3 ANTHROPOMETRICS

Please refer to the following as guidance for designing facilities and equipment to be used by Persons with Disabilities. Proper space should be allocated for persons using mobility devices, e.g. wheelchairs, crutches and walkers, white cane etc. as well as those walking with the assistance of other persons (Figure 3-2, 3-6 and 3-7).

3.1 MOBILITY DEVICES AND SPACE ALLOWANCES

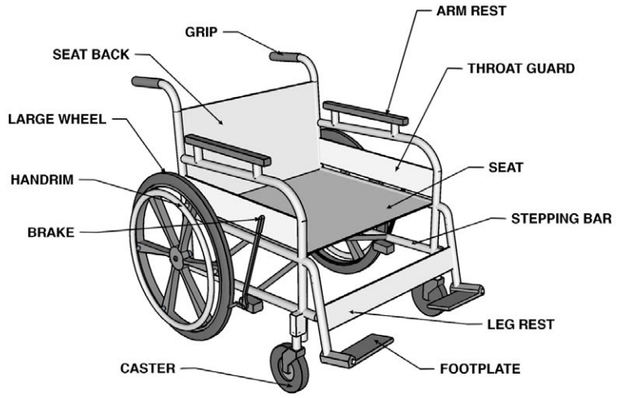


Figure 3-1: Structure of wheelchair and name of each part (standard type)

3.1.1 Wheelchair

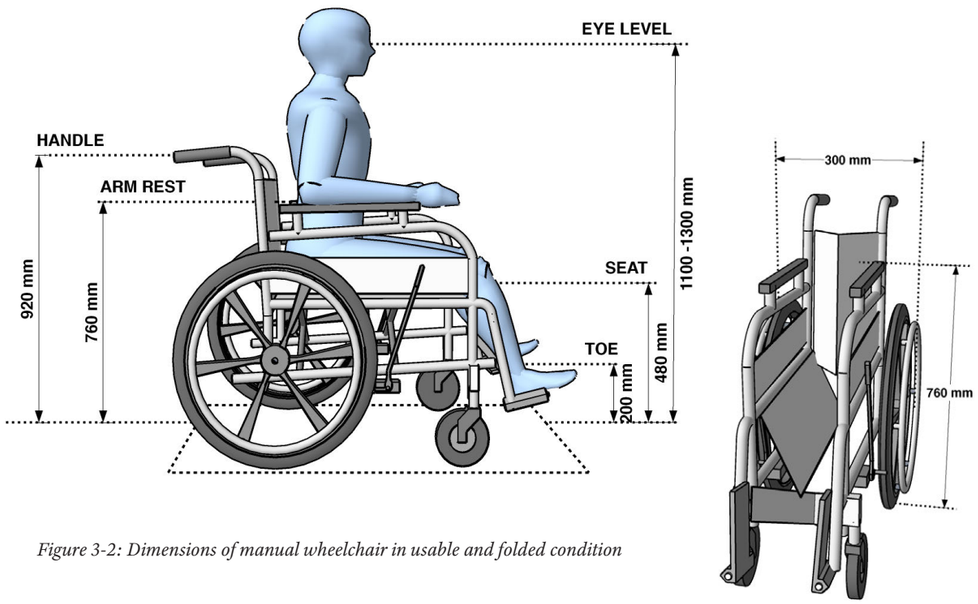


Figure 3-2: Dimensions of manual wheelchair in usable and folded condition

Electric wheelchairs may be larger, heavier and less maneuverable than manual wheelchairs.

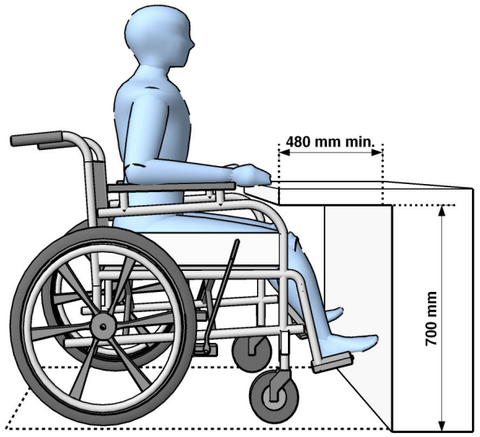


Figure 3-3: Knee clearance

3.1.1.2 Circulation dimensions

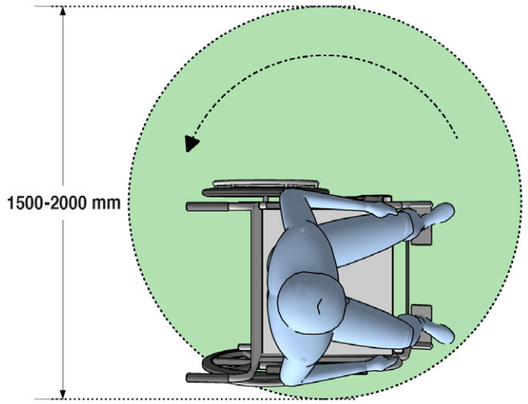


Figure 3-4: Turning radius

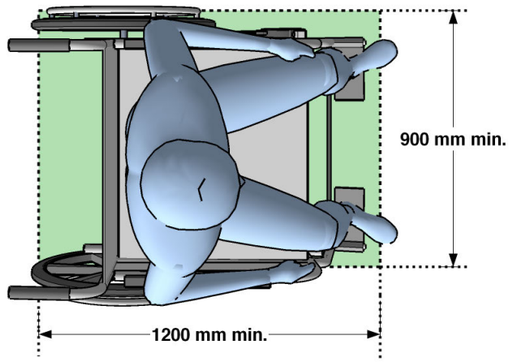


Figure 3-5: Clear floor space

3.1.2 Space Allowance for crutch user

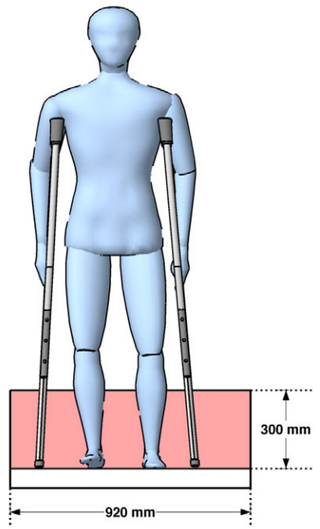


Figure 3-6: Space requirement for crutch user

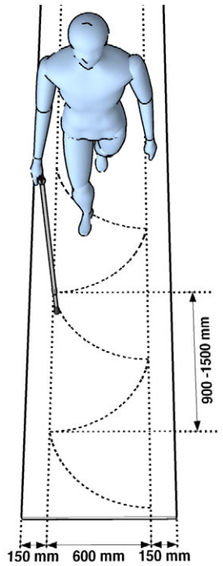


Figure 3-7a: Radial range of white cane

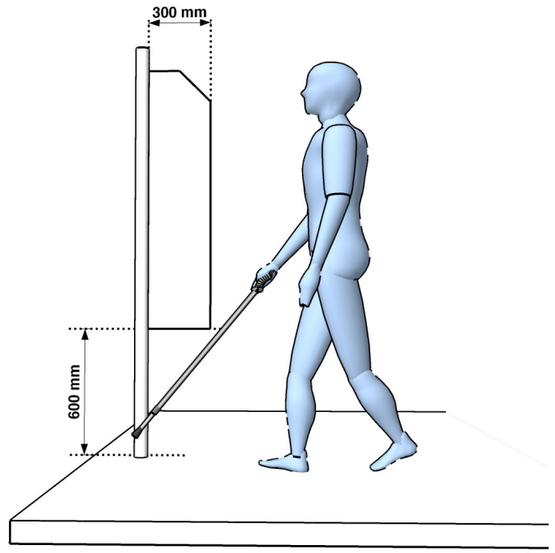


Figure 3-7b: Object detection by the visually impaired

3.1.3 Space allowance for white cane users

- Protruding objects should be installed with consideration of the range of a person with vision impairment white cane.
- Place a barrier to alert blind or visually impaired persons under stairways or escalators.
- Clear headroom in walkways, halls, and other circulation spaces.
- Radial range of white cane: 900 mm wide. (Figure 3-7a).
- Obstacles above 600 mm cannot be detected by the white cane. Projections or obstacles above this height should be reflected at the floor level with level or textural differences. (Figure 3-7b).

3.2 Reach Range

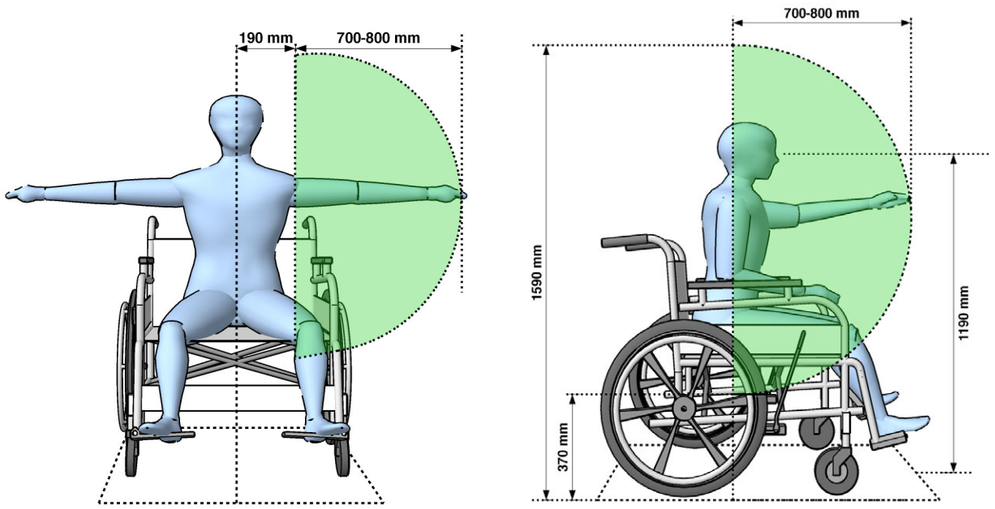


Figure 3-8: Range of reach of wheelchair user

3.2.1 Reach unobstructed

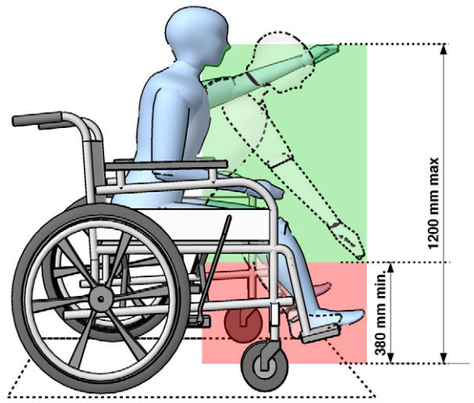


Figure 3-9: Forward and lower reach of wheelchair user

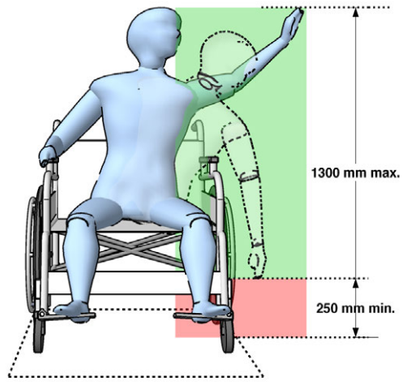


Figure 3-10: Side upper reach and side lower reach

3.2.2 Reach over obstructions

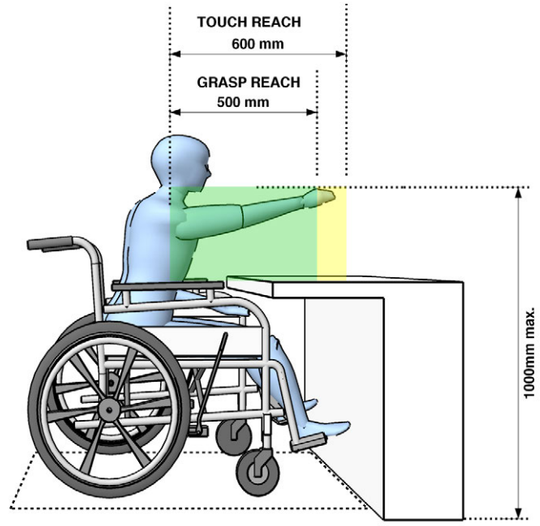
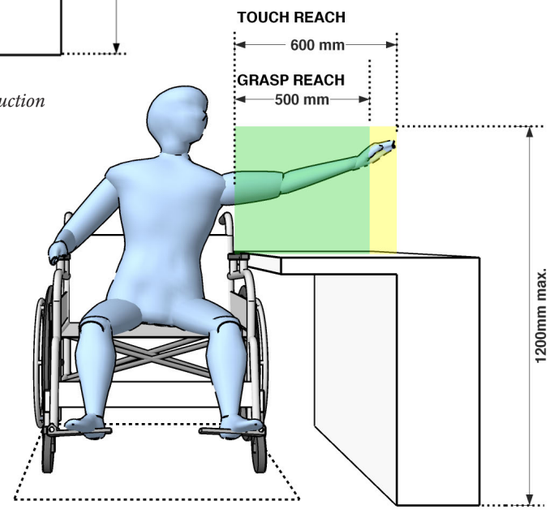
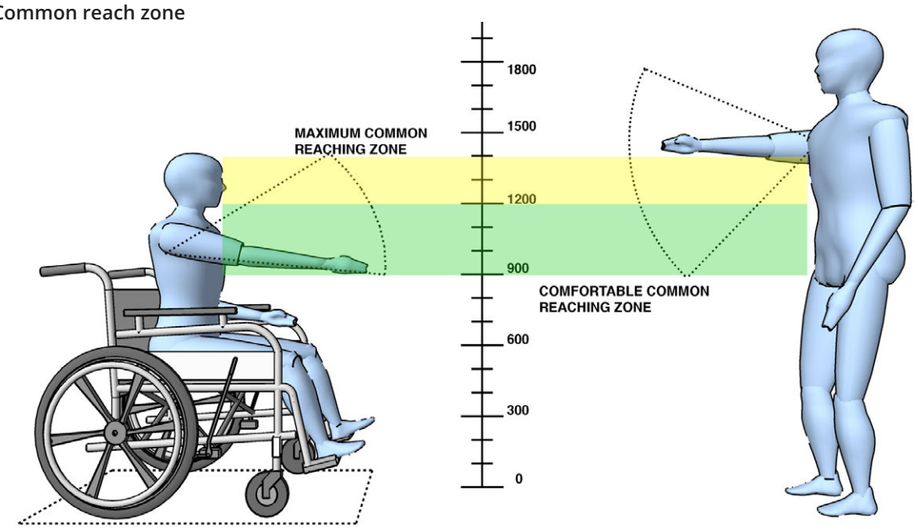


Figure 3-11: Forward and side reach over obstruction



Common reach zone



F igure 3-12: Common reach zone

3.3 Vision Zone

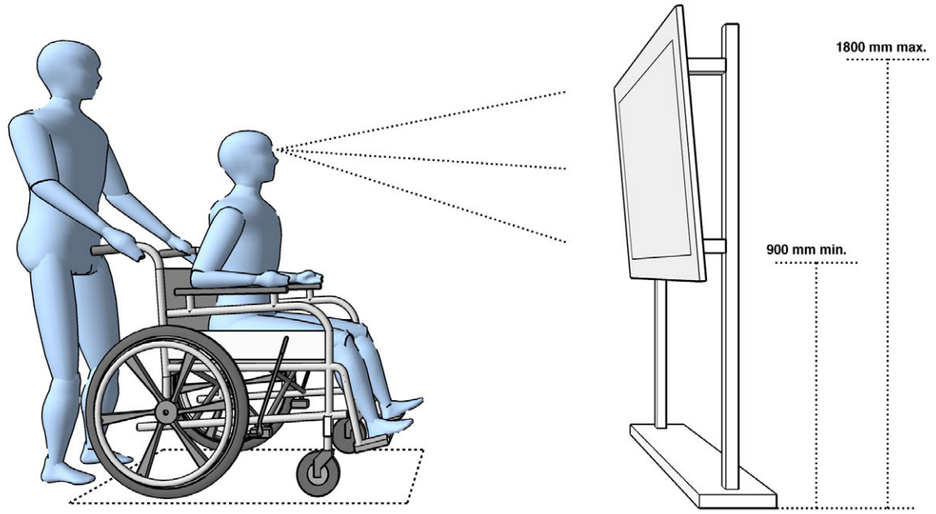


Figure 3-13: Field of Vision

3.4 Heights and widths

3.4.1 Wheelchair Users

Average <1200mm

3.4.2 Standing Person

Average <2000mm

3.4.3 Height of controls

- Controls 400–1200mm
- Height for switches (power) 400–500 mm
- Height for switches (light) 900–1200 mm
- Height of doors handles 900–1000 mm
- Opening controls for windows 900–1000 mm
- Space required under counter 350 mm deep

3.4.4 Entrance/ exit door

- Width of entrance/exit door ≥900 mm
- Front approach doorways space ≥600 mm
- Latch approach doorways space ≥1250 mm

4_CLASSIFICATION OF BUILDINGS

All public buildings must meet accessibility requirements for Persons with Disabilities. At least one main entrance per facility should be accessible to a wheelchair user. Waiting areas, coffee shops, display areas, merchandising departments, service areas, ticket counters, refreshment stands, etc. for public use, should be accessible to all Persons with Disabilities and not wheelchair users only. At least one unisex accessible washroom/toilet should be provided. Multi-level buildings should have one such facility near the general washrooms on all floors.

4.1 GENERAL CATEGORIZATION OF BUILDING TYPOLOGIES

Category 1:
Residential
Accessible facilities for Persons with Disabilities should be provided in new apartment buildings for rent or sale.
On old constructions, modification of entry & exit, kitchens, washrooms, rooms, etc. should be retrofitted per Chapter 5.

Category 2:
Commercial (Retail Shopping Zone, General Business)
Merchandise display areas in shops should be conveniently located for a wheelchair user. Place angled mirrors placed above high shelves for visibility. Braille lists, menus, and signage should be present. Changing rooms should have door with 900 mm clearance and allow for 360 degree turn of a wheelchair. All modifications should be carried out as per Chapter 5.

Category 3:
Manufacturing
New light manufacturing factories where disabled people may be employed should incorporate designs for all Persons with Disabilities. Heavy manufacturing factories need not consider these designs.

Category 4:
Building open to public (public & private)
New office buildings should be made accessible as per Chapter 5.

For small office buildings with limited space for accessible washrooms / toilets on each floor, provide one unisex accessible washroom (Section 8.2) on ground level to serve the entire building. This washroom should be located adjacent to an accessible elevator. For office building subdivided among various tenants, a unisex accessible washroom (Section 8.2) should be provided on each floor

Category 5: **Recreational**

Category 6: **Transportation & Communication**

Category 7: **Agricultural and Water bodies**

Category 8: **Special Areas**

4.2 OTHER CATEGORIES

i. Assembly Halls (movie theatres, lecture halls, stadiums etc.) Estimate the number of spaces designated for wheelchair users in a seating area according to Table 4-1.

Removable or flip-up armrests at row end seats
Level floor areas for wheelchair users at row ends on multiple levels. (Figure 4-1)

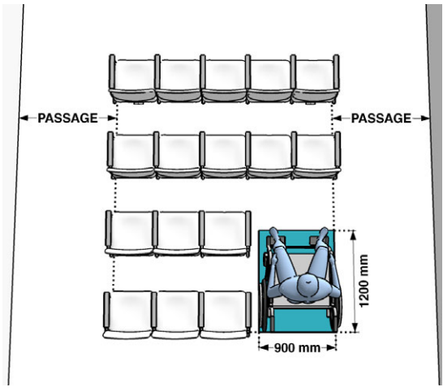


Figure 4-1: Wheelchair seating in a Hall

Table 4-1: Seating for wheelchair users in Halls/theatre/stadiums

No. of seats in seating area	Required spaces for wheelchair users
≤ 600	1 per 100
≤1000	6 + 2
>1000	8+1 for each additional increment of 1000 seats

ii. Cafeterias and Restaurants
- New restaurants, eating spaces, or parts thereof to be accessible to Persons with Disabilities
- Retrofit old buildings per Chapter 5
- Mount tray slides and counters at 800 mm from the floor for wheelchair users Food shelves should be mounted at ≤1200 mm and aisle space of minimum 900 mm should be provided (Figure 4-2)
- Cantilevered tables or tables with straight legs at each corner are recommended
- Low tables provided for wheelchair user access.

iii. Hotels
- New hotel or motel: at least two rooms wheelchair user accessible (Chapter 12)
- Bathrooms connected to these rooms to be fully equipped (Section 8.2 and 8.12)
- Rooms designated for wheelchair users should be placed at ground level
- See Chapter 5 for accessible elements and Chapter 9 for evacuation standards

iv. Hospitals and Health Facilities
All facilities and services to be accessible. See Chapter 5

v. Educational buildings
- Teaching, administrative and common areas accessible to Persons with Disabilities
- Ramps/lifts in stepped lecture halls or auditoriums
- At least one accessible unisex washroom per floor, including student dorms & residential accommodations
- Recreational facilities to be usable and accessible by Persons with Disabilities
- Administrative staff members, employees and visitors with disabilities should have full accessibility at Colleges for physical education, police or military training and other activities requiring full physical abilities

vi. Libraries
- All open book stacks: Accessible
- All library facilities and equipment: Accessible
- A room available for people with hearing and vision impairment who need reading assistance

vii. Sports buildings
- Sports halls accessible as per Chapter 5
- Per facility, minimum one shower room (Section 8.12), one washroom (Section 8.2) and one changing room to be wheelchair accessible
- Spectators' seating areas wheelchair accessible (Figure 4-1 and Table 4-1)

viii. Public transit buildings
All public areas used by passengers should be accessible.

ix. Industrial buildings
Maximum accessibility to all people should be provided to the extent possible in accordance with the requirements mentioned in Chapter 5.

x. Historic buildings
The character of a historical building can be preserved and accessibility can be provided for Persons with Disabilities & elderly through innovative solutions.

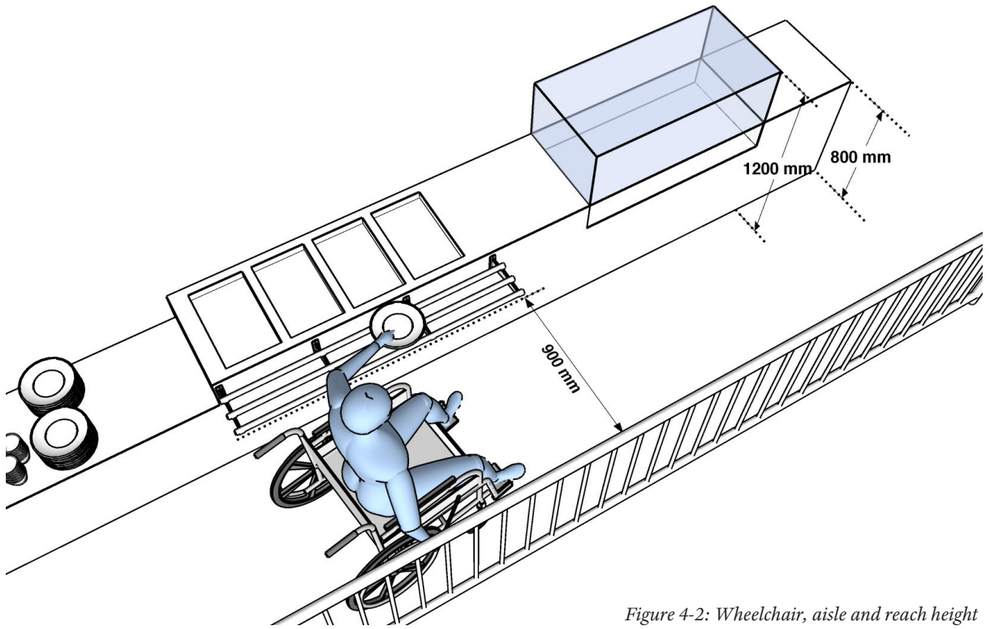


Figure 4-2: Wheelchair, aisle and reach height

5 UNIVERSAL DESIGN ELEMENTS WITHIN BUILDING PREMISES

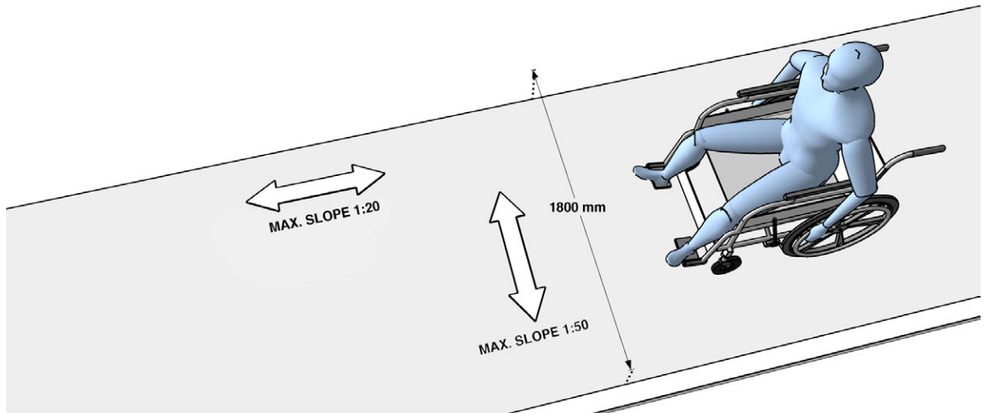
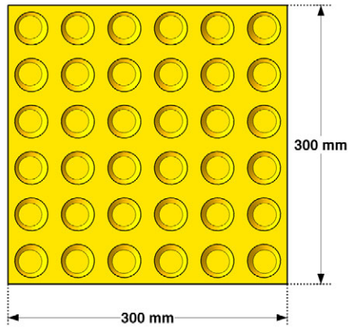


Figure 5-1: Walkway gradient

5.1 SITE PLANNING

5.1.1 Walks and paths
- Smooth, hard, leveled surface suitable for walking and wheeling
- Avoid Irregular surfaces
- Minimum width for two way traffic: 1800 mm
- Around trees/poles etc. width adjusted to 1500 mm
- Walkway gradient ≤1:20 (Figure 5-1)
- Rest areas at convenient intervals of 30 meter with bench/ resting seats adjacent to walkway if walkways >60 meters. Seat height 450 to 500 mm, with hand rests at 700 mm height and a backrest
- Tactile pavers applied in walkways adjacent to seating areas for persons with vision impairment
- Avoid manholes or gratings

5.1.2 Levels, grooves and gratings
- Vertical level changes up to 6mm may not need edge treatment.
- Changes in level 6 to 12 mm should be leveled off with a slope ≤1:2
- Narrow slots ≤10mm wide
- Slots long edge perpendicular to the direction of movement
- Flushed with ground level
- Non-slip finish



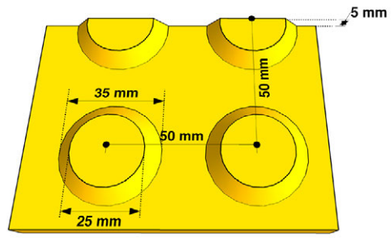


Figure 5-3: Warning blocks

5.1.3 Tactile pavers: guiding & warning blocks

5.1.3.1 Tactile guiding blocks (Line-type)

- Indicates a correct path to follow for a person with visual impairment
- Recommended one/two rows of tactile guidance tiles along the entire length of the accessible route
- No obstacles along the route of the guidance blocks
- Clear headroom ≥2.1 meters height

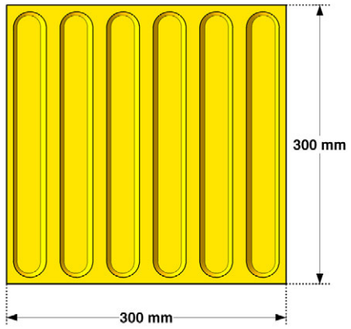


Figure 5-2: Guiding blocks

5.1.3.2 Tactile warning blocks (Dot-type)

- Indicates to persons with visual impairments potential hazard or a change in direction of the walkway. (traffic intersections, doorways, etc.)
- Use to screen off obstacles, drop-offs or other hazards, discourage movement in an incorrect direction & to warn of a corner or junction
- Install two rows of tactile warning tiles across the width of the accessible pathway: Each time the walkway changes direction; Before intersections, building entrances, and other obstacles; 300 mm before the beginning and end of the ramps & stairs, at landings and entrance to any door.

5.1.4 Barriers and hazards

No protruding objects along the accessible route or maneuvering space.

- Protruding objects must visually contrast with background/environment
- Position free-standing columns (bollards) outside the width of an access route
- Within an access route, free standing columns and posts must display a visually contrasting 200 mm band, 1400 to 1600 mm from the floor
- Bollards ≥1000 mm high and ≥900 mm apart (Figure 5-5)
- Bollards not linked with ropes or chains

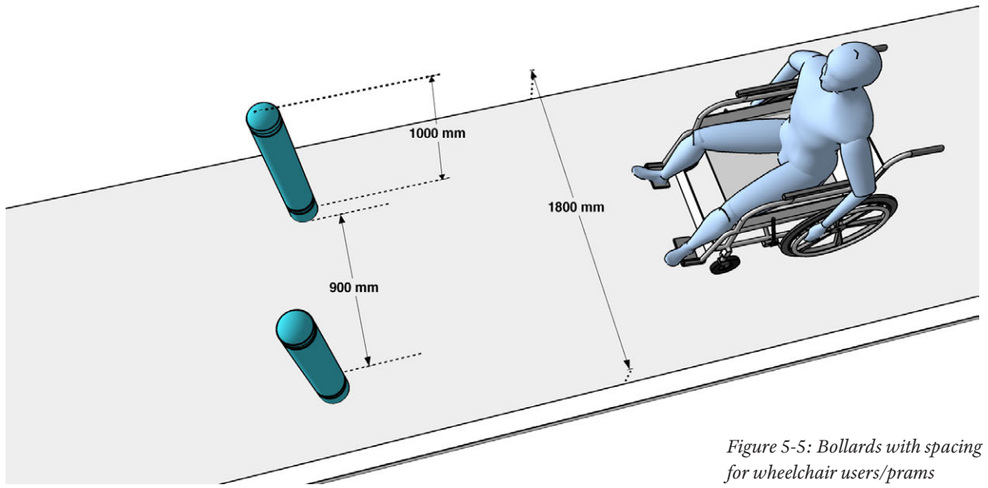
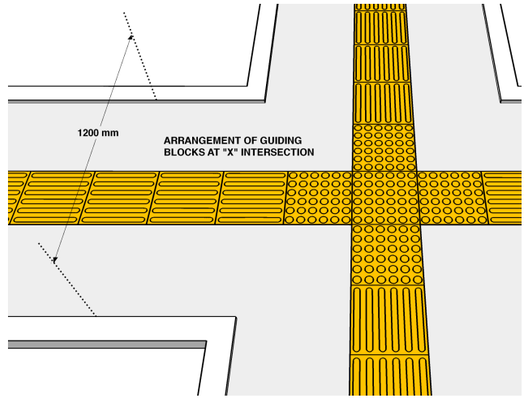
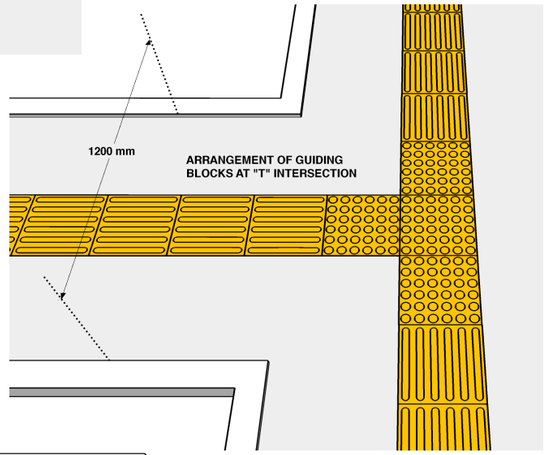


Figure 5-5: Bollards with spacing for wheelchair users/prams





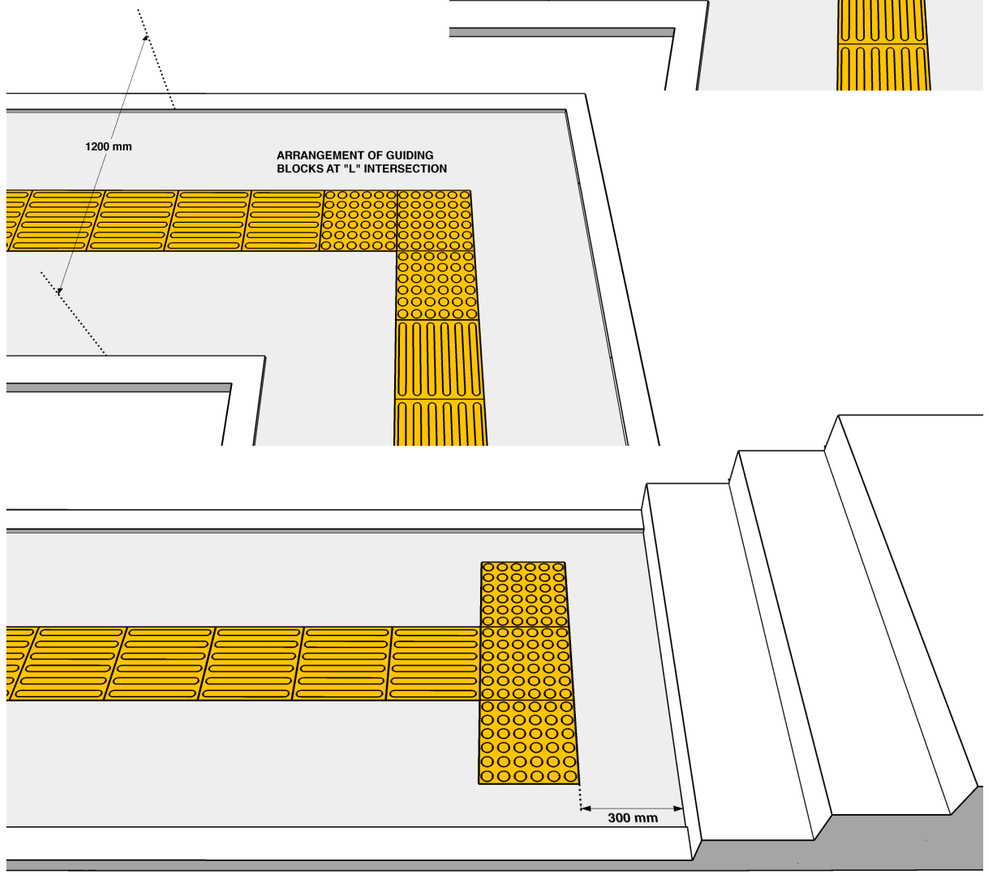


Figure 5-4: Configuration and layout of tactile pavers: guiding and warning

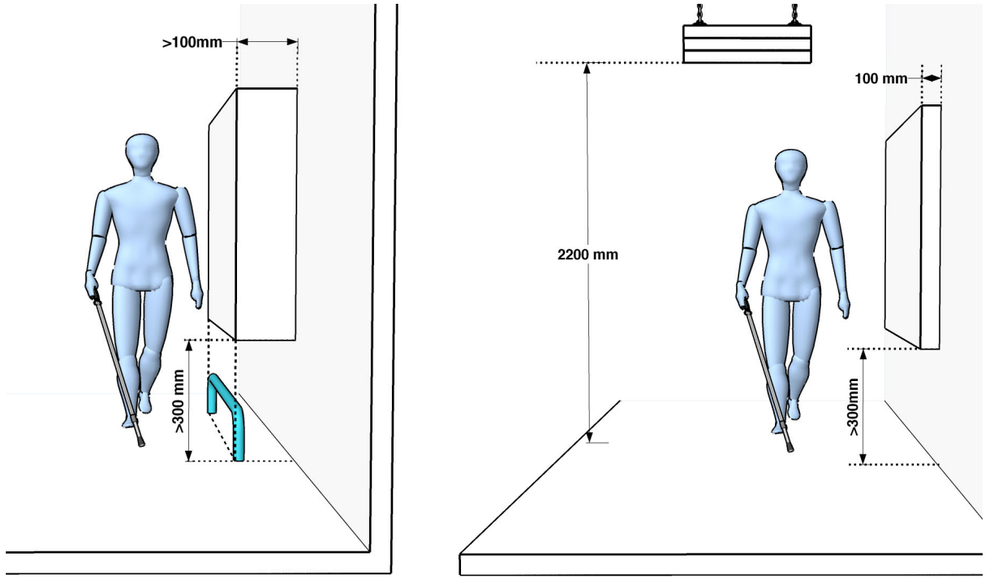


Figure 5-6: Protruding obstacles and clearance

5.1.4.1 Protruding objects

- White cane users can only detect projecting objects with the lower edge of the projection below 300 mm and upper edge 1200 mm above the floor
- Objects mounted 300 to 2200 mm to protrude <100 mm. (Figure 5-6)
- Provide Hazard Protection if objects project >100 mm into access route & their lower edge >300 mm above the ground.
- Hazard protection must not extend beyond the object, or be set back >100 mm from the edge.

5.1.5 Kerb ramp

A kerb ramp is required where pathways meet the road. Provide tactile pathway along the road crossing for persons with visual impairments.

5.1.6 Typical detail of walkway

- Width ≥1800mm (Figure 5-7a)
- Non-slip material
- Surface different from rest of the area
- Perpendicular to vehicular traffic
- Warning blocks installed 300mm before and after finishing of the walkway

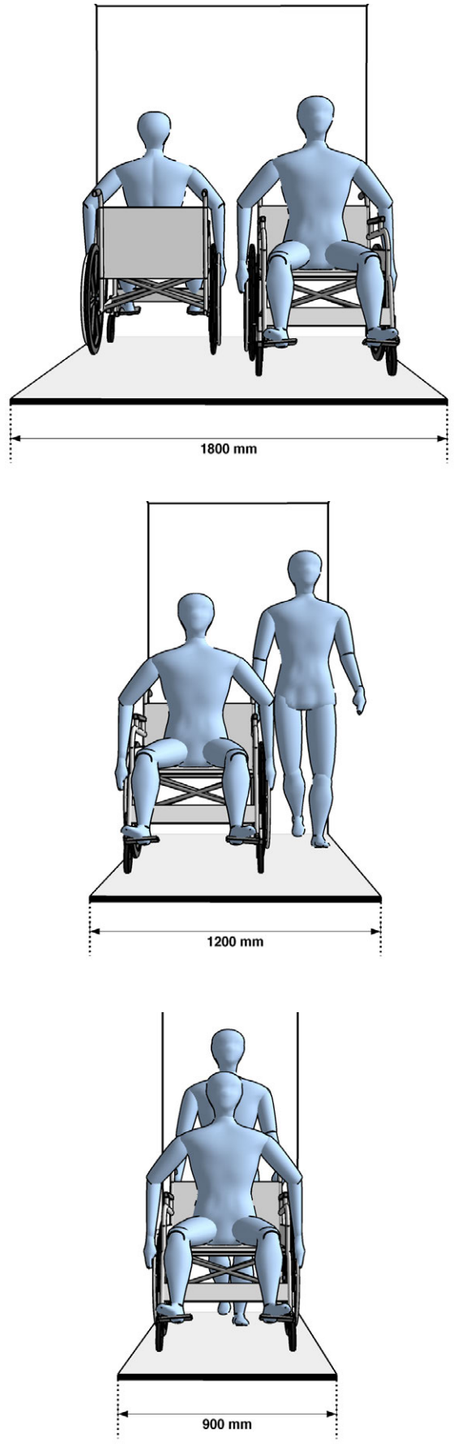


Figure 5-7: Minimum width of a clear walkway

5.1.7 Parking

Reserve accessible parking within 30m of accessible entrances. See Section 10.1.5. for details

5.1.8 Lighting for walkways

- Illuminate the walkway
- Lighting fixtures at <4m
- Lighting every 20–30m, focused on the walkways
- A whiter light source, e.g. high-pressure sodium, benefits the visually impaired
- White lighting at average 35–40 lux is recommended
- lighting pole should be clear of the walkway
- Light pole within the tree-planting zone is recommended
- Lower height light poles to avoid casting shadows where there are high trees

5.2 SPACE ALLOWANCES: See Section 3.1

5.3 FLOOR SURFACES

5.3.1 Floor surface should be stable, firm, level, slip-resistant, preferably matt finish with no projections or unexpected changes in level

- Avoid complex patterns
- Avoid patterns that could be mistaken for steps (stripes).
- Floors should be leveled or sloped ≤1:20. If greater, the floor should be marked as ramp.

5.3.2 Lines of brightly coloured tape may be placed on the floor surface in poorly lighted areas.

5.3.3. CARPETS:

- Fixed securely
- Firm backing, cushion, or pad
- Exposed edges fastened to floor surface and trim along the length of the exposed edge

5.4 APPROACHES

5.4.1 Approach to building

- Section 10.1 and Section 10.2 compliant alighting and boarding point
- at the level of approach.
- Blend driveway to pavement or footpath surfaces to a common level or ramp them
- For differences in level between the driveway and footpath, use Kerb ramp (Section 7.1)

5.4.2 Passenger alighting and drop off points

- ≥ 1500 mm wide by 6000 mm long and level with vehicle
- Parallel and adjacent to vehicle pull up space
- If there are kerbs between the access aisle and the vehicle pull-up space install a kerb ramp complying with Section 7.1
- Recommended to have identification signage (symbol of accessibility) for alighting area (Section 6.4.7.5)
- Recommended to be sheltered
- Tactile floor guidance leading from the building drop off area to entrance

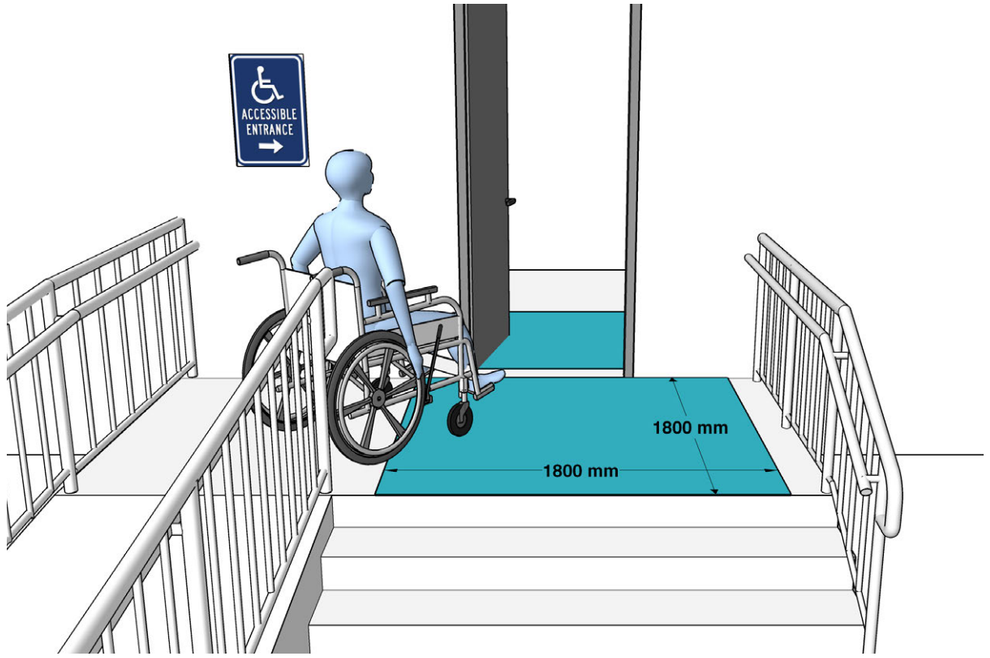


Figure 5-8: Door opening

5.4.3 Access to building

- Provide access route connecting all major entrances & exits of the building to the alighting and boarding points
- All accessible entrance doors must have approach complying with (Section 5.4)
- Accessible entrance must have an accessible route to elevators
- Accessible entrance located adjacent to the main entrance and not at the rear of the building if not the main entrance
- Accessible entrances clearly signed and easy to locate
- Symbol at all other non-accessible entrances directing to the accessible entrance
- Clear landing ≥1800 x 1800 mm on either side of the entrance door (Figure 5-8)
- Accessible entrance door ≥900 mm. 1m recommended
- Access to and from door should be ≥1200mm
- Anti-skid/ non-slip internal floor surfaces.
- Internal floor surface materials suitable for movement of wheelchairs/mobility aids
- Floormats flush with the floor
- Beepers recommended at all main entrances in addition to tactile pavers
- A tactile diagram of the building with Braille and audio facilities at the entrance
- Manifestations on glazed entrance doors recommended at two levels, at 800 to 1000 mm and also at 1400 to 1600 mm from the floor
- Manifestation to be ≥150mm high and contrast against the background (Section 5.7.16)

5.5 INTERNAL CORRIDORS AND ACCESSIBLE ROUTES

5.5.1 Width

- ≥1500 mm clear width (Section 5.1.6)
- Additional maneuvering space required at doorways.
- For two wheelchairs to pass, the minimum clear width is 1800 mm

5.5.2 Resting benches/seats

See Section 5.11

5.5.3 Protruding objects

Avoid obstacles, projections or other protrusions in pedestrian areas (Figure 5-7 and 5-8)

5.5.4 Floor surfaces in corridors

- Avoid carpeting
- If carpet is used, carpet pile to be <12mm and fixed firmly (Section 5.3.3)

5.5.5 Lighting in corridors

- Even, diffused lighting
- Avoid glare, reflections or heavy shadows
- Illumination level ≥150 lux

5.5.6 Doors leading into corridors

- Avoid doors opening outwards into a frequently used corridor, excepting doors to accessible toilets and service ducts
- If a door opens into an infrequently used corridor (Emergency Exit), the corridor width must have 900 mm clear space within the corridor with the door open (Section 5.7). Avoid sloping floor surfaces in the corridor near these doors.
- Recess doors that open towards a frequently used corridor at least the width of the door leaf
- Any door likely to be held open should have a leading edge that visibly contrasts with the main surface of the door and background. The architrave should contrast with the wall surfaces.

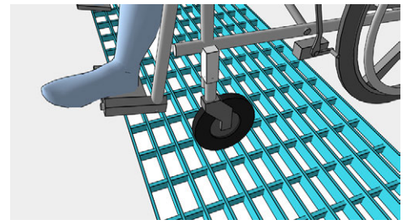
5.5.7 Tactile guidance Path along the internal corridors and accessible routes

Provide a tactile floor guidance path for independent movement of persons with visual impairments along the accessible corridor and route connecting the entire building. Tactile guidance path must cover the entire building premises, connecting all public utilities, locations and building entrance and exits.

5.6 GRATINGS

5.6.1 Grating located along the exterior circulation:

- Cover recommended
- Spaces <12 mm wide in one direction
- Long dimension perpendicular to the primary direction of travel. (Figure 5-9)



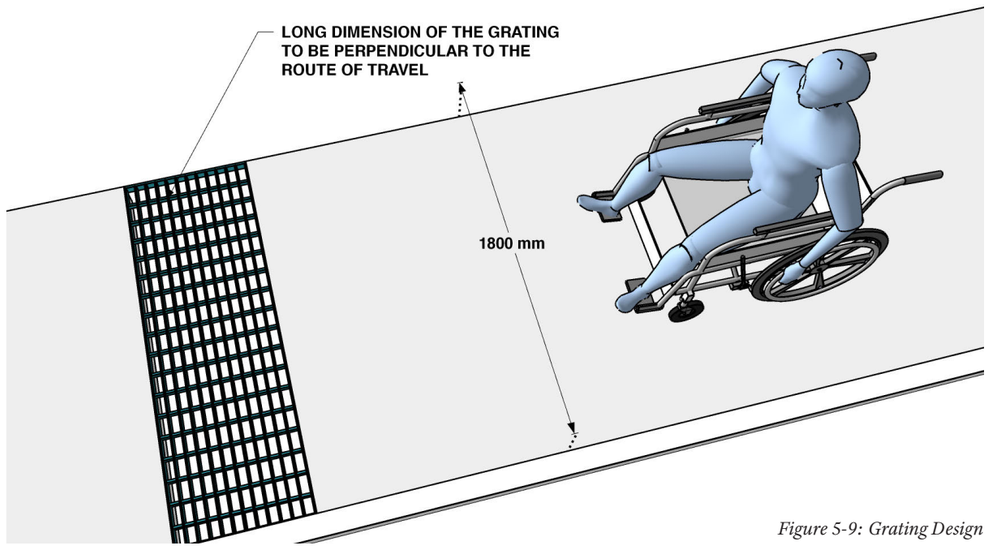


Figure 5-9: Grating Design

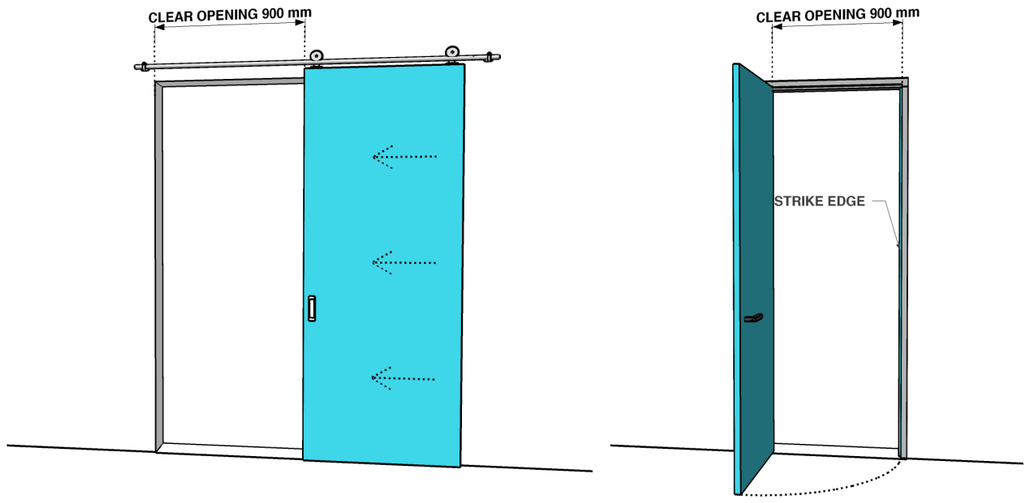


Figure 5-10: Clear door width

5.7.1 General Recommendations

- Doorways leveled
- Supplement revolving doors or turnstiles with swing type door that has 900 mm minimum opening width
- Toilets/washroom doors outward swinging or two way opening type. Alternately use sliding or folding doors
- Light and easy to operate, requiring <20 N to operate
- Push button system for automatic doors
- Warning blocks installed 300 mm before entrances

5.7.2 Clear width

- ≥900 mm clear opening, measured from face of door to the face of the door stop with the door open 90 degrees (Figure 5-10)

5.7.3 Thresholds

- Avoid thresholds
- <12 mm high if unavoidable
- >5 mm high should be beveled

5.7.4 Double-leaf doors

Make at least 1 active leaf Section 5.7.2 compliant

5.7.5 Maneuvering space at doors

(Figure 5-12)

- 650 mm provided beyond door leading edge
- Minimum free space around door handle:
  - On the pull side: 650 mm
  - On the push side: 300 mm
  - 300 mm for two-way swing door

5.7.6 Two doors in series

1200 mm + width of the door swinging into that space between a series of two hinged or pivoted doors (Figure 5-11)

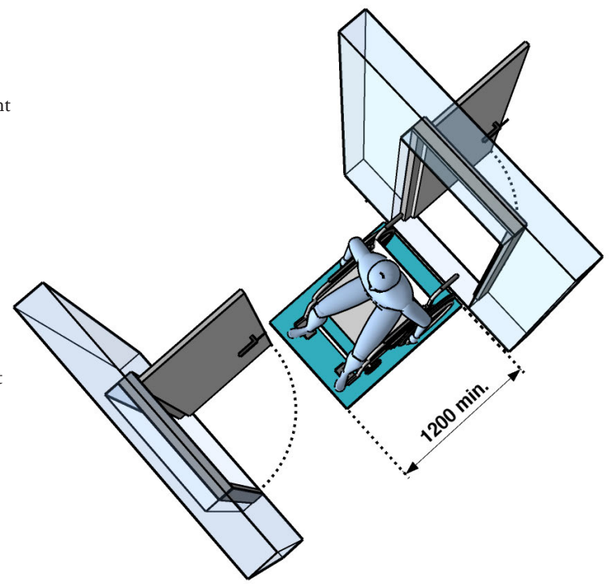
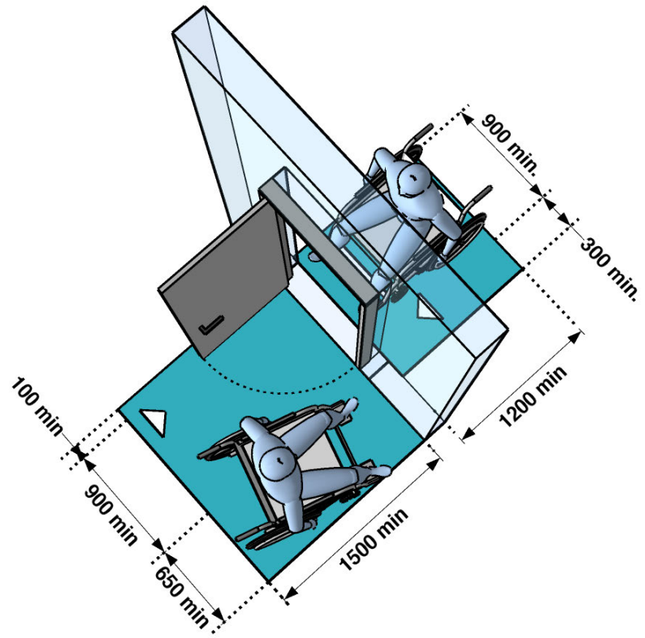


Figure 5-11: Space between two doors



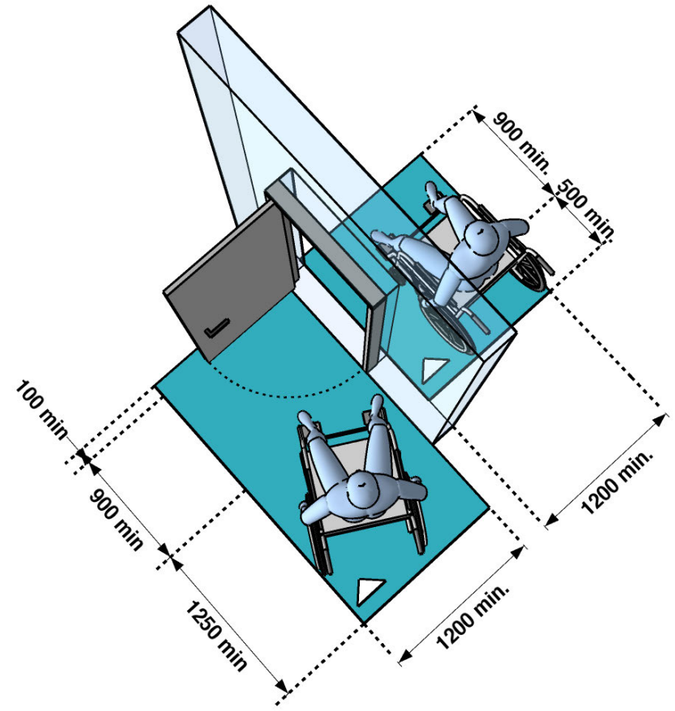


Figure 5-12: Maneuvering space needed for wheelchair users to approach doors

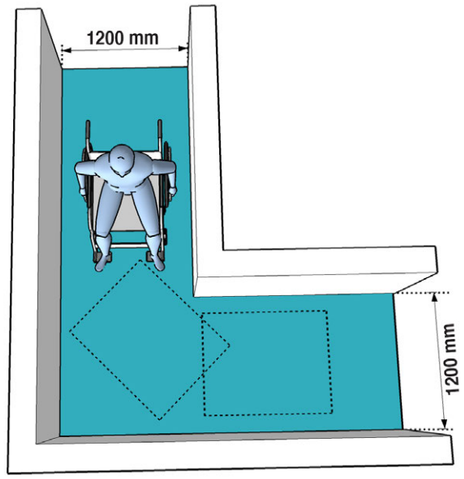


Figure 5-13: Space for wheelchair in 90 Degree turn

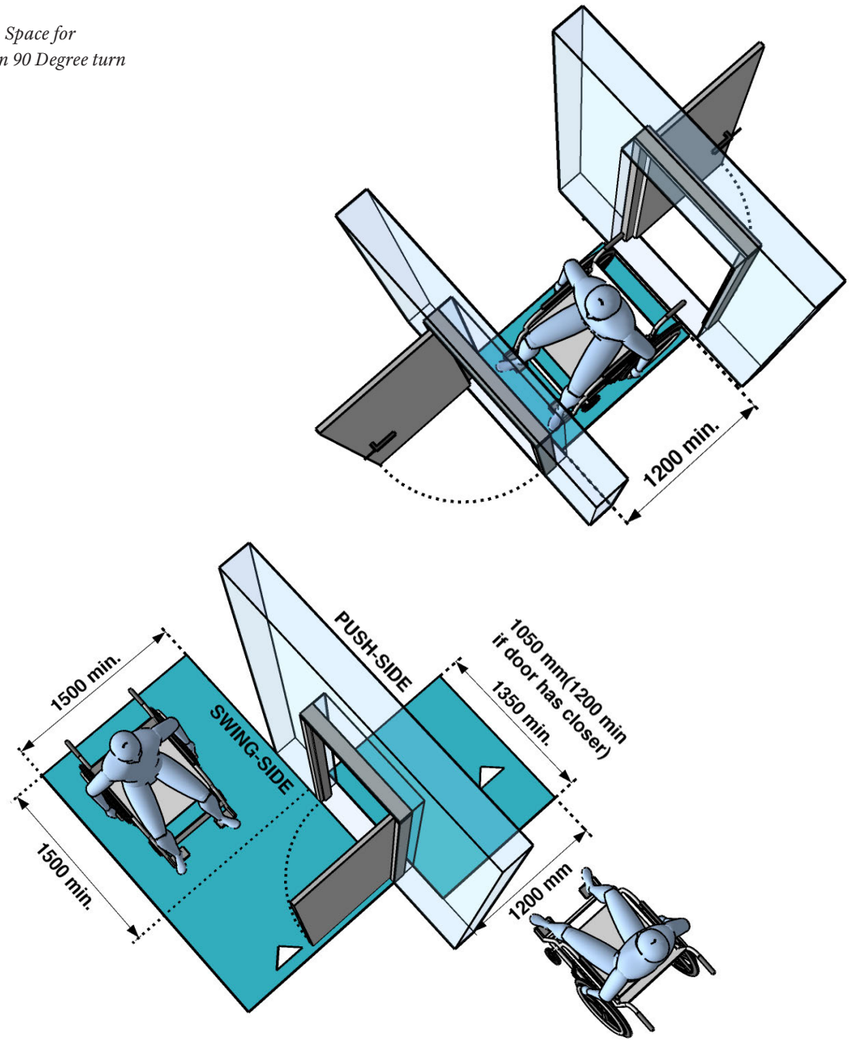


Figure 5-14: Maneuvering space needed for approach doors

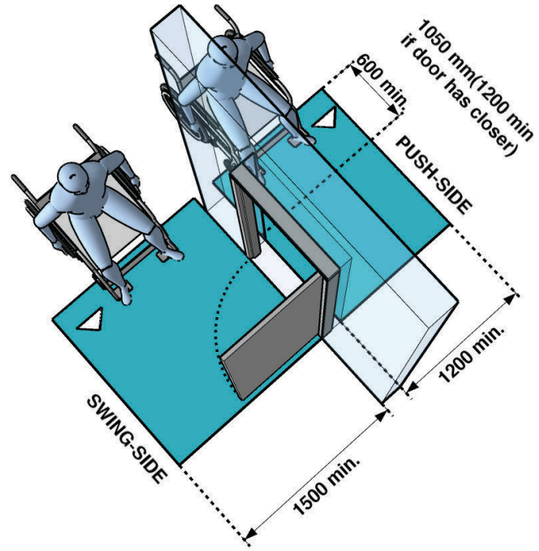


Figure 5-14: Maneuvering space needed for wheelchair users to approach doors

5.7.7 Wheelchair maneuvering space

(Figure 5-13, 5-14)

- Corridor width ≥1200 mm
- Sliding doors recommended for narrow spaces

5.7.8 Door hardware

(Figure 5-15)

Handles, pulls, latches and locks recommendations:

- Single handed operation
- Usable without fine finger control, tight grasping, pinching or twisting to operate
- Mounted 850–1100 mm high
- Door furniture contrasts with the body of the door
- Consistent design and location on building doors
- Horizontal handle on the closing face of the doors, approx 760 mm high. For closing door that lacks self-closing mechanism (e.g., a WC compartment)

5.7.9 Door handles

Recommendations: (Figure 5-16)

- Push–pull mechanisms
- Lever handles on latched doors
- D shaped handles
- Avoid doorknobs

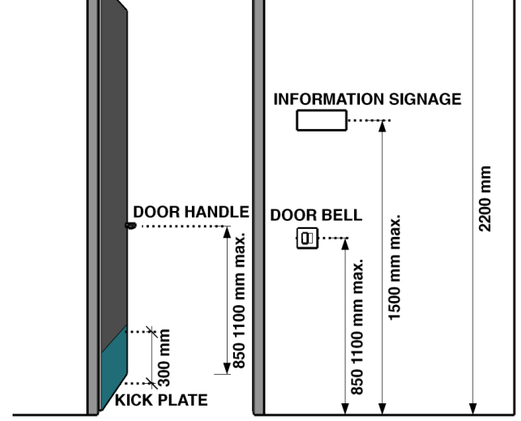
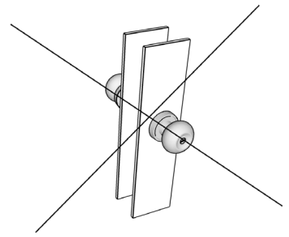


Figure 5-15: Door hardware location



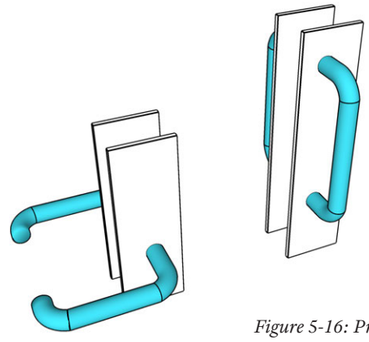


Figure 5-16: Preferred door handles

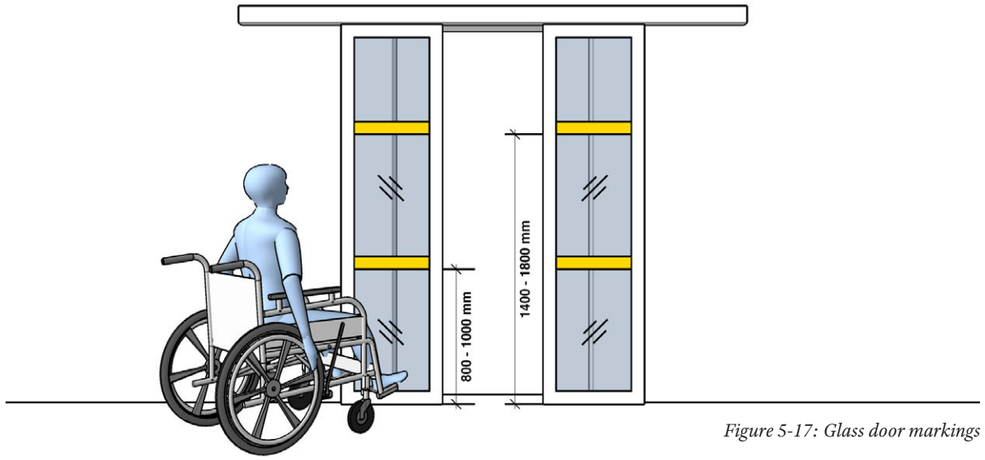


Figure 5-17: Glass door markings

5.7.10 Sliding/folding doors
Operating hardware usable from either side when the door is fully open

5.7.11 Door opening force
Maximum 20N.

5.7.12 Door closure
From 90 degrees open position, the door should take >3 seconds to be semi-closed.

5.7.13 Vision panel
Two-way swing doors or doors in general circulation areas should have vision panels for visibility from a height of 800 mm to 1500 mm. (Figure 5-18)

5.7.13.1 Kick-plate
For High use doors, Kick-plates 300–400 mm tall (Figure 5-18).

5.7.13.2 Door identification
- Doors and frame visibly contrast against the wall
- Avoid reflective materials

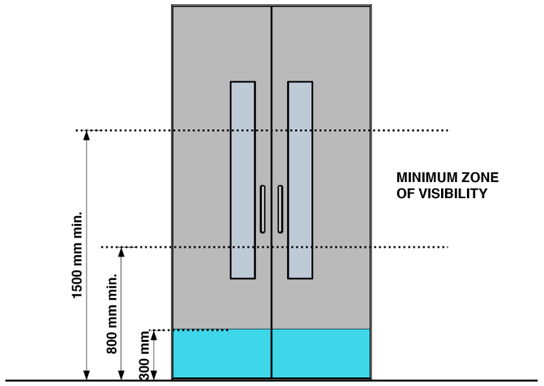


Figure 5-18: Visibility Zone

5.7.13.3 Glass doors
- Manifestations on door 800 mm to 1000 mm from the floor and within 1400 mm to 1600 mm from the floor (Figure 5-17) with high contrast against background
- Glass door edge should be visibly apparent when open
- Glass door should be prominently differentiated from wall if door is adjacent to, or incorporated within, a fully glazed wall

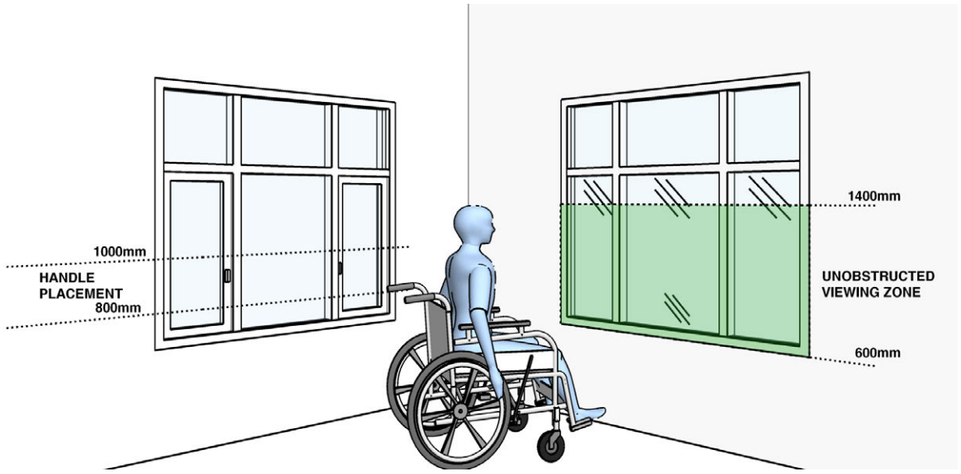


Figure 5-19: Standards for accessible window

5.8 WINDOWS
- Handles/controls per Section 5.10.2.
- Unobstructed viewing zone 600 to1400 mm.
- Controls/ropes for Curtain or Venetian blind at 800 to 1000 mm height

5.9 HANDRAIL/GRAB BARS
5.9.1 General
- Firmly set and easy to grasp so that the hand can slide along the rail unobstructed.
- Braille/tactile markings recommended at the beginning and the end to inform people with visual impairment.

5.9.2 Handrail recommendations:
- Slip-resistant
- Ends rounded
- Circular with 38-45 mm diameter
- Clear space ≥50 mm from the walls
- No abrasive or sharp elements
- Continuous, uninterrupted gripping surface (Figure 5-20)

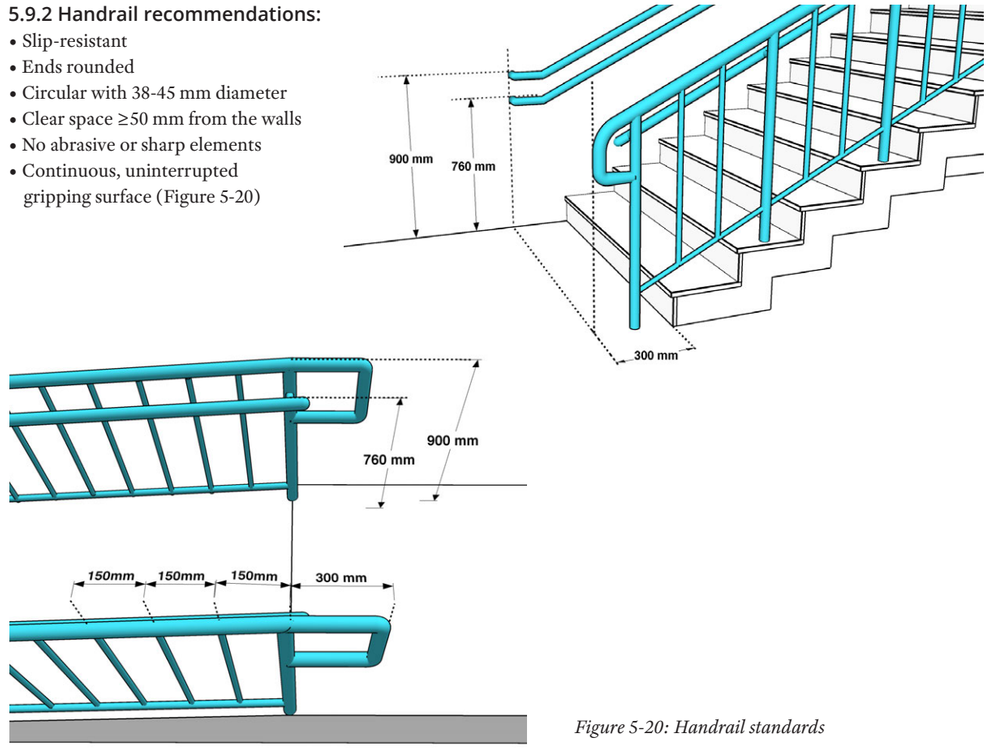


Figure 5-20: Handrail standards

5.9.3 Grab Bars

Grab bars recommendations:

- Slip-resistant
- Visibly contrast with wall
- Securely fixed
- Ends rounded
- Knurled surfaces preferably
- Circular with 38-45 mm diameter
- No abrasive or sharp elements
- Clear space ≥50 mm from the walls (Figure 5-21)
- 760 to 900 mm from the floor
- Weight bearing up to 250 kg.
- In rural areas, indigenous materials can be used

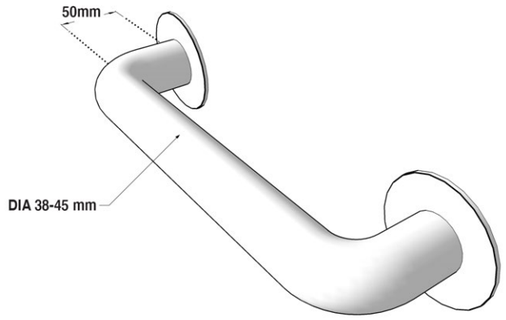


Figure 5-21: Grab Bar

5.10 CONTROLS AND OPERATING MECHANISM

5.10.1 Clear Floor Space (Figure 5-22)

- 900 x 1200 mm clear floor space at controls and operating mechanisms
- Clear knee space of 900 mm wide, 480 mm deep and 650 mm high where a forward approach is used, which may overlap the clear floor space by a maximum of 480 mm

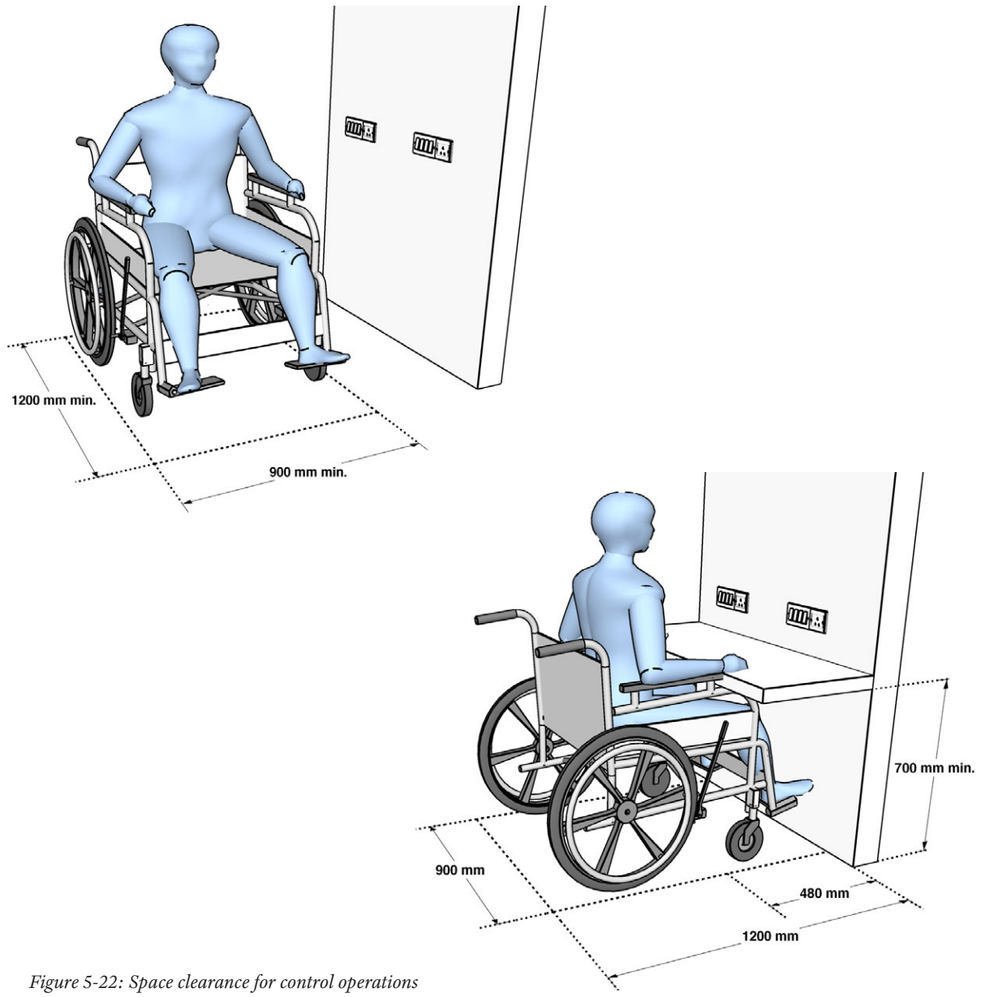


Figure 5-22: Space clearance for control operations

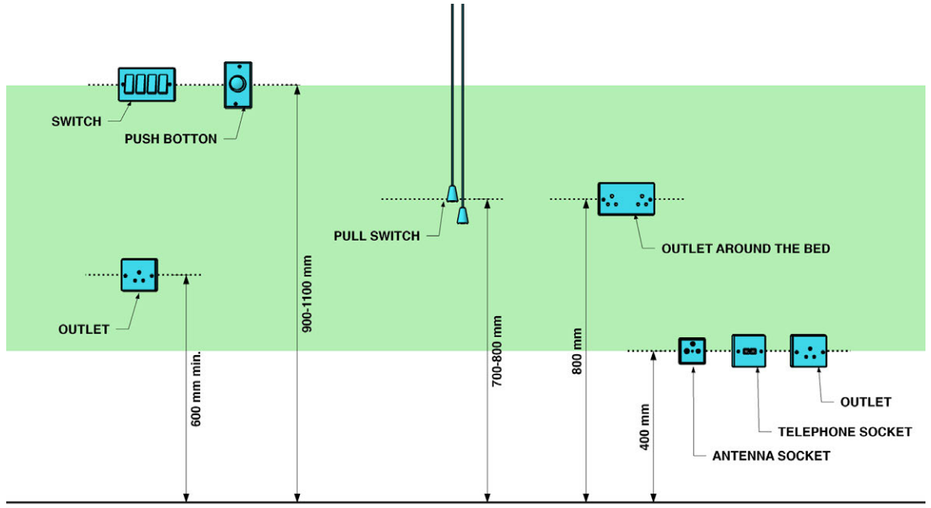


Figure 5-23: Location of electrical sockets, control, etc.

5.10.2 Electrical points, Controls and Outlets

(Figure 5-23)

The operable controls for vending machines, electrical switches, wall sockets and intercom buttons should be:

- Adjacent to clear floor space;
- 600 to 1100 mm (Figure 5-28) from the floor excepting vending machines where the upper limit is extended by 100mm maximum
- ≥ 400 mm from room corners
- Operable one handed
- Does not require pinching, twisting of the wrists or tight grasping
- <22N operable force

5.10.3 Faucets/taps

- One handed or electrical controlled
- Does not require pinching, twisting of the wrist, or tight grasping;
- <22N operable force
- Lever type handles (not self-closing) operable with a closed fist (Figure 5-24).
- Controls contrast with the surrounding face plate panel
- Face plate contrasts with the background wall.
- Information in relief (embossed letters/symbols accompanied with Braille information) for tactile reading.
- Switches, etc, should have large push plates, operable by one hand

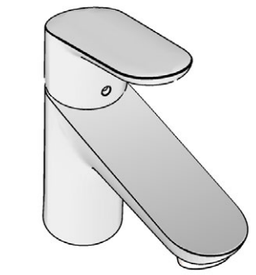
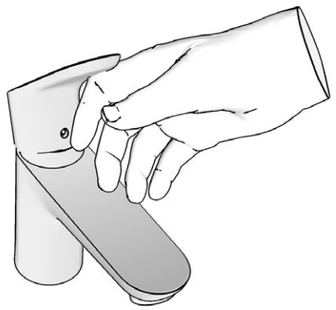


Figure 5-24: Long handle tap



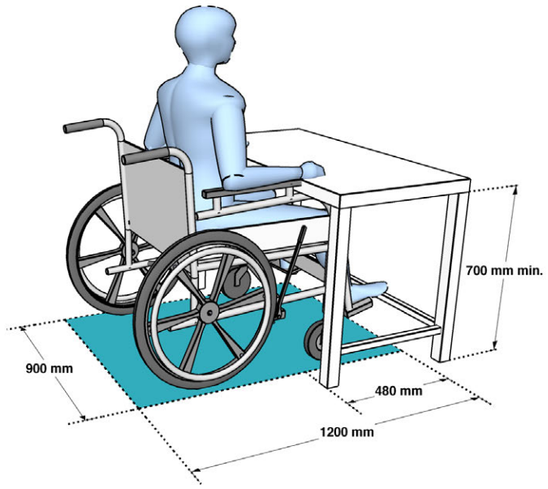


Figure 5-25: Clear floor space for wheelchair

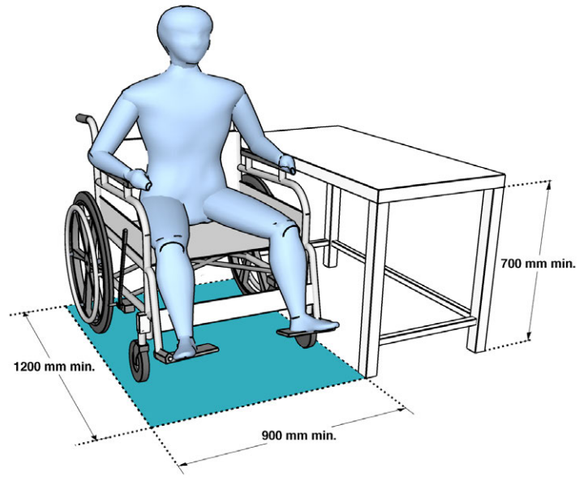


Figure 5-26: Counter tops/table height

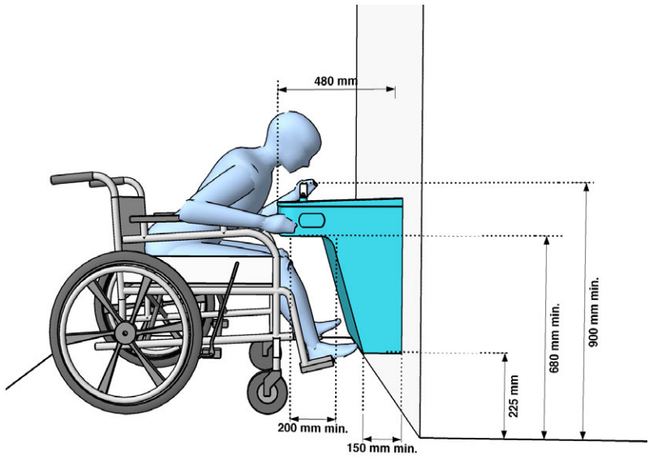


Figure 5-27: Drinking water fountain

5.11 SEATING SPACES

5.11.1 Clear Floor Space
900 x 1200 mm (Figure 5-25) for seating spaces (counters, tables, work surfaces). See Section 5.10.1

5.11.2 Clear Knee Space
900 mm wide, 480 mm deep and 650 mm high for forward approach. May overlap the clear floor space by a maximum of 480 mm (Figure 5-25)

5.11.3 Counter Tops
800 mm from the floor with clear knee space of 680 mm (Figure 5-26)

5.12 OTHER FACILITIES

5.12.1 Drinking Water Fountain
(coolers & taps) (Figure 5-27)
- Controls (see Section 5.10)
- 900 x 1200 mm clear floor space
  - –750 mm wide, 200mm deep x 680mm high, clear knee space between the bottom of the apron and floor
  - –750 mm wide, 230 mm high toe space
  - –Provision for water glass
  - –1200 x 1200 mm clear floor space in front of the unit for free standing or built-in-drinking water coolers or taps without a knee space
- Wall-mounted drinking water provision in alcove recommended to avoid hazard for persons with visual impairments
- Two drinking facilities at different heights is optimal for standing adults, people in wheelchairs and children
- 100 mm high water flow to allow a cup or glass

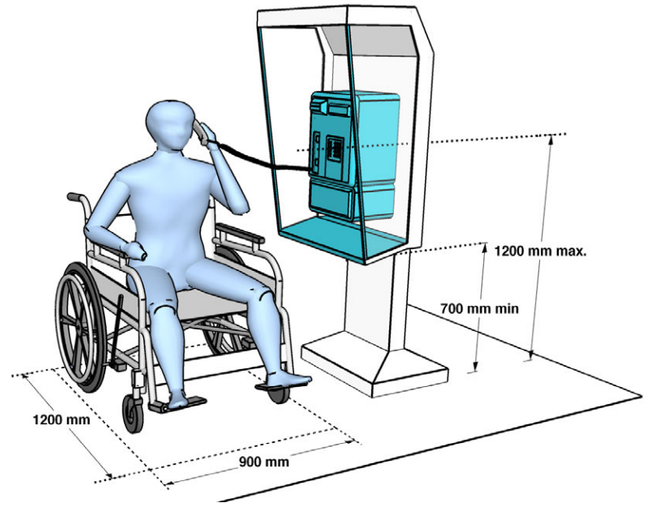


Figure 5-28: Accessible public telephone

5.12.2 Public Telephone
5.12.2.1 General (Figure 5-28)
At least one accessible payphone where payphones are provided.

5.12.2.2 Clear Space
900 x 1200 mm clear space in front of the telephone booth

5.12.2.3 Counter Top
Counter tops 650 to 800 mm from the floor with a minimum clear knee space of 680 mm high. Counter top ≥480mm deep.

5.12.2.4 Telephone Booth
- 900 mm clear opening width.
- Enclosed space ≥900 x 1200 mm, unobstructed by fixed seats.

5.12.2.5 Height
- Telephone controls 800 to 1200 mm high

5.12.2.6Telephone Cord
- ≥900 mm

5.12.2.7 Signage
- Display the International Symbol of Access on accessible telephones.

5.12.2.8 Mailbox / Dropbox
- Mail / drop box slot maximum height 1200 mm
- 900 X 1200 mm clear floor space

5.12.2.9 Vending Machine
- Coin slot height 1200 mm or less
- 900 X 1200 mm clear floor space
- Operating buttons in contrasting colours and raised numbers

5.12.2.10 ATM - Money Machine
- 900 X 1200 mm clear floor space
- Control buttons 800 to1000 mm high
- Operating buttons in contrasting colours and raised numbers/Braille

5.13 SIGNAGE
See Chapter 6.

5.14 LEVEL CHANGES
See Chapter 7.

5.15 TOILETS
See Chapter 8.

5.16 PARKING
See Chapter 10.

6 SIGNAGE

The following determine the effectiveness of information on the use of a building:
Location, accessibility, layout and height of signs; Lettering size, symbols and their reading distances;
Tactile letters and symbols; Visual contrast and illumination; Materials and the finished surfaces used for signs & symbols;
Audible cues; Integration with other communication systems.

6.1 SIGNAGE PROVISIONS

- Provide Information and direction signs at junctions of circulation routes, key destinations and in areas where hearing enhancement systems are fitted.
- Directional signs to identify and provide a logical sequence to a point of destination with clear instruction for return routes to named exits. Destination names should be consistent throughout the signage system.
- Clear notification of steps or ramps on a route should be at both ends of the route.
- The International Symbol for Accessibility should be incorporated in signs to facilities for Persons with Disabilities.
- Include spaces where announcements can be transmitted through a hearing enhancement system. Signs should inform persons with hearing impairment where these systems are available and where to get equipment for hearing enhancement systems.
- Use recognizable symbols/pictograms in place of text when possible. Uncommon symbols should be supplemented with text and not used in isolation.
- In main circulation routes, use wall mounted or ceiling hung information boards at lift landings, floor level landings of staircases, and at other major decision points (junctions/intersections).

6.2 TYPES OF SIGNAGES

:: Directional
:: Information
:: Identification
:: Instructive
:: Health & Safety

6.2.1 Directional Signage

Figure 6-1: Directional Signage

6.2.2 Information

6.2.3 Identification

Identify entrances, destinations, street addresses, buildings, rooms, facilities, places of interest.

6.2.4 Instructive

Instruction for device operation, way finding, etc.

6.2.5 Health & Safety

Providing lifesaving directives and/
or mandatory rules to follow

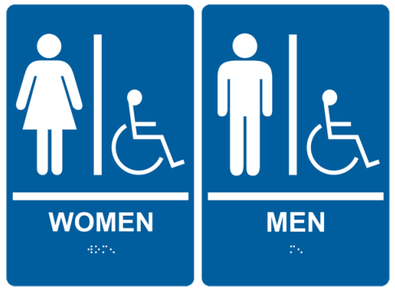


Figure 6-2: Universal Signage

6.3 LOCATION

Place to indicate all public buildings, spaces, and facilities including transportation infrastructure and locations such as:

- Approach to building/facility/service
- Entrance / Exit
- Main lobby or reception
- Public facilities such as library, toilets etc.
- Departments and offices
- Fire exits
- Parking and garages

6.4 UNIVERSAL SIGNAGE

Key elements: (Figure 6-2)

- Colour / Value contrast
- Character, Content and Layout
- Pictograms and accessibility symbols
- Positioning
- Viewing Distance
- Lighting (measured in lux)
- Material and surface finish
- Alternative formats etc. embossed letters with Braille (Audio/Visual information, Maps and models)

6.4.1 Colour Contrast Signs

6.4.1.1 Basic Colour Contrast principles:

- Text, pictograms, and figures should contrast with background
- Sign and environment should contrast
- Light levels (lux)
- 70% LRV contrast between sign panel and wall
- Avoid shades of same colours
- Avoid using same commonly used colours as safety signs
- 5 colours maximum
- Surface should be non-reflective
- Avoid red/green and yellow/blue colour combinations considering colour blindness
- Avoid using shades of the same colour

6.4.1.2 Schedule of Colour Contrast for Signs

Background	Signboard	Legend
Red Brick or Dark Stone	White	Black, dark green or dark blue
Light brick or light stone	Black/dark	White or Yellow
Whitewashed walls	Black/Dark	White/Yellow
Green Vegetation	White	Black, dark green or dark blue
Back-lit sign	Black	White or yellow

Table 6-1: Typical Schedule of Colour Contrast for Signs

6.4.2 Character, Content and Layout

6.4.2.1 Signage Typeface and Style

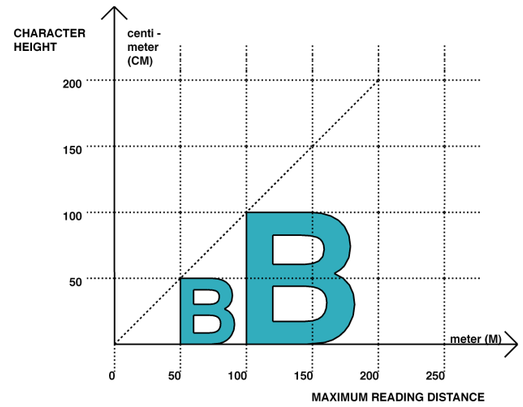
Sans serif family of fonts are recommended Avoid many type sizes on one sign. Avoid italics or script texts.

6.4.2.2 Basic principles

- Sans serif font
- Upper and lower case
- Left justified
- Tactile embossed with Braille
- Avoid bold
- Consistent font stem widths
- Avoid italics, condensed text, light stems

6.4.2.3 Upper & Lower Case Lettering

- Signs are more legible with upper and lower case lettering.
- The nature of information that the sign imparts can be indicated by the height and boldness of the lettering.



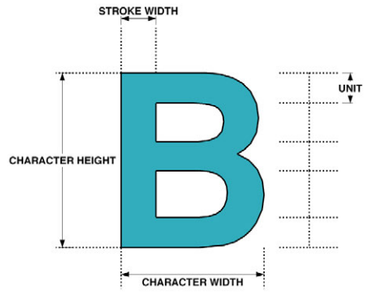


Figure 6-3: Character Proportion
Figure 6-4: Character Height

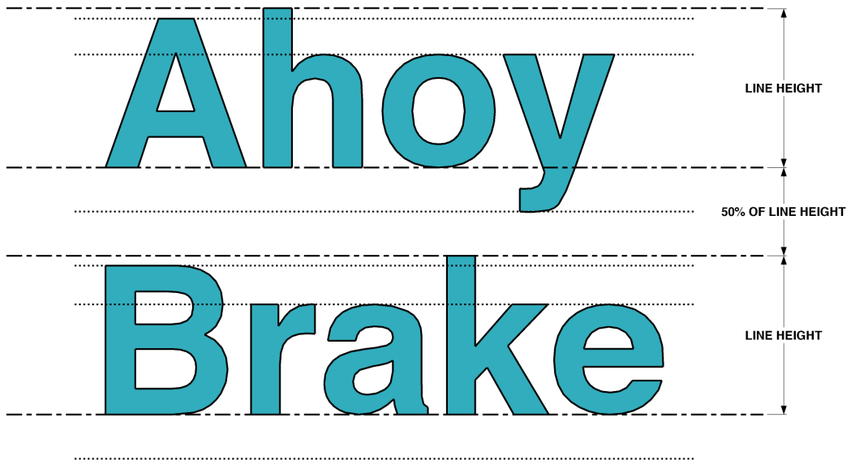


Figure 6-5: Spacing between lines

6.4.2.4 Line spacing

Should be 50% of the line height.
Choose font style with: Character width-to-height ratio between 3:5 and 1:1 (Figure 6-5)
and Stroke width-to-height ratio between 1:5 and 1:10

6.4.2.5 Pictograms

A combination of lettering and symbols is recommended. This helps those with language barriers, Autism, intellectual disabilities, multiple disabilities as well.

6.4.3 Positioning the Signage

- Should be clearly visible and approachable.
- Center wall-mounted signs with detailed information (timetables, or diagrams) approx 1400 mm from the ground, with the bottom edge 900 mm high and the top edge up to 1800 mm from floor level.
- Place Braille and tactile signage 900 to 1500 mm (1050 mm ideal)
- Make duplicates of detailed signs and instructions, such as safety notices, and place them at high and low levels; 1600 to 1700 mm and at 1000 to 1100 mm.
- Projecting or ceiling suspended signs kept above head height at 2300 mm. Increase lettering size in proportion to the distance from the reader.
- Signs should be positioned so the reader does not obstruct circulation paths.

6.4.3.1 Sign Location inside the Building

- Position signs where they are clearly visible (Figure 6-7).
- Building directory signage, building direction signage and bulletin board signs should be 1800 mm high at the top
- Room number and identification signage to be 1400mm high from the bottom of the sign, and 50 mm from the door frame (Figure 6-17). The closest horizontal joint should be used in case of tile wall
- Place detailed signs and instructions, such as safety notices, at both high and low levels, i.e. at 1600 to 1700 mm and at 1000 to 1100 mm

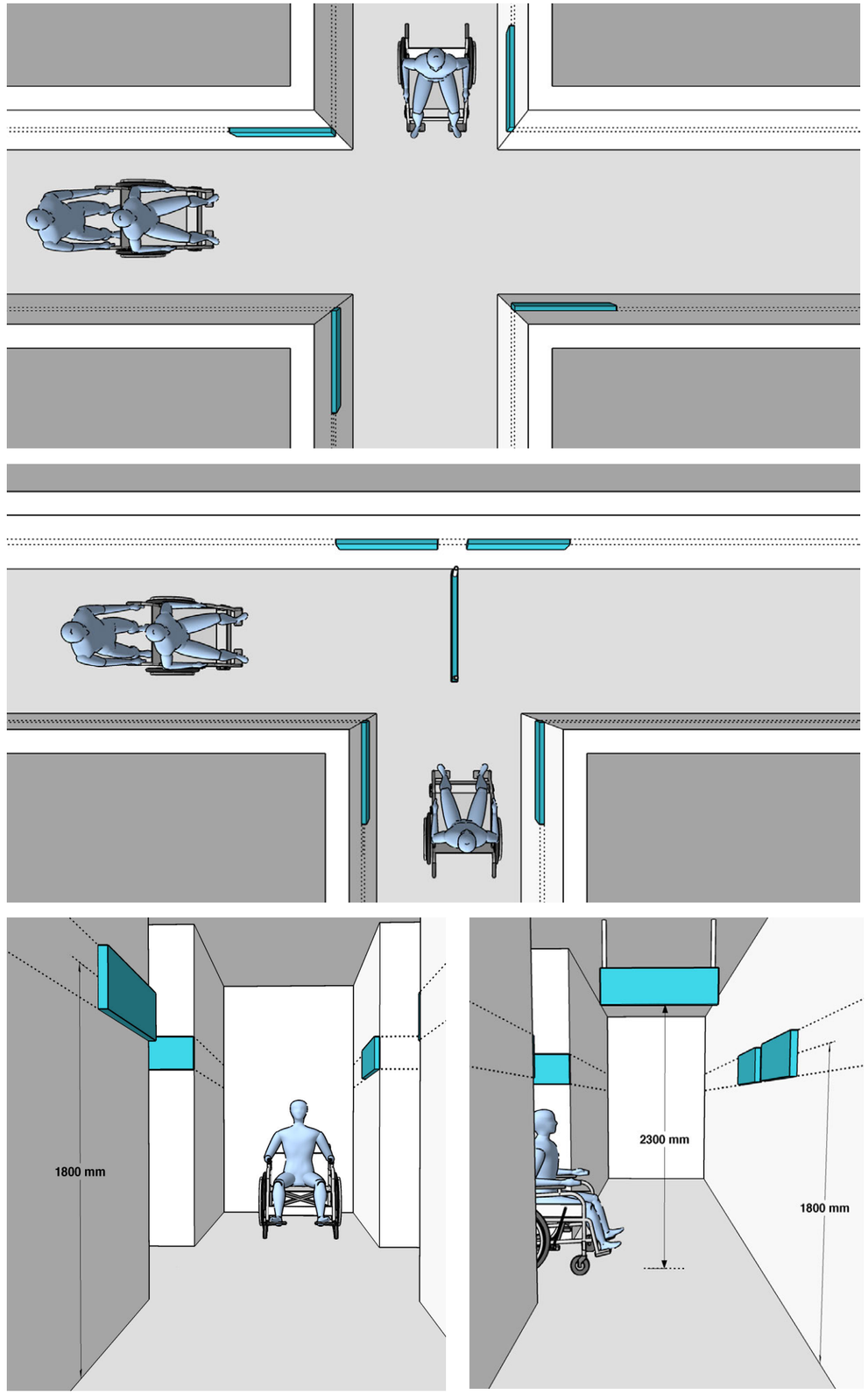


Figure 6-7: Preferred location of signages

6.4.4 Viewing Distances

- Long distance signage = fascia signs, external location, external direction, house numbers (Figure 6-9a)
- Medium range signage = location + direction, identification signage
- Close range signage = room signs, directories, wall mounted information etc.

6.4.4.1 Size of Signage

Standardize the width of signage. (See Chart)

6.4.4.2 Size of Letters in Signage

(See Chart)

6.4.5 Lighting/Signage Illumination

Signs evenly lit with 100 to 300 lux. Directional signage, maps and text panel minimum acceptable level of lighting is 200 lux.

6.4.6 Signage material

- Non-reflective. The surface should be non-glare and non-glossy.
- Recommended materials for signage are wood, acrylic, Aluminum Composite Panel (ACP) considering easy maintenance, reduced wear and tear and possible damage by vandalism.

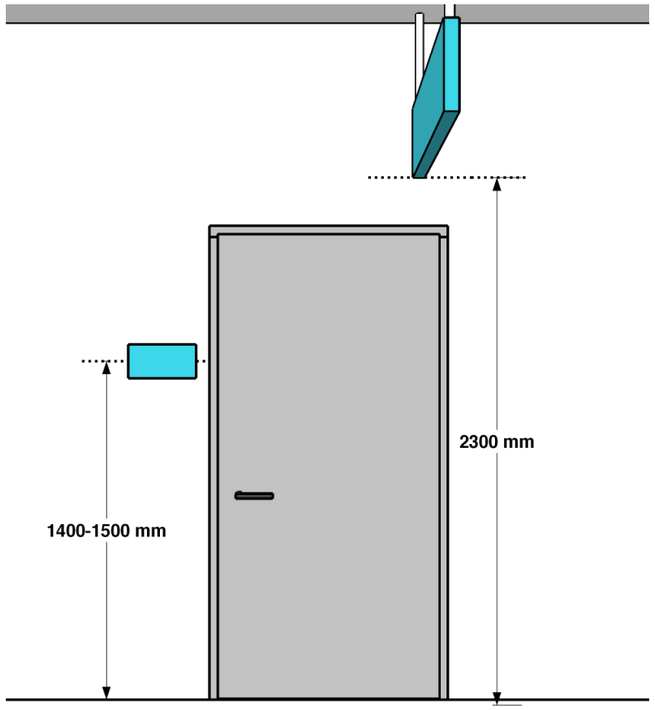


Figure 6-8: Height and placement of signages

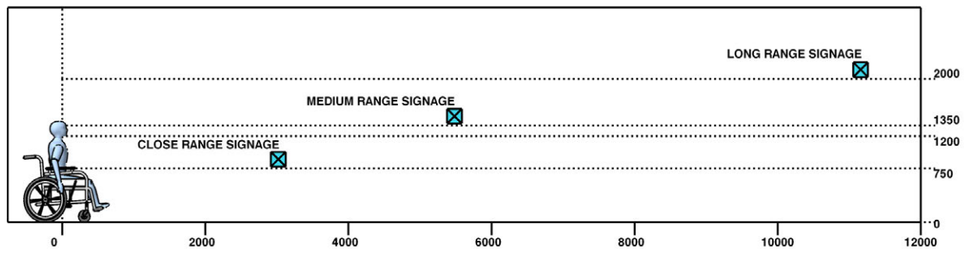


Figure 6-9a: Viewing distance for signages

	Eye Level Range	Preferred Viewing Height	Acceptable Viewing Height	Min Clearance for Suspended Signage
Person in Wheelchair	1100–1300mm	750mm	750-1200mm	2000mm
Standing Person	1450-1750mm	1200mm	1200-1300mm	2000mm

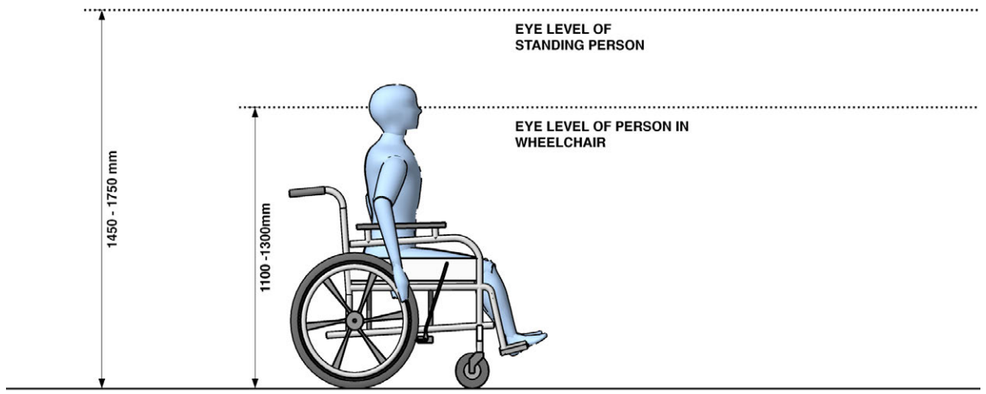


Figure 6-9b: Viewing distance for signages

Viewing Distance	Size of Signage
Up to 7 meters	60 mm x 60 mm
7 meters – 8 meters	100mm x 100 mm
Exceeding 8 meters	200 mm x 200 mm to 450 mm x 450 mm

Table 6-2: Size of Signage

Viewing Distance	Letter Height
2 - 3 meters	15 mm
6 meters	20 mm
8 meters	25 mm
12 meters	40 mm
15 meters	50 mm
25 meters	80 mm
35 meters	100 mm
40 meters	130 mm
50 meters	150 mm

Table 6-3: Size of Letters in Signage

6.4.7 Alternative formats / tactile signs

Embossed letters, raised pictograms and raised arrows can be integrated into signs. Provide both Braille and audio inputs to signage for persons with visual impairments.

Dot Spacing:	2.5 mm	Character Spacing:	6.5 mm
Dot Height:	0.5 mm	Line Spacing:	10.0 mm
Dot Base Diameter:	1.5 mm		

6.4.7.1 Braille specification

A Braille cell consists of six raised dots arranged in two parallel rows with three dots each (Figure 6-10).

6.4.7.2 Maps & Models

A tactile map or model can be very useful to visually impaired people and to people with hearing impairments.

6.4.7.3 Audio Signs/Audio information

- Signal to Noise ratio >+5dB is required for people with hearing impairment.
- In noisy environments, repeat spoken information at least once.
- Audible alarm systems 15dB to 120dB over the prevailing sound level.

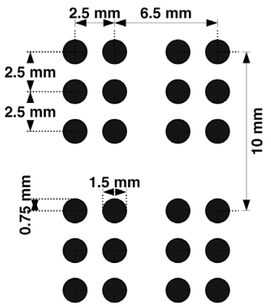


Figure 6-10: Braille specifications

Figure 6-11:
International Symbol of Accessibility

6.4.7.4 Audio visual signage

• Audio signs – play a recorded message when touched or activated

6.4.7.5 International Symbol of Accessibility

Display the International Symbol of Accessibility (Figure 6-11) at all accessible entrances. If an entrance is not accessible, provide directions including the symbol to an accessible route. There are similar guidelines for elevators, evacuation and refuge areas, restrooms and bathing facilities. Volume control telephones, text telephones, and assistive listening systems are also required to display symbols of accessibility

• Navy Blue background with White lettering,
• Symbols and border size = 200 x 200 mm square with 1.25mm border.
• Certain signage situations require specific pictograms shown in Figure 6-12

Figure 6-12: Signage for accessible Access

7 LEVEL CHANGES

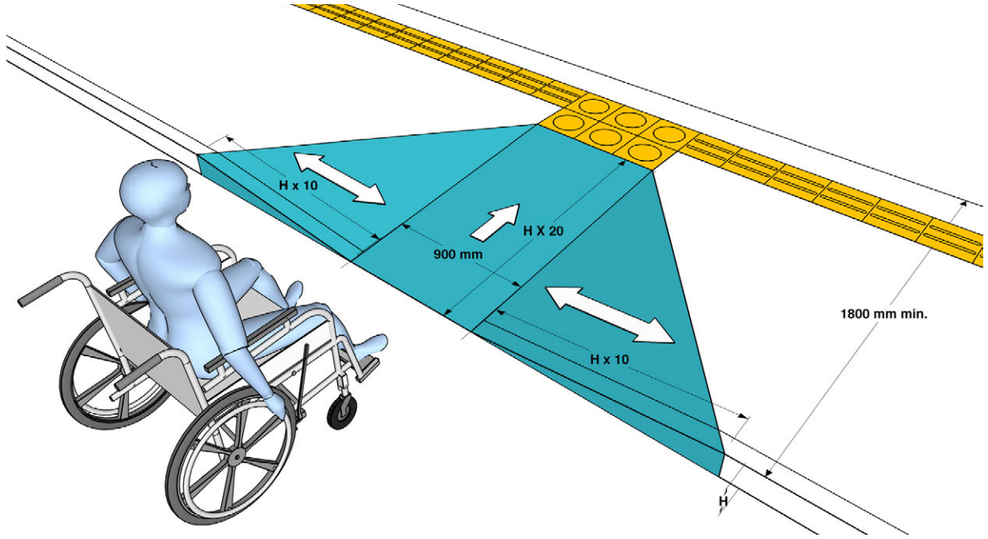


Figure 7-1: Kerb ramp detail

7.1 KERB RAMPS

• For vertical rise <150 mm
• Slip-resistant surface
• Design to avoid water accumulation on the walking surface
• Handrails not required
• Avoid projecting onto road surface
• Prevent obstruction by parked vehicles by location or protection
• Unobstructed by signposts, traffic lights, etc.
• Avoid use if projecting in

7.1.2 Gradient (Figure 7-1)

• Gradient <1:12
• Flared sides <1:10

7.1.3 Width

• 900 mm minimum.

7.1.4 Flared Sides

• Sides of the Kerb ramps to be flared as shown in Figure 7-2
• The flared side gradient to be <1:10

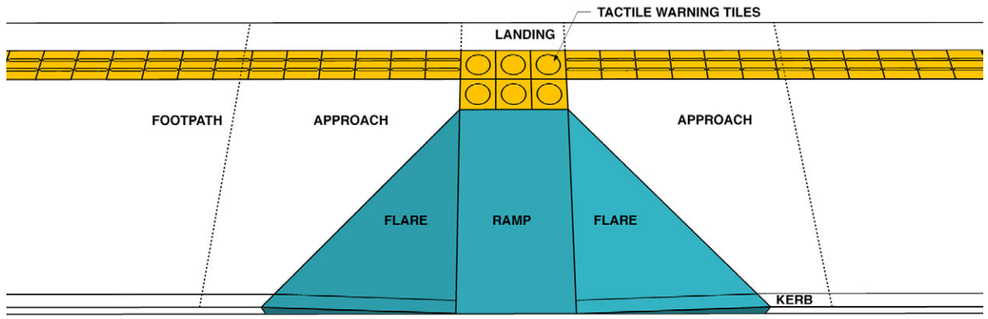


Figure 7-2: Typical kerb ramp requirements

7.2 RAMPS

7.2.1 General

- Provide accessibility by both steps and ramps
- Provide stepped approach as described in Section 7.2, in addition to the ramp approach, if the horizontal run of the approach ramp exceeds 9000 mm length.
- Elevators recommended for large changes in elevation requiring multiple ramps and landing combinations.
- At beginning and end of each ramp at also at the beginning and end of each run, a single row of tactile warning blocks should be placed

7.2.2 Gradient

Make gradient constant between landings. See Table 7-1.

Level Difference	Min Gradient of Ramp	Ramp Width	Handrail on both sides	Notes
≥ 150 mm	1:12	1200 mm	Yes	
≤ 300 mm				
≥ 300 mm	1:12	1500 mm	Yes	Landings every 5 m of ramp run.
≤ 750 mm				
≥ 750 mm	1:15	1800 mm	Yes	Landings every 9 m of ramp run.
≤ 3000mm				
≥ 3000	1:20	1800 mm	Yes	Landings every 9 m of ramp run.

Table 7-1: Minimum specifications for Ramps

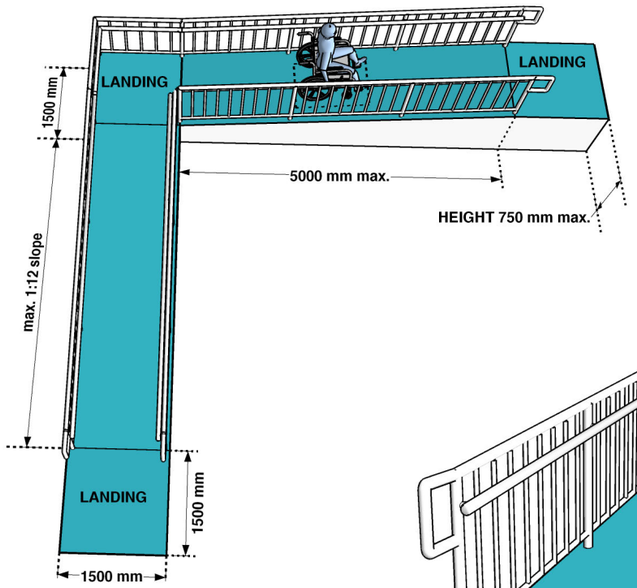
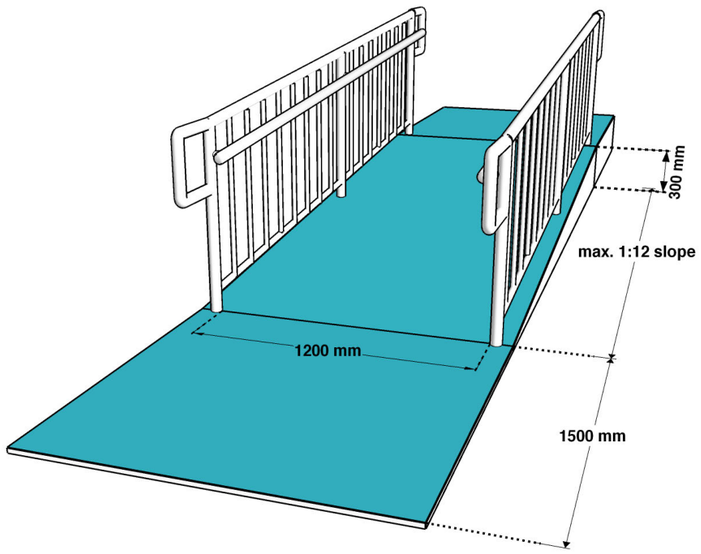


Figure 7-3: L-shape ramp with landing



7.2.3 Width

- 1200 mm clear width minimum

7.2.4 Surface

- Slip resistant
- Prevent water accumulating on the walking surfaces

7.2.5 Landings

- Put level landings at the top and bottom of each run and each change of direction (Figure 7-3)
- Landings recommendations:
  - :: At regular intervals for ≤ 9000 mm of every horizontal run. (Figure 7-3)
  - :: Level platform ≥1500 mm
  - :: See Section 5.4.3, if connected to a doorway

7.2.6 Handrails

For ramp runs with a vertical rise >150 mm:

- On both sides of ramp
- Section 5.9 compliant
- 760 to 900 mm high
- Continuous on both sides and include landings

Handrail extensions (Figure 7-4)

- Extend horizontally ≥300 mm beyond the top and bottom of the ramp
- Avoid projecting into another path of travel

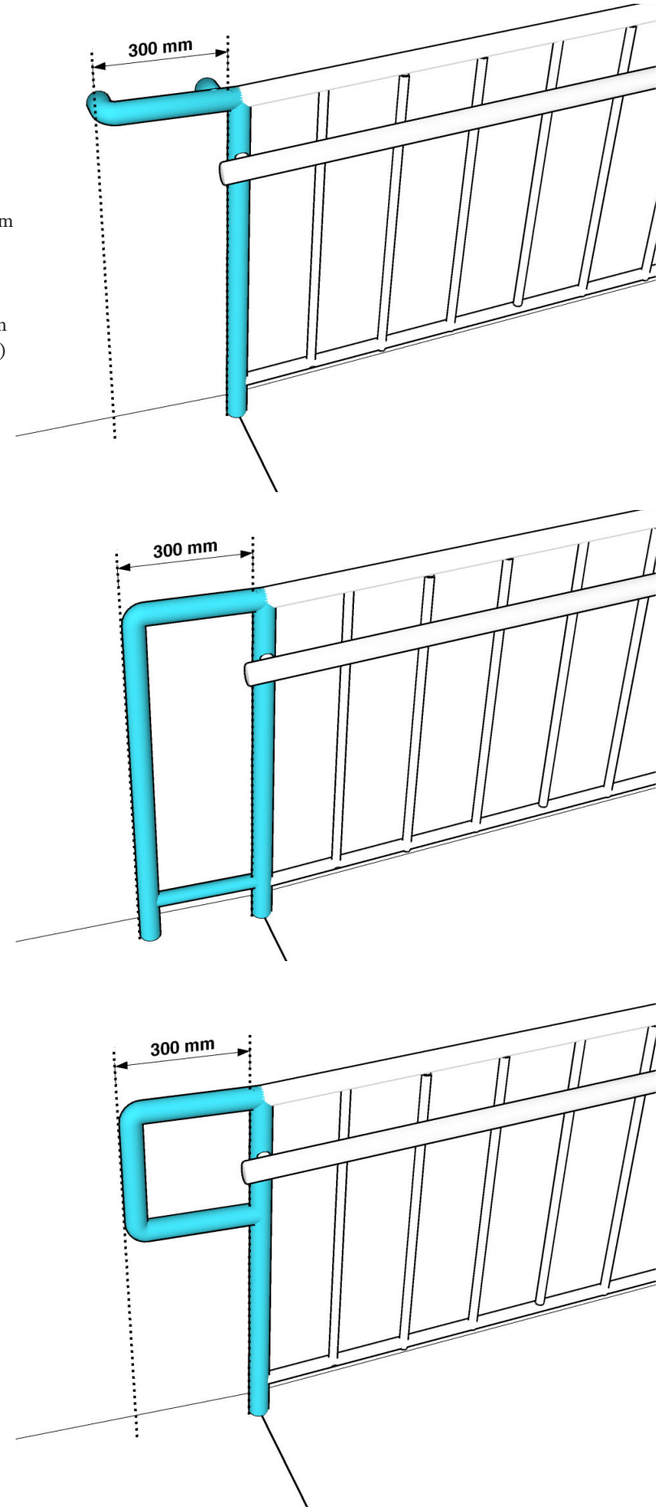


Figure 7-4: Typical handrail extensions

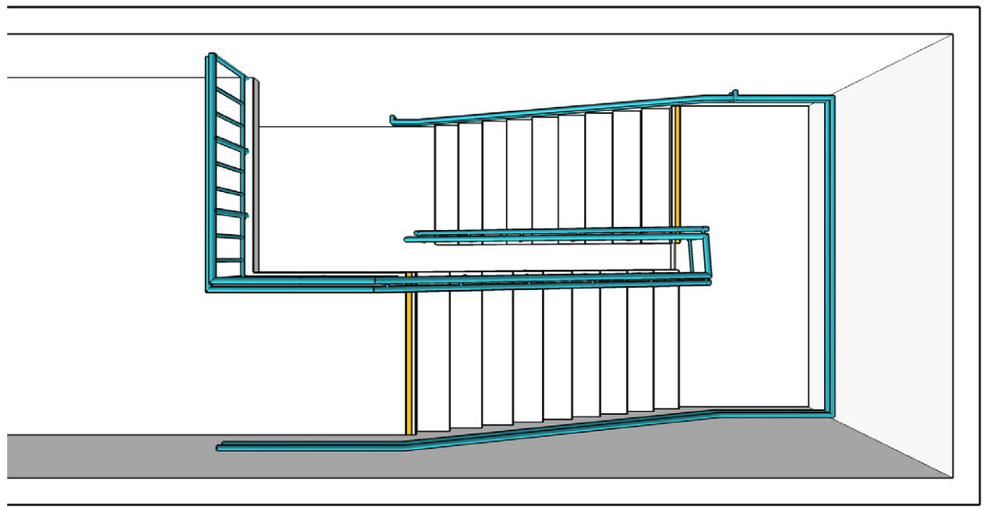


Figure 7-5: Continuous and extended handrail

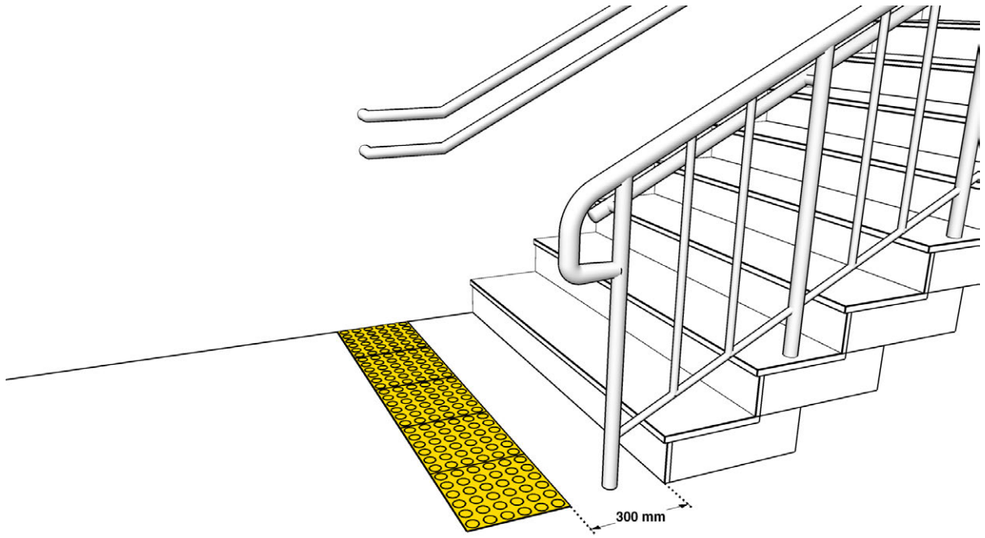


Figure 7-6: Placement of warning blocks for steps

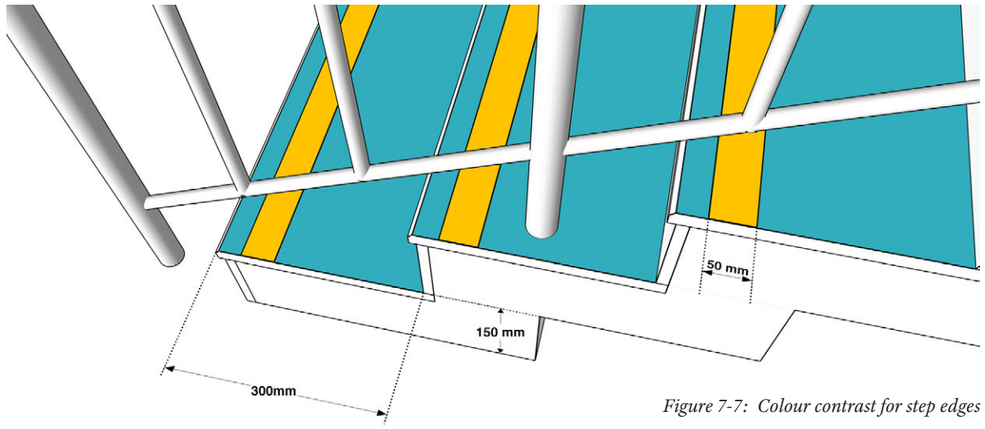


Figure 7-7: Colour contrast for step edges

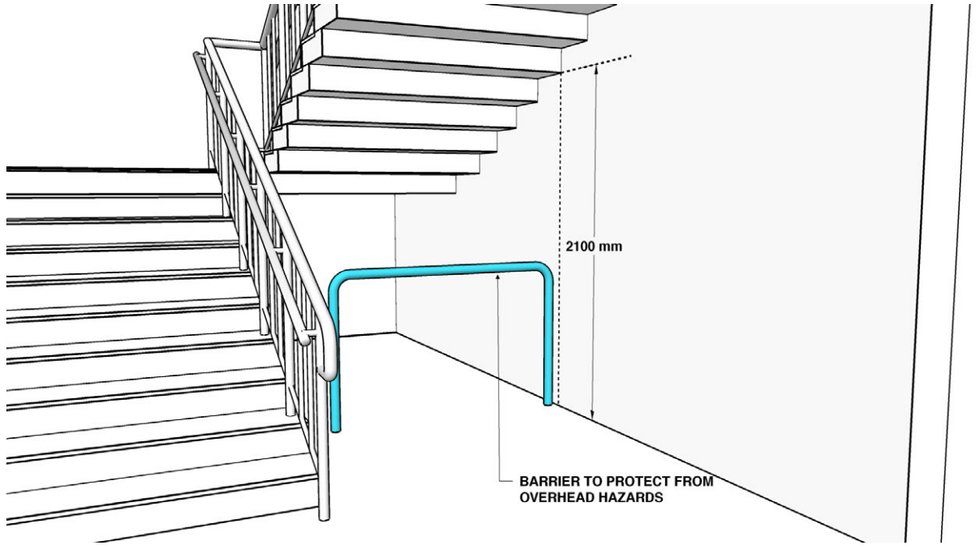


Figure 7-8: Guard rail under soffit

7.3 STAIRS

- Not to be the only means of moving between floors.
- Supplement stairs with lifts (Section 7.4) and /or ramps (Section 7.2).
- Treads 300 mm deep
- Risers <150 mm.
- Maximum 12 risers per flight.
- 1200 mm minimum depth stairs landing.
- 1500 mm clear width minimum.
- Consistent height and depth.
- Avoid projecting, nosing, open stairs, and spiral stairs.
- Handrail for stairs should:
  - :: Comply with Section 5.9.3
  - :: Extend ≤ 300 mm beyond the top and bottom step (Figure 7-6 and 7-5)
- Install warning blocks 300 mm before and 300 mm after each flight of steps (Figure 7-6) see Section 5.1.3
- Colour contrast between steps and landings.
- Contrast colour bands 50 mm wide should be provided on edge of the tread (Figure 7-7).

7.4 LIFTS

7.4.1 Lift signage

All levels used by the general public or staff to have accessible lifts. The symbol of accessibility should mark the lifts with directional signs to the lifts.

Signs for the location of an accessible lift should be clearly visible from the building entrance. The International Symbol for Access (Section 6.4.7.5) should be incorporated into the sign.

Number of floors listed on the wall opposite the lift at each lift landing.
A floor directory of the main facilities and services available on the lift landing is recommended, as well as an accessible emergency egress route and refuge areas for Persons with Disabilities

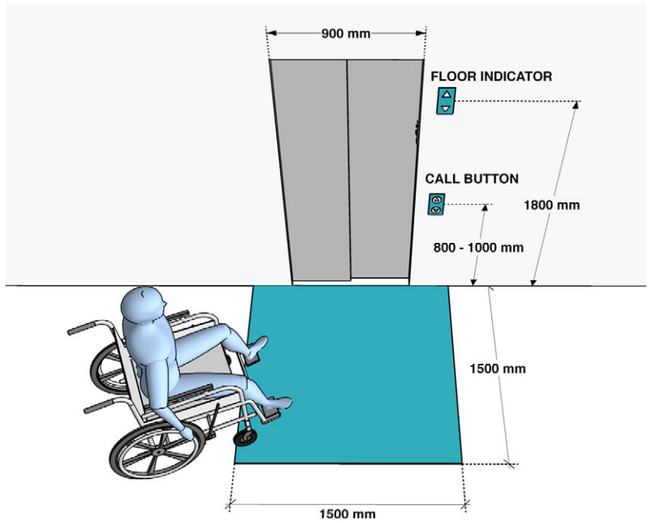


Figure 7-9: Specifications of lift controls

7.4.2 Lift Size

- ≥1500 x 1500 mm (Figure 7-10).
- 13 passenger lift recommended for easy wheelchair maneuverability

7.4.3 Door

- ≥900 mm clear opening (Section 5.7)
- Colour contrast with adjacent wall.
- Lift door & floor surface at even level.
- <12 mm gap between the lift door and building floor.
- Automatic door closing time >5 seconds
- Closing speed <0.25 meters per second.

7.4.4 Call Button

- 900 x 1200 mm clear floor space
- 800 to 1000 mm high (Figure 7-9).

7.4.5 Control Panel

- 900 x 1200 mm clear floor space
- 800 to 1000 mm high (Figure 7-10).
- Braille/ raised letters in sharp contrast from the background. (Figure 7-11)

7.4.6 Grab Bars

- Section 7.2.6 compliant;
- 900 mm high (Figure 7-10)
- Fixed on both sides and rear of the lift.

7.4.7 Audio and Visual Indicators

Audio announcement system with visual display indicating floor level & communicating the door open/close status.

- Clearly audible (50 decibels).

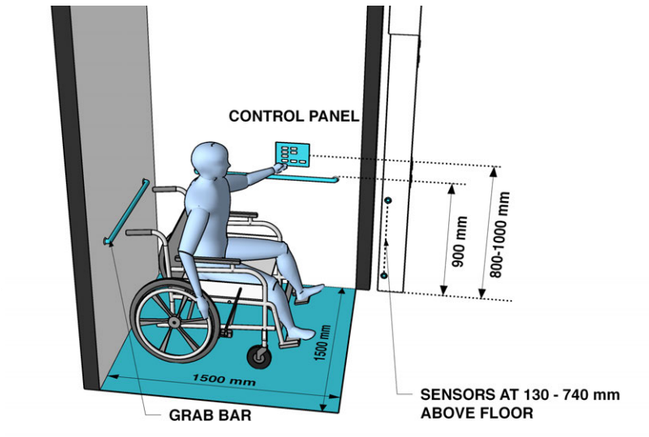


Figure 7-10: Placement of lift accessories

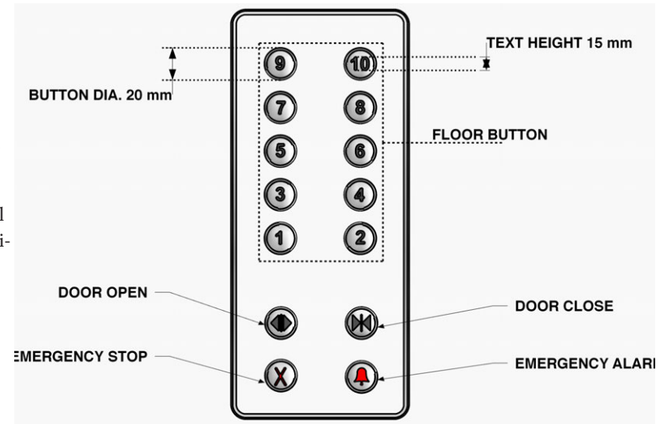


Figure 7-16: Layout of lift control panel

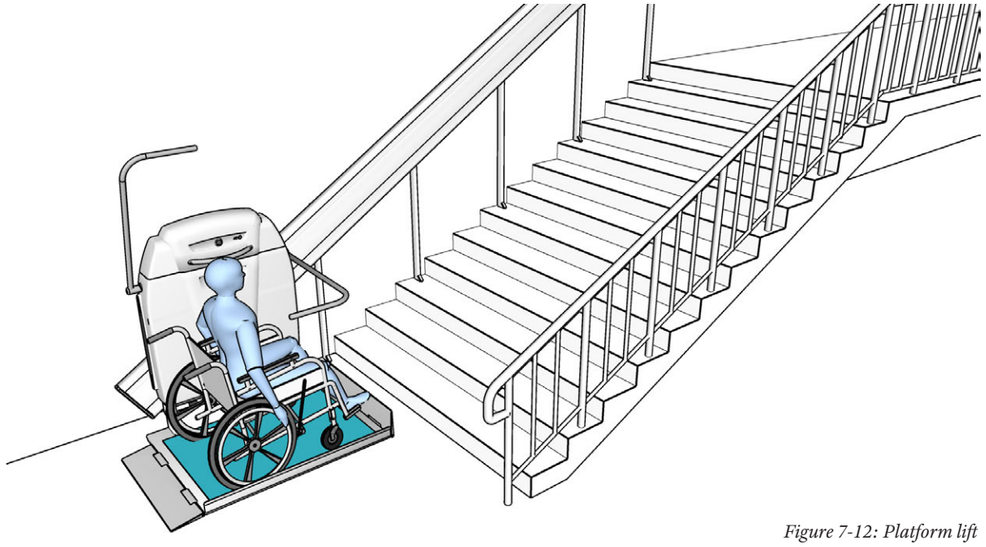


Figure 7-12: Platform lift

7.4.8 Other facilities

- Minimize visually and acoustically reflective wall surfaces
- Slip resistant floor should be similar to landing surface.
- Mirror on the wall of the lift car opposite the lift door to aid navigation for wheelchair users. The mirror bottom should extend 900 mm from the lift floor.
- Emergency communication system should be coupled with induction loop system. Telephone units should have an inbuilt inductive coupler to assist persons using hearing aids.

7.5 WHEELCHAIR STAIR-LIFT AND PLATFORM LIFT

7.5.1 General

- vertical or an inclined movement.
- Alternative to lift or ramp

7.5.1.1 Vertical Movement Platform Lifts

- For maximum level changes of 2500 mm.
- For level changes of more than 1200 mm, the lift should be in a closed structure with doors at different accessible levels.
- Various openings for entry and exit.
- Minimum size 1200 X 1000 mm.

7.5.1.2 Inclined movement platform lifts

- Can be installed along the stair wall barring any obstruction of the required width of the exit (Figure 7-12)
- The seat or platform can be folded when not in use.
- 900 mm minimum stair width
- Can be installed on all types of stairs including switch back stairs and spiral staircases
- Typically used to connect one or more floors or for split levels.

7.5.1.3 Lift Size

- Minimum platform width 1050 mm
- Minimum platform length 1250 mm

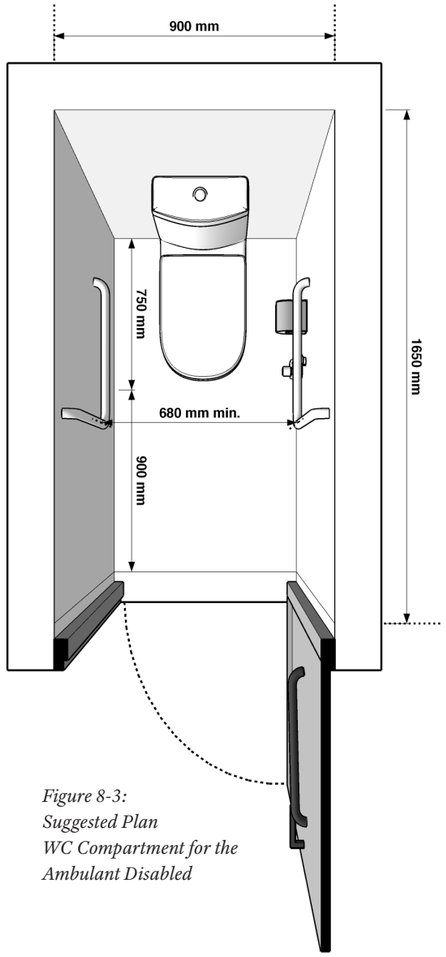


Figure 8-3: Suggested Plan WC Compartment for the Ambulant Disabled

8 ACCESS TO TOILET FACILITY

8.1 GENERAL

- Signage clearly visible and Section 6.4.7.5 compliant
- Urinals Section 8.4 and 8.12 compliant
- Unisex Accessible Toilets (multi-use)
- One unisex accessible toilet in each toilet block on each floor of all public buildings
- One cubicle in every toilet block for use by persons with ambulatory disabilities
- The unisex toilet: (Figure 8-2)
  - :: 2200 X 2000 mm minimum
  - :: ≥900x1200 mm clear space for wheelchair users to access fixtures and utilities
  - :: Door Section 8.5 compliant
  - :: Water closet Section 8.6 compliant
  - :: Grab bars Section 8.7 compliant
  - :: Wash basin Section 8.8 compliant
  - :: Essential washroom accessories Section 8.9 compliant
  - :: toilet roll dispenser and hand water faucet mounted below grab bars, 50–200 mm from the top of the water closet seat and <300 mm from the front edge of seat
  - :: Cloth hook mounted on side wall <1200 mm from floor and projecting <40 mm from the wall
  - :: Shelf 400 x 200 mm fixed 900 to 1000 mm from floor

8.3 TOILET CUBICLE FOR WHEELCHAIR USERS

Section 8.2 compliant

8.4 TOILET CUBICLE FOR AMBULATORY DISABLED

One WC for the use of the ambulant disabled persons (Figure 8-3 and 8-4) per toilet block

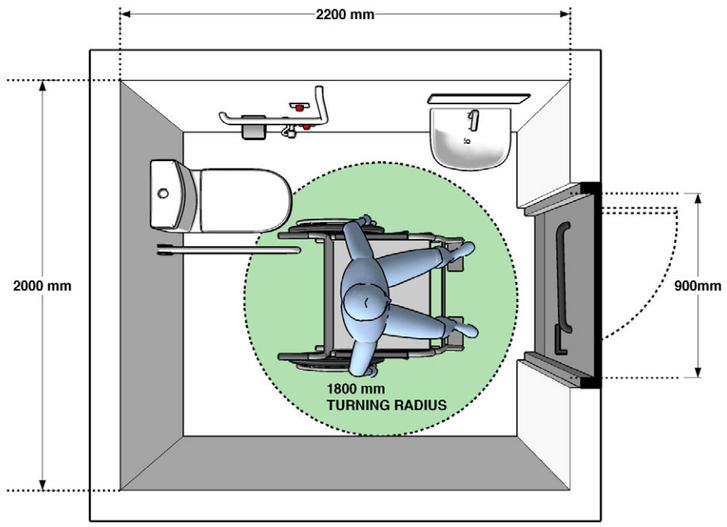
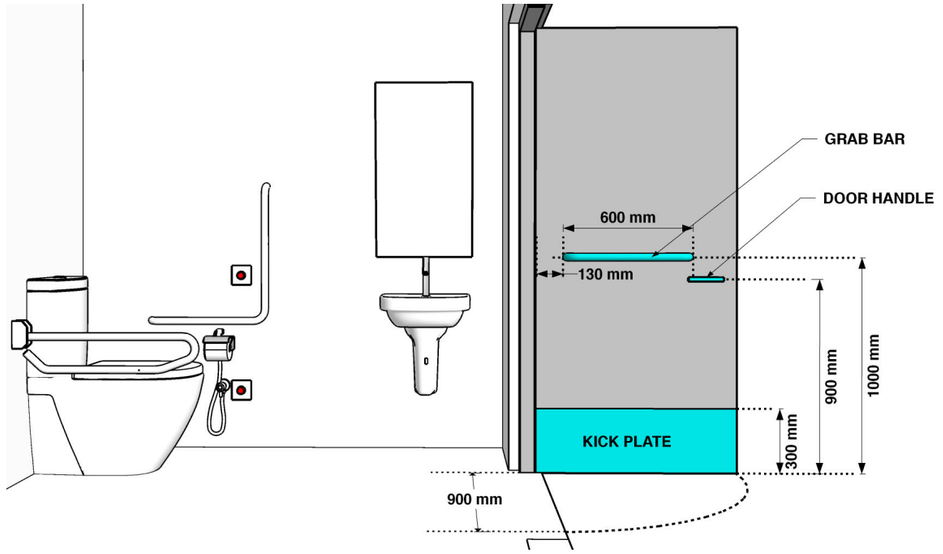


Figure 8-1: Wheelchair maneuvering space in toilet



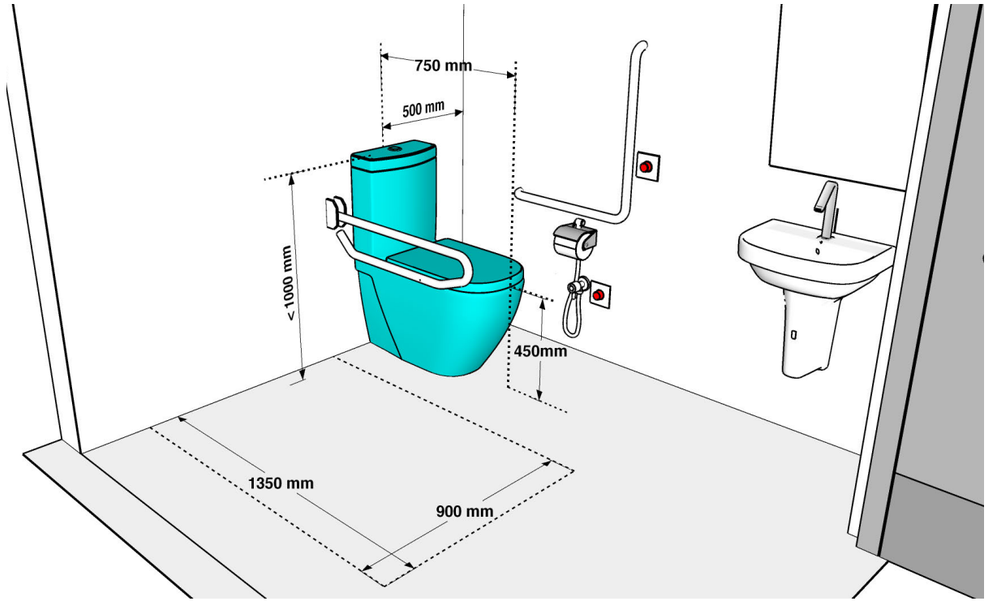


Figure 8-2: Unisex accessible toilet layout

8.5 TOILET DOORS

8.5.1 Essential requirements for toilet door

- Outward opening door or two-way door or sliding type with 900 mm clear opening width (Section 5.7).
- Horizontal pull-bar on inside of door 600 mm long, 130 mm from the hinged side of the door at 1000 mm height.
- Lockable from inside by one hand, requiring <22Nforce and without fine finger control, tight grasping, pinching or twisting of the wrist

8.6 WATER CLOSET

- Water closet seat top 450 to 480 mm from the floor (Figure 8-2), otherwise provide a circular base under the water closet which does not protrude beyond base of water closet
- Back support
- Wall-hung or corbel type recommended
- Securely attached water cistern cover
- Lever type or automatic flush control <1000 mm high on the transfer side of the water closet
- Left and right hand transfer option in case of two accessible water closets

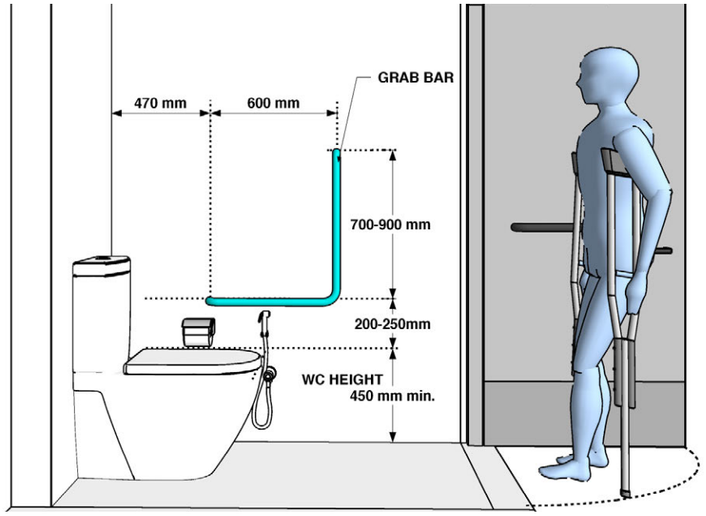


Figure 8-4: WC Compartment for the Ambulant Disabled

8.7 WATER CLOSET GRAB BARS

- One L-shape grab bar
- Hinged type horizontal grab bar
- A call switch/emergency alarm

8.8 WASHROOM ACCESSORIES

Mirror with bottom edge ≤1000 mm from the floor and angled 30 degrees; Soap and towel dispensers, hand dryer and waste bin with controls/operable parts 800 to 1000 mm from the floor; Positioned close to basin.

8.8.1 Additional Considerations

High contrast between the fixtures, walls and the flooring for visual impairment considerations. Visual emergency alarm in the toilet.

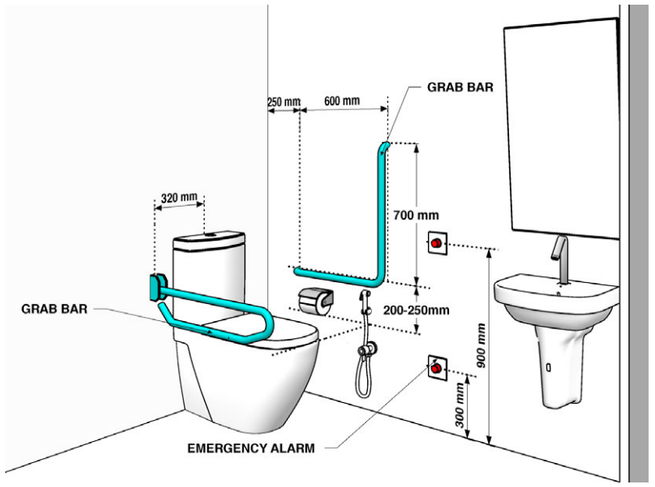


Figure 8-5: Grab bars specifications

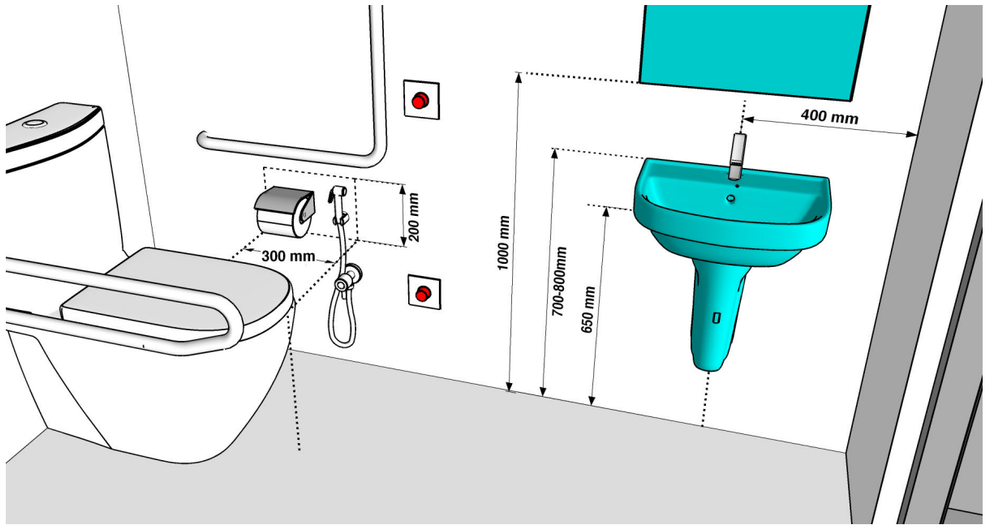


Figure 8-6: Washbasin specifications

8.9 URINALS

- Grab bars on at least one urinal on each floor (Figure 8-7);
- Stall-type or wall-hung urinals, with an elongated rim 430 mm above the finish floor.
- 760 x 1220 mm clear floor space in front of urinals. Urinal shields with 735 mm clearance between them can be provided (not to extend beyond the front edge of the urinal rim).
- Flush controls:
  :: Section 8.6 compliant
  :: ≤1200 mm from the floor
  :: Urinals as per Figure 8.7

8.10 SIGNAGE OF ACCESSIBLE TOILETS

- Unisex accessible toilets (Figure 8-8)
- Ladies and Gents toilets
- General toilets should have male pictogram in triangle or female pictogram in circle marked plates with raised alphabets and Braille (Section 6.4.7.1) on the wall beside door latch Additional signage on door optional (Figure 8-10)
- A distinct audio cue (beeper/clapper) above the toilet door entrance for toilet identification
- Signage placement (Figure 8-10)
- 760 x 1220 mm clear floor space in front of urinals. Urinal shields (not extending beyond the front edge of the urinal rim) with 735 mm clearance between them can be provided

8.11 SHOWER CUBICLES (Figure 8-9)

8.11.1 Size

- 2000 x 2200 mm minimum.
- 2400 x 2500 mm combined toilet and shower room minimum dimensions
- 1350 x 900 mm minimum clear floor space in front of the shower entrance with the 1350 mm dimension parallel to the shower entrance.
- Slip resistant shower floor.
- Grab bars for the shower cubicle should be Section 8.7 compliant.
  :: One L-shaped bar or two grab bars in L-shaped configuration 700-800 mm high
  :: One vertical grab bar minimum 750 mm long with another horizontal minimum 900 mm long.

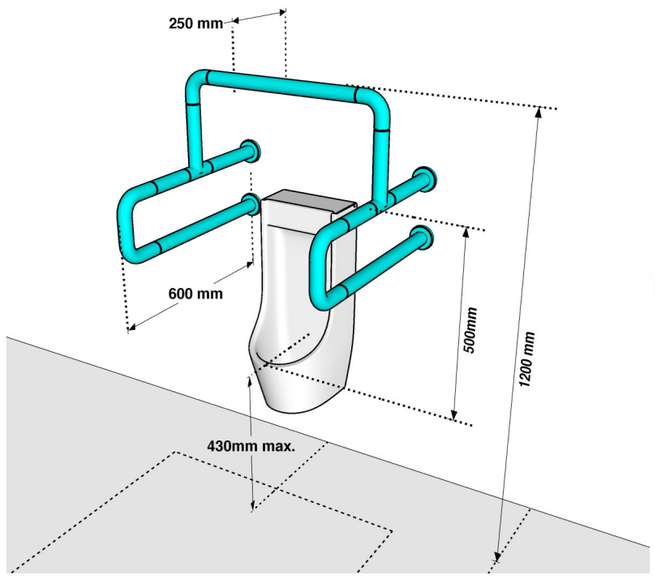


Figure 8-7: Urinal with chest support grab bar

Figure 8-8: Signage for Unisex toilet, gents and ladies toilet

8.11.3 Stationary, Fittings and Accessories

- Shelf for toiletries between 400-800 mm
- Shower controls 500 mm from the rear wall
- Shower controls 750 to 1000 mm from the floor
- Adjustable detachable shower head with 1500 mm long hose, installed 800 mm-1200 mm from the floor
- Shower head bar not to obstruct the use of grab bars
- Roll-in shower cubicle curbs <10 mm high with 1:2 beveled slope
- Unobstructed transfer from wheelchair onto shower seat

8.11.4 Shower seat

- Wall mounted shower seat, preferably fold up
- 450 to 480 mm from center-line of the water closet to adjacent wall
- 50 mm distance from front edge of the water closet to rear wall
- 450 to 480 mm from the floor to top of the shower seat
- 1350 mm depth and 900 mm width clear floor space in front and on the transfer side, adjacent to the water closet
- Non-slip, self-draining with rounded edge
- On wall nearest to controls
- 400 mm wide extending the full depth of cubicle, excepting space required for shower curtain

8.12 PUBLIC TOILETS

- Provide unisex accessible public (multi-use) toilets.
- Display international symbol of accessibility outside accessible toilets.
- Toilet door to be outward opening or two way opening or a sliding type with 900 mm clear opening width.
- 600 mm horizontal pull-bar on inside of the door, 130 mm from the hinged side of the door and 1000 mm from floor.

8.13 STANDARDIZATION IN TOILET DESIGN

A tactile layout of the toilet should be provided on the wall, near the latch side at 900 mm height.

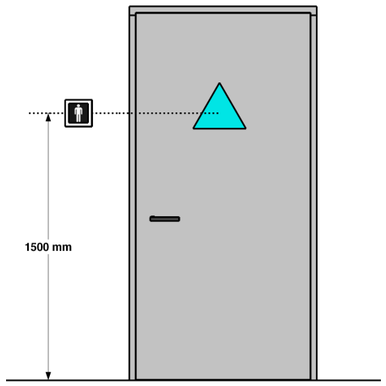
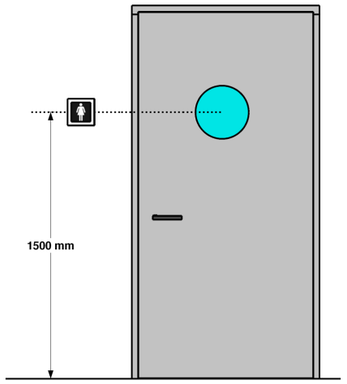


Figure 8-10: Placement of signage



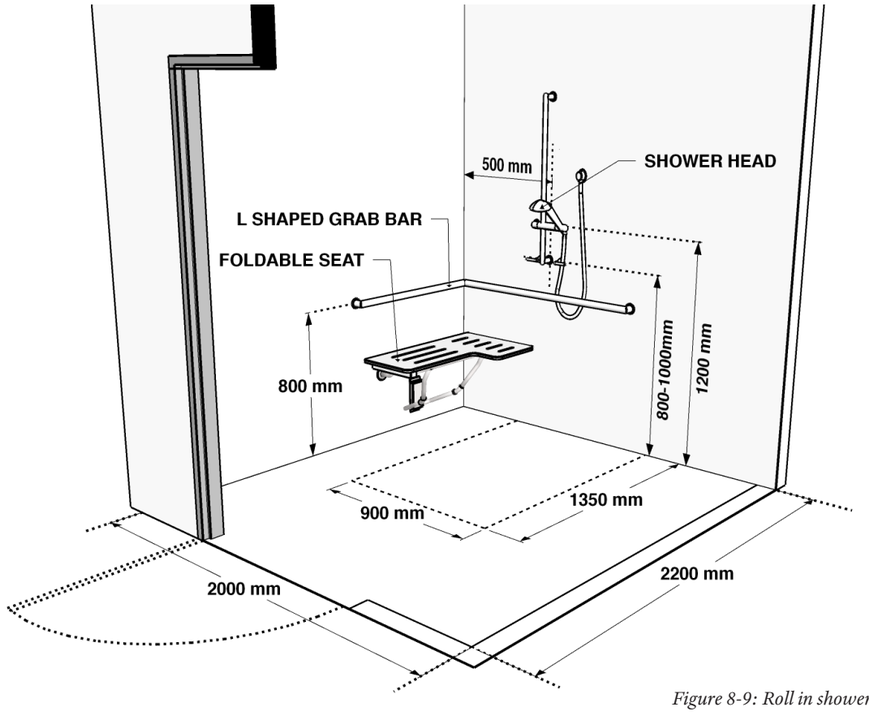


Figure 8-9: Roll in shower cubicle

9 FIRE EVACUATION NEEDS

9.1 ALARM PANELS

- Install Fire alarm boxes, emergency call buttons and lighted panels 800 to 1000 mm high.
- Panels labeled with raised letters and also in Braille
- High contrast with wall.

9.2 ALERTING SYSTEMS

- Audible alarms with with live or pre-recorded Voice Instructions to guide persons to the nearest emergency exit.
- Visual or sensory alarms to alert persons with hearing impairments installed in all areas users may visit (including toilet areas, storerooms etc.)

9.3 EVACUATION PLANS

- Clearly indicate designated emergency evacuation routes (Section 9.5.1) as well as location of refuge areas (Section 9.5) in all public areas.
- Incorporate raised letters and tactile routes, with Braille.
- High contrast with wall or environment.

9.4 Emergency Evacuation Routes

Provide accessible means of egress in the same number as required for exits by local building/fire safety regulations in buildings or facilities, or portions of buildings or facilities, required to be accessible, as per National Disability Authority, 1998.

- 1500 mm minimum width for designated evacuation routes.
- Free of any steps, obstacles, or sudden changes in level.
- 1500 mm minimum clear width between handrails in exit stairway and either incorporate a Section 9.5 compliant area of refuge within an enlarged floor-level landing or a horizontal exit
- Orientation and direction signs installed frequently along the evacuation route with internal illumination recommended
- Traditional overhead emergency lighting luminaries, conforming to the Indian Standard IS:9583-1981: Emergency Lighting Units, is acceptable for people who are visually impaired
- Exit signs in accordance with IS:4878-1968
- Exit signage on the evacuation route in tactile format
- Provide tactile floor guidance along the emergency route (Section 5.1.3)

Note: Fireproof doors generally require a force greater than 25 N to operate. Consider using magnetic catches or floor springs that are connected with the fire alarm system.

9.5 PROVISION OF REFUGE AREAS

- A refuge area or area of rescue assistance, is a place of relative safety where persons may await rescue assistance.
- Provide refuge areas in a number equal to that of inaccessible required exit where a required exit from levels above or below a level of accessible exit is not accessible.
- Every area of refuge is accessible by an accessible egress route.
- Direct access to an exit stairway from every area of refuge.
- Separate each area of refuge from the remainder of the storey by a smoke barrier with minimum 1-hour fire resistance rating.
- Refuge provides at least two accessible areas >750 mm by 1200 mm each. Rescue assistance area not to encroach on required exit width. Areas per story shall be not less than one for every 200 persons of calculated occupant load per area of rescue assistance.
- 1500 mm clear width of between the handrails of connected stairs
- Visual and audible two-way communication between each area of rescue assistance and the primary entry.

9.5.1 SIGNAGE

- International symbol of accessibility and “REFUGE AREA” displayed for each area of rescue assistance
- Illuminated when exit sign illumination is required
- Directions to areas of rescue assistance signage at all inaccessible exits and where otherwise necessary
- Instructions on the use of the area under emergency conditions posted alongside the two-way communication

10 ALIGHTING AND BOARDING AREAS

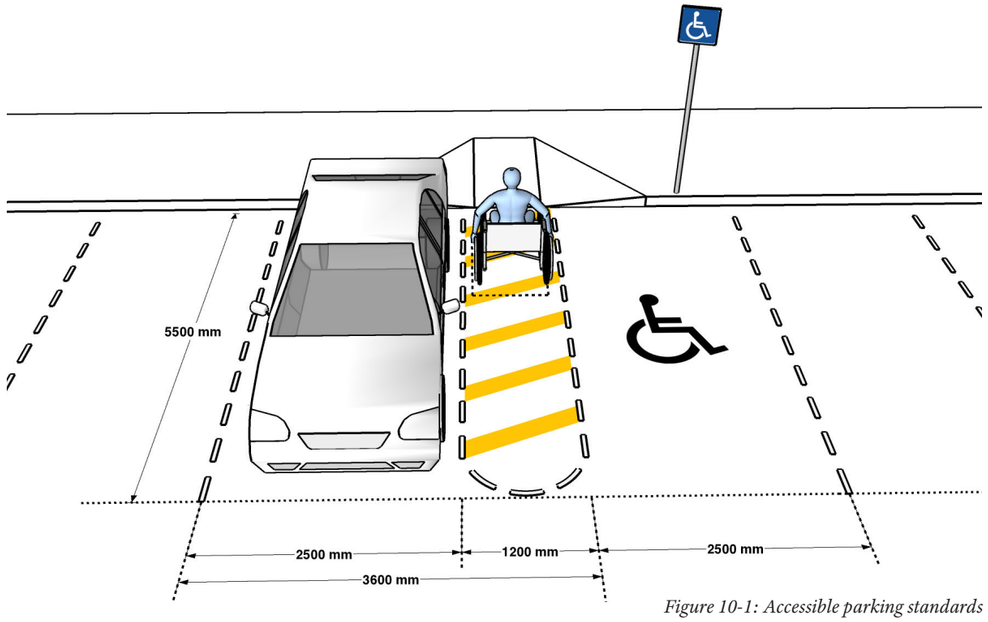


Figure 10-1: Accessible parking standards

10.1 CAR PARKS

10.1.1 SIGNAGE

- Display International symbol of accessibility at approaches and entrances to car parks to indicate accessible parking lot for Persons with Disabilities
- Display directional signs where there is a change of direction to direct individuals to the accessible parking lot
- Place directional signs along the route leading to the accessible parking lot if the location of the accessible parking lot is not obvious or is distant from the approach viewpoints
- Accessible parking lot should be identifiable by the International Symbol of Accessibility in accordance to the Section 6.4.7.5
- Vertical signs 2100 mm from ground

10.1.2 Symbol

- International Symbol of Accessibility on the accessible parking lot marked clearly for drivers/riders with disabilities only
- The Symbol painted on the designated lot to be Section 6.4.7.5 compliant and:
  :: Within a square 1000–1500 mm in length
  :: Centered in the lot
  :: Painted white on a blue background

10.1.3 Car Park Entrance

2400 mm clearance

10.1.4 Location

- Within 30 meters of an accessible entrance and / or lift lobby. If access is by lift, parking to be within 30 meters.
- 1200 mm width required for wheelchair users to pass behind a reversing vehicle.

10.1.5 Accessible Car Parking Lot (Figure 10-1)

- 5000 × 3600 mm
- Firm, level surface without aeration slabs
- Shelter recommended
- 1200 mm side transfer bay may be shared by two adjoining accessible parking bays. Yellow or white cross-hatch road markings in the side and rear transfer zones.
- Consider distribution of spaces for use by the Persons with Disabilities based on frequency of parking needs.
- 2 accessible parking lots per 25 car parking spaces.

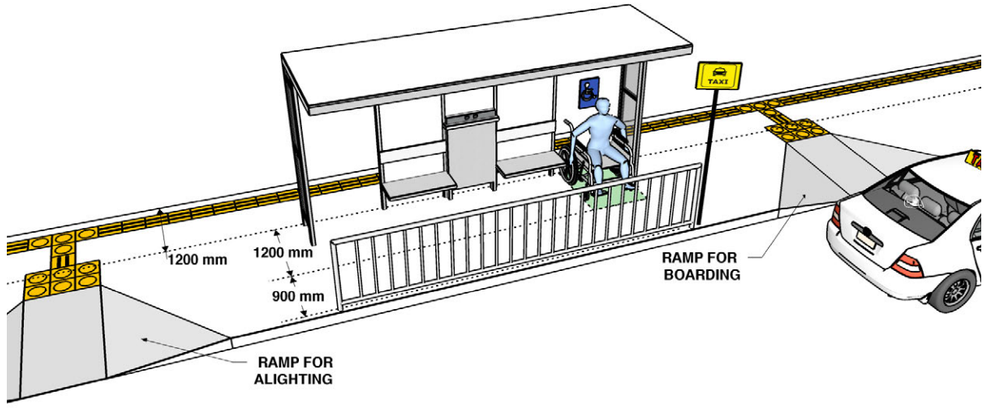


Figure 10-2: Layout for accessible taxi/car boarding

10.2 TAXI/AUTO RICKSHAW STANDS

10.2.1 General (Figure 10-2)

- At least one accessible route from the alighting and boarding point to the accessible building entrance.
- Directional signs to accessible entrance.
- Guiding blocks along the accessible walkway from the taxi stand to the building entrance.
- Signs for Taxi/Auto Rickshaw Stand visible after dark (35–40 lux) and mounted on vertical pole.
- Taxi bay recommended at the level of approach for Persons with Disabilities to alight and board the vehicle.
- The driveway, pathway or walkway should be blended to a common level or be ramped where transfer has to be made from a vehicular surface to a pedestrian surface.

10.2.2 Passage Way

- Pedestrian walkway continued at minimum width of 1200mm behind the taxi stand.

10.2.3 Handrails

- Section 5.9 compliant / Installed at 760 mm and 900 mm heights.

10.2.4 Ramps

- Two separate ramps for boarding and alighting when taxi stand is not on the same level with the walkway or pathway. (Figure 10-2)
- Install kerb ramp where there are kerbs between the access aisle and the vehicle pick-up space.

10.2.5 Seats

- Seats should be provided at the taxi stand.
- Seats should not impede the movement of wheelchair users and persons with vision impairment.

10.2.6 Shelter

Taxi stand should be sheltered.

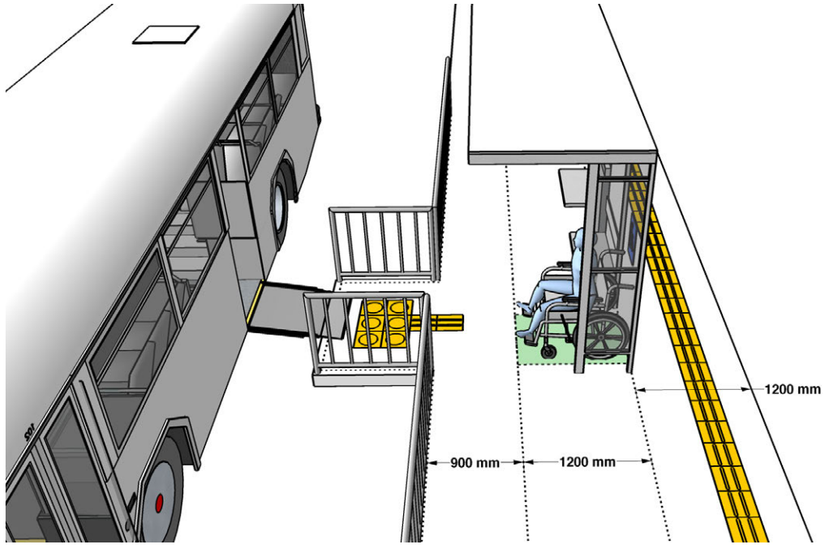


Figure 10-3: Bus stop design

10.3 BUS STOPS

10.3.1 General

- At least one accessible route from the bus stand alighting and boarding point to the walkway leading to the accessible building entrance.
- Install Directional signs to accessible entrance.
- Guiding blocks along the accessible walkway from the bus stand to the building entrance.
- Minimum illumination level of 35 to 40 lux at bus stand

10.3.2 Location

- Near accessible entrance
- Pathway, driveway or walkway should be blended to a common level or be ramped where transfer has to be made from a vehicular surface to a pedestrian surface

10.3.3 Passage Width

- Minimum width of 1200 mm clear passageway

10.3.4 Seats

- Provide seats at the bus stand that do not impede the movement of wheelchair users.

10.3.5 Shelter

- Shelter recommended.

10.3.6 Ramps

- Two separate ramps for boarding and alighting, conforming to Table 7.1 when bus stand is not on the same level with the walkway or pathway.
- Kerb ramp complying with Section 7.1 for curbs between the access aisle and the vehicle pick-up space.

10.4 RAILWAY STATIONS AND AIRPORTS

10.4.1 Level Approach

- Avoid level differences on approach route. Place ramp conforming to Table 7.1 if the station is not on the same level as the walkway or pathway.
- Non-slip walkway surfaces, with Tactile pavements on approach walkway.

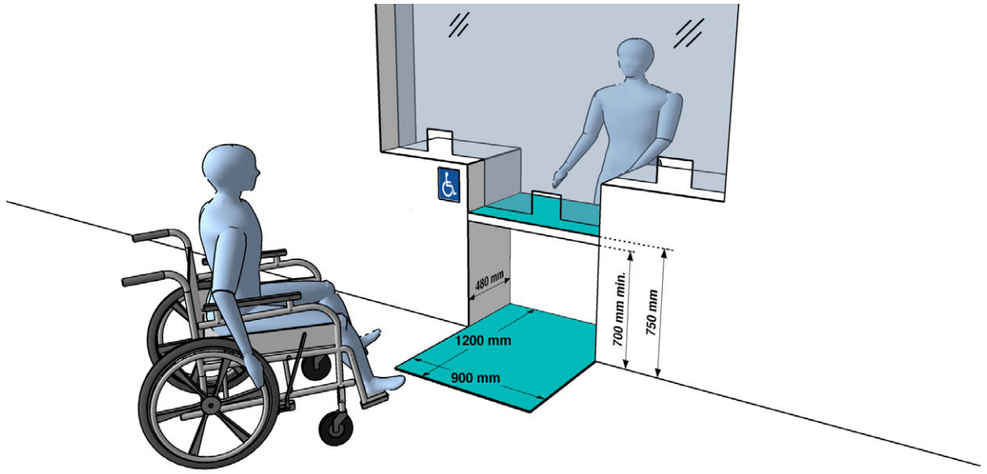


Figure 10-4: Counter tops

10.4.2 Station Entrances and Exits

- Minimum width of 1800 mm
- Level or ramped and Table 7.1 compliant.

10.4.3 General Station Interiors

- Tactile layout map of the station with Braille and audio labels at the entrance.
- Tactile map marked by floor tactile guidance.
- Minimum 1800 mm lobby/corridor width.
- Non-slip, level floor surfaces.
- Directional signs to facilities and platform numbers.
- Signage in Braille/raised numbers.
- Guiding and warning blocks on the corridors/concourse.
- Stairs Section 7.3 compliant.
- Lifts Section 7.4 compliant.
- Audio announcements supplemented with visual information displays.
- Seating areas at regular intervals.

10.4.4 Reservation and Information Counters

- 900 x 1200 mm clear floor space in front of the counters
- At least one low counter at 750 mm – 800 mm from the floor with clear knee space of 750 mm high by 900 mm wide by 480 mm deep (Figure 10-4)
- At least one counter with induction loop unit
- Pictographic maps indicating all services offered
- At least 1 counter staff should be sign language literate

10.4.5 Toilet Facilities

- At least one unisex accessible toilet complying with Chapter 8.

10.4.6 Ticket Gates

- At least one of the ticket gates ≥900 mm wide
- At least one with continuous line of guiding blocks

10.4.7 Platforms

- 600 mm before the track edge a row of warning blocks installed (Figure 10-5)
- Non-slip, level flooring
- Seating areas
- Lux level 35 to 40
- No gap or difference in level between platform and train entry (Figure 10-6)
- All platforms inter-connected by accessible routes or lifts (Section 7.4)
- Accessible level entrance to the train coach

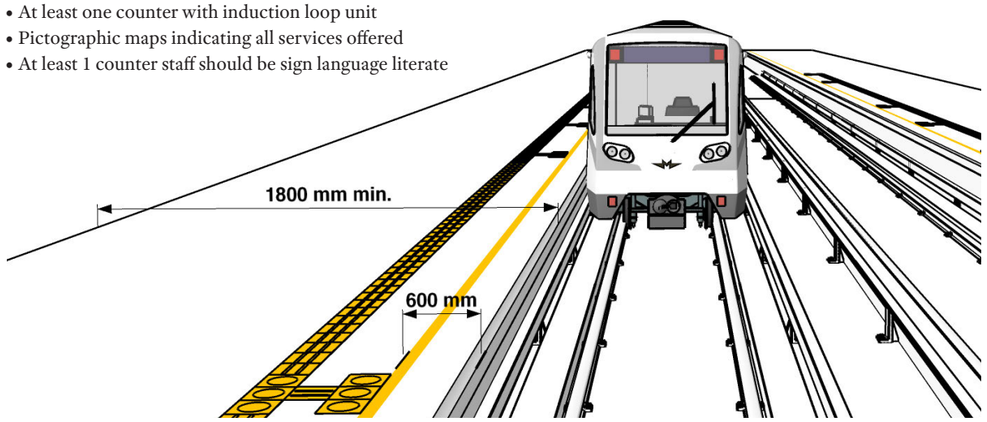


Figure 10-5: Warning blocks on platform edges

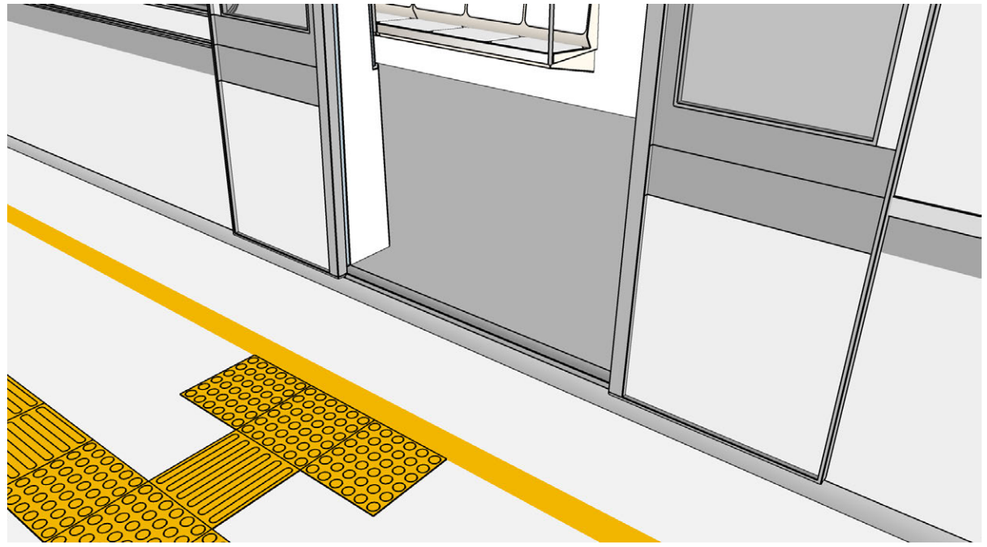


Figure 10-6: Level boarding

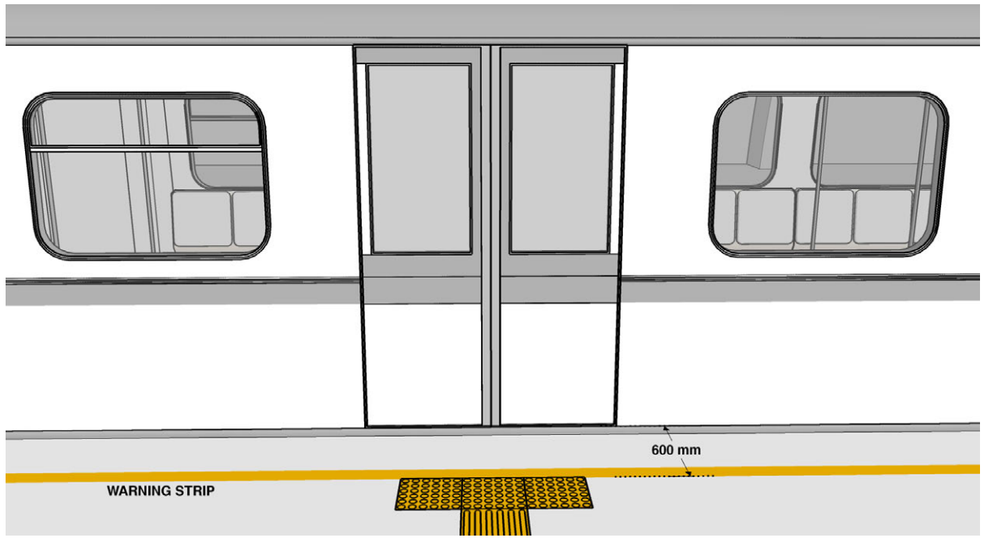


Figure 10-7: Warning Strip

10.5 Piers and Jetties

10.5.1 General

- All forms of water transport should be accessible
- Ferries fitted with accessible ramps compliant with Table 7.1
- Space for securing a wheelchair in position for comfortable integration with other passengers within cabin
- Fully accessible, simple boarding and disembarkation procedures at piers
- Similar guidelines for designing accessible piers and jetties as for railway stations except for the platform.

11 TRANSPORT AND ROAD PLANNING

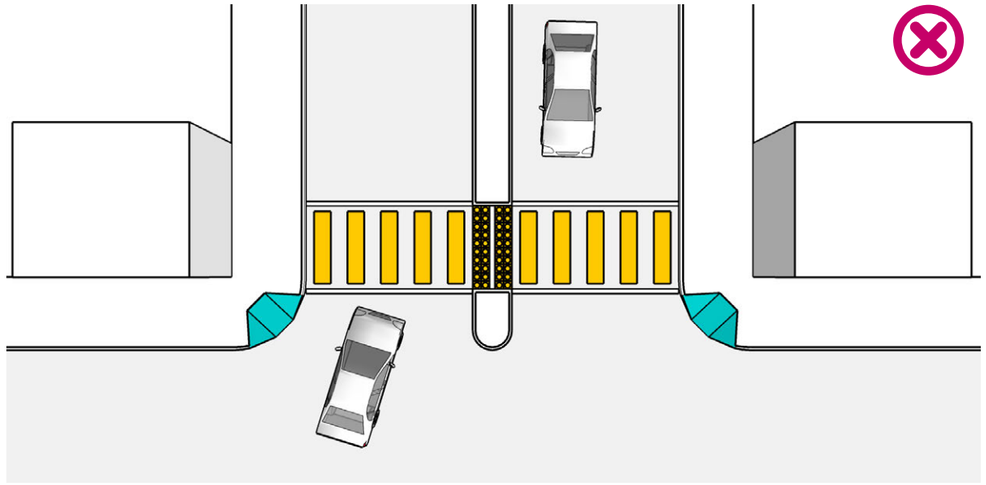
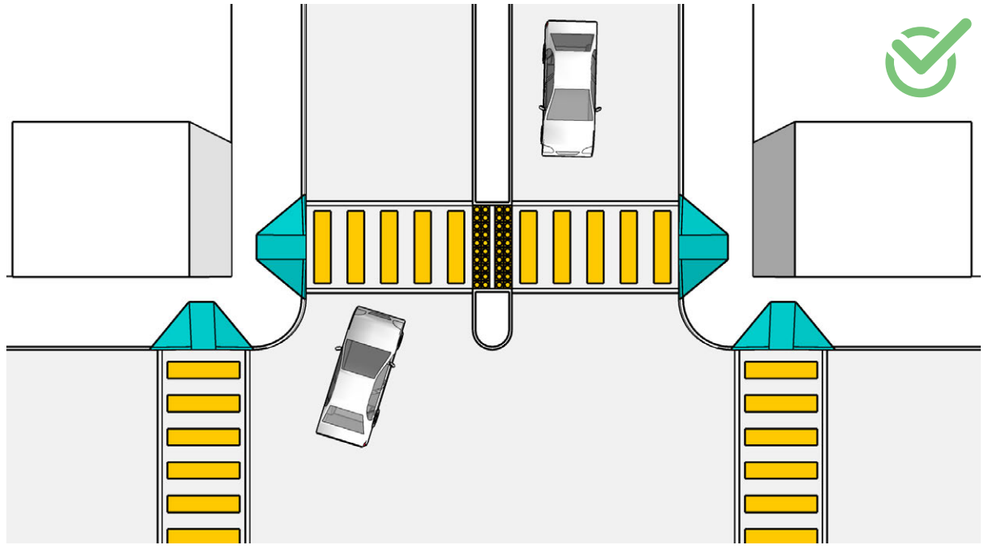


Figure 11-1: Kerb ramp placements at turnings (Wrong way shown above, Right way shown below)



11.1 Sidewalks / Footpaths

- Non-slip surface
- Non slip Along entire length of the road
- <150 mm high
- Minimum 1800 mm wide
- Tactile guiding blocks
- Well defined edges of paths and routes by use of different colours and textures recommended
- No obstacles or projections along pathway; if unavoidable, allow clear headroom of at least 2000 mm from the floor level
- Where ever a person is expected to walk into or off the pathway install kerb cuts compliant with Section 7.1
- Tactile warning blocks at all entry and exit points from the pathway

11.2 Kerb Ramps at Walkways and Pedestrian Crossings

- Kerb ramp at pedestrian crossing wholly within the area designated for pedestrians use (Figure 11-1).
- Tactile floor guidance.
- Zebra crossings should be in easily detectable 3D texture

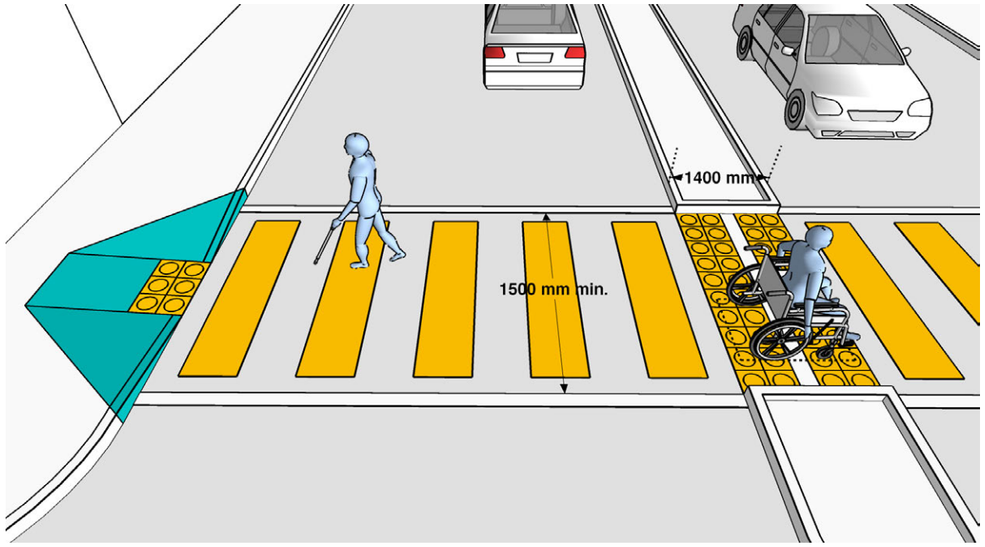


Figure 11-2: Median refuge/island

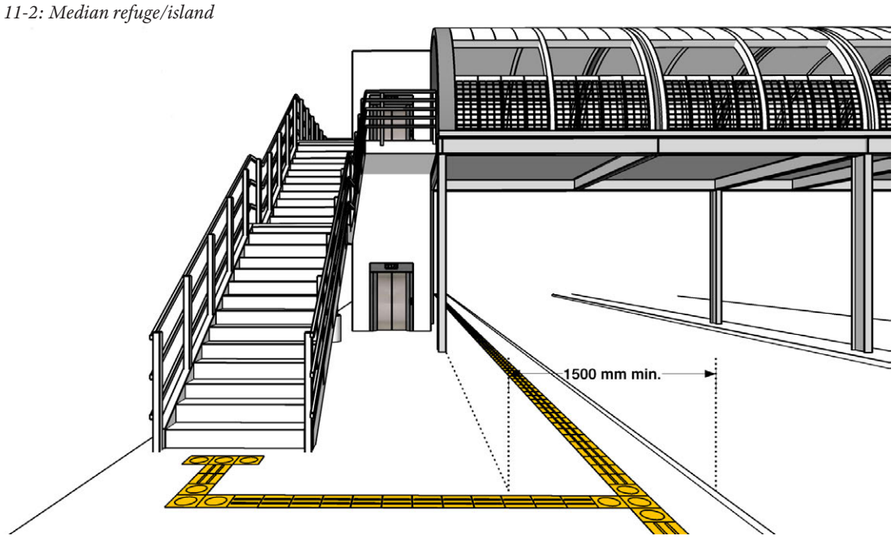


Figure 11-3: Pedestrian foot over ridge with ramp and steps

11.3 Road Intersections

- Traffic control signal at pedestrian crossings
- Traffic islands recommended for the safety of all road users
- Guide strips to indicate the position of pedestrian crossings
- Road bumps to reduce approaching traffic speed

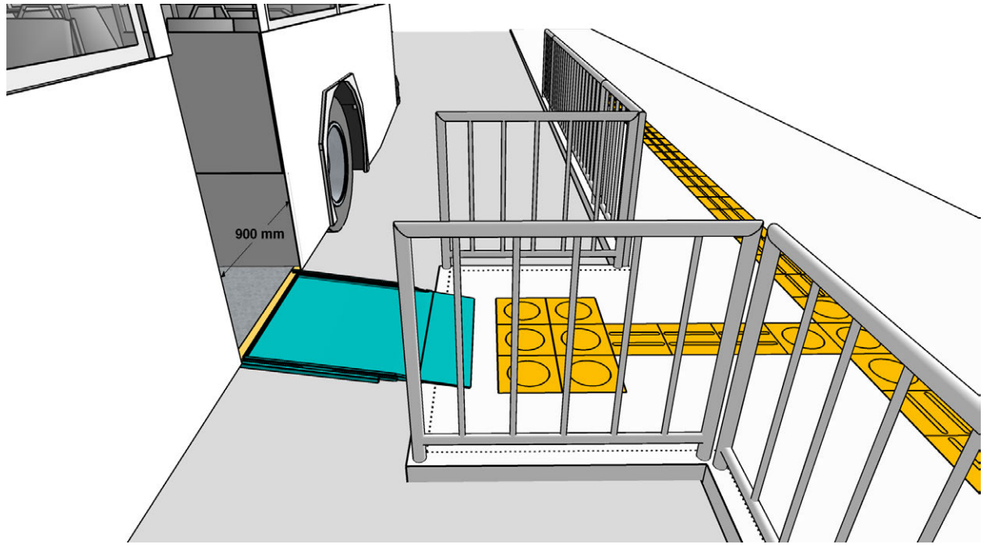
11.4 Median Refuge/Islands

Raised islands in crossings:

- Section7.1 compliant kerb ramps at both the sides with level area ≥1500 mm long in the middle or cut through and level with the street (Figure 11-2)
- Coloured tactile marking strip ≥600 mm wide to marking beginning and end of traffic island.

11.5 Traffic signals

- Clear audible signals at pedestrian traffic lights
- Place acoustic devices at the crossing point of origin, not at the point of destination
- Avoid installation of two adjacent acoustic devices such as beepers
- Program the time for crossing based on the slowest crossing persons.



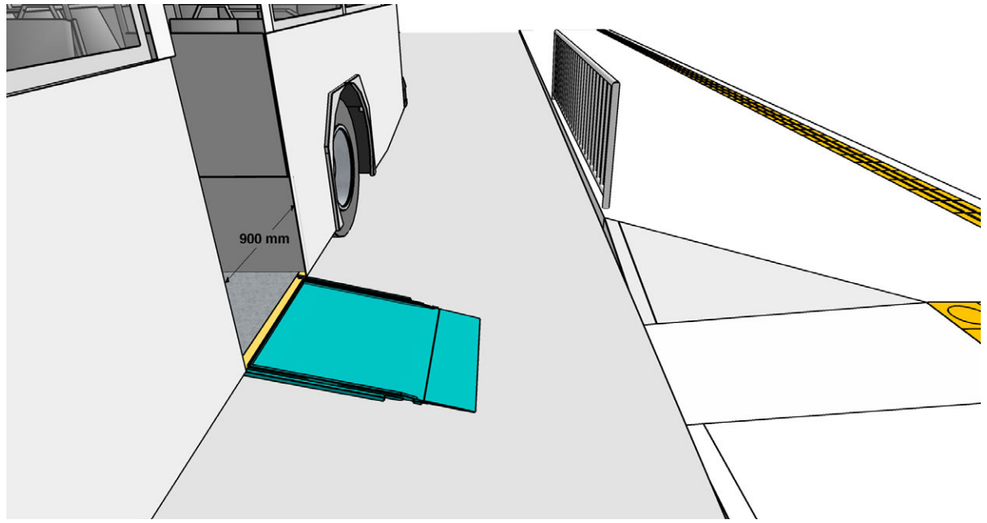


Figure 11-4: Low floor bus boarding from road level and bus stand platform

11.6 Subways and Foot Over Bridges

- Signage at strategic locations
- Slope ramps or lifts at both the ends
- ≥1500 mm wide walkway (Figure 11-3)
- Tactile guiding and warning blocks along the length of the walkway
- Keep walkway free of obstructions and projections
- Seats at regular intervals along the walkway and at landings

11.7 Public Transport

11.7.1 Land Transport

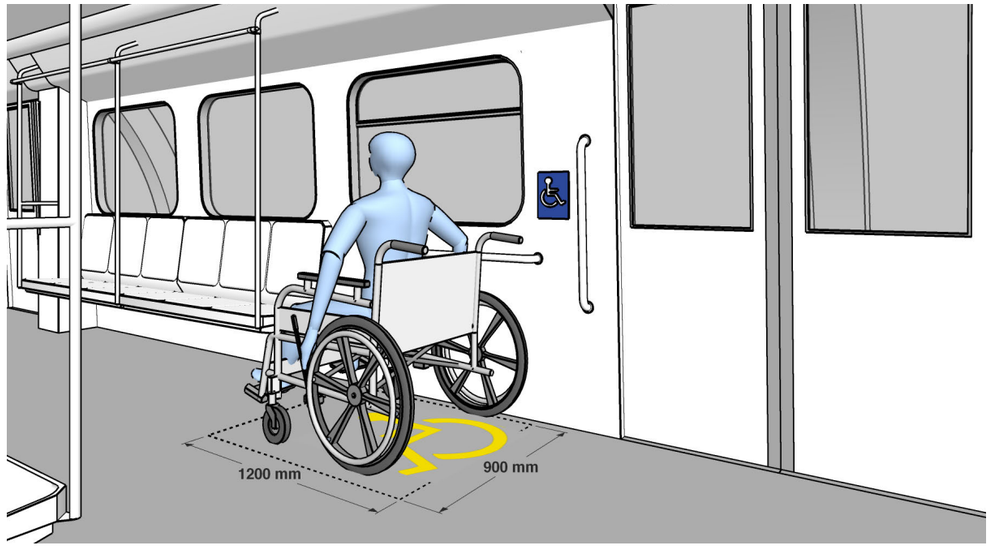


Figure 11-5: Wheelchair Space

11.7.1.1 Accessible buses

- ≥1200 mm wide bus doors
- Low floor
- Handrail and footlight
- Hydraulic lift or pull-out/foldable ramp (Figure 11-4) in the doorway
- **Wheelchair spaces**
  :: In an appropriate position, without preventing other passengers from getting on and off
  :: The location of that space indicated using the standard symbol for wheelchair accessibility inside and outside the bus
  :: Wheel stoppers and wheelchair safety belts provided
- **Alighting Buzzers**
  :: Alighting buzzers easily accessible for seated or standing passengers
  :: Push button installed at 900 to 1200 mm
  :: Clearly visible
  :: Adequately sized
  :: Display the information in Braille/raised numbers
- **Information Signs**
  :: Names of all stops along a bus route displayed prominently inside the bus
  :: Route and final destination displayed outside the bus in large, easily readable, illuminated text.

11.7.1.3 Taxi

- Adapted to allow passengers to get in and out while seated in their wheelchairs

11.7.2 Rail Transport

11.7.2.1 General

- Fully accessible carriages on every train.
- Electronic signboard displayed on each platform for all railway announcements.
- Staff at hand on request and trained in assistance methods.
- Fully accessible stations for all rail travel with extra wide turnstiles alongside Section 5.7 compliant wheelchair accessible doorways.
- Staff on hand to assist Persons with Disabilities to enter or exit through gates.
- Design all new railway stations to be fully accessible, while those being retrofitted should comply with standards given in these Guidelines.
- See Section 10.4 for accessible railway station details.

11.7.2.2 Accessible Railway Cars

- Minimum width 900 mm
- <12 mm gap between the car doors and the platform
- Wheelchair accessible coach identification on door
- At least one car door should have apparatus such as a hydraulic lift or pull-out ramp installed in the doorway for wheelchair users when the car door and the platform cannot be at the same level
- **Wheelchair space**
- Beside the door (Figure 11-5)
- Indicated within and outside the car by the international symbol of accessibility
- Wheel stoppers and ring-strap or other appropriate safety grip
- **Seats**
  :: Provide seats for passengers with disabilities and elderly people near the doors
- **Aisles**
  :: ≥900 mm wide
- **Information Signs and Announcements**
  :: Train routes map with Braille/raised numbers
  :: Announcement and visual display of the names of stations route In each car
  :: Raised numbers on the display with sharp contrast from the background.

11.7.3 Water and Air Transport Crafts

11.7.3.1 Water transport crafts: Ship and Ferry Interior

- Doors ≥900 mm wide
- Aisles ≥800 mm wide
- Accessible toilet and shower cubicle provided on board the ship. (Section 8.2 and 8.12 compliant)
- Wheel stoppers, ring-strap or other appropriate safety grip

11.7.3.2 Air Transport Crafts

- Aircraft to be safe for wheelchair passengers
- Airports to be fully accessible with appropriate boarding facilities
- Accessible toilet facilities on board aircraft. See Section 10.4

11.7.3.3 Aircraft Interior

- Doors ≥900 mm wide
- Aisles ≥750 mm wide
- Accessible toilet and shower cubicle on board the ship. (Section 8.2 and 8.12 compliant)
- Electric plugs accessible for passengers requiring respirators to be plugged in

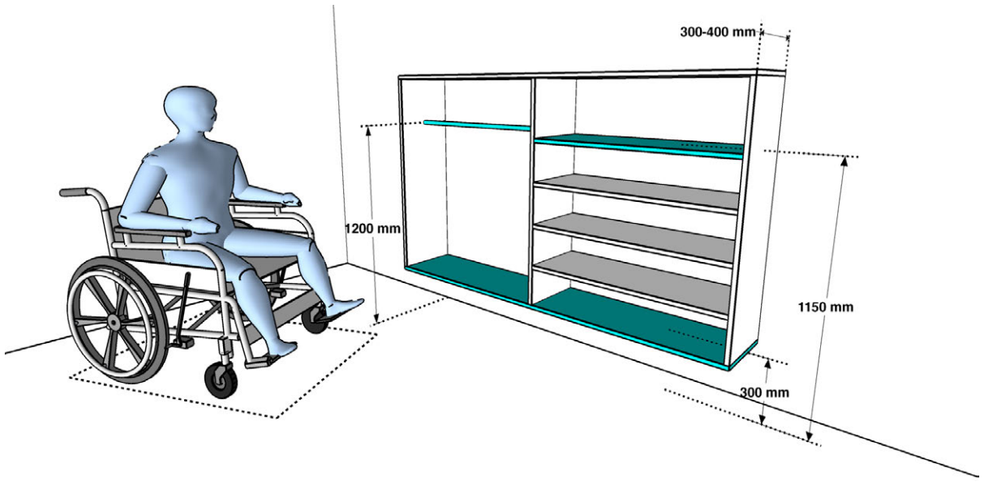


Figure 12-1: Storage space

12 ADAPTED HOUSING

12.1 EXTERIOR

12.1.1 Route of Entry:

- Non-slip, firm and even surface
- No loose gravel
- Continuous surface, unobstructed and uninterrupted by steps or sudden changes in level
- Visual signage with Braille at appropriate height identifying shopping areas, apartment blocks, bus stop, taxi stand, etc
- For multiple entries, select the most accessible one based on driveway proximity, level walking surface, stairs height and available handrails
- Level walkway, free of cracks and uneven surfaces from driveway to the home. See Section 10.1 for accessible parking
- Stairs conforming to Section 7.3 with handrails conforming to Section 5.9.3
- Section 7.2 compliant ramp if installed

12.1.2 Entrance

- Well lit and adequately covered from the elements
- Platform ≥1500 ×1500 mm for wheelchair users

12.2 INTERIOR

12.2.1 Furniture Arrangement

- ≥1500 mm turning radius to maneuvering wheelchair or ambulating with an assistive device
- Clear passage between rooms
- Unrestricted access to wall switches, electrical outlets, and telephones
- Controls & operating mechanisms Section 5.10 compliant
- ≥900 × 1200 mm clear floor space in front of all utilities and furniture

12.2.2 Floor surface

- Floor surface Section 5.5.4 compliant

12.2.3 Doors

- Doors Section 5.7 compliant
- Handles Section 5.7.9 compliant
- Glass doors marked with a bright coloured motif at eye level

Hazardous areas in dwellings frequented by people with visual impairments should use door handles with knurled surfaces.

12.2.4 Stairs

- Section 7.3 compliant
- Well lit

12.3 BEDROOM (Figure 12-2)

- ≥1500 mm turning in space for wheelchair, at least near all the doors
- ≥900 × 1200 mm clear floor space in front of all furniture
- Bed for a wheelchair:
  :: 450-480 mm from the floor surface
  :: Stable
- Bedside table or cabinet 450–900 mm from the floor for lamp, telephone, necessary medications, or call bell
- Wall hook at 1100-1300 mm recommended for closet area
- For closet:
  :: ≥900×1200 mm clear floor space
  :: Clothes bar 1200 mm from the floor
  :: Shelves installed between 300 mm and 1150 mm

Door handle Section 5.7.9 compliant

12.4 LIVING ROOM

- ≥1500 mm turning space near all living room entry points
- Except when the wheelchair user does the cooking, living-dining is preferable to a kitchen-dining room
- Dining table clear knee space ≥900 mm wide, 480 mm deep, 750 mm high
- Floor surface Section 5.5.4 compliant
- ≥900 x 1200 mm clear floor space in front of fixtures
- Chair seat heights ≥500 mm.
- Controls & operating mechanisms Section 5.10 compliant

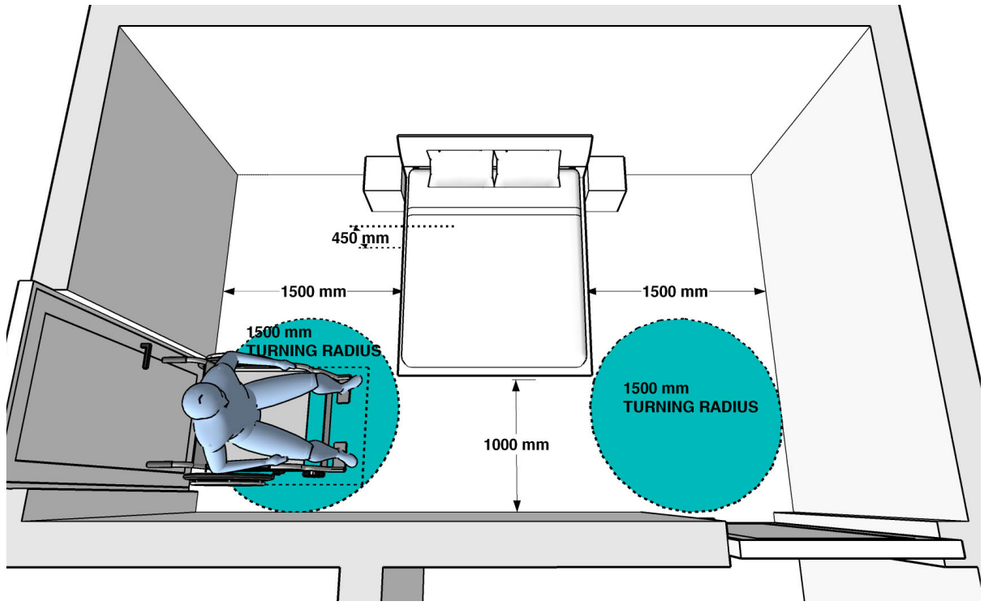


Figure 12-2: Space around bed

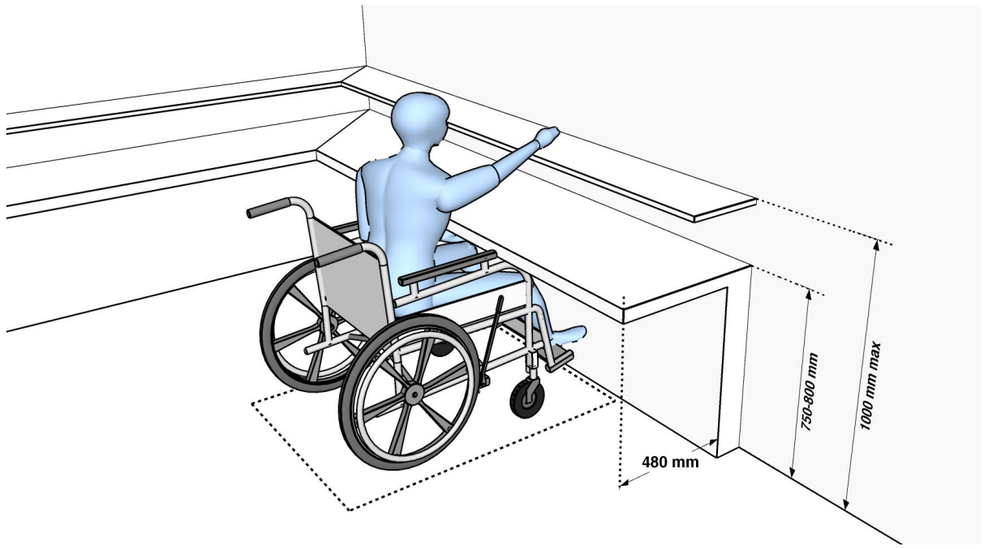


Figure 12-3: Shelves and cupboards

12.5 WASHROOM

Section 8.2 compliant.

12.6 KITCHEN

- ≥1500 mm Wheelchair turning radius between counter and opposite walls
- Floor surface allows for easy wheelchair maneuverability
- Counter tops (Figure 12-3)
  :: Counter tops 750–800 mm high with ≥900 mm wide, 480 mm deep and 750 mm high (Figure 12-4) clear knee space
  :: Rounded edges on counter tops/slabs
  :: Smooth surfaces to facilitate sliding heavy items
  :: Slide-out working spaces recommended
  :: Stools (preferably with back and foot rests) strategically placed in main work area
  :: Shelves and storage spaces 300 to 1200 mm in height
  :: Controls and operating mechanisms Section 5.10 compliant
  :: Insulate exposed hot-water pipes under the sink