering the fasteners in the direction of the grain and by keeping fasteners in from the edges.
- Lumber shall not be notched or drilled greater than allowable notching or drilling dimensions in 9.23.5. of the Code.

6. COLUMNS AND ANCHORAGE (Code Section 9.17. and Article 9.23.6.2.)

- Except as provided below, the minimum size of square wood columns shall be 140 mm x 140 mm (5 1/2" x 5 1/2").
- 89 mm x 89 mm (3 1/2" x 3 1/2") wood columns are permitted to be used for floating decks where the columns support 2-ply sandwich beams and lintel beams, and where the total area supported does not exceed 8.3 m² (89.3 ft²).
- Wood columns shall be at least the width of the beam or supported member above, and can either be a solid piece, or built-up with 38 mm (1 1/2") thick plies nailed together with 76 mm (3”) nails @ 300 mm (11 7/8”) o.c., or bolted together with 9.52 mm (3/8”) diam. bolts @ 450 mm (17 3/4") o.c.
- Columns shall be centered above the supporting pier/foundation, and the pier/foundation shall be adequately sized to support the size of the column above such that the column does not protrude over the edges of the pier/foundation.
- Columns or posts that support a non-floating deck shall be anchored to the foundation to resist uplift and lateral movement, or alternatively where the distance from grade to the underside of the floor joists is not more than 600 mm (23 5/8”) the columns or posts may be anchored directly to the ground to resist uplift.
- Anchorage of columns to the foundations may be provided by pre-manufactured hardware such as a metal column saddle bracket with an anchor rod embedded into the concrete, or other form of bracket fastened to both the column and concrete foundation.
- If the deck meets the criteria to be classified as a floating deck, the columns and posts need not be anchored to the foundation or the ground.

7. BEAMS (Code Subsection 9.23.8.)

- Except as provided below for 2-ply ‘sandwich beams’ and ‘lintel beams’, all floor beams shall be built-up wood beams made up of a minimum of 3 plies, each 38 mm (1 1/2"), and fastened together.

- The size of built-up beams, and their maximum spans shall be as per Table A-8 from Part 9 of the Code, or be designed by a qualified professional. **Figure 4** below lists beam sizes commonly used on wood framed residential decks.

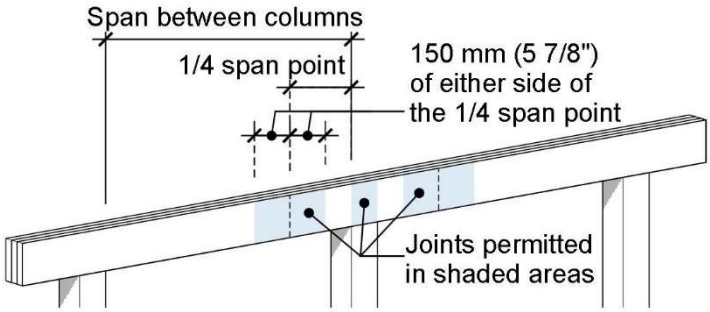
Figure 4 – Maximum Spans for Built-up Floor Beams, SPF Grade No. 1 or 2
Forming Part of Sentence 9.23.4.2.(3) and Table A-8

Maximum Span, m (ft-in)					
Size of Beam, mm (inch, nominal size)	Supported Length, m (ft-in)				
	2.40 m (7'-10")	3.00 m (9'-10")	3.60 m (11'-10")	4.20 m (13'-9")	4.80 m (15'-9")
3 - 38 x 184 (3 - 2 x 8)	3.07 m (10'-1")	2.85 m (9'-4")	2.63 m (8'-8")	2.44 m (8'-0")	2.28 m (7'-6")
4 - 38 x 184 (4 - 2 x 8)	3.38 m (11'-1")	3.14 m (10'-4")	2.95 m (9'-8")	2.80 m (9'-2")	2.63 m (8'-8")
3 - 38 x 235 (3 - 2 x 10)	3.92 m (12'-10")	3.52 m (11'-7")	3.22 m (10'-7")	2.98 m (9'-9")	2.79 m (9'-2")
4 - 38 x 235 (4 - 2 x 10)	4.32 m (14'-2")	4.01 m (13'-2")	3.71 m (12'-2")	3.44 m (11'-3")	3.22 m (10'-7")
3 - 38 x 286 (3 - 2 x 12)	4.57 m (15'-0")	4.09 m (13'-5")	3.73 m (12'-3")	3.46 m (11'-4")	3.23 m (10'-7")
4 - 38 x 286 (4 - 2 x 12)	5.25 m (17'-3")	4.72 m (15'-6")	4.31 m (14'-2")	3.99 m (13'-1")	3.73 m (12'-3")

Footnotes: ○ Supported Length means half the sum of floor joists on both sides of the beam/footing, and where joists are cantilevered the Supported Length shall include the entire length of the cantilever.

- Except as provided below, joints in built-up wood beams shall be made overtop of columns.
- Where a beam is continuous over more than one span, joints may be made within the span close to the internal support columns, as per 9.23.8.3. of the Code, and as illustrated in **Figure 5** below:
  - Individual members are permitted to be butted together to form a joint at or within 150 mm (6") of the end quarter points of the clear spans, provided the quarter points are not those closest to the ends of the beam,
  - Members joined at quarter points shall be continuous over adjacent supports,
  - Joints in individual members of a beam that are located at or near the end quarter points shall not occur in adjacent members at the same quarter point and shall not reduce the effective beam width by more than half,
  - Not more than one butt joint shall occur in any one member of a built-up beam within any one span.

Figure 5 – Joints in built-up wood beams



- The Town also allows the use of 2-ply 'sandwich beams' and 'lintel beams', which refers to beams made up of 2 plies, each 38 mm (1 1/2") thick.
- Lintel beams are fastened together directly, similar to built-up beams, whereas the plies of sandwich beams are separated and fastened to either side of the row of support columns as a spacer between the plies.
- Sandwich beams shall only be used to support floor joists bearing on top of both plies of the beam, and shall not be used to hang floor joists on the sides on the beam.
- Joints in 2-ply sandwich beams and lintel beams shall be made over top of support columns, at least 38 mm (1 1/2") from the edges of the column
- The maximum spans of 2-ply sandwich beams and lintel beams shall be as per **Figure 6** below.

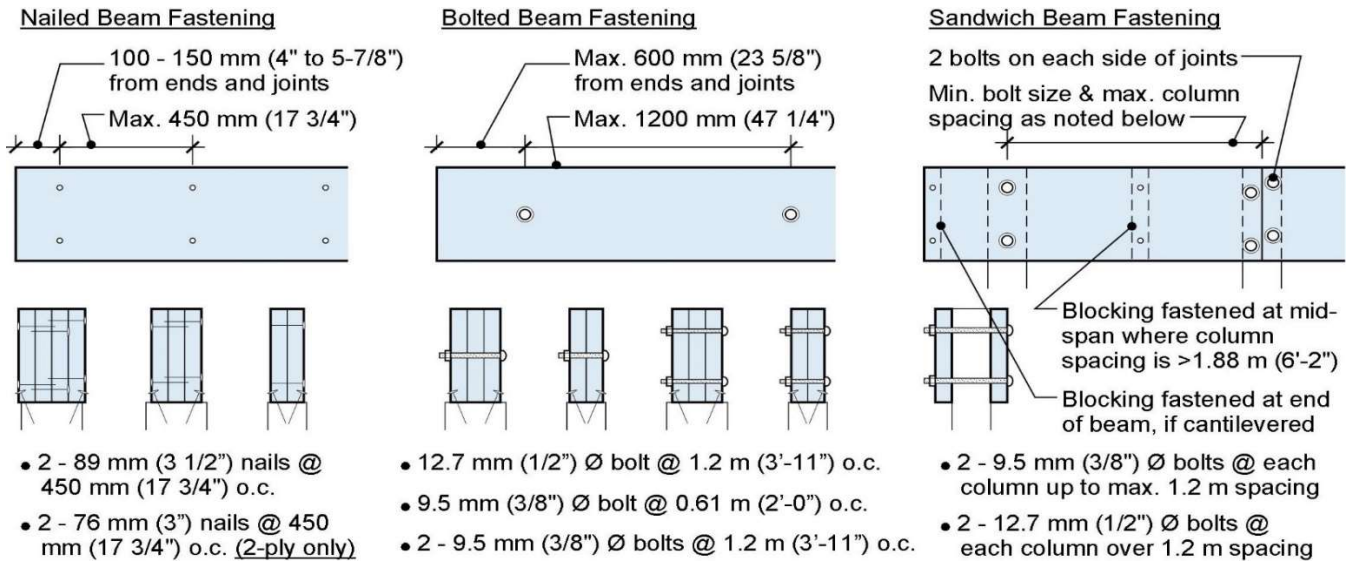
Figure 6 – Maximum Spans for 2-ply Sandwich Beams and Lintel Beams, SPF Grade No. 1 or 2

Size of Beam, mm (inch, nominal size)	Maximum Span, m (ft-in) Supported Length, m (ft-in)				
	2.40 m (7'-10")	3.00 m (9'-10")	3.60 m (11'-10")	4.20 m (13'-9")	4.80 m (15'-9")
2 - 38 x 140 (2 - 2 x 6)	1.42 m (4'-8")	1.36 m (4'-6")	1.30 m (4'-3")	1.24 m (4'-1")	1.18 m (3'-11")
2 - 38 x 184 (2 - 2 x 8)	1.73 m (5'-8")	1.66 m (5'-5")	1.58 m (5'-2")	1.51 m (5'-0")	1.44 m (4'-9")
2 - 38 x 235 (2 - 2 x 10)	2.11 m (6'-11")	2.02 m (6'-8")	1.94 m (6'-4")	1.85 m (6'-1")	1.76 m (5'-9")
2 - 38 x 286 (2 - 2 x 12)	2.46 m (8'-1")	2.35 m (7'-9")	2.26 m (7'-5")	2.15 m (7'-1")	2.05 m (6'-9")

Footnotes: ○ Supported Length means half the sum of floor joists on both sides of the beam/footing, and where joists are cantilevered the Supported Length shall include the entire length of the cantilever.

- The ends of all beams shall not extend or cantilever past the end of the support column by more than one joist spacing, up to a maximum of 406 mm (16").
- All beams shall be fastened in accordance 9.23.3.4. and 9.23.8.3. of the Code, and as illustrated in **Figure 7** below which includes additional fastening options not included in the Code.

Figure 7 – Beam Nailing Requirements and Examples



8. FLOOR JOIST FRAMING (Code Subsections 9.23.4. and 9.23.9., and 9.23.14.)

- The sizes, spacing, and spans of floor joists shall be designed in conformance with Tables A-1 and A-2 from Part 9 of the Code, and as listed in **Figure 8** below for joist types commonly used on wood framed residential decks.
- Floor joists require a minimum end bearing length of 38 mm (1 1/2"), such as on top of a beam or a ledger board, or using manufactured joist hangers fastened to the side of a beam or ledger board.
- Where the floor joists are bearing on manufactured joist hangers, the hanger shall be installed as per the manufacture's instructions using all required fasteners specified by the manufacturer.
- Floor joists supported on hangers at the end of a ledger board or end of a beam shall make use of a type of hanger that is designed for that instance, such as a 'concealed' joist hanger, and shall not be bent or modified in any way unless permitted by the hanger manufacturer.

Figure 8 – Maximum Spans for Floor Joists, SPF Grade No. 1 or 2, with Strapping at mid-span
Forming Part of Sentence 9.23.4.2.(1) and Table A-1

Maximum Span, m (ft-in)					
Joist Spacing, mm (in)	Joists Size, mm (inch, nominal size)				
	38 x 89 mm (2" x 4")	38 x 140 mm (2" x 6")	38 x 184 mm (2" x 8")	38 x 235 mm (2" x 10")	38 x 286 mm (2" x 12")
305 mm (12")	1.86 m (6'-1")	2.92 m (9'-7")	3.54 m (11'-7")	4.17 m (13'-8")	4.75 m (15'-7")
406 mm (16")	1.72 m (5'-8")	2.71 m (8'-11")	3.36 m (11'-0")	3.96 m (12'-12")	4.52 m (14'-10")
610 mm (24")	1.58 m (5'-2")	2.49 m (8'-2")	3.20 m (10'-6")	3.77 m (12'-4")	4.30 m (14'-1")

Footnotes:
- Where 38 x 89 mm (2” x 4”) or 38 x 140 mm (2” x 6”) floor joists are used, and where guard rails are required, the guards cannot be designed per SB-7 details and shall be designed by a qualified professional (see further notes on guards below).

- Where the span of the joists exceeds 2.1 m (6’-10 5/8”), blocking or bridging shall be provided between the joists with consecutive rows of blocking/bridging located not more than 2.1 m (6’-10 5/8”) apart. Alternatively, the use of min. 19 mm x 89 mm (1” x 4”) strapping on the underside of joists can be used in lieu of blocking/bridging.
- Floor joists may be cantilevered past the end of a beam or support in accordance with the maximum allowable distances listed in **Figure 9** below.

Figure 9 – Maximum Cantilever of Floor Joists
Forming Part of Article 9.23.9.9.

Maximum Joist Cantilver, mm (in)			
Joists Size, mm (inch, nominal size)	Not supporting roof or floor loads from above	Supporting roof load, but no floor loads from above	Supporting roof and floor loads from above
38 x 89 mm (2" x 4")	300 mm (11 3/4")	Not permitted	Not permitted
38 x 140 mm (2" x 6")	400 mm (15 3/4")		
38 x 184 mm (2" x 8")	600 mm (23 5/8”)	400 mm (15 3/4")	
38 x 235 mm (2" x 10")		600 mm (23 5/8”)	
38 x 286 mm (2" x 12")			

Footnotes:
- Decks with roof loads are not covered by this guideline.

- Where the distance of a floor joist cantilever exceeds what is permitted or is not permitted by **Figure 9**, the distance of the cantilever shall be determined through calculations by a qualified professional showing that the cantilever can support the loads imposed, and that the joists will not exceed the maximum deflection of 1/240 as required by 9.4.3.1. of the Code.

9. LEDGER BOARDS (Code Subsections 9.23.3. and 9.23.9.)

- A ledger board is a horizontal piece of lumber that is fastened to a structure, such as floor beam or the frame of a house, and that is used to support the deck floor joists.
- While Article 9.23.9.2. of the Code only covers ledger strips for joists framed into the sides of beams, this guideline provides further information on the installation and fastening of ledger boards to the frame of a house.
- The size of the ledger board shall be not less than the size of the supported floor joist.
- Ledger board fasteners shall be installed in a staggered ‘W’ pattern as per **Figure 11** below, with fasteners set in from the edges to avoid splitting of the ledger board.

- Where the ledger board is framed into the header joist or rim joist of the supporting floor structure, the installation and fastening shall meet the following requirements, and as illustrated in the cross-section detail in **Figure 10** below:
  - The ledger board shall be fastened with lags screws or through-bolts with washers, or with structural screws that have been demonstrated to have equivalent strength as the same diameter and same length lags or bolts,
  - The header joist or rim joist of the supporting floor structure shall be either 38 mm (1 1/2”) thick lumber, or 25 mm (1") to 29 mm (1 1/8") thick APA certified engineered wood rim board,
  - Except as provided below, the minimum fastener size shall be 12.7 mm (1/2") Ø, and the maximum fastener spacing shall conform to **Figure 12**,
  - Where 9.5 mm (3/8”) Ø fasteners are used, the total number of ledger fasteners required by **Figure 12** shall be doubled,
  - Where 7.9 mm (5/16”) Ø fasteners are used, the total number of ledger fasteners required by **Figure 12** shall be tripled,
  - The minimum length of fasteners shall be 100 mm (4”), and sufficient to fully penetrate the header or rim joist.

Figure 10 – Ledger Board Cross-section

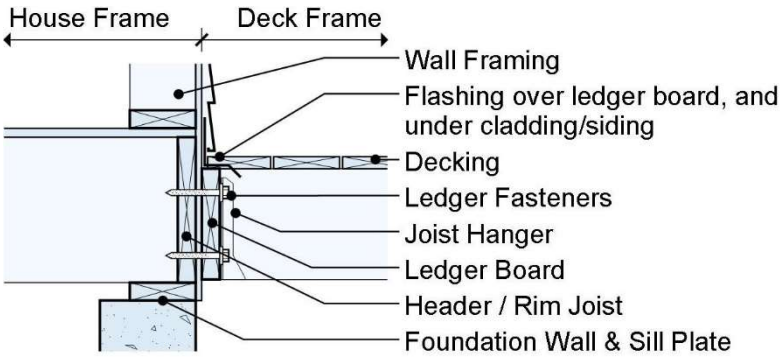


Figure 11 – Ledger Board Fastening Pattern

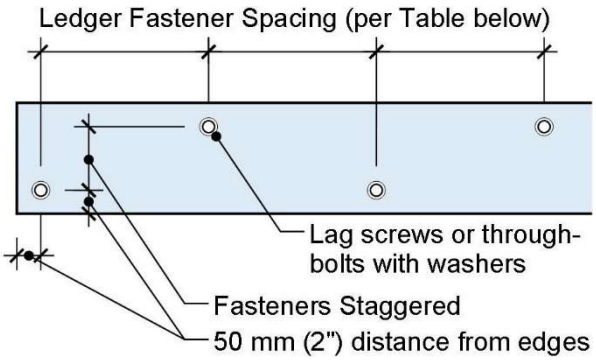


Figure 12 – Ledger Board Fastener Spacing

Maximum Spacing of 12.7 mm (1/2") Ø Ledger Fasteners, mm (in)					
Header Joist / Rim Joist Material Type (material that the Ledger Board is fastened to)	Joists Span, m (ft-in)				
	≤ 1.83 m (≤ 6')	1.83 to ≤ 2.44 m (6' to ≤ 8')	2.44 to ≤ 3.05 m (8' to ≤ 10')	3.05 to ≤ 3.66 m (10' to ≤ 12')	3.66 to ≤ 4.90 m (12' to ≤ 16'-1")
38 mm (1 1/2") solid lumber	610 mm (24")	483 mm (19")	406 mm (16")	305 mm (12")	203 mm (8")
29 mm (1 1/8") engineered wood	813 mm (32")	610 mm (24")	483 mm (19")	406 mm (16")	305 mm (12")
25 mm (1") engineered wood	610 mm (24")	483 mm (19")	406 mm (16")	305 mm (12")	254 mm (10")

Footnotes:
- Where 9.5 mm (3/8”) Ø fasteners are used, the number of fasteners shall be doubled.
- Where 7.9 mm (5/16”) Ø fasteners are used, the number of fasteners shall be tripled.
- Engineered wood fastening is based on The Engineered Wood Association’s ‘APA Performance-Rated Rim Board’ design guideline.

- Where the ledger board is framed into wood stud wall framing, the fastener spacing shall be the same as for 38 mm (1 1/2") solid lumber in **Figure 12** and the fasteners shall penetrate a minimum of 38 mm (1 1/2") into the framing.

- Where the ledger board is framed into solid poured concrete, such as a foundation wall, the maximum fastener spacing shall be the same as for 38 mm (1 1/2") solid lumber in **Figure 12**, the surface of the concrete shall be smooth to evenly apply the ledger, and the fasteners shall penetrate a minimum of 64 mm (2 1/2") into the concrete.
- Ledger boards supported on other materials, such as masonry veneer, hollow concrete block, or non-structural materials, shall be designed by a qualified professional.
- Ledger boards shall be flashed in a manner that prevents ingress of precipitation behind the ledger.

10. DECKING (Code Subsections 9.23.14. and 9.30.3., and Article 9.8.9.5.)

- Where wood lumber decking is used as the finished floor surface of the deck, the minimum thickness shall comply with **Figure 13** below, and the lumber shall be laid at right angles to the joists so that the end joints are staggered and occur over supports.

Figure 13 – Thickness of Wood Floor Decking
Forming Part of Subsections 9.23.14. and 9.30.3.

Maximum Spacing of Floor Joists	Minimum Thickness of Decking, mm (inch)
305 mm (12")	25 mm (1")
406 mm (16")	
610 mm (24")	38 mm (1 1/2")

Figure 14 – Thickness of Wood Stair Treads
Forming Part Sentence of 9.8.9.5.(1)

Maximum Spacing of Stair Stringers	Minimum Thickness of Stair Tread, mm (inch)
750 mm (2'-5 1/2")	25 mm (1")
900 mm (2'-11 1/2")	38 mm (1 1/2")
1200 mm (3'-11 1/4") where the riser supports the front of treads	

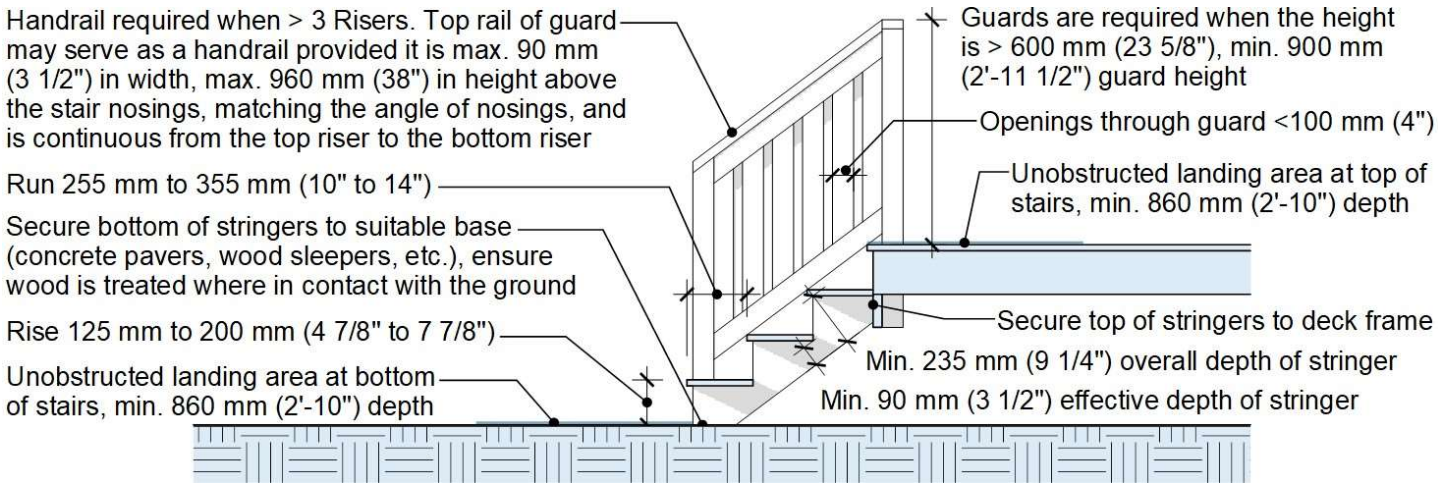
- Lumber decking shall be fully supported at the ends on solid bearing, and individual decking boards shall not be more than 184 mm (7 1/4") in width.
- Other decking and stair tread materials, including but not limited to composite, PVC, polyethylene, or metal decking, shall only be used where the product has been approved for use in Ontario by one of the following means:
  - A ruling from the Ontario Minister of Municipal Affairs and Housing,
  - An evaluation by the Ontario Building Materials Evaluation Commission (BMEC),
  - An evaluation by the Canadian Construction Materials Centre (CCMC) for use in Ontario.
- Where other decking and stair tread materials noted above are used, they shall be installed in accordance with the manufacturer's installation requirements, including the size and spacing of supports, and fastening requirements.

11. STAIRS, RAMPS, AND LANDINGS (Code Subsections 9.8.2. to 9.8.6., and 9.8.9.)

- The minimum width of stairs shall be 860 mm (2'-9 7/8").
- The dimensions for a stair rise, which is measured as the vertical distance between adjacent stair treads, shall be minimum 125 mm (4 7/8"), and maximum 200 mm (7 7/8").
- The dimensions for a stair tread run, which is measured as the horizontal distance from nosing to nosing of adjacent stair treads, shall be minimum 255 mm (10"), and maximum 355 mm (14"), and the nosings shall not be greater than 25 mm (1").
- The riser dimensions and tread run dimensions within any one flight of stairs shall be uniform within a maximum of tolerance of 5 mm (3/16") between adjacent treads or landings, and 10 mm (3/8") between the largest and smallest riser and tread within the flight.

- Where a stair does not serve as an exit, the bottom riser where it meets grade may be tapered across the riser up to a maximum slope of 1 in 12 (4.76°).
- Stair stringers shall be supported and secured at both top and bottom, and spaced no greater than 900 mm (2'-11 1/2"), except where the riser supports the front portion of the tread, the spacing shall be no greater than 1200 mm (3'-11 1/4").
- Stair stringers in contact with the ground shall be treated to prevent decay or shall be a decay resistant wood species.
- The minimum thickness of wood decking used on stair treads shall comply with **Figure 14** above.
- Typical construction details and requirements of stairs are depicted below in **Figure 15**.

Figure 15 – Typical Stair Construction



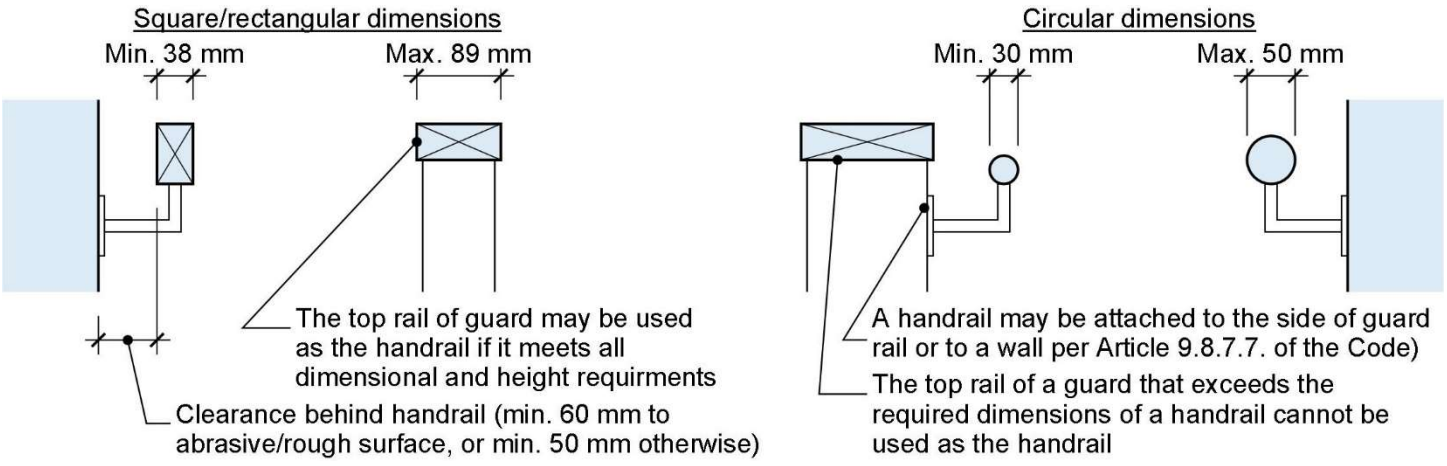
- Curved stairs with tapered treads are also permitted by the Code in accordance with the applicable provisions and dimensions requirements of Section 9.8. of the Code (not covered in this guideline).
- Where ramp is designed as an access to or from a deck, the ramp shall have a minimum width of 860 mm (2'-9 7/8"), and a maximum slope of 1 in 10 (10% or 5.71°).
- Where the total rise height of a ramp between floor levels or landings exceeds 1500 mm (4'-11"), the maximum slope shall be 1 in 12 (8.33% or 4.76°).
- Except where exempt as noted below, landings shall be provided at the top and bottom of stairs and ramps.
- Where exterior stairs are provided at a door between the deck and a dwelling unit, a landing may be omitted at the top of the stair provided that the following conditions are met:
  - The stair does not contain more than three risers, which includes the riser from the top stair tread to the finished floor of the dwelling unit,
  - The door does not serve as the primary entrance to the dwelling unit,
  - The door is either a sliding door, or a swinging door that swings away from the stair, and
  - Where a storm or screen door is provided, it may swing over the stair if it is equipped with hardware to hold it open.
- A landing may be omitted at the bottom of an exterior stair provided there is no obstruction, such as a gate or door, or other obstruction that would prevent access to and from the stair, within 860 mm (2'-9 7/8") from the end of the stairs.

- Landings shall be the same width as the stairs or ramp and shall have a minimum depth of 860 mm (2'-9 7/8").
- Landings, including ground surfaces that act as landings, shall have a slope not exceeding 1 in 50.
- The clear height over landings shall be not less than 1950 mm (6'-4 3/4").

12. HANDRAILS (Code Subsection 9.8.7.)

- Handrails are intended to provide guidance and support to stair and ramp users, by means of a graspable railing.
- Handrails are required on every set of exterior stairs that has more than 3 risers, and on every exterior ramp that has a rise height greater than 400 mm (15 3/4").
- Only one handrail is required on exterior stairs, however, exterior ramps require two handrails, one on each side.
- Handrails shall be continuous throughout the length, from top to bottom of the stair or ramp, except where interrupted by doorways, landings, or newel posts at changes in direction, and shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard.
- The height of handrails shall be between 865 mm (2'-10") and 1070 mm (3'-6 1/8"), measured vertically from the top of the handrail to the edge of the stair nosing or ramp surface below, and installed at the same angle as the stair of ramp.
- Handrails shall be constructed so as to be continually graspable along their entire length with no obstruction on or above them to break a handhold, and shall have the following minimum and maximum dimensions listed below, and as illustrated in **Figure 16**:
  - A circular cross-section with an outside diameter not less than 30 mm (1 3/16") and not more than 50 mm (2"), and
  - A square or rectangular cross-section with a width not less than 38 mm (1 1/2") and not more than 89 mm (3 1/2").

Figure 16 – Handrail Dimensions and Design Examples



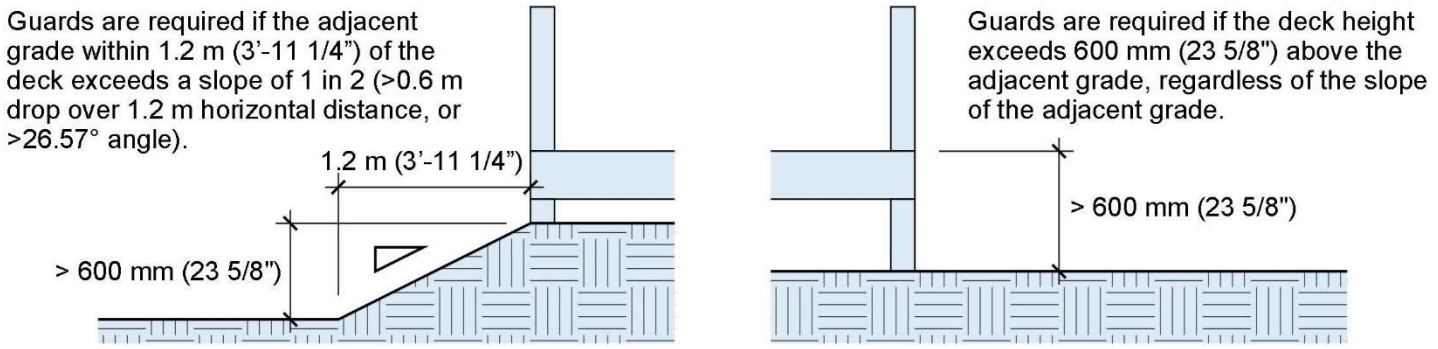
- Clearance shall be provided between the handrail and any surface behind it, and the clearance shall be not less than 60 mm (2 3/8") where the surface is rough or abrasive (such as masonry), or 50 mm (2") in all other cases.

- Handrails may project into and above a stair of ramp, however any projection of the handrail shall not reduce the minimum required width of the stair or ramp by more than 100 mm (4”). Example, for the minimum stair width of 860 mm (2’-9 7/8”), the handrail projection shall not reduce the stair to less than 760 mm (2’-6”) in width.
- Handrails and their supports shall be designed and constructed to withstand a uniform load of not less than 0.7 kN/m (47.97 lbs/ft), which is deemed to be achieved under the following conditions:
  - The handrail is attached to wood studs or blocking, or to a suitable designed guard rail,
  - The attachment points are spaced not more than 1.2 m (3’-11 1/4”) apart measured horizontally,
  - The first attachment point at either end is located not more than 300 mm (11 3/4") from the end of the handrail, and
  - Fasteners consist of a minimum of 2 - No. 8 wood screws at each attachment point, penetrating not less than 32 mm (1 1/4") into solid wood.

13. GUARDS (Code Subsection 9.8.8.)

- A guard is a protective barrier placed around openings, stairs, landings, raised walkways, or other locations to prevent accidental falls from one level to another.
- Guards are required where the height from the walking surface of the deck is greater than 600 mm (23 5/8”) to the adjacent surface or grade, or where the adjacent surface or grade within 1.2 m (3’-11 1/4”) exceeds a slope of 1 in 2 (0.6 m drop over 1.2 m horizontal distance, or 26.57° angle), and this is illustrated further in **Figure 17** below.

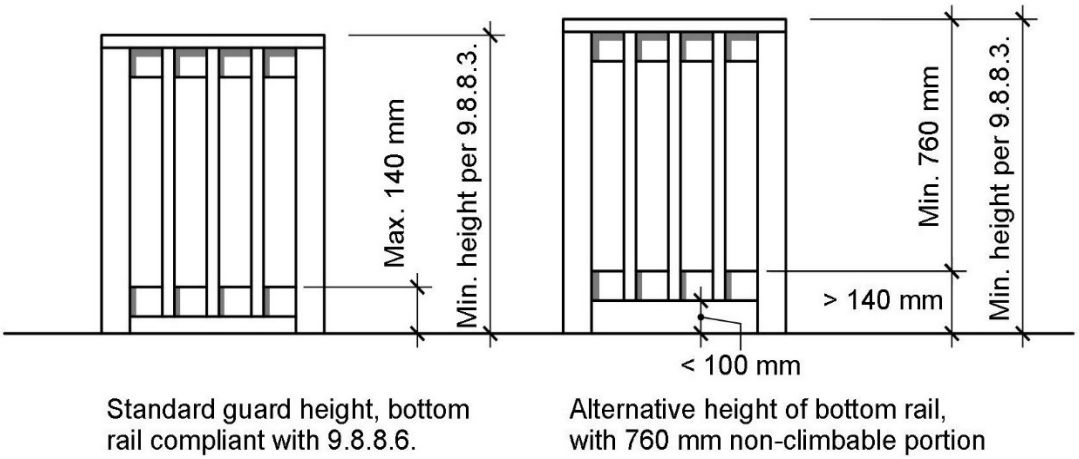
Figure 17 – Locations Where Guards Are Required



- The minimum height of a guard shall be 900 mm (2’-11 1/2") where the height to grade is not more than 1.8 m (5’-10 7/8”), and increased to 1070 mm (3’-6 1/8”) where the height to grade exceeds 1.8 m (5’-10 7/8”).
- Where guards are required, openings through the guard, such as those between pickets and below the bottom rail, shall be of a size that prevents the passage of a 100 mm (4”) sphere.
- Guards shall be designed to be non-climbable so that no member, rail, attachment, or opening located between 140 mm (5 1/2") and 900 mm (2’-11 1/2") above the deck surface will facilitate climbing.
- To be deemed as non-climbable, the horizontal bottom rail of the guard shall be no more than 140 mm (5 1/2") above the deck, with the portion above being made up of nominally vertical members that will not create a ‘ladder effect’, except as provided below and described in **Figure 18**.

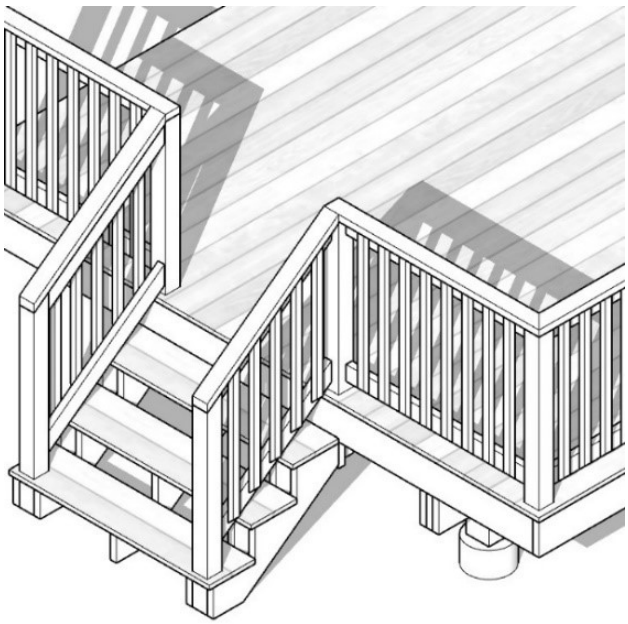
- Where the bottom rail of the guard exceeds 140 mm (5 1/2") above the deck, the height of the guard shall be increased such that a minimum 760 mm (2'-6") high non-climbable portion above the bottom rail of is provided, as illustrated in **Figure 18** below, but in no case shall the open space below the bottom allow the passage of a 100 mm (4") sphere.

Figure 18 – Climbablity of Guards and Acceptable Rail Heights



- Guards can either be designed and engineered to resist the minimum specified loads set forth in Table 9.8.8.2. of the Code, or be constructed in accordance with the details, connections, and requirements in MMAH Supplementary Standard SB-7, "Guards for Housing and Small Buildings".
- The two types of SB-7 wood framed guards are the 'Post and Rail Guard System' and the 'Cantilevered Picket Guard System' as illustrated and described in **Figure 19** and **Figure 20** below.

Figure 19 – SB-7 Post and Rail System



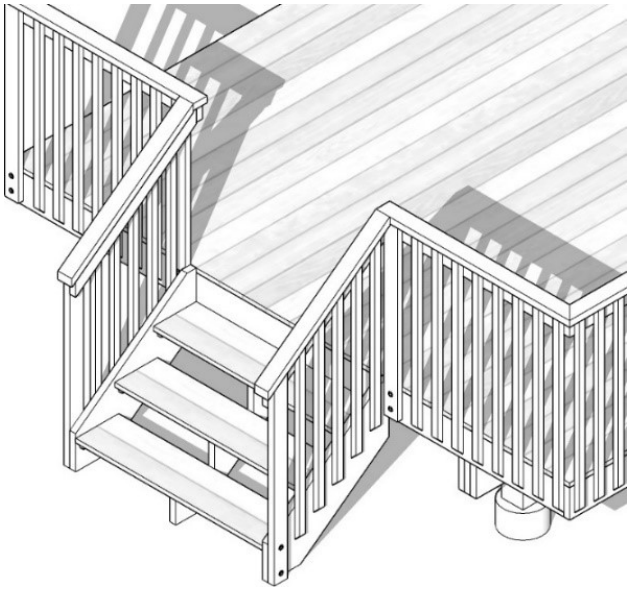
Description of SB-7 Post and Rail System

- A Post and Rail System consists of a horizontal top rail that transfers loads to vertical posts that are anchored to and through the floor joist system.
- This system may incorporate a horizontal bottom rail that is attached to the posts near the deck surface.
- The posts are spaced apart from one another, and the space between is infilled with a guard system.
- The 'infill panels' or 'infill pickets' between the posts, is made up of an assembly of vertically oriented elements/pickets that span between the floor or bottom rail and the top rail, to create complete guard system.

Post and Rail System Detail Numbers

- Top and Bottom Rail to Post, EA-1 to EA-5
- Post to Floor, max. Post Spacing, EB-1 to EB-6
- Infill Picket, EC-1 to EC-4

Figure 20 – SB-7 Cantilevered Picket System



Description of SB-7 Cantilevered Picket System

- A Cantilevered Picket System consists of a horizontal top rail that transfers loads to vertical pickets.
- The pickets, fastened to the outside of the floor frame below, transfer the loads from the top rail to the floor system.
- Ends of the guards shall be supported, such as attachment to the house, or the end shall be reinforced by a post with sufficient fasteners, such as at the bottoms of stairs.
- Corners of the guard shall have a minimum of 10 pickets returned on each side, unless reinforced by other means

Cantilevered Picket Detail Numbers

- D-Fir-Larch, Spruce-Pine-Fir, Hem-Fir, ED-1 and ED-2
- Northern Species and Cedar, ED-3 and ED
- Corner Picket (all wood species), ED-5

- The standard SB-7 details noted above are included in the Appendix at the end of this document.
- For guards on stairs using the Post and Rail System, posts shall be installed at the bottom of stairs in a manner similar to Details EB-1 to EB-6, and if required down the sides of the stairs based on the maximum posts spacing in Details EB-1 to EB-6, with blocking or stringers on at least two sides of the posts to provide suitable support.
- Where the Cantilevered Picket System corner Detail ED-5 requires a 10 picket return on each side of the guard, 2 standard pickets may be substituted for one 38 mm x 89 mm (2”x4”) fastened with either 5 - #8 x 76 mm (3”) screws (provided it does not also need to act as a post as noted below), or with 2 - 9.5 mm (3/8”) Ø lags screws or bolts.
- For the Cantilevered Picket System, where SB-7 requires the ends of the guards to be supported, or where a corner of the guard does not conform to Detail ED-5 (such as less than 10 picket return, or not using a miter joint), the following may be provided as suitable support:
  - At the end of a guard, where the guard abuts the building, attachment of the top rail to the frame of the building,
  - At the end of a guard, attachment of the top rail to a post installed in accordance with Details EB-1 to EB-6,
  - At the end of a guard, a 38 mm x 89 mm (2”x4”) post fastened with 2 - 9.5 mm (3/8”) Ø lags screws or bolts,
  - At a corner location not in conformance with Detail ED-5, a 38 mm x 89 mm (2”x4”) post fastened with 2 - 9.5 mm (3/8”) Ø lags screws or bolts, or a post installed in accordance with Details EB-1 to EB-6.

- For the sides of stairs using the Cantilevered Picket System, Details ED-1 to ED-4 may be used in a similar manner attached to the sides of stair stringers, except that the guard shall be reinforced as follows (per TACBOC Detail D01c):
  - 38 mm x 89 mm (2”x4”) posts fastened with 2 - 9.5 mm (3/8”) Ø lags screws or bolts to the side of the stair stringers, both at the top and bottom of the stair,
  - If the stair exceeds 1.2 m (3’-11”) in horizontal length, additional 38 mm x 89 mm (2”x4”) posts shall be installed as noted above, at a maximum horizontal spacing of 1.2 m (3’-11”) along the sides of the stringer, and with 38 mm x 89 mm (2”x4”) blocking installed between the stair stringers at the location of the additional posts.
- Guards that are not designed and constructed of wood in accordance with the SB-7 details, or that are designed and constructed of other materials such as steel, aluminum, glass, or pre-manufactured guard systems, shall be designed by a qualified professional who can confirm that the guard design will satisfy the minimum specified loads set forth in Table 9.8.8.2. of the Code or be designed in accordance with Part 4 of the Code.
- Where glass is used in an engineered guard, the glass shall be either safety glass of the laminated or tempered type (CGSB-12.1-M, “Tempered or Laminated Safety Glass”), or wired glass (CGSB-12.11-M, “Wired Safety Glass”), and the thickness of the glass shall be in accordance with the engineered design.

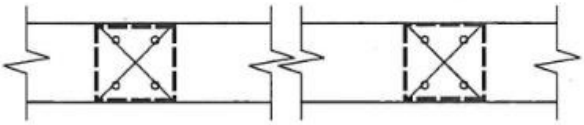
14. PERMITS AND OTHER REQUIREMENTS (Building Code Act, Code Sections 9.1. and 9.5.)

- A building permit is required for a deck or exterior floor platform in either of the following scenarios:
  - Greater than 10 m² (107.6 ft²) in area, regardless of location,
  - Any area where the deck is attached to a building, or
  - Any area where serving as an exit or entrance to a building, including a stair or landing access to a building.
- A building permit is <u>not</u> required for decks and floor platforms that are less than or equal to 10 m² (107.6 ft²) in area that meets all the following conditions:
  - Not attached to a building,
  - Not serving as an exit or entrance to a building, and
  - At least 1 m (3’-3 3/8”) away from an exit or entrance to a building, including a stair or landing access to a building.
- Decks and other exterior floor platforms shall meet the applicable requirements of the Town of Carleton Place Development Permit by-law, such as locations and zones permitted, setback dimensions from lot lines, maximum area, and lot coverage, etc.
- Horizontal clearances are required between decks and any existing above ground electrical conductors and power lines, measured from the maximum conductor swing to the building as follows:
  - Minimum 1 m for electrical conductors carrying voltages 750 V or less, except where necessary to connect to the electrical wiring of the building,
  - Minimum 3 m, for voltages greater than 750 V but not exceeding 46 kV,
  - Minimum 3.7 m, for voltages greater than 46 kV but not exceeding 69 kV,
  - Or conform to the requirements of CAN/CSA-C22.3 No.1 for voltages greater than 69kV.

15. APPENDIX CONTENTS

SB-7 Appendix – List of Wood Guard Rail Details

- Post and Rail – EA-1 Top rail nailed to post
- Post and Rail – EA-2 Top/bottom rail skew nailed to post with 76 mm (3") nails
- Post and Rail – EA-3 Top/bottom rail skew nailed to post with 63 mm (2 1/2") nails
- Post and Rail – EA-4 Top/bottom rail face nailed or screwed to post
- Post and Rail – EA-5 Top/bottom rail fastened to post with framing anchors
- Post and Rail – EB-1 Post nailed to rim joist
- Post and Rail – EB-2 Post screwed to rim joist
- Post and Rail – EB-3 Post bolted to floor joist with 8 mm (5/16") machine bolts
- Post and Rail – EB-4 Post bolted to floor joist with 9.5 mm (3/8") machine bolts
- Post and Rail – EB-5 Post bolted to 2 floor joists
- Post and Rail – EB-6 Post fastened to floor, where guard is parallel to floor joists
- Post and Rail – EC-1 Picket nailed to endcap; endcap screwed to rail
- Post and Rail – EC-2 Picket nailed to rail
- Post and Rail – EC-3 Picket screwed to rail
- Post and Rail – EC-4 Picket screwed to top rail and rim joist
- Cantilevered Picket – ED-1 Picket screwed to rim joist (D-Fir, Larch, Spruce-Pine-Fir, Hem-Fir)
- Cantilevered Picket – ED-2 Picket screwed to rim joist, guard parallel to joists (D-Fir, Larch, Spruce-Pine-Fir, Hem-Fir)
- Cantilevered Picket – ED-3 Picket screwed to rim joist and deck (Northern species)
- Cantilevered Picket – ED-4 Picket screwed to rim joist and deck, guard parallel to joists (Northern species)
- Cantilevered Picket – ED-5 Corner (All wood species)



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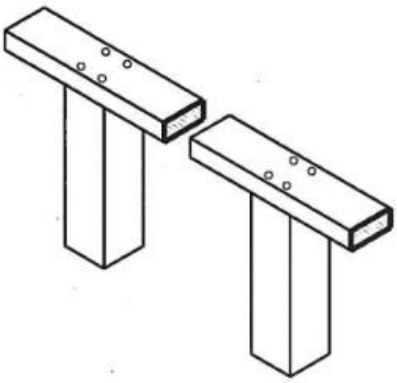

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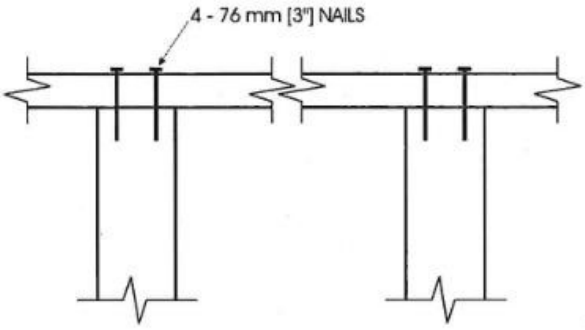
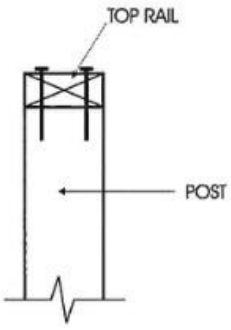


FRONT ELEVATION



SIDE ELEVATION

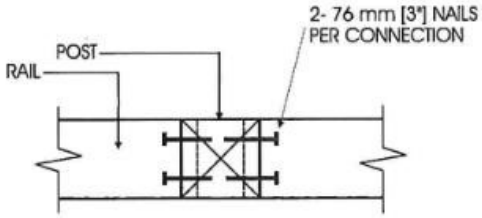
Detail EA-1

Exterior Connection: Top Rail Nailed to Post

Notes:

1. The top rail must be continuous. Use Detail EA-5 at the end spans, where continuity ends.

MAXIMUM SPAN OF RAIL BETWEEN POSTS	
Species	Maximum Span, m (ft-in)
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.52 (5'-0")
Northern Species	1.52 (5'-0")
Column 1	2



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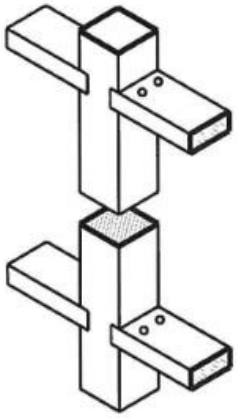

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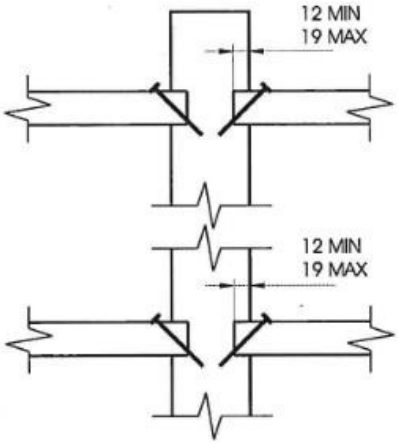
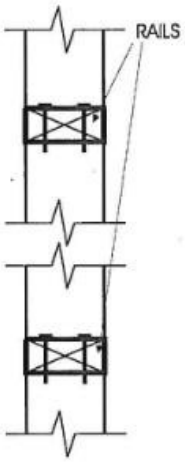


FRONT ELEVATION



SIDE ELEVATION

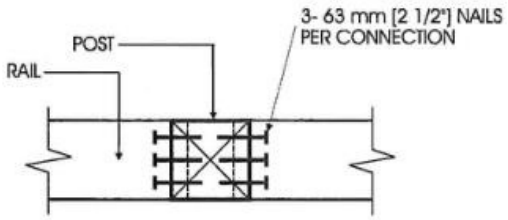
Detail EA-2

Exterior Connection: Top/Bottom Rail Skew Nailed to Post - 76 mm (3") Nails

Notes:

1. The maximum span is more often governed by post spacing.
2. Provide support to bottom rail at intervals not more than 2.0 m (6'-7").
3. The bottom rail may be bevelled as detailed in Figure 2.1.2.
4. 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



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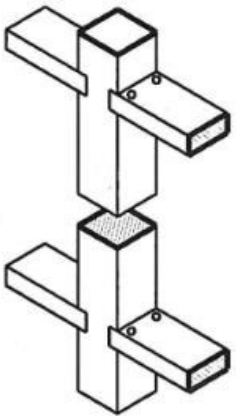

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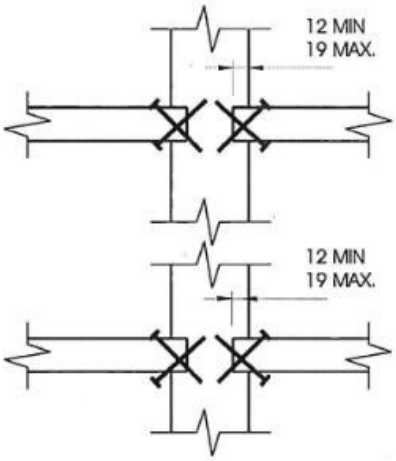
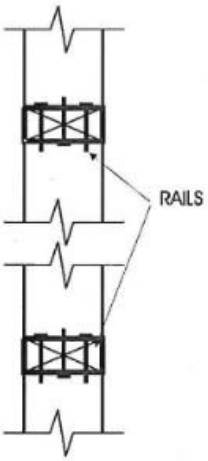


FRONT ELEVATION



SIDE ELEVATION

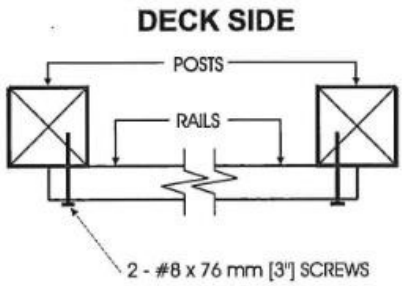
Detail EA-3

Exterior Connection: Top/Bottom Rail Skew Nailed to Post - 63 mm (2½") Nails

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



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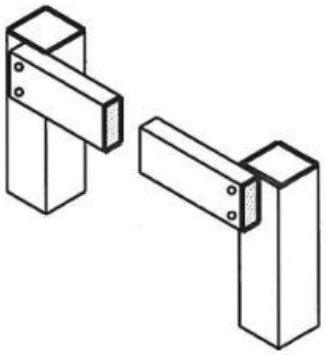
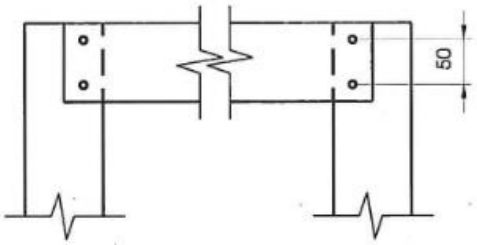
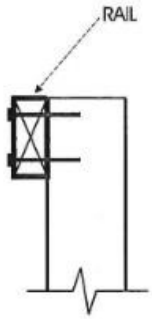


AXONOMETRIC



FRONT ELEVATION



SIDE ELEVATION

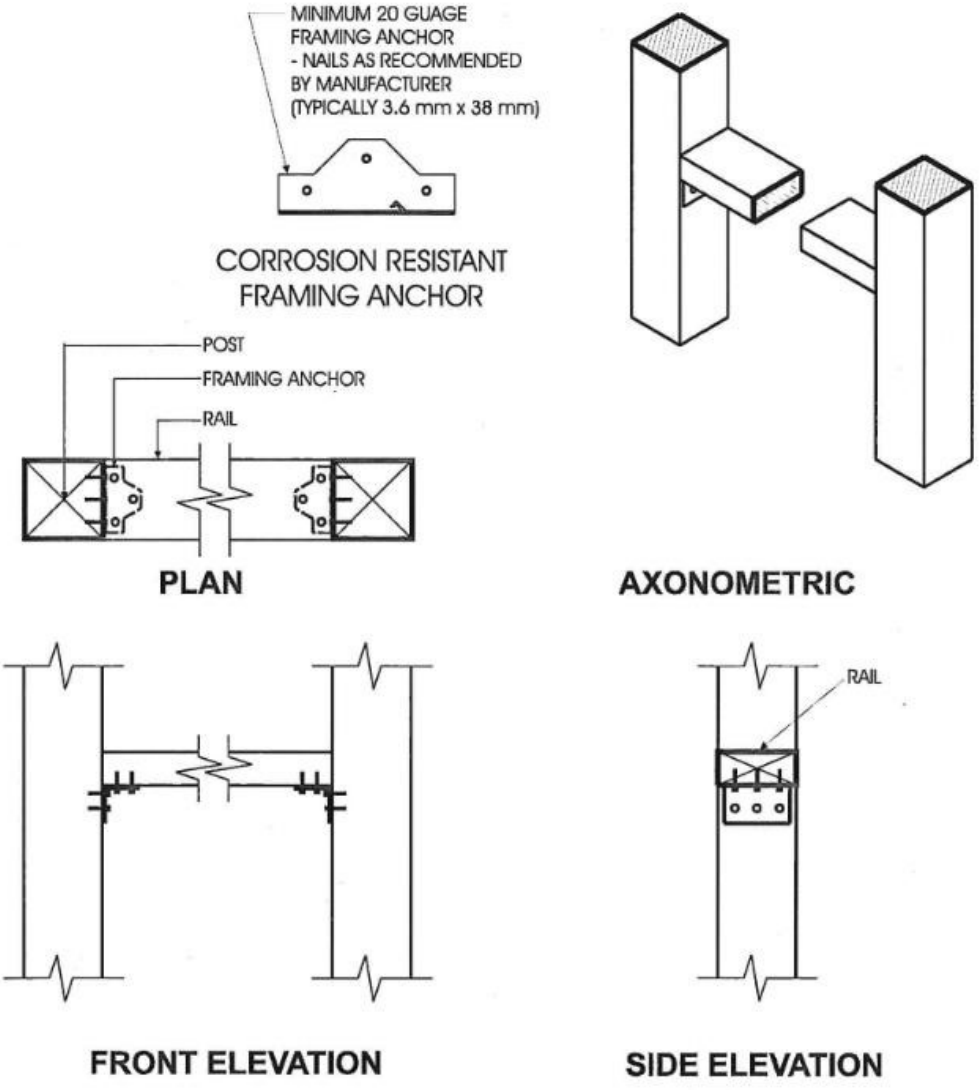
Detail EA-4

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



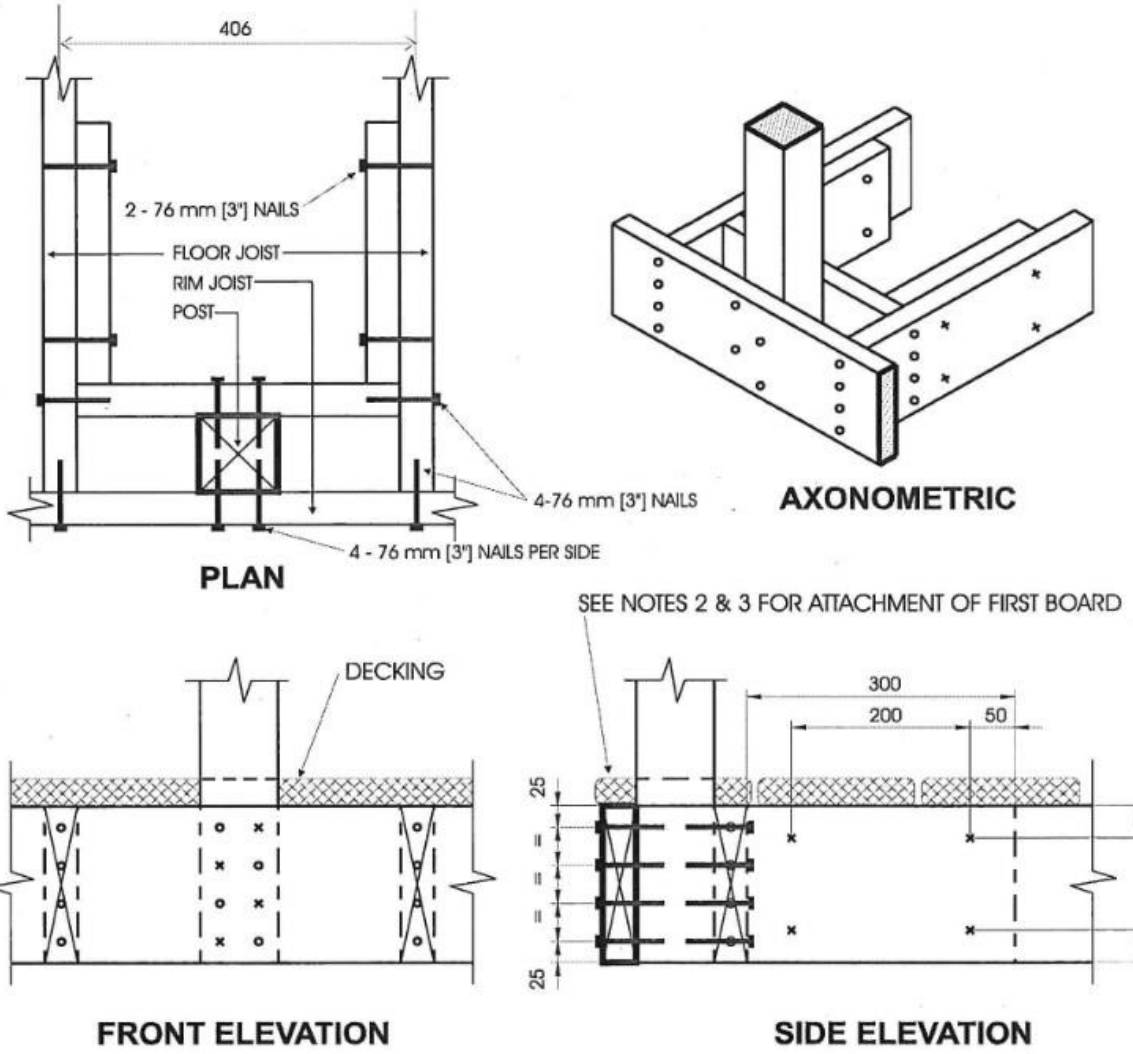
Detail EA-5

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



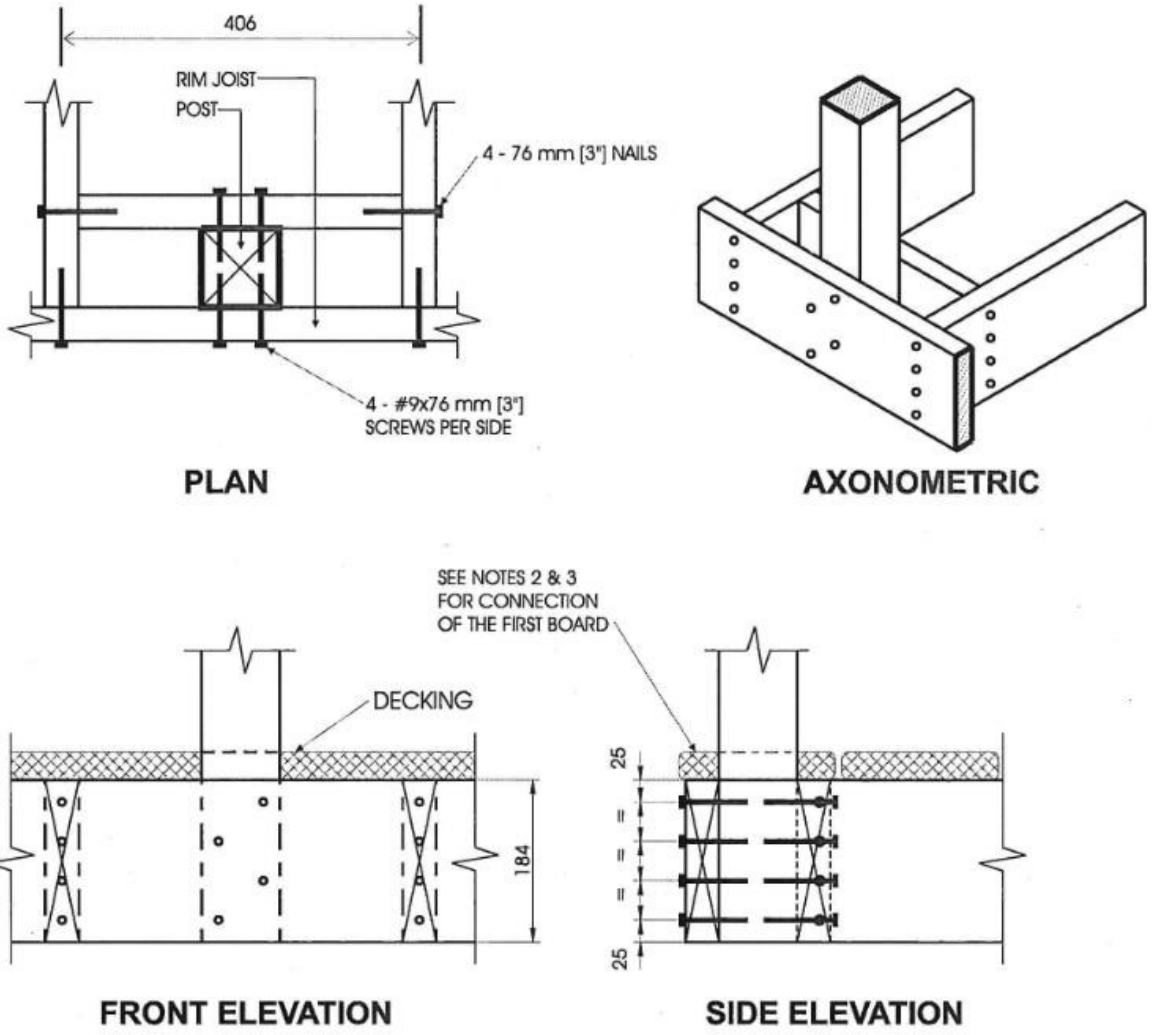
Detail EB-1

Exterior Connection: Post Nailed 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. 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	1.22 (4'-0")
Northern Species	1.20 (3'-11")
Column 1	2



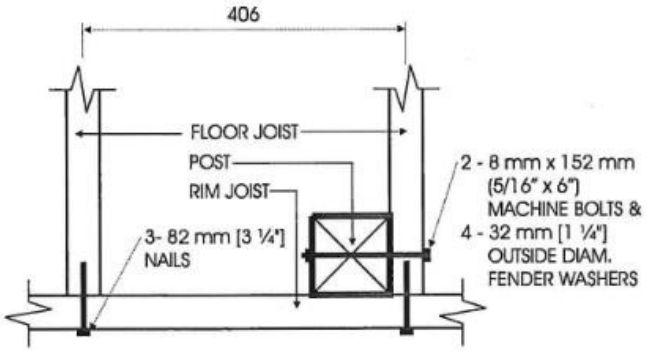
Detail EB-2

Exterior Connection: Post Screwed to Rim Joist

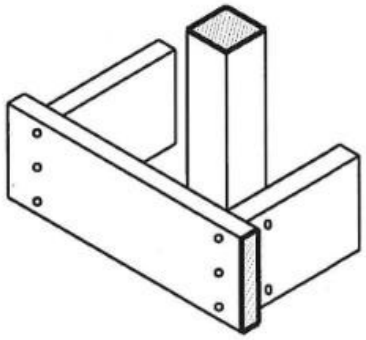
Notes:

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 (2½") 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 (2½") 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.

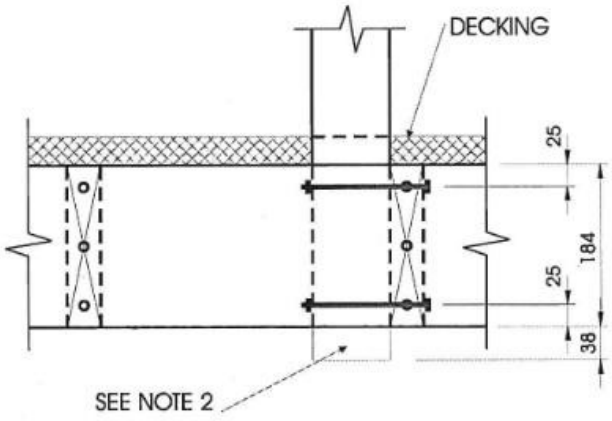
MAXIMUM SPAN OF RAIL BETWEEN POSTS	
Species	Maximum Span, m (ft-in)
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	1.56 (5'-1")
Northern Species	1.20 (3'-11")
Column 1	2



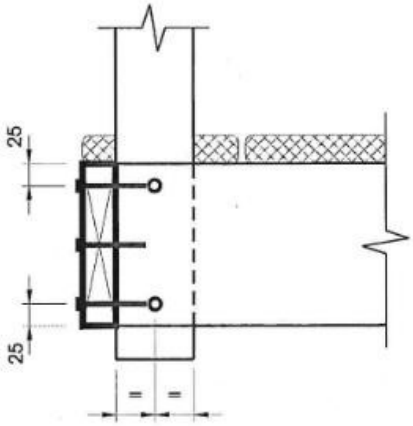
PLAN



AXONOMETRIC



FRONT ELEVATION



SIDE ELEVATION

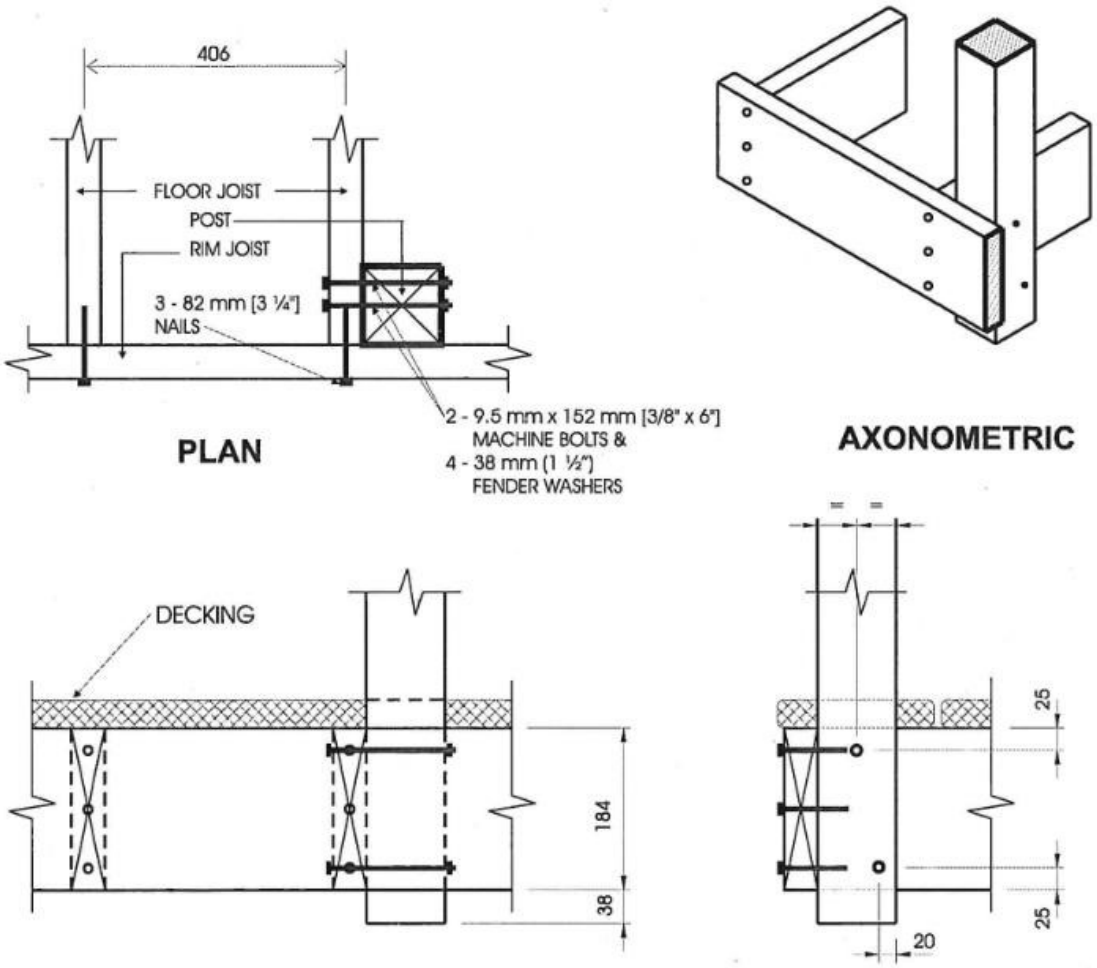
Detail EB-3

Exterior Connection: Post Bolted to Floor Joist - 8 mm (5/16") Bolts

Notes:

1. Decking is omitted from the plan view and the axonometric view for clarity.
2. 38 mm (1½") 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 (1½") 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	1.29 (4'-3")
Northern Species	1.20 (3'-11")
Column 1	2



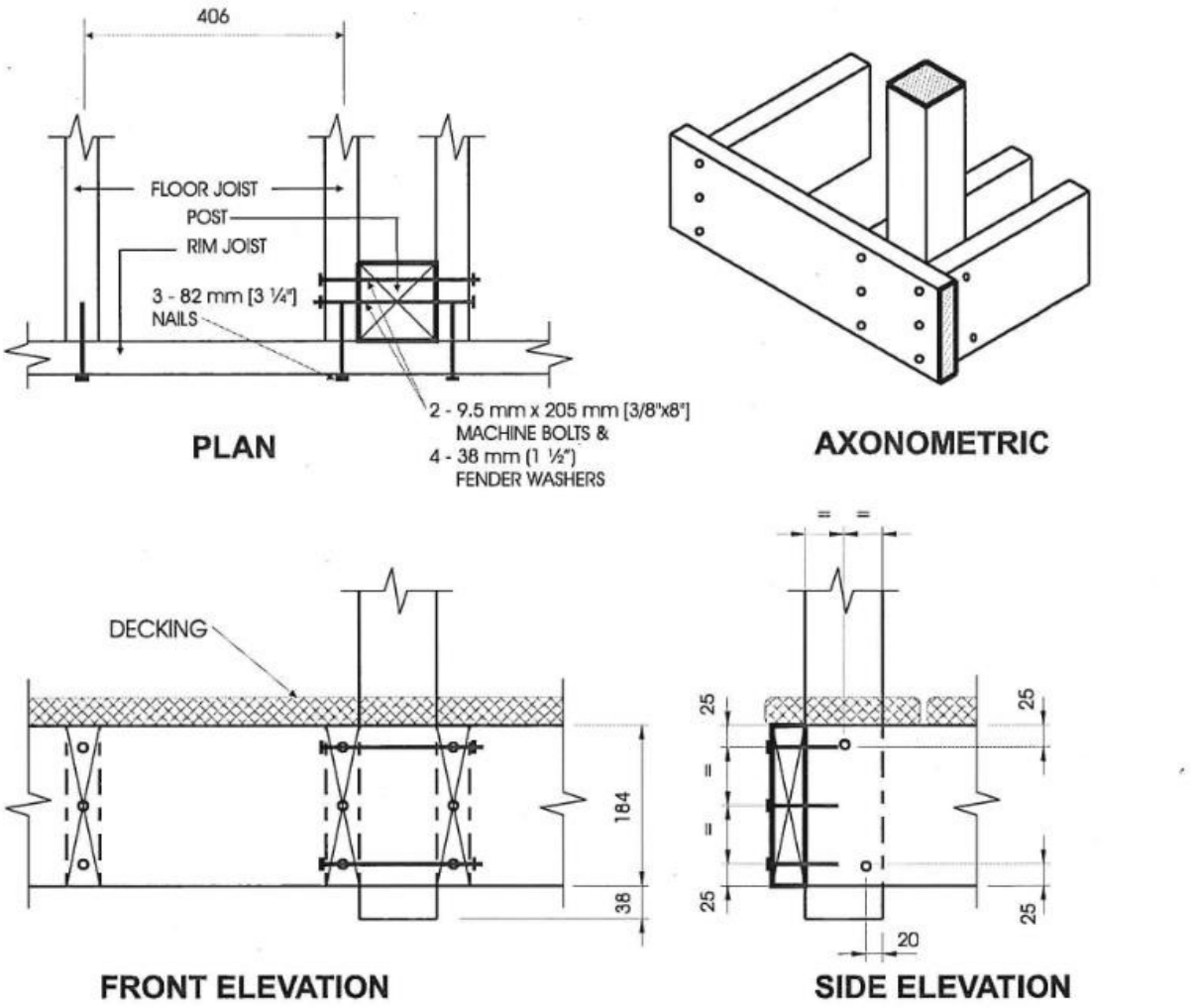
Detail EB-4

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 (1½") 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 (1½") 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



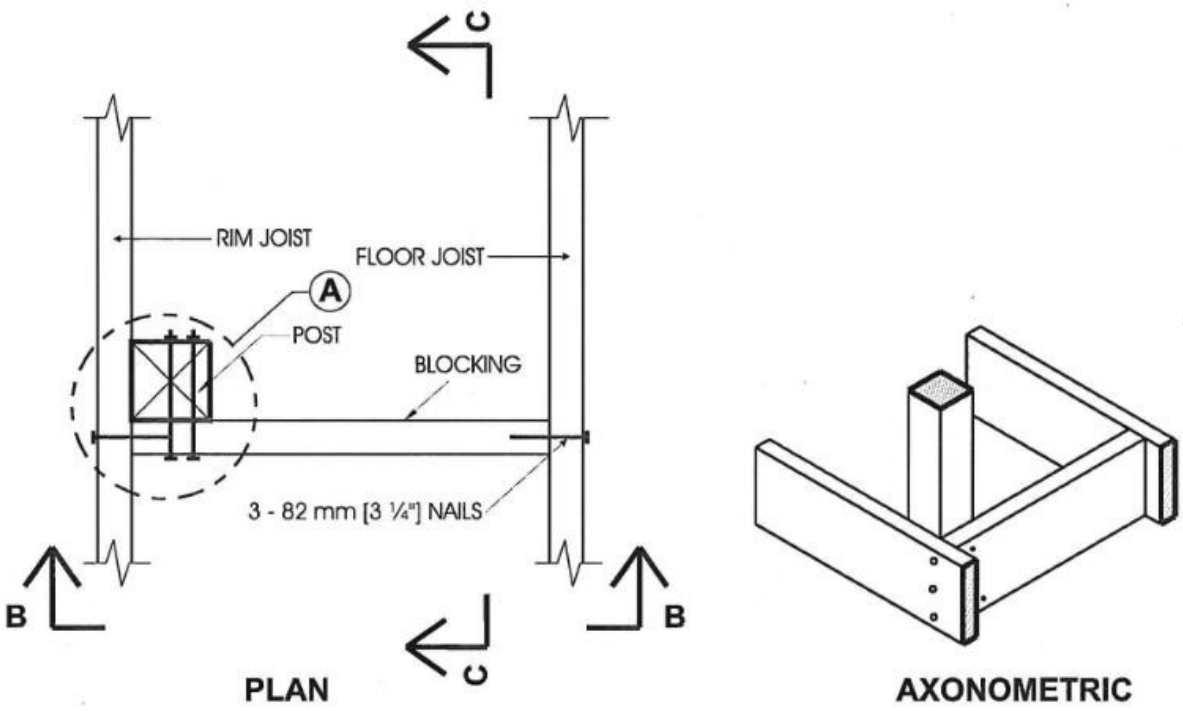
Detail EB-5

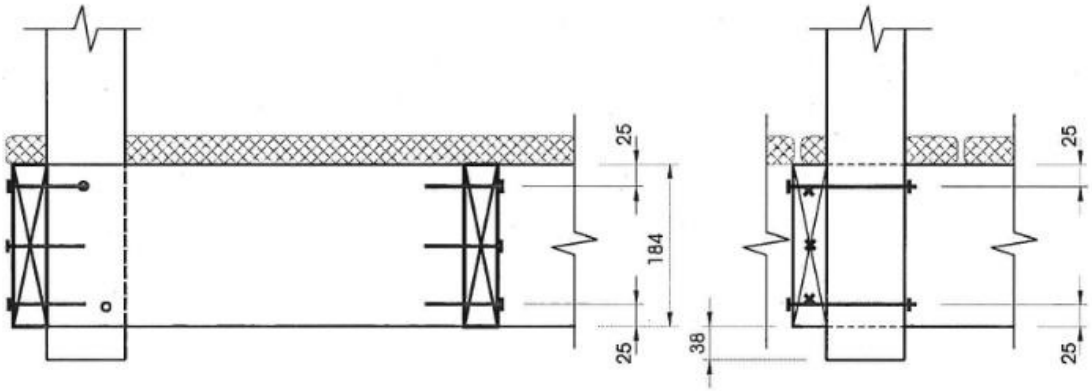
Exterior Connection: Post Bolted to 2 Floor Joists

Notes:

1. Decking is omitted from the plan view and the axonometric view for clarity.
2. 38 mm (1½") 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 (1½") 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	2.14 (7'-0")
Northern Species	1.20 (3'-11")
Column 1	2



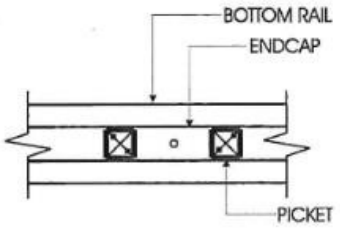


Detail EB-6

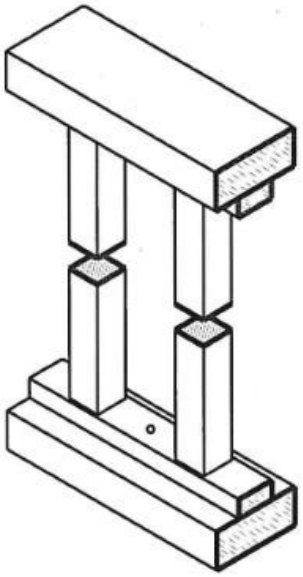
Exterior Connection: Post Fastened to Floor, Guard Parallel to Floor Joists

Notes:

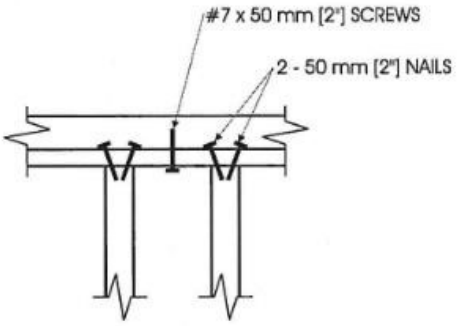
1. Use any of the connection details shown on Details EB-1 to EB-5 at location "A". Connection Detail EB-4 is shown in this detail, as an example.
2. Maximum spacing between posts is determined from connection detail used at location "A".
3. Decking is omitted from the plan view and the axonometric view for clarity.
4. Blocking shall be not less than 38 mm x 184 mm (2" x 8" nominal).
5. Dimensions shown are in mm unless otherwise specified.



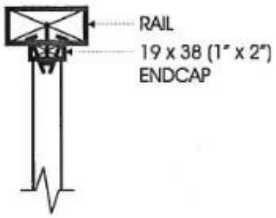
PLAN
BOTTOM RAIL



AXONOMETRIC



FRONT ELEVATION



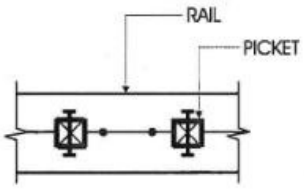
SIDE ELEVATION

Detail EC-1

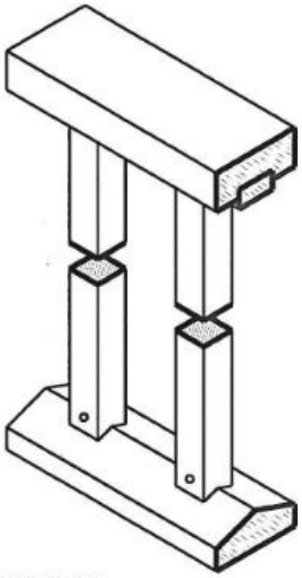
Exterior Connection: Infill Picket Nailed to Endcap - Endcap Screwed to Rail

Notes:

1. Fasten each end of each picket to endcaps with 2 - 50 mm (2") nails.
2. Fasten endcaps to rails with #7 x 50 mm (2") screws at 300 mm (12") o.c.
3. See Table 2.1.2. for minimum sizes of pickets.



PLAN
BOTTOM RAIL



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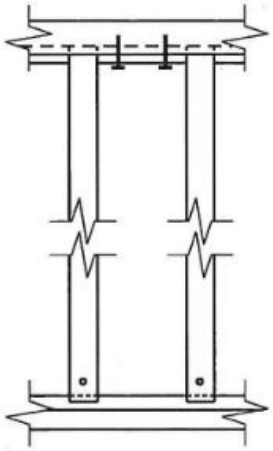
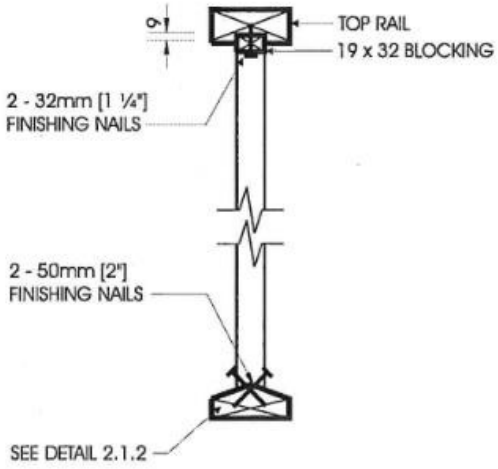


FRONT ELEVATION



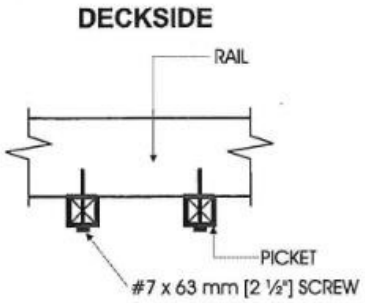
SIDE ELEVATION

Detail EC-2

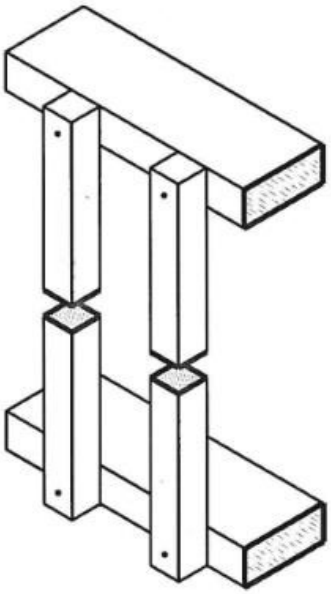
Exterior Connection: Infill Picket Nailed to Rail

Notes:

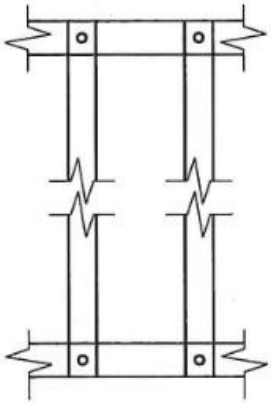
1. See Table 2.1.2. for minimum sizes of pickets.
2. Dimensions shown are in mm unless otherwise specified.



PLAN



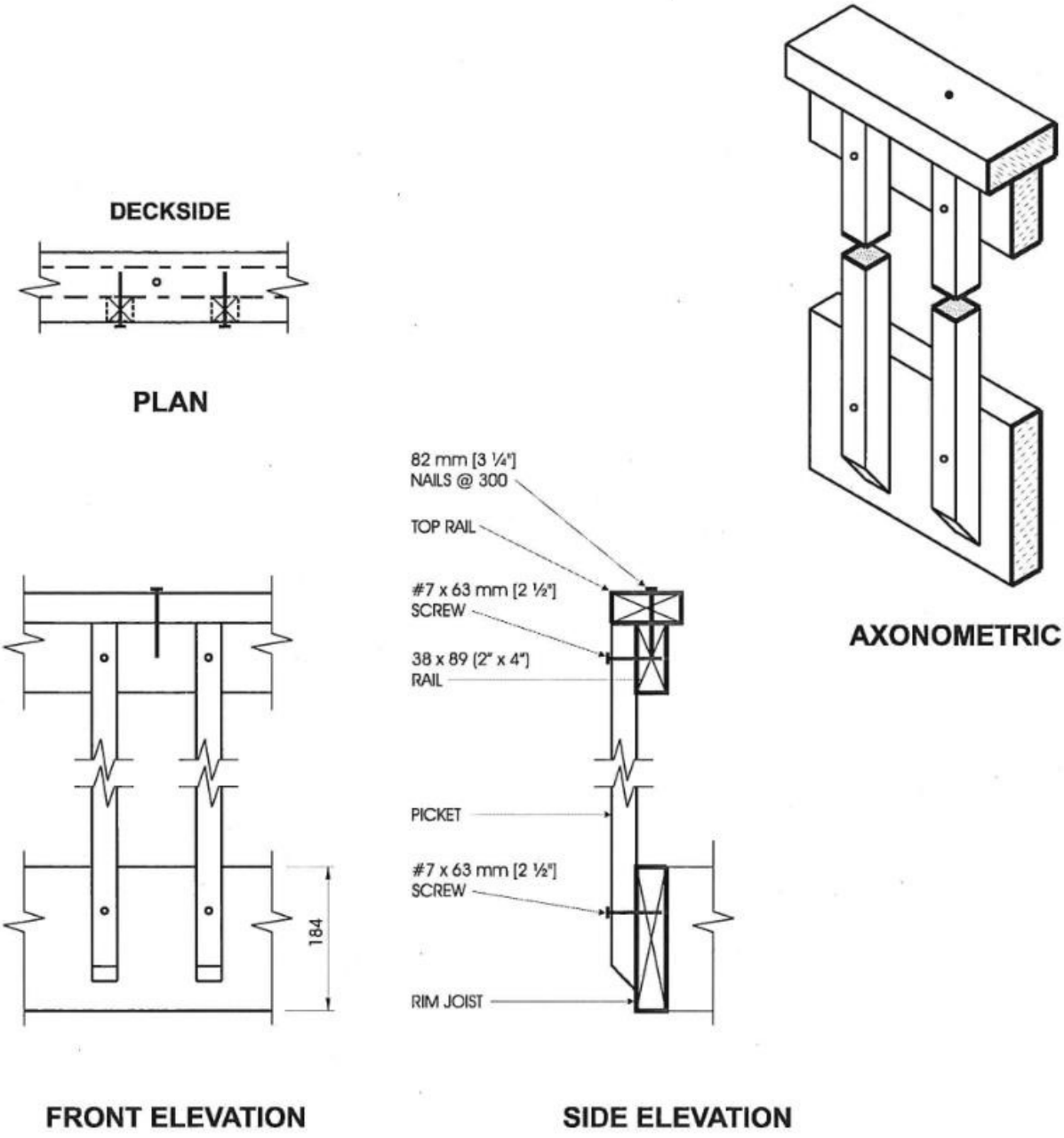
AXONOMETRIC



FRONT ELEVATION

SIDE ELEVATION

Detail EC-3
Exterior Connection: Infill Picket Screwed to Rail

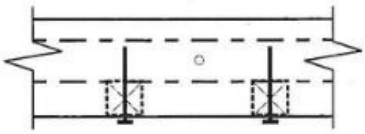


Detail EC-4

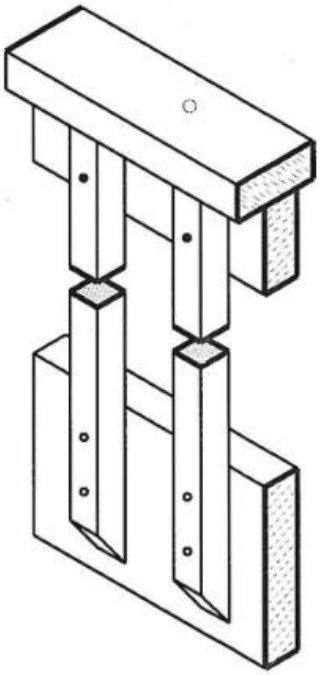
Exterior Connection: Infill Picket Screwed to Top Rail and Rim Joist

Note:

1. Dimensions shown are in mm unless otherwise specified.



PLAN



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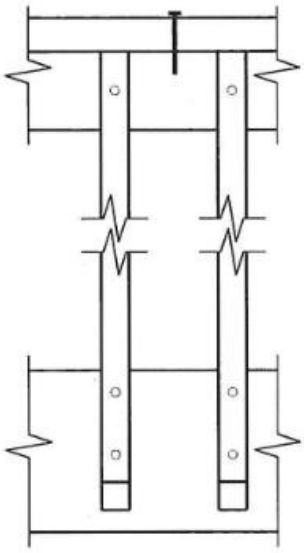
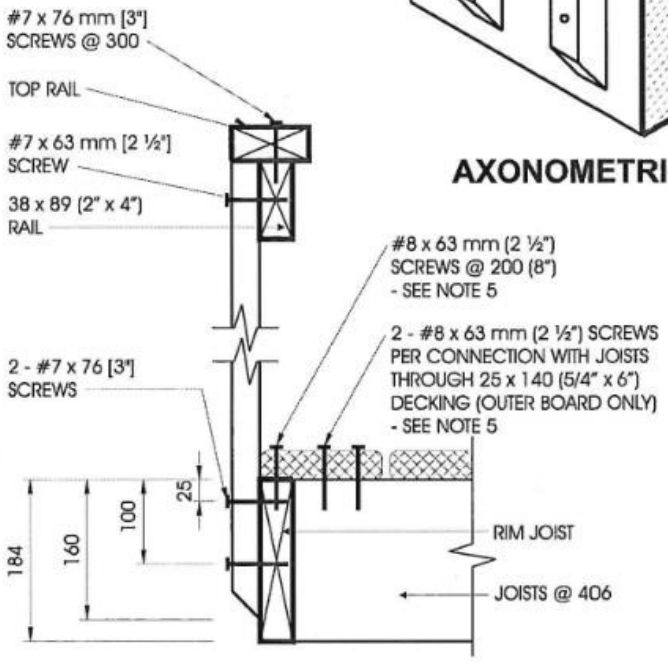


FRONT ELEVATION



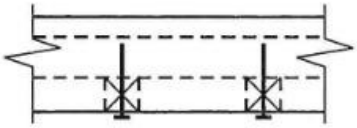
SIDE ELEVATION

Detail ED-1

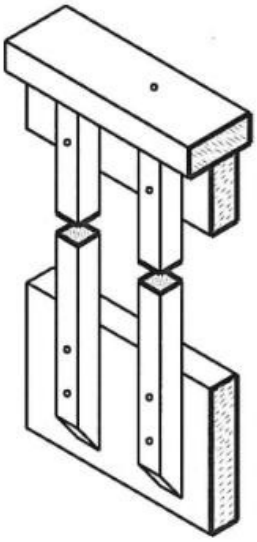
Exterior Connection: Cantilevered Picket Screwed to Rim Joist

Notes:

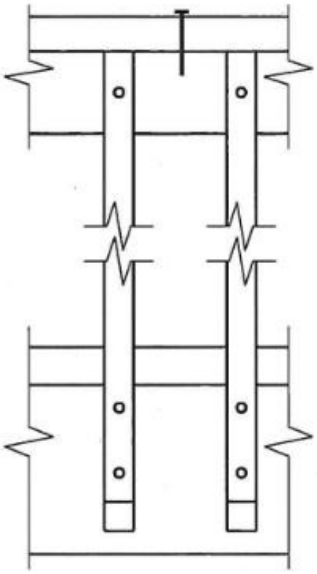
1. Provide a suitable post, return, or solid support at each end of the guard.
2. Wood for cantilevered pickets shall be Douglas Fir-Larch, Spruce-Pine-Fir, or Hem-Fir Species.
3. Fasten rim joist to each floor joist with 3 - 82 mm (3¼") nails.
4. Dimensions shown are in mm unless otherwise specified.
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").



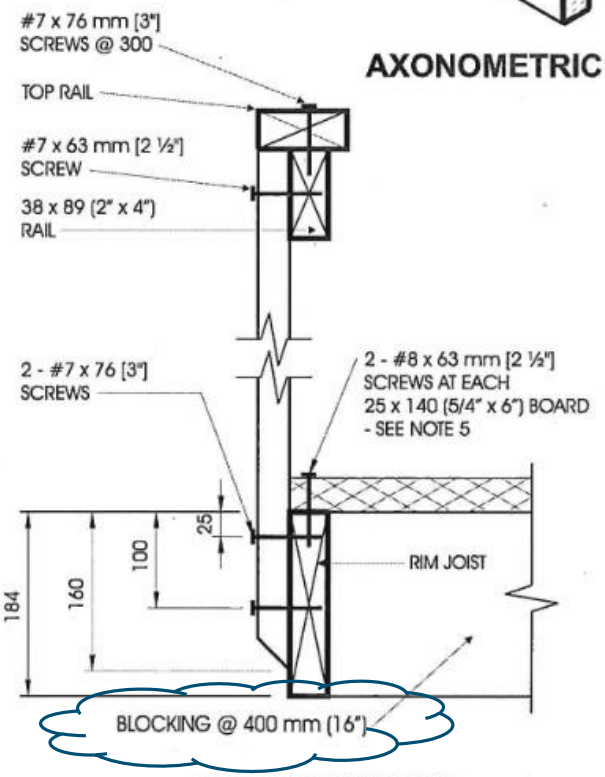
PLAN



AXONOMETRIC



FRONT ELEVATION



SIDE ELEVATION

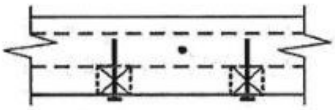
Detail ED-2

Exterior Connection: Cantilevered Picket Screwed to Rim Joist, Guard Parallel to Floor Joists

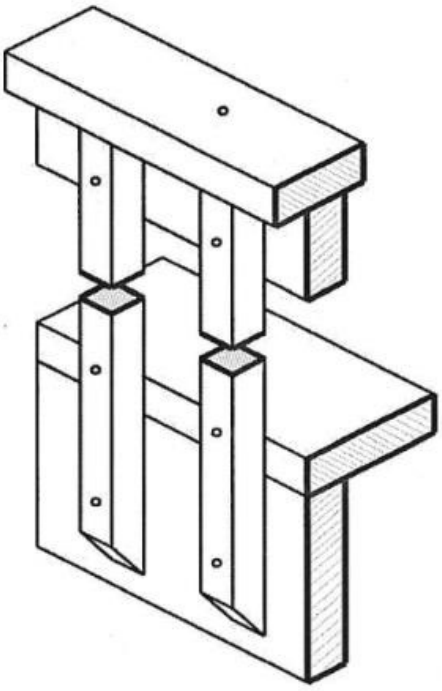
Notes:

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 blocking with 3 - 82 mm (3¼") nails.
4. Dimensions shown are in mm unless otherwise specified.
5. Where 38 mm (2" nominal) thick boards are used, the length of the wood screws shall be not less than 76 mm (3").

NOTE: This detail is for use with Northern Wood Species and Cedar only, and for use with 38 mm x 140 mm (2"x6") floor decking only.



PLAN



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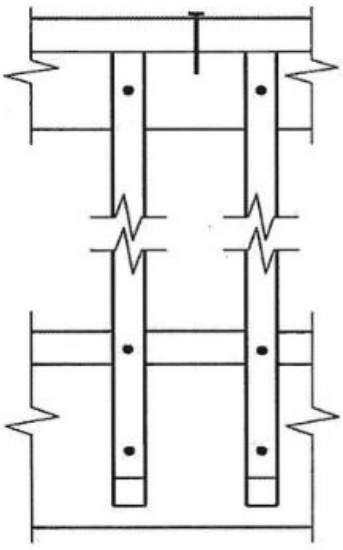
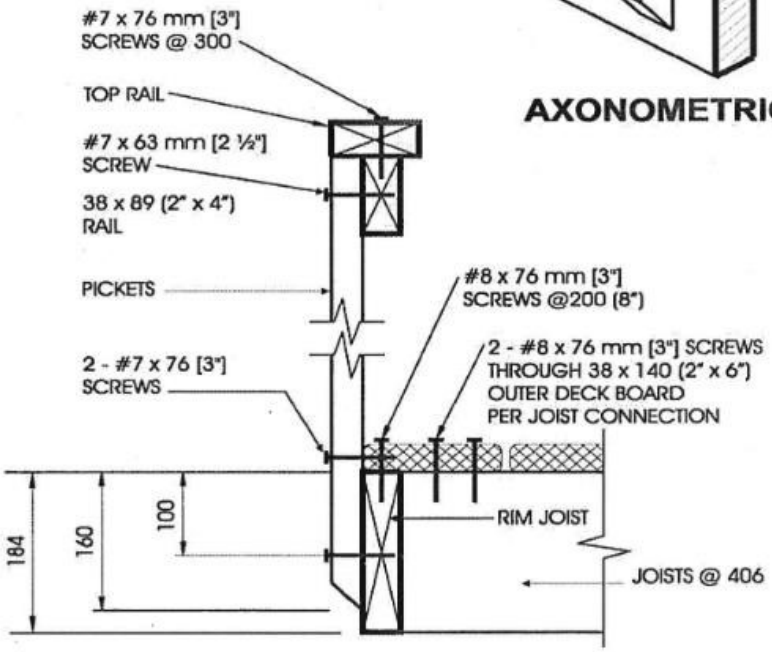


FRONT ELEVATION



SIDE ELEVATION

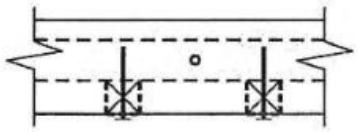
Detail ED-3

Exterior Connection: Cantilevered Picket Screwed to Rim Joist and Deck

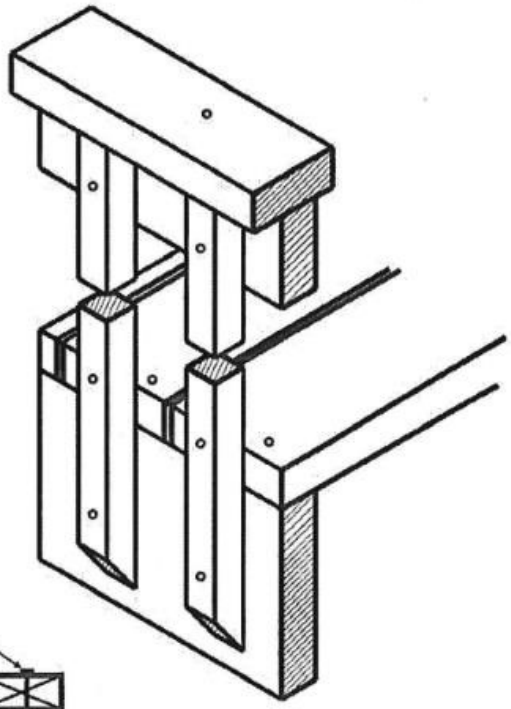
Notes:

1. Provide a suitable post, return, or solid support at each end of the guard.
2. Wood for cantilevered pickets shall be Northern Species.
3. Fasten rim joist to each floor joist with 3- 82 mm (3¼") nails.
4. Dimensions shown are in mm unless otherwise specified.

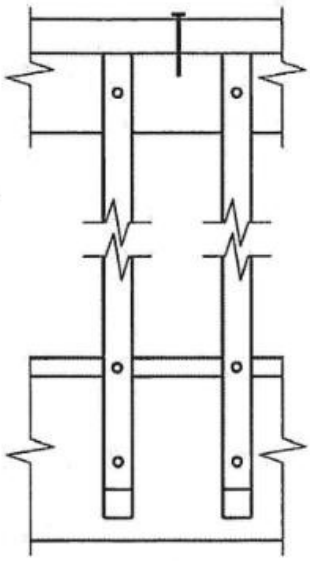
NOTE: This detail is for use with Northern Wood Species and Cedar only, and for use with 38 mm x 140 mm (2"x6") floor decking only.



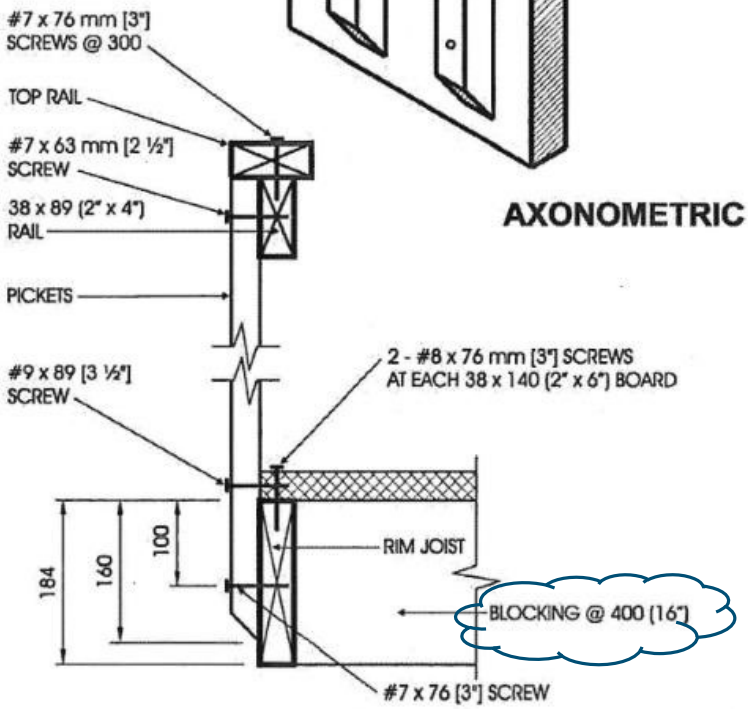
PLAN



AXONOMETRIC



FRONT ELEVATION



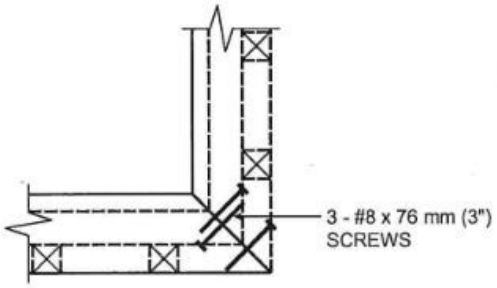
SIDE ELEVATION

Detail ED-4

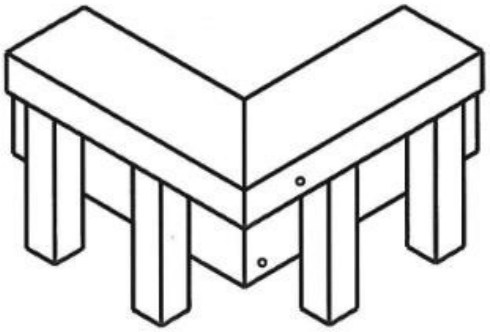
Exterior Connection: Cantilevered Picket Screwed to Rim Joist and Deck, Guard Parallel to Floor Joists

Notes:

1. Provide a suitable post, return, or solid support at each end of the guard.
2. Wood for cantilevered pickets shall be Northern Species.
3. Fasten rim joist to blocking with 3 - 82 mm (3¼") nails.
4. Dimensions shown are in mm unless otherwise specified.

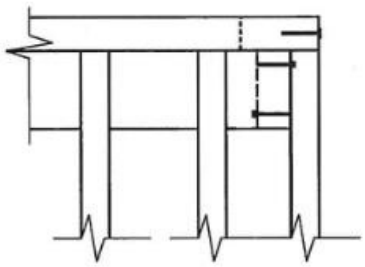


PLAN TOP RAIL

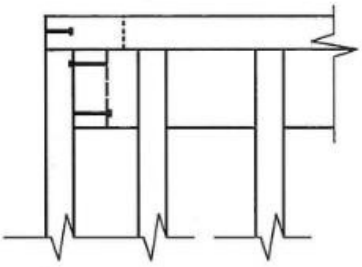


AXONOMETRIC

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.