

# Decks

## Construction information



## General information

A deck is an outdoor structure with a total area of more than 3.4 m<sup>2</sup> (36 sq. ft.).

All decks located in a back or side yard that are more than 600 mm (2'-0") above ground level require development and building permits. If the deck is more than 600 mm (2'-0") above ground level and level with a main floor entrance, it does not require a development permit, but still requires a building permit. For more information on development permit exemptions, visit [winnipeg.ca/developmentpermits](http://winnipeg.ca/developmentpermits).

A development permit establishes land use and confirms the structure is located on the property in accordance with the zoning bylaw and other City departments' requirements.

A building permit confirms the structure meets code requirements. Building permits must align with prior development permit approvals.

A landing is an outdoor platform with a total area of less than 3.4 m<sup>2</sup> (36 sq. ft.). For more information on landings, visit [winnipeg.ca/decks](http://winnipeg.ca/decks).

**Note:** If the deck (regardless of height or size) will eventually support a structure with a roof, such as a sunroom, family room, etc., it is recommended to apply for the entire project to ensure the deck is designed to support the future structure. Electrical work requires a separate permit. Refer to [winnipeg.ca/electricalinstallations](http://winnipeg.ca/electricalinstallations) for more information.

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**Note**

The Winnipeg Building By-law is primarily an administrative document that adopts the Manitoba Building Code and related standards to provide construction regulations.

Throughout this publication, the Manitoba Building Code will be referred to as the building code.

Decks vary in size and area and it is beyond the scope of this publication to identify each possible solution. The requirements and construction guidelines that follow are provided to assist with designing and constructing a deck.

# Zoning

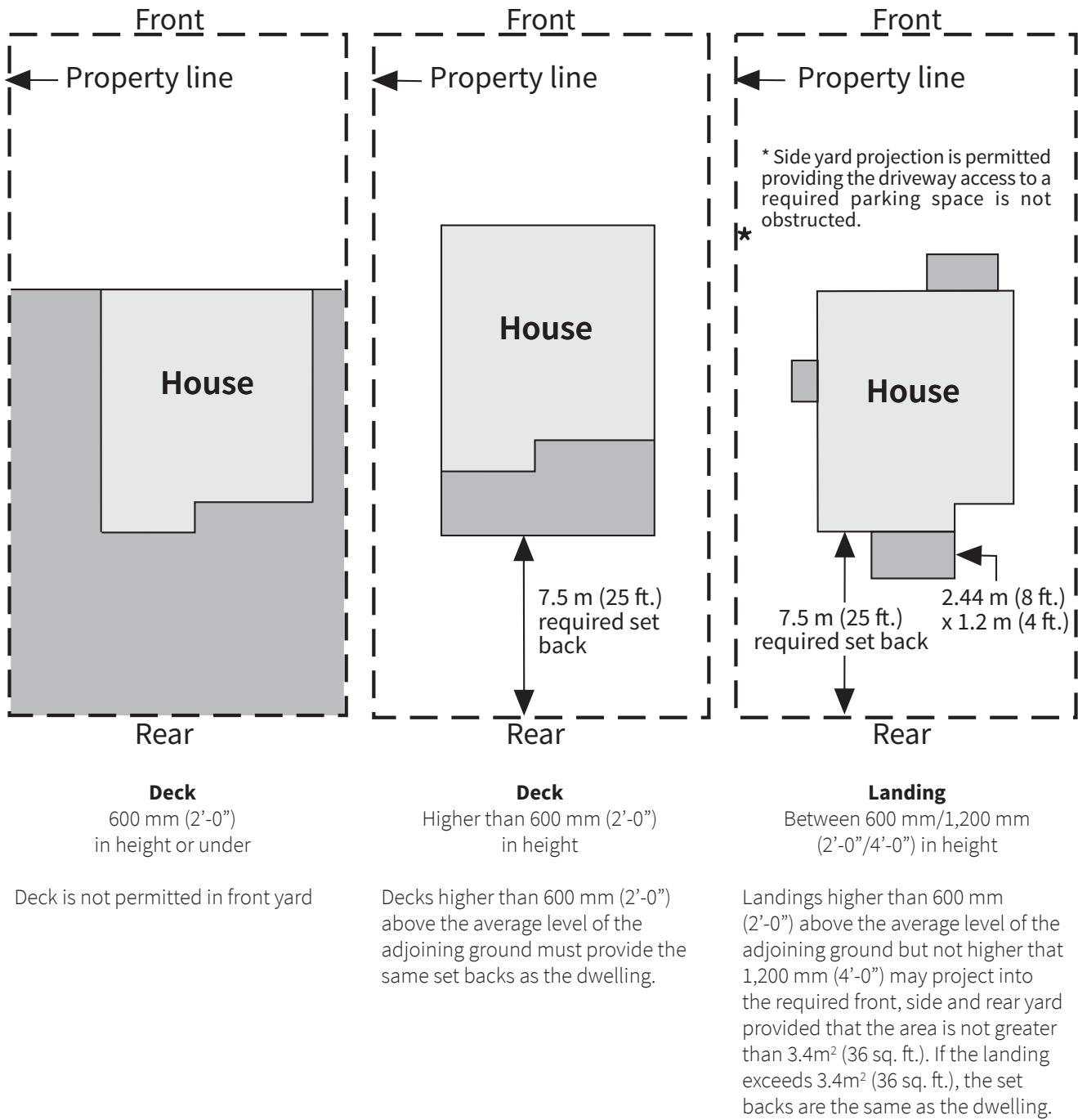
## Where and how high can I build my deck?

As indicated in **Figure 1**, zoning requirements on the height of the deck will determine its location.

## If I cannot meet the zoning requirements, what are my alternatives?

To vary these requirements, you must apply for a zoning variance.

Figure 1: Deck location



# Foundations

## Open decks under 1300 mm (4'-3") in height

### Surface pad foundations

Surface pad foundations are only permitted when an open deck is:

- a. not more than one storey
- b. not more than 55 m<sup>2</sup> (592 sq. ft.) in area
- c. not more than 1300 mm (4'-3") in distance from finished ground to the underside of the joist
- d. not supporting a roof, and
- e. not attached to another structure, unless it can be demonstrated that differential movement will not adversely affect the performance of that structure as determined by the authority having jurisdiction

When using surface foundations, access must be provided to the foundation to permit re-leveling of the deck platform. It can be provided either by:

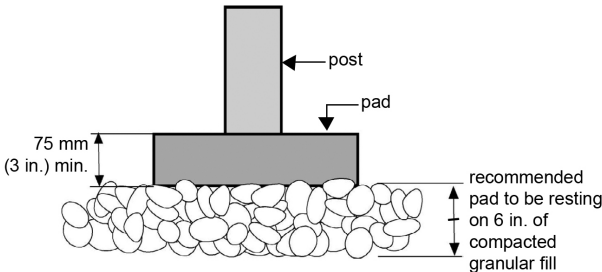
- a. a passageway with a clear height and width under the deck platform of not less than 600 mm (2'-0"), or
- b. installing the decking in a manner that allows easy removal (e.g. screws)

### What are the recommendations for a surface pad foundation?

Surface pads of concrete shown in **Figure 2** should be a minimum of 75 mm (3 in.) thick. Wood posts and/or wood beams closer than 150 mm (6 in.) to the ground must be pressure-treated preservative lumber to prevent the premature deterioration of the post or beam, which will be bearing on the pad.

Refer to **Table 1** to determine the recommended size of the surface pad foundation. These pad sizes are based on existing industry standards and are generally available at most lumber or home supply dealers.

**Figure 2: Surface pad foundation**



**Table 1: Recommended deck foundation pad sizes<sup>(1)</sup>**

Maximum supported joist length <sup>(2)</sup>	Concrete surface pad size <sup>(3)</sup> (length x width x thickness)
1.22 m (4'-0")	300 mm x 300 mm x 100 mm (12 in. x 12 in. x 4 in.)
2.44 m (8'-0")	450 mm x 450 mm x 75 mm (18 in. x 18 in. x 3 in.)
3.65 m (12'-0")	600 mm x 600 mm x 150 mm (24 in. x 24 in. x 6 in.)

### Notes to Table 1:

<sup>(1)</sup>This table requires beams that are supported every 2.4 m (8'-0") or less.

<sup>(2)</sup>Supported joist length means half the span of joists supported by the beam plus the length of the overhang beyond the beam (**see Figure 5**).

<sup>(3)</sup>Pad sizes are based on industry standards.

### Can a pergola or a trellis type structure be added to a deck on pads?

Yes. A pergola or trellis would not support snow or rain loading, and would not be considered a building according to the building code. These types of structures are designed to provide shade and would not be subject to the more restrictive requirements of the building code.

**Note:** While a building permit may not be required for a pergola or trellis, good construction practice is mandated by the City of Winnipeg Building By-Law (4555/87), and the ultimate responsibility of the owner to ensure safety of occupants and property are maintained.

## Open decks over 1300 mm (4'-3") in height

### Deep foundations

When the underside of the deck joists are more than 1300 mm (4'-3") above the ground, the foundation depth must be at least the depth of frost penetration - 1.8 m (6'-0"). Any concrete pile or pier foundation designed by an engineer, or alternatively screw piles, is required. If the long-term goal is to enclose all or a portion of the deck, it is suggested that a foundation as described in the **House Additions** brochure is used.

**What information is needed for a deck supported on screw piles?**

A foundation using screw piles may be permitted if the pile extends below the depth of frost penetration and has been properly tested. You may need to retain someone to do load calculations to determine that the loads transferred to the foundation do not exceed the loads for the tested piles. If the future plan is to enclose the deck with a sunroom or screened patio, the type of screw piles must be approved for such uses complete with plans sealed by an engineer. For more information, see the Information Bulletin on helical, augered, and screw piles at: [winnipeg.ca/ppd/infocentre/informationbulletins.stm](http://winnipeg.ca/ppd/infocentre/informationbulletins.stm)

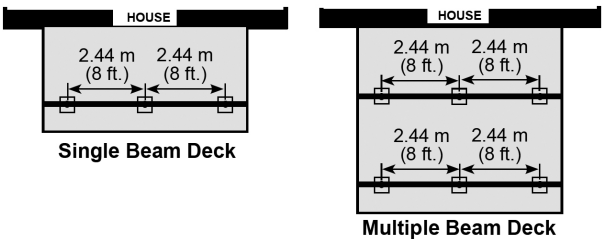
# Structural

**How far apart can these pads, piles, piers, or screw piles be installed?**

The location of the pads, piles, piers, or screw piles can vary depending on the size and type of material used for the beam that spans from one to the other; and the amount of floor area that each is required to carry.

The examples shown in **Figure 3** are based on a beam that is supported a maximum 2.44 m (8'-0") on centre. The beam table that follows indicates beams which are adequate for this spacing.

Figure 3: Deck beam spacing



**Can I vary from this 2.44 m (8'-0") spacing?**

The beam sizes indicated in this publication have been calculated by using common engineering principles. Other variations are possible provided the deck is designed and installed to carry a live load of 1.9 kPa (40 psf).

If you wish to increase the spacing of the pads, piles, piers, or screw piles, or reduce the beam sizes indicated in the beam tables, you may need to retain someone who is familiar with engineering calculations. Whichever design you choose must be indicated on the plans at the time of building permit application.

**What size posts should I use and how should they be anchored?**

Posts, if used, should be at least the width of the beam, centred on the pad, pile, pier, or screw pile, and securely fastened to the beam by means of toe-nailing, wood gussets, angle brackets, or other equivalent method. Posts exceeding 1.5 m (5'-0") in height should be braced to each other or up to the beam and floor or, alternatively, they should be anchored to the pad, pile, pier, or screw pile in order to prevent them from shifting at the bottom.

**What size of beams do I need?**

The beam table (**Table 2**) is intended for single beam decks and multiple beam decks that are supported at 2.44 m (8'-0") intervals along the beam. Also see **Figure 5**.

Table 2: Deck beam sizes<sup>(1)</sup>

Maximum supported joist length <sup>(2)</sup>	Beam size <sup>(3)</sup>
1.82 m (6'-0")	3 - 38 x 140 mm (3 - 2 x 6) or 2 - 38 x 184 mm (2 - 2 x 8)
2.44 m (8'-0")	4 - 38 x 140 mm (4 - 2 x 6) or 2 - 38 x 184 mm (2 - 2 x 8)
3.05 m (10'-0")	3 - 38 x 184 mm (3 - 2 x 8) or 2 - 38 x 235 mm (2 - 2 x 10)

**Notes to Table 2:**

- <sup>(1)</sup>This table requires beams to be supported every 2.44 m (8'-0") or less.
- <sup>(2)</sup>Supported joist length means half the span of joists supported by the beam plus the length of the overhang beyond the beam (see **Figure 4**).
- <sup>(3)</sup>This table is for use with Spruce-Pine-Fir lumber grades 1 and 2.

## How do I calculate the loads on my foundation?

The loads can be calculated using the formula below and Figures 4 and 5.

Load = (supported joist length) X (support beam length) X 50 lbs. per sq. ft. (total floor load) = total load (in pounds)

**Supported joist length** - see Table 2, note 2 and Figure 4

**Supported beam length** means half the span of the beam supported by the column plus the length of the overhang beyond the column (see Figure 5)

Figure 4

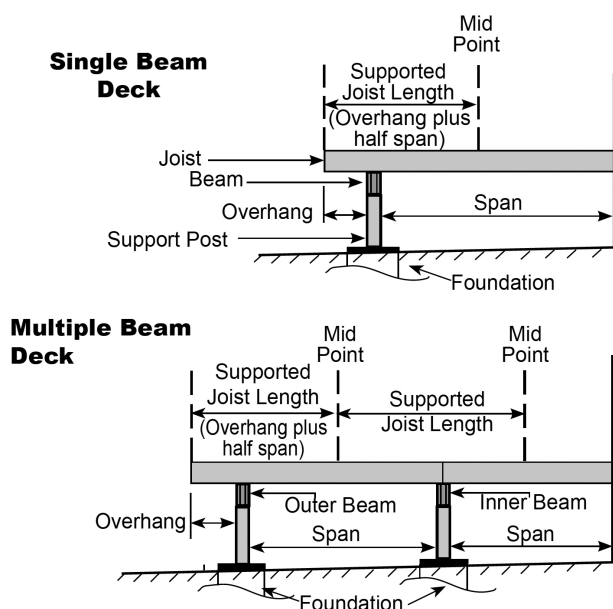
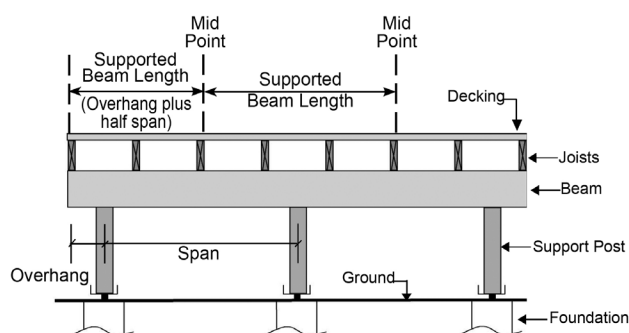


Figure 5



**EXAMPLE**

HOUSE

Joists

A B C

10'

2'

2' 8' 8' 2'

Calculations for A and C. (They would have the same reaction.)

$$\left(\frac{10}{2} + 2\right) \times \left(\frac{8}{2} + 2\right) \times 50 \text{ lbs/ft}^2 = \text{Total Load (lbs.)}$$

$$(7 \times 6 \times 50 = 2100 \text{ lbs.})$$

Calculations for B

$$\left(\frac{10}{2} + 2\right) \times \left(\frac{8}{2} + \frac{8}{2}\right) \times 50 \text{ lbs/ft}^2 = \text{Total Load (lbs.)}$$

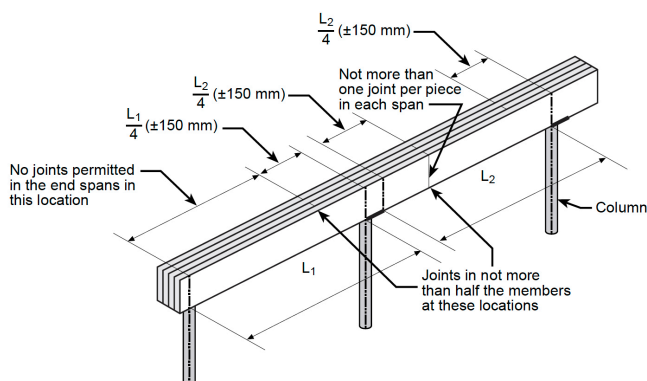
$$(7 \times 8 \times 50 = 2800 \text{ lbs.})$$



### Can I have joints in the beam?

Yes. However, joints are only permitted on multi-span beams. When joints are necessary, they should be situated on a support post or within  $\pm 150$  mm (6 in.) of the quarter points of the clear span of the beam. No joints are permitted in the end spans of the beam and not more than one joint per piece in each span. On multiple-ply (3 ply or more) laminated beams the joints should be staggered so that they occur on alternate supports. If it is intended to project the beam beyond the end supports, there should be no joints on the end support. 2 ply beams may only have joints over supports. See Figure 6.

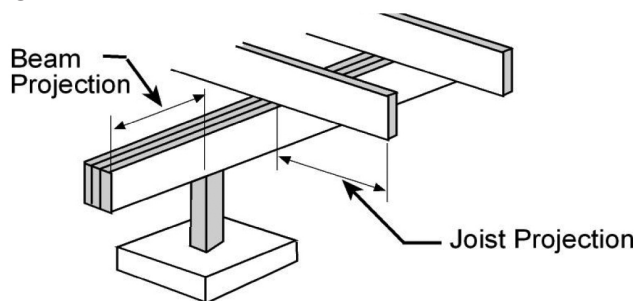
Figure 6: Joint location in built-up beams



### How far can I project the beam beyond the end support?

The beam can project up to a maximum of 600 mm (2'-0") beyond the end support. See Figure 7.

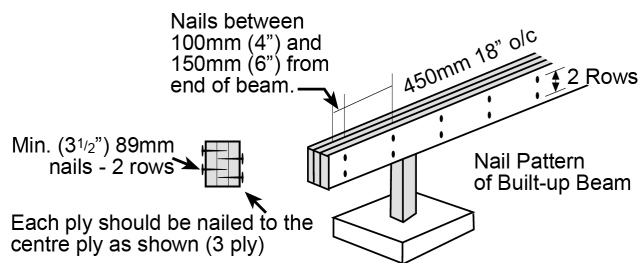
Figure 7



### How should beam laminations be nailed together?

Individual members must be nailed together. See Figure 8.

Figure 8



### How far can the joists project beyond the face of the outside beam?

If the future plan is to eventually enclose all or a portion of the deck with a roofed structure which could carry snow, the building code states that the joists can only project 400 mm (16 in.) where 2x8 joists are used, and 600 mm (2'-0") where 2x10 or larger joists are used. The projection of 2x6 joists would require engineering analysis to determine if the floor assembly would be sufficient to carry the superimposed roof loads. See Figure 7.

Note that if you are not planning to enclose the deck in the future, 2x8 joists or larger may have projections up to 600 mm (2'-0"). Any projections greater than 600 mm (2'-0") require engineering analysis.

### What size of deck joists do I require?

The size of the joists are governed by the distance they have to span and the spacing at which the joists are installed.

Table 3 indicates the acceptable span distances for wood decks. Joist spans are measured from face of support to face of support (in the case of a wood deck from face of beam to face of beam, or from face of beam to face of ledger).

Another item to consider when selecting the size and spacing of the joists, is the type of material you intend to use as decking. Check with the lumber dealer to ensure that the decking you select will not sag significantly between the joists as a result of the joist spacing you have chosen.

### Do the deck members need to be pressure treated?

When the vertical clearances between the wood elements and the finished ground level is less than 150 mm (6 in.) or when the wood elements are not protected from exposure to precipitation they must be pressure treated with a preservative to resist decay.

Table 3: Deck joist spans - design live loads for 1.9 kPa (40psf)

Commercial designation	Grade	Joist size (in)	Maximum span (ft-in) joist spacing			Joist size (mm)	Maximum span (m) joist spacing		
			12 in.	16 in.	24 in.		300 mm	400 mm	600mm
Spruce - Pine - Fir Pressure Treated (Not Incised)	No. 1	2 x 6	10' 1"	9' 2"	7' 10"	38 x 140	3.1	2.8	2.4
	and	2 x 8	13' 2"	12' 1"	10' 2"	38 x 184	4.0	3.7	3.1
	No.2	2 x 10	16' 10"	14' 1"	12' 6"	38 x 235	5.1	4.3	3.8

## Design

### What is the difference between guardrails and handrails?

Guardrails are intended to prevent persons from falling off the edge of a stair or a raised floor area such as a deck. The guardrail must be able to withstand the pressure of a human body applied horizontally to it. They must be continuous around the deck surface. Handrails are required to assist persons in ascending or descending stairs. They offer a continuous handhold to support persons who may stumble on the stair. Handrails are required to be graspable. Where dimensional lumber is used on edge, contours shaped on both sides must be provided to allow the fingers and thumb to curl to create a grip. The practice of installing a dimensional lumber cap on the flat to act as a handrail is not acceptable. If guardrail design does not meet handrail requirements, a handrail will need to be added in addition to a guardrail.

### Will my deck require guardrails?

Guards are only required on decks that are more than 600 mm (2'-0") above finished ground level.

### What if my deck is less than 600 mm (2'-0") above finished ground level?

A guardrail is not required but, if one is provided, the openings through the guards have restrictions. These openings must either be less than 100 mm (4 in.) or greater than 200 mm (8 in.). This is to prevent children from accidentally getting their head stuck in the guard.

### What are the construction requirements for a required guardrail?

Required guardrails shall not be less than 900 mm (36 in.) high where the walking surface of the deck is not more than 1800 mm (6'-0") above the finished ground level, and 1070 mm (42 in.) high where the walking surface exceeds 1800 mm (6'-0"). See Figures 9 & 10.

Openings in the guardrail must prevent the passage of a spherical object having a diameter of 100 mm (4 in.)

Required guardrails must be a rigid construction, and designed to provide demonstrated effective performance.

Figure 9: Guardrail height

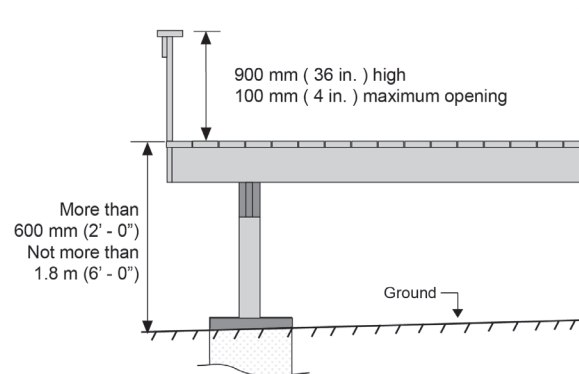
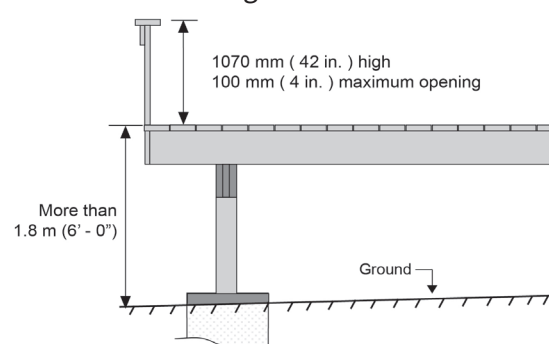


Figure 10: Guardrail height

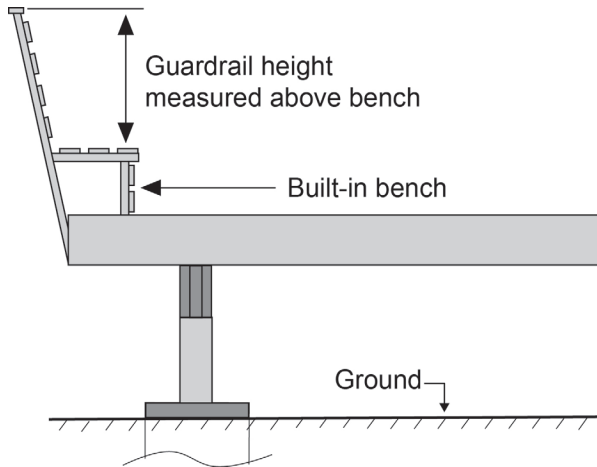




### Can a built-in bench serve as a guardrail?

No, unless a guardrail meeting the previously described height and opening requirements is provided above the flat surface of the bench and any openings below the bench also meet the maximum opening requirements (see Figure 11).

Figure 11: Guardrail and bench



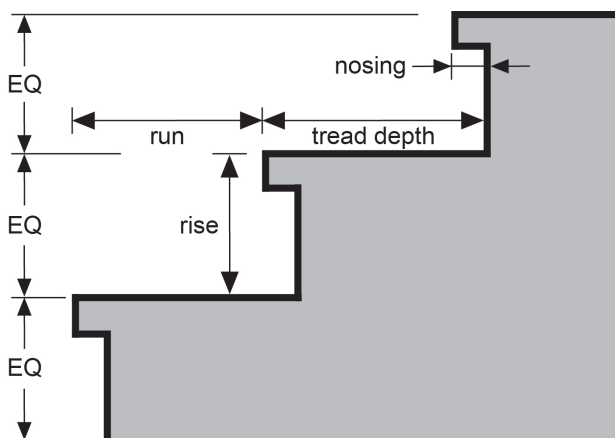
### What is the difference between a built-in bench and a chair or a table?

If a chair or a table are in a hazardous position, you have the option to move them. A built-in bench does not provide that option.

### Are there any requirements for stairs?

The building code requires stair width to be at least 900 mm (36 in.) and that treads and risers have uniform rise and run in any one flight with riser heights not exceeding 200 mm (8 in.). The building code also requires the minimum run of each tread to be 255 mm (10 in.) with a maximum 25 mm (1 in.) nosing. See Figure 12 for details.

Figure 12: Stair detail



### Are guardrails required for stairs?

Guards are required on stairs where there is a difference in elevation of more than 600 mm (2'-0") to finished ground level. The height of guards for flights of steps shall be 900 mm (3'-0") and be measured vertically from the top of the handrail to a line drawn through the leading edge of the treads served by the guard. Guards shall be constructed in the same manner as Figure 13.

If a guardrail is required, the triangular openings formed by stair risers, stair treads and the bottom of a guardrail shall prevent the passage of a 150 mm (6 in.) diameter sphere. See Figure 13A.

### Will the stair also require a handrail?

The building code states that if any outside stair has more than three risers, a handrail is required on one side of the stair. The handrail is to be located between 865 mm (34 in.) and 1070 mm (42 in.) in height measured vertically from the top of the handrail to a straight line drawn through the tips of the nosings of the stair. Outside stairs with three risers or less do not require handrails.

In those cases where a stair also requires a guardrail, a reasonable solution is to provide a guardrail which also acts as a handrail, as shown in Figure 13. If the design of a guardrail does not incorporate a graspable handrail at the proper height, then a handrail would need to be added to the inside of that guardrail (see Figure 14).

Figure 13: Combine guardrail/handrail

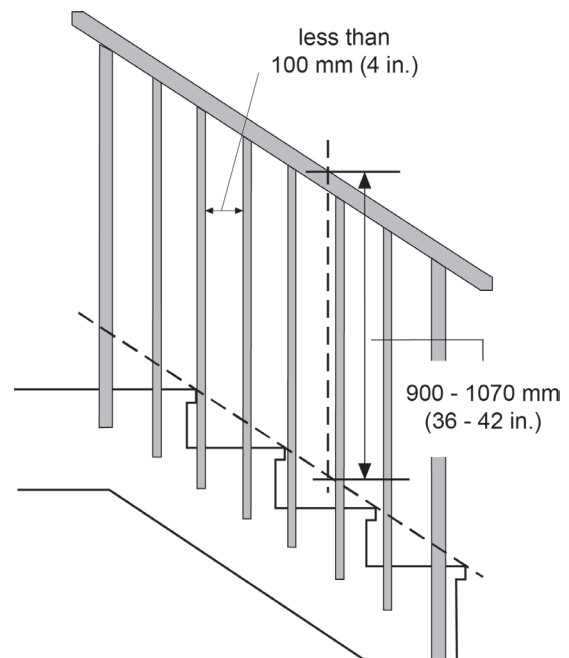
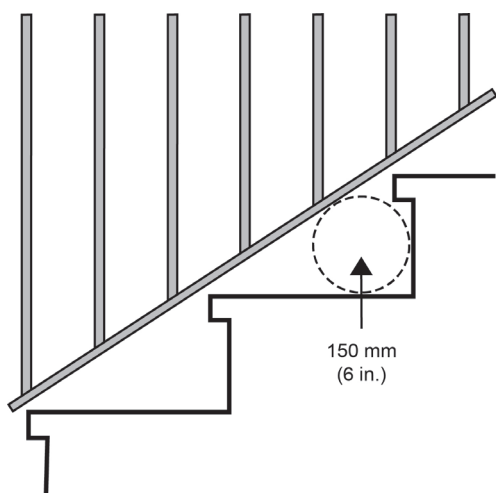


Figure 13A: Stair guardrail detail

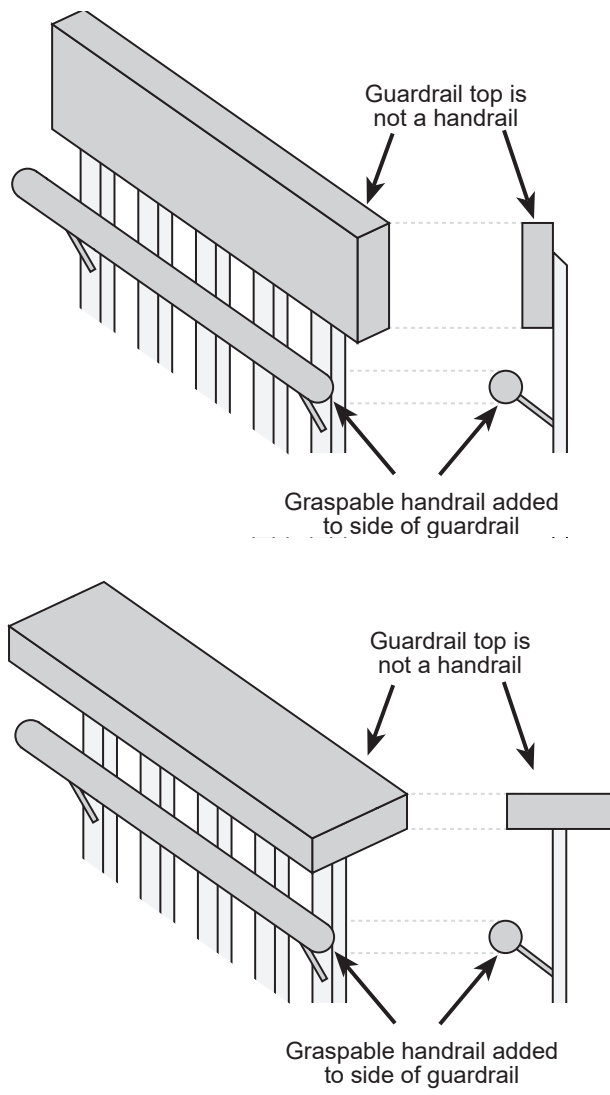


## Overhead power supply conductors

A deck construed below overhead power supply conductor requires a minimum clearance of 3.5 m (11'-6") between the deck surface and the conductors. A deck with a structure, such as a pergola or gazebo, requires overhead conductors to be maintained at least 1 m (3'-3") above a peaked roof and at least 2.5 m (8'-2") above the highest point of a flat roof or roof that can be readily walked upon. If the deck will be installed below a hydro meter, it may be necessary to relocate the meter to maintain the proper meter height. Contact Manitoba Hydro for more information.

## Inspections

Figure 14: Graspable handrail



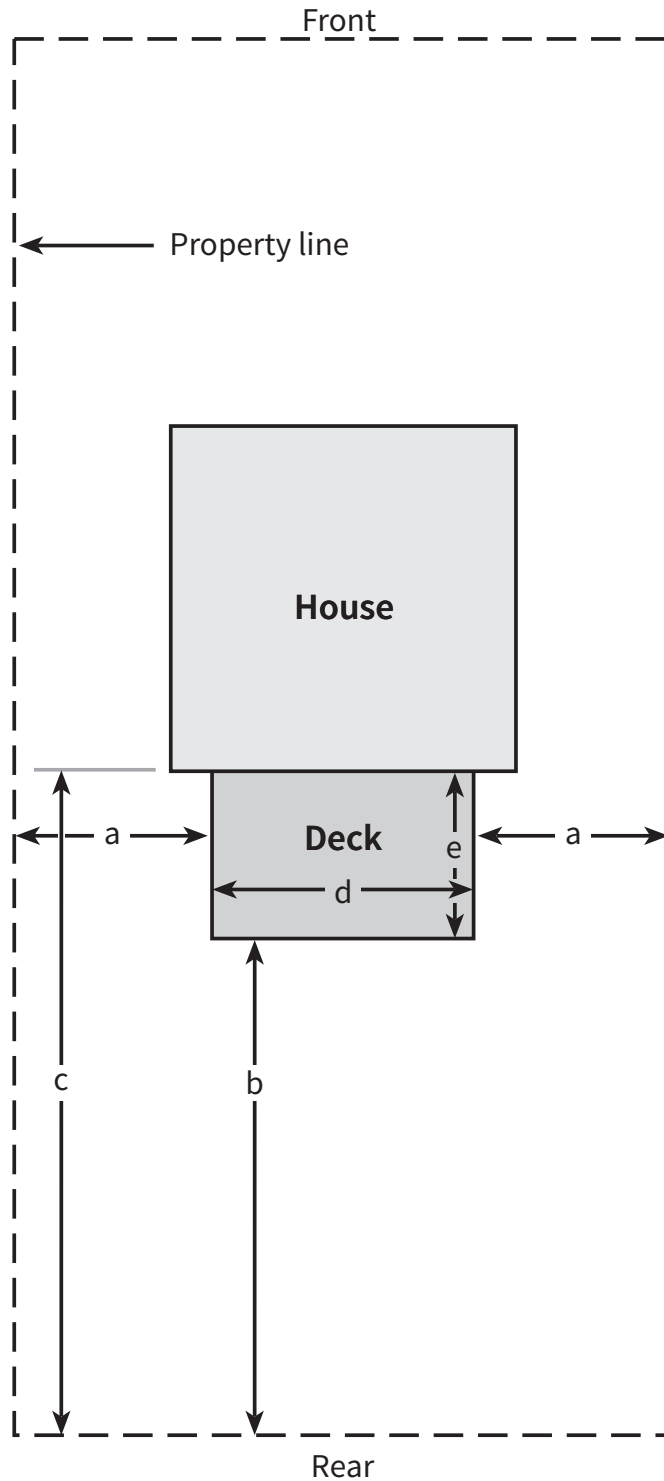
The Housing Inspections Branch regulates construction for compliance with applicable codes, standards and bylaws. This monitoring is carried out through the permit approval process and periodic site inspections.

The responsibility for compliance rests with the property owner. Prior to covering any new work, you must schedule an inspection by submitting the housing inspection request form at [winnipeg.ca/housinginspection](http://winnipeg.ca/housinginspection).

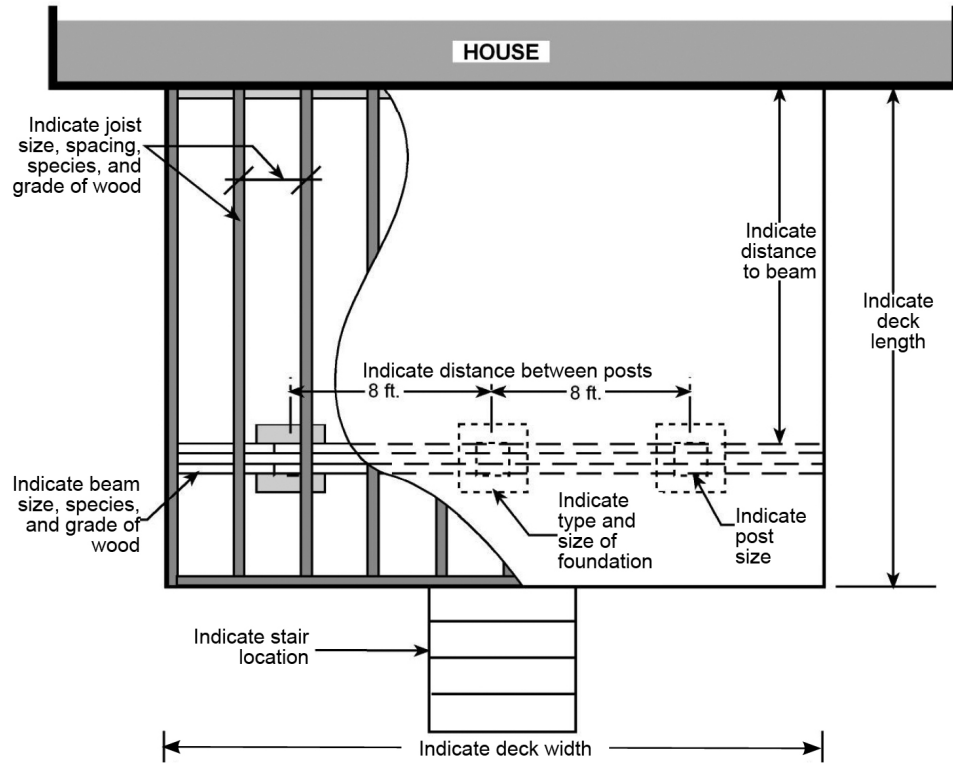
# Sample drawings

## Site plan

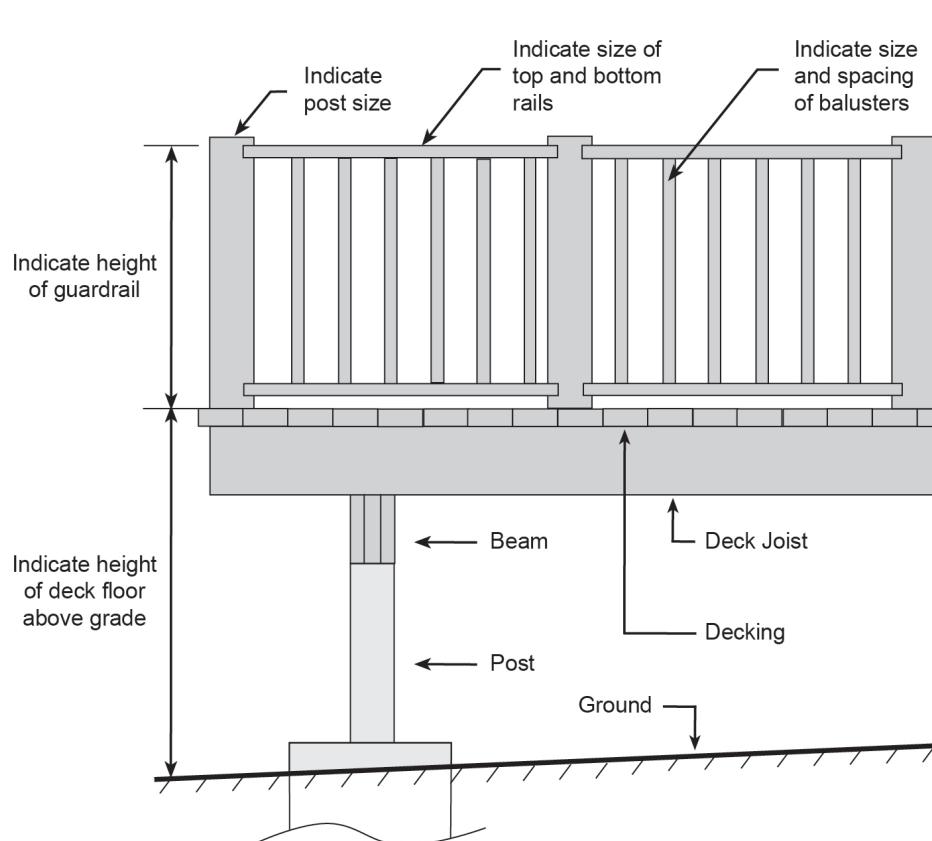
- a - distance from deck to side property lines
- b - distance from deck to rear property line
- c - rear yard distance
- d - deck width
- e - deck length



## Construction plan



## Elevations





Zoning & Permits Branch

Unit 31 - 30 Fort Street, Winnipeg, Manitoba R3C 4X7 | [winnipeg.ca/ppd](http://winnipeg.ca/ppd)

Permits Direct Line

204-986-5140 | [ppd-permit@winnipeg.ca](mailto:ppd-permit@winnipeg.ca)

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Every effort has been made to ensure the accuracy of information contained in this publication. However, in the event of a discrepancy between this publication and the governing City of Winnipeg By-law, the bylaw will take precedence.