الهيئة الملكية لمدينة الرياض
ROYAL COMMISSION FOR RIYADH CITY

ACCESSIBILITY CODE
FOR RIYADH CITY

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INTRODUCTION

INTRODUCTION

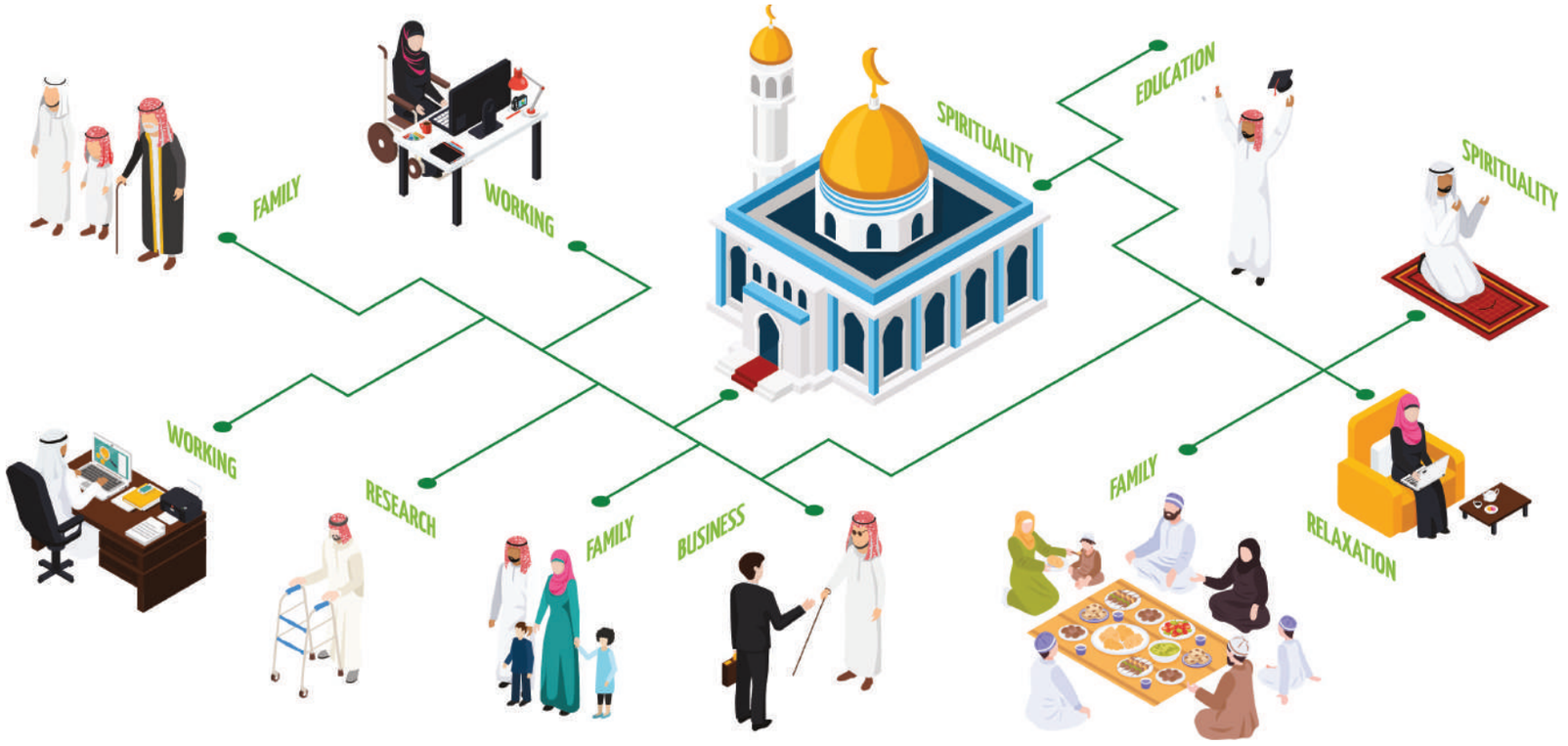
UNIVERSAL DESIGN IS ABOUT IMPROVING ACCESSIBILITY FOR ALL PEOPLE

Universal Design addresses accessibility at all levels, demographics and abilities. Truly universal design will address disability in all its forms - from able-bodied people with a temporary disability to people suffering multi- limb mobility restrictions or severe sight and hearing impairments. A good start to considering the overwhelming concept of universal design is to design accessibility for all abilities.

INTRODUCTION

UNIVERSAL DESIGN CAN ENABLE INDEPENDENCE FOR ALL PEOPLE

Universal Designg enables people to lead independent lives, regardless of physical or other impairment is a primary objective of the design guidelines

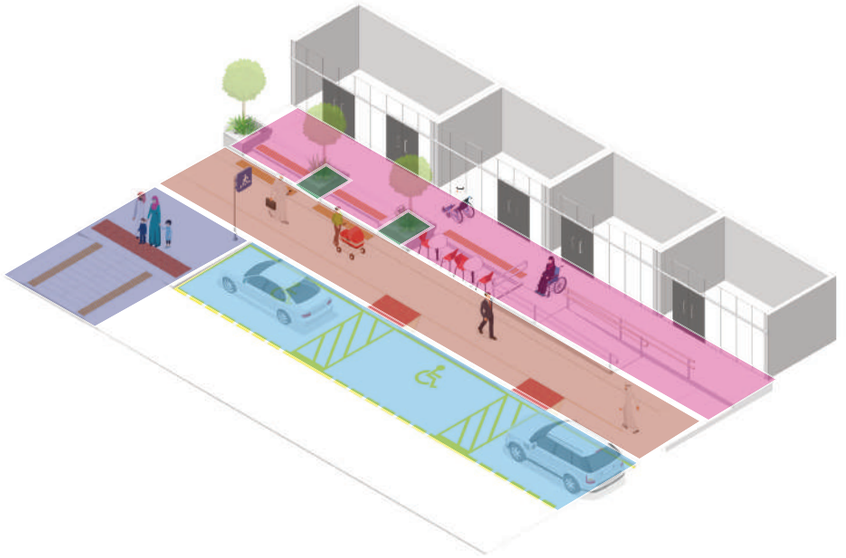


INTRODUCTION

THE DAILY JOURNEY FOR PEOPLE

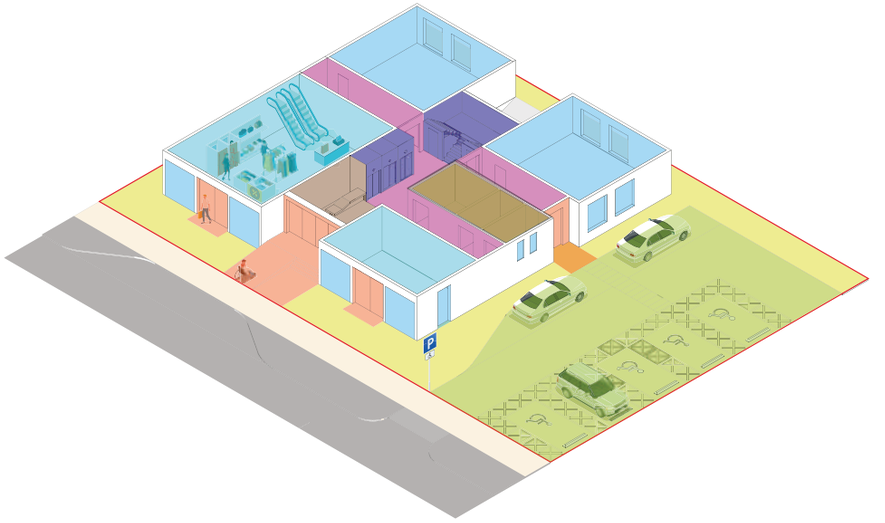
The chapters of the this document have been structured to cover all the elements that impact the daily journey of somebody with disabilities in Riyadh, from using streets to how they open and use specific rooms in buildings.

PART A / EXTERNAL AREAS



- CAR PARKING & DROP-OFF
- TRAVELING ON STREETS
- ACCESSING BUILDINGS FROM STREETS
- CROSSING ROADS
- LANDSCAPE & OPEN SPACES

PART B & C / BUILDING AND THEIR SPECIFIC ROOMS



- ARRVING AT BUILDING
- APPROACHING THE BUILDING
- ENTERING THE BUILDING
- MOVING IN THE BUILDING
- SANITARY FACILITIES
- USING & ACCESSING ROOMS

INTRODUCTION

HOW TO USE THIS GUIDELINE

This building code is not expected to be used as an Academic report on disability. It is a textbook code that allows people to find exactly what element of unviersal design they need. Each page has colour and number code to allow easy navigation.

Page title

The color and letter related chapter and page indicator

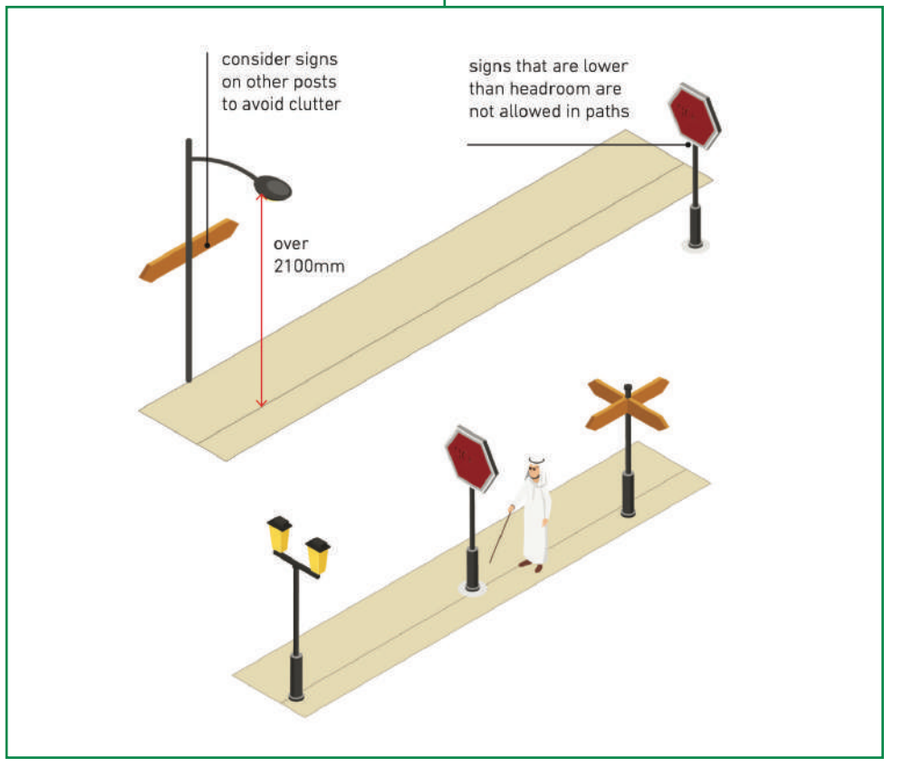
Diagram, illustration or photograph

OBSTRUCTIONS TO HEIGHT

A 4 4

numerical dimensions or gradient

- The clear height for headroom in accessible paths is minimum 2100mm above floor.
- No objects that are between 650-2100mm should protrude more than 100mm into accessible paths.
- Any object below 650mm can protrude into the space but must not reduce the total width of path below the allowed d
- This height measurement is taken from the leading edge of the object as shown in diagram
- Any doorways such as park gates or collonades on external paths should be a clearh height of a minimum 1980mm and preferred more than 2100mm from floor.



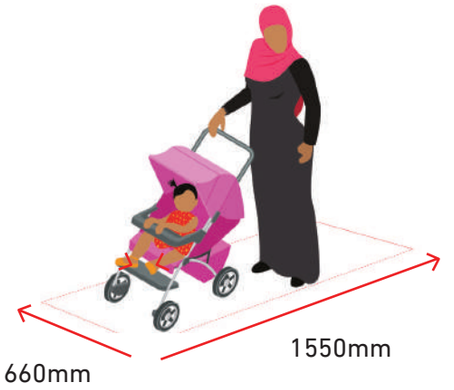
INTRODUCTION

CLEAR FLOOR SPACE REQUIREMENTS

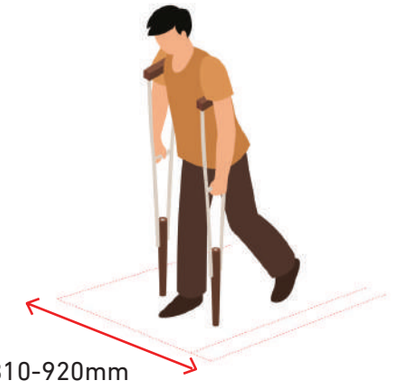
Understanding the size and space requirements of people and their vehicels is an essential start to Universal Design practice.

Person with luggage

Person with pram / stroller

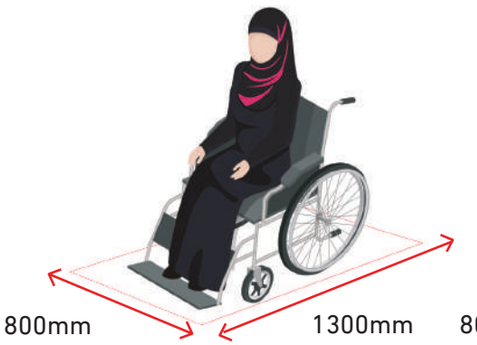


Person with crutches

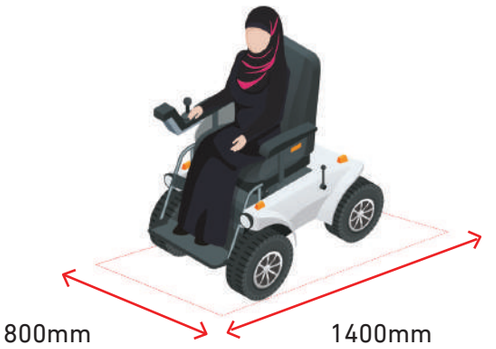


Person with walker

Person with wheelchair



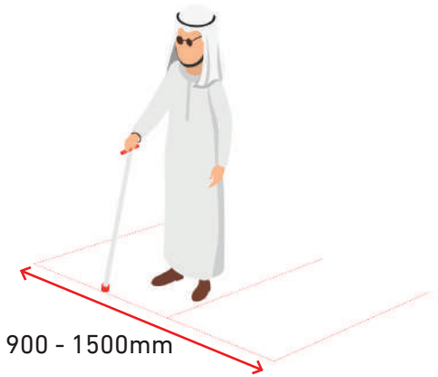
Person with mobility scooter



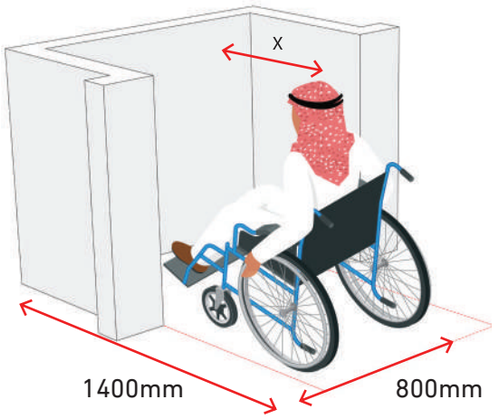
INTRODUCTION

TURNING SPACES AND CLEARANCES

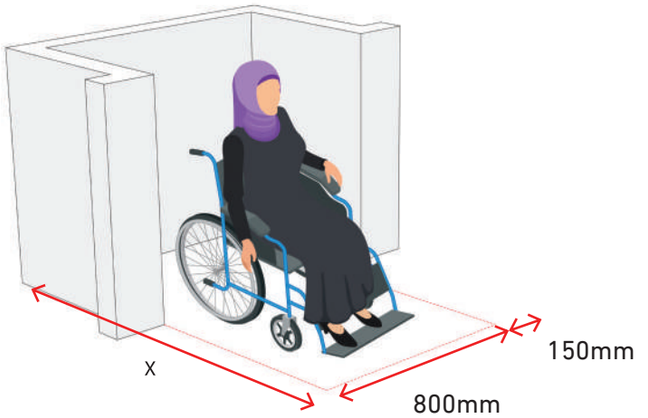
Blind person with long white cane



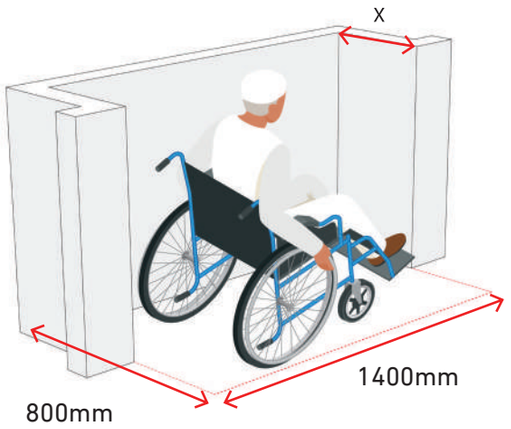
Frontal clearance at alcove
Frontal approach where X is 610mm of less



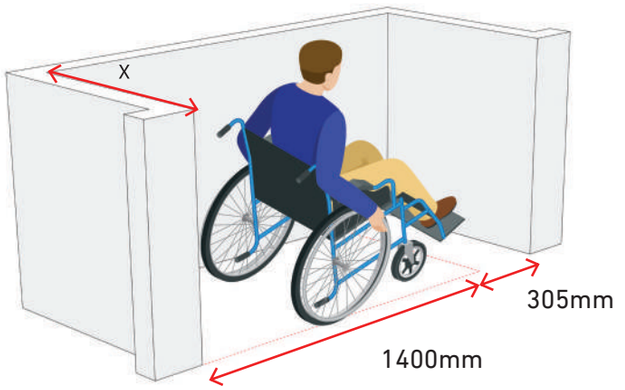
Frontal clearance at alcove
Frontal approach where X is more than 610mm



Parallel clearance at alcove
Parallel approach where X is 400mm of less



Parallel clearance at alcove
Parallel approach where X is more than 400mm



Turning circle for person in wheelchair

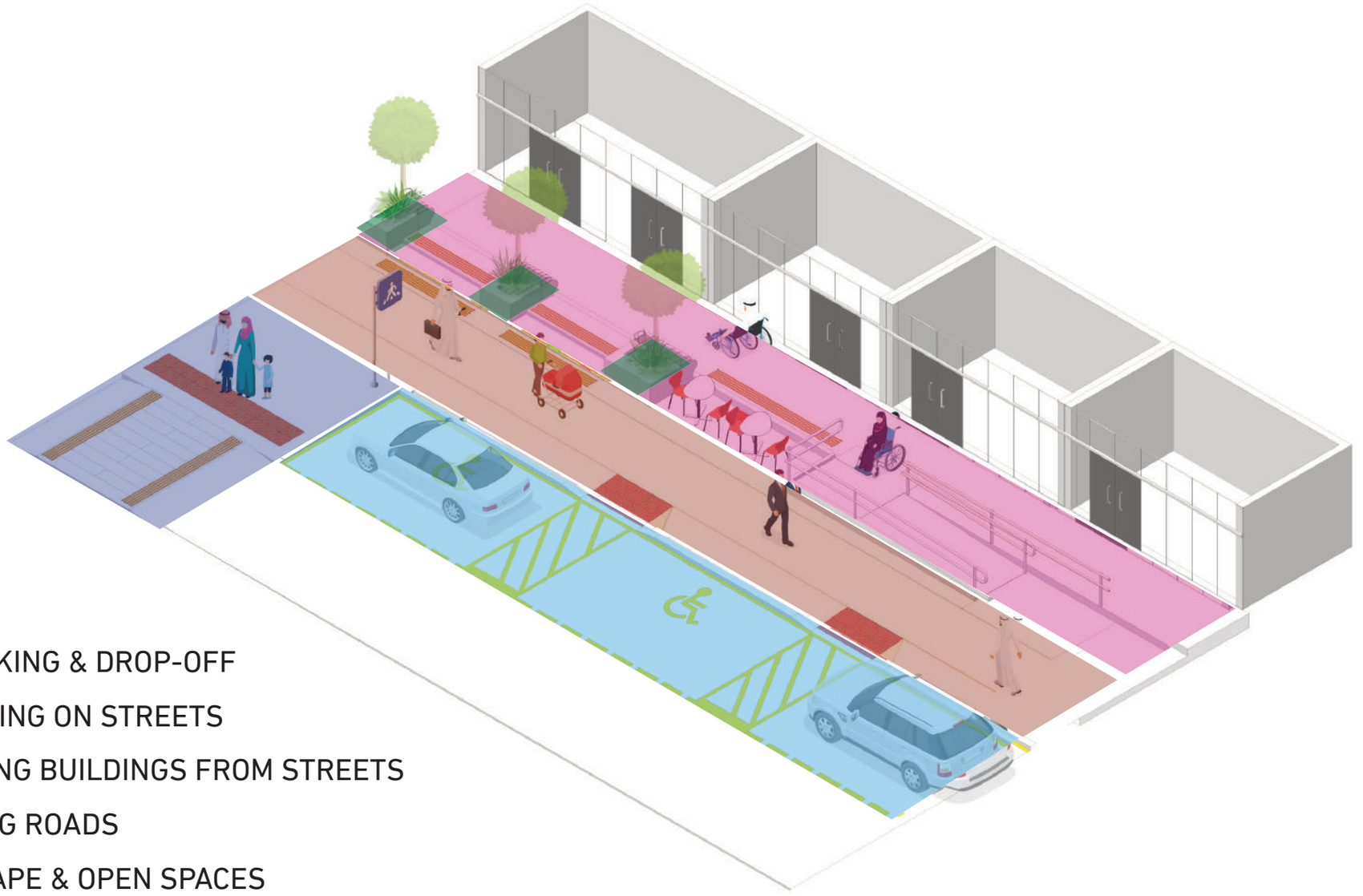
A

EXTERNAL AREAS

Car Parking & Drop Off

A

A 1 Car Parking & Drop Off



- CAR PARKING & DROP-OFF
- TRAVELLING ON STREETS
- ACCESSING BUILDINGS FROM STREETS
- CROSSING ROADS
- LANDSCAPE & OPEN SPACES

A 1 1 AMOUNT OF ACCESSIBLE PARKING

Accessible Spaces

- Accessible car parking is for people with a disability.
- The user is required to have documentation displayed in vehicle.

Limited Mobility Spaces

- Limited mobility spaces are for people who may require extra time and space for vehicle access. This includes families with small children, expectant mothers, caregivers, people using walkers, canes and crutches.

Disabled Car Parking for buildings

- Disabled car parking spaces to be located at shortest distance to main building entrance.
- Where multiple entrances exist, disabled parking to be provided at closest distance to accessible entrance.
- Avoid or minimise crossing of roads on route to entrance.
- The direction towards building entrance should be clear from the car parking space.
- A sign adjacent to accessible parking space should direct towards accessible entrance
- Table 1 applies to parking structures and ground surface car parking areas.
- Table 1 is a minimum requirement and a higher proportion is expected in hospitals, medical facilities and other places with higher frequency of disabled visitors.

Minimum amount of disabled car parking

	TOTAL	ACCESSIBLE SPACES	LIMITED MOBILITY SPACES
	Total number of car parking spaces provided	Number of designated accessible car parking spaces required	Number of designated accessible limited spaces required
1	50-1	1	1
2	100-51	2	2
3	200-101	4	2
4	300-201	5	3
5	500-301	6	4
6	501 and over	6 plus 1 for each 100 over 500	501 and over

Table 1: Minimum disabled car parking spaces as per current KSA guidelines

A 1 2 SIGNS

Disabled Parking Sign

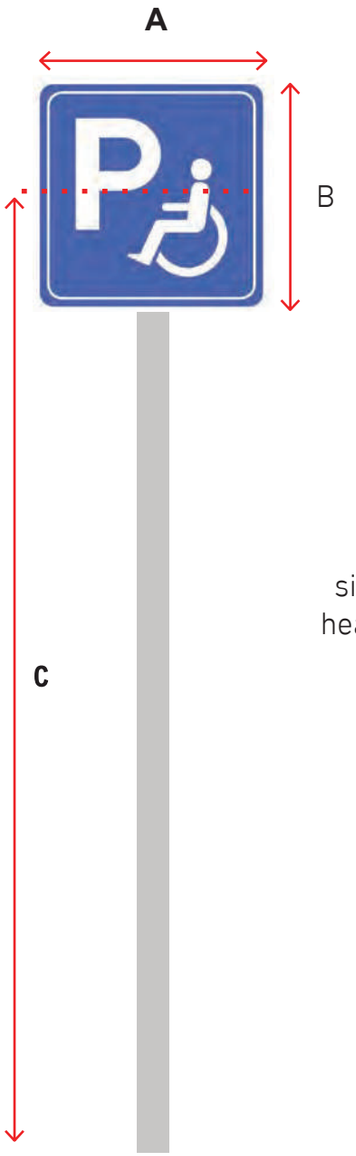
- Signs to be mounted vertically on a post or wall
- Signs should not reduce width or height of accessible path to below standards.
- International symbol of access must be displayed and contrast with its background

Directional signs

- A sign adjacent to accessible parking space should direct towards accessible entrance or other accessible facility

Dimensions

A - Width of sign: 300mm minimum
B - Height of sign: 450mm minim=um
C - Height of sign post (measured from centre): 2100mm minimum from ground



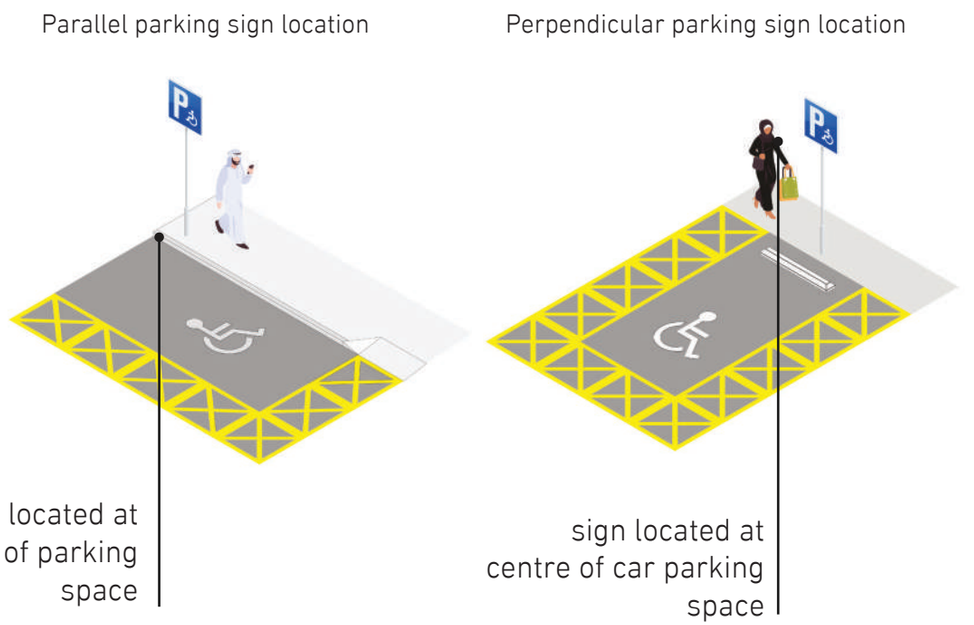


Figure 1: Examples of preferred signs around bays

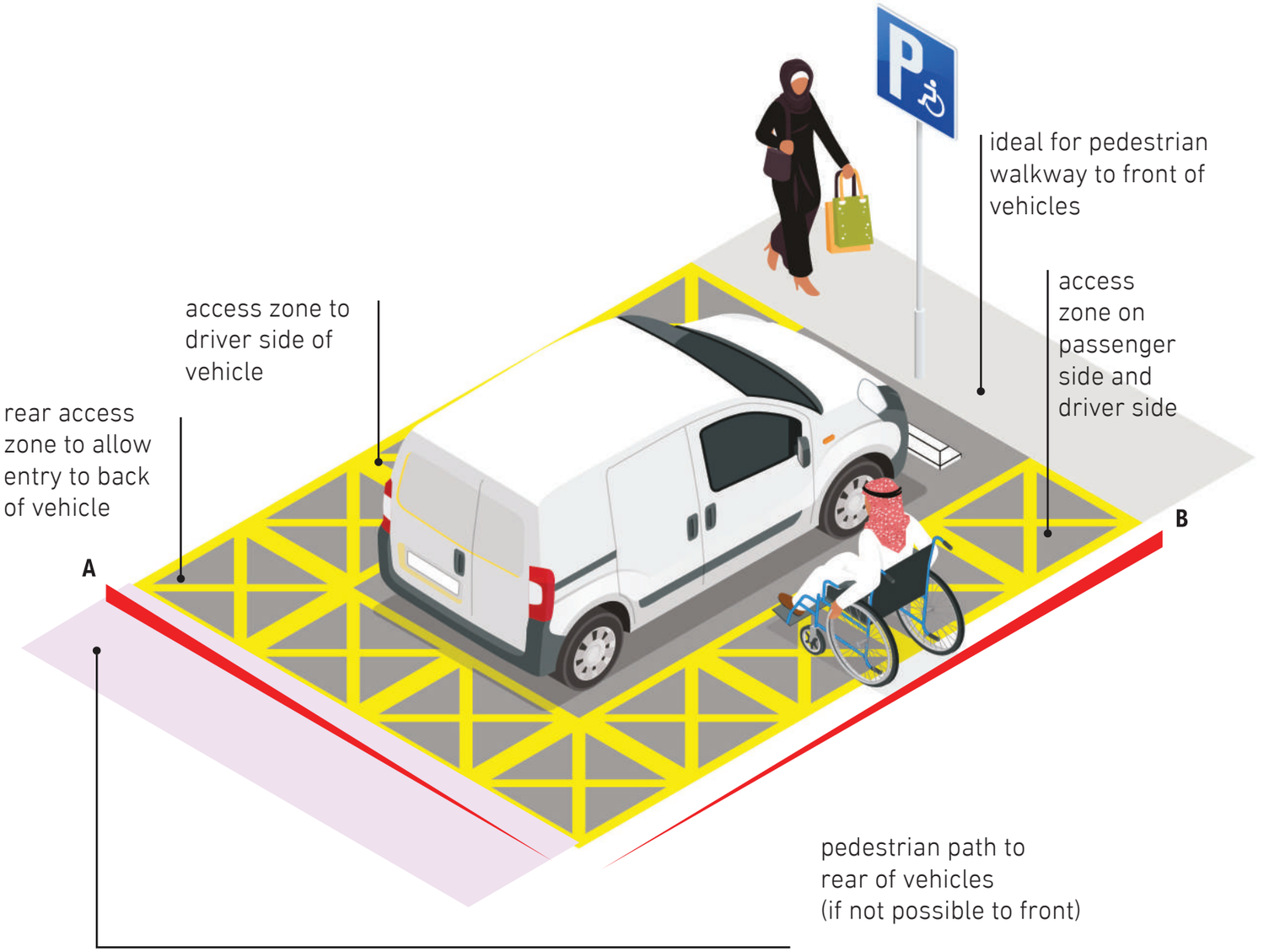
A 1 3 AMOUNT OF ACCESSIBLE PARKING

- Surface materials for disabled parking should be firm, smooth and stable.
- The maximum gradient of parking bay and access zones is 2% for running and cross slopes
- A pedestrian pathway should be provided to the front and rear of all car parking bays.

Gradient

A- Cross slope: 2% maximum

B- Running slope: 2% maximum



A 1 4 SURFACE MARKINGS

Symbol of Access

- The international symbol of access should be displayed on surface of disabled car parking bay

Access Zone Hatching

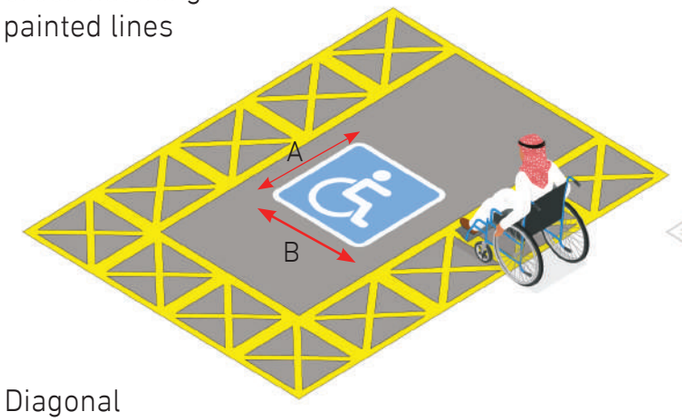
- Colour of access zones hatchings to visually contrast with ground surface material.
- Examples are shown but other combinations are permissible.
- Disabled car parking spaces should have access zones to rear and both sides of vehicles.
- Limited mobility parking spaces should have access zones to both sides of vehicle.

Dimensions

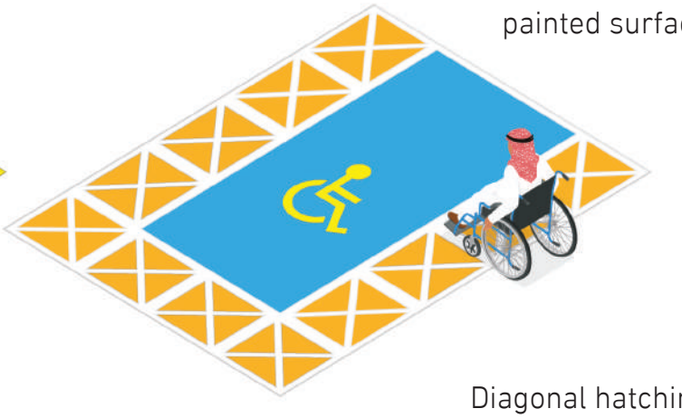
International symbol of disability dimensions:
A- 1500mm minimum
B- 1500mm minimum

Examples of hatching styles

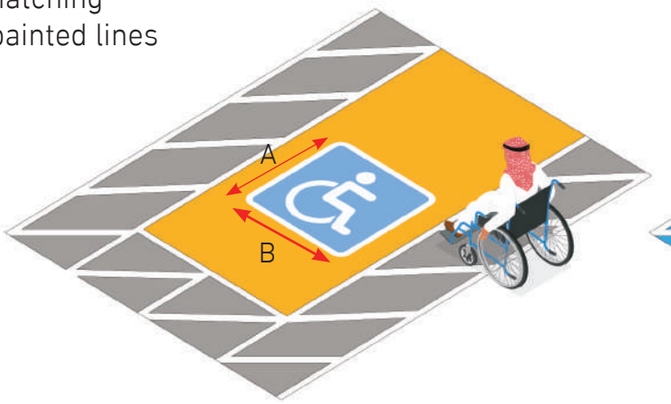
Cross hatching painted lines



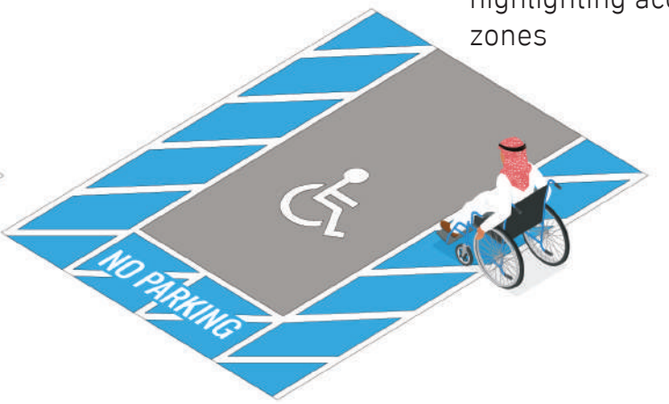
Cross hatch and painted surface



Diagonal hatching painted lines



Diagonal hatching highlighting access zones



Examples of colour contrasting symbols

A 1 5 BAY DIMENSIONS

Width & Length

- Minimum parking bay dimensions can not be reduced.
- International symbol for access to be displayed on surface of bay.

Clear Headroom

- The minimum height for accessible parking spaces is 2750mm above the floor
- For indoor car parking areas, a minimum 2600mm high is permissible

Dimensions

A- driver side access zone:
1200mm minimum (ideal 2100mm)

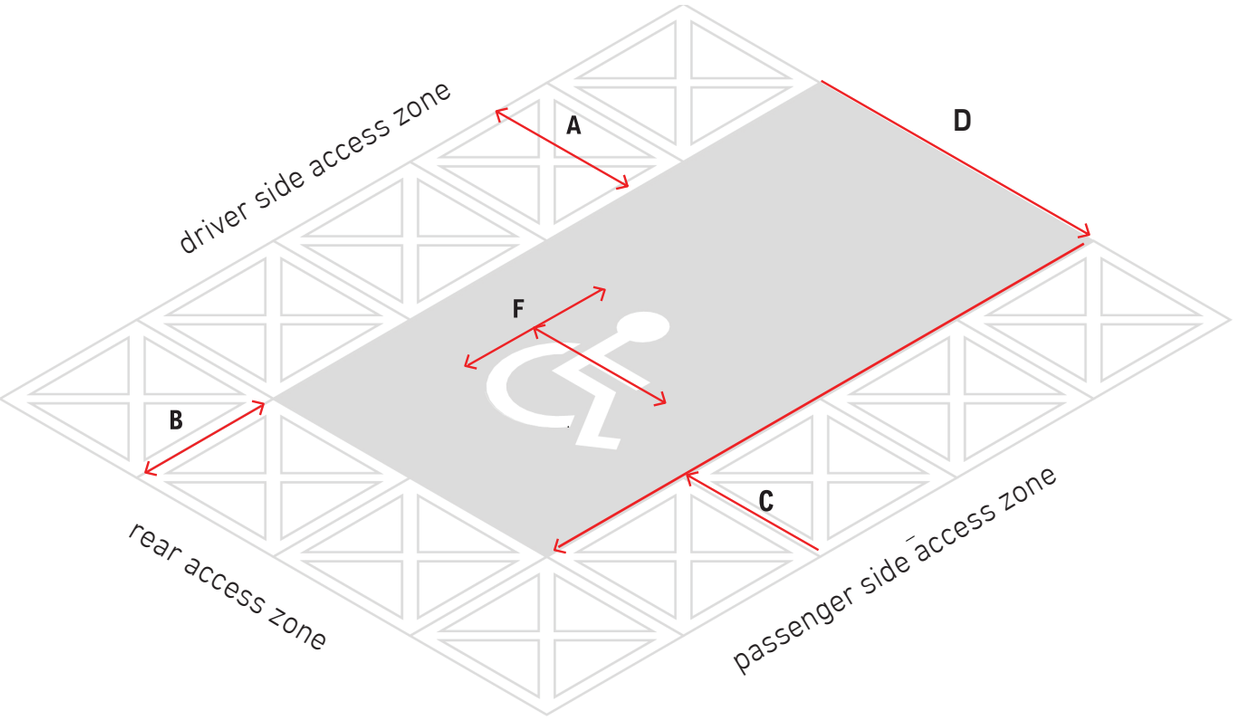
B- rear side access zone:
1200mm minimum (ideal 2100mm)

C- passenger side access zone:
1200mm minimum (ideal 2100mm)

D- car parking bay width:
- Parallel - 3900mm minimum (with access zone)
- Perpendicular - 2400mm minimum
- Angle - 2900mm

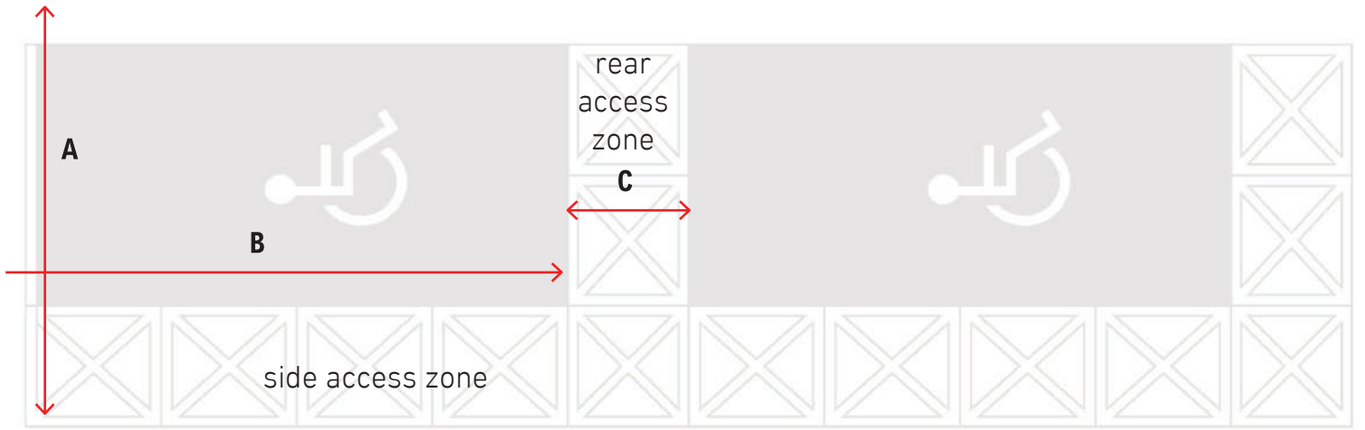
E- car parking length:
- parallel - 5400mm minimum
- perpendicular - 6100mm minimum
- angle - 6350mm

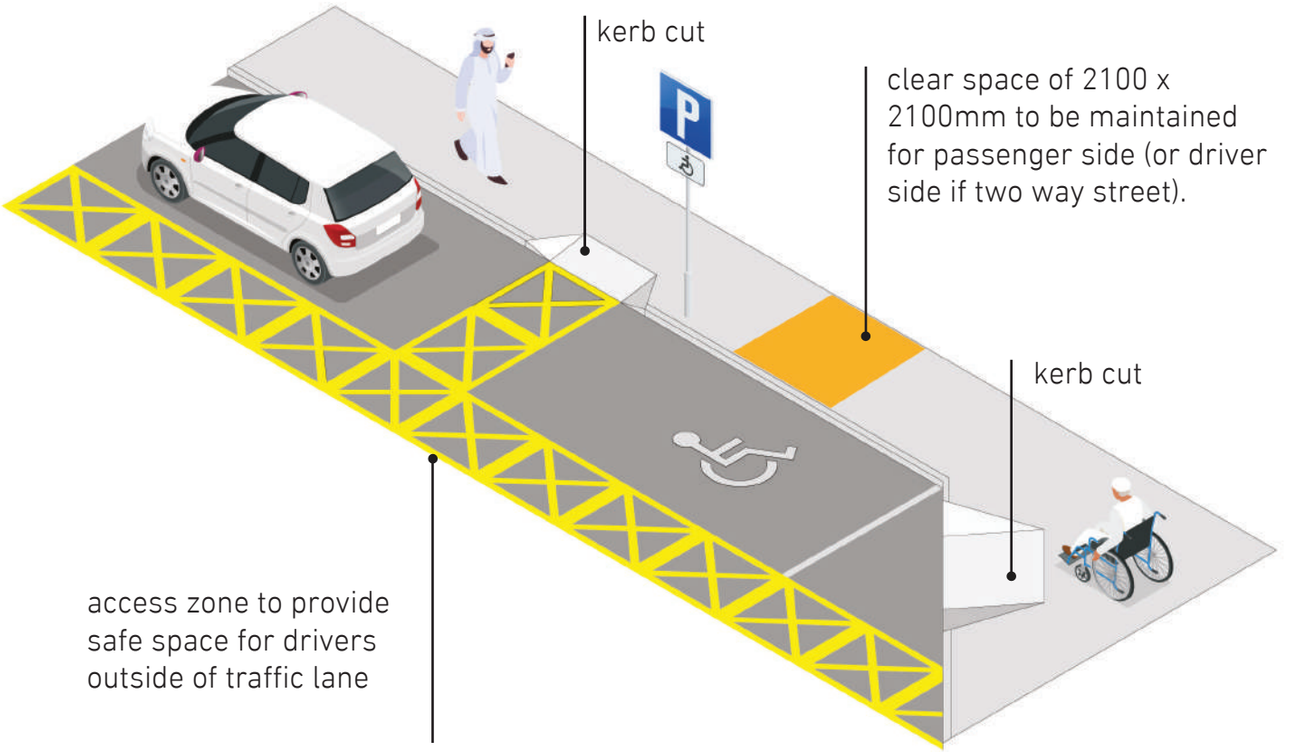
F- size of international sign for access:
1200mm minimum length and height



A 1 6 PARALLEL SPACE

- Parallel spaces should have access zone to road side.
- Access zone to rear is mandatory.
- Access zones to side must extend entire length of parking bay.
- In exceptional circumstances, access zones may reduce to 1500mm width if can be proven there is no other option.





Dimensions

A- total width of parking bay and access zone:
3900mm minimum

B- parking bay length:
5400mm minimum

C- side access zone:
minimum of 1500mm (if renovation) or 2100mm (if new)

A 1 7 PERPENDICULAR SPACE

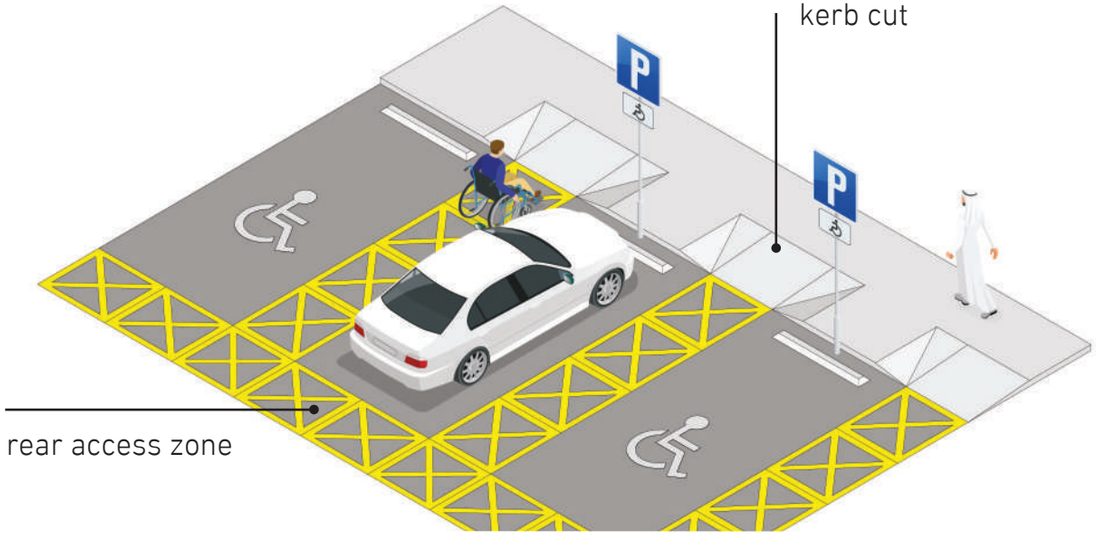
- Perpendicular space should have access zones to both sides and rear.
- Access zone to at least one side is mandatory.
- Access zones to side must extend entire length of parking bay.
- Side access zones can be shared with the adjacent parking bay

Dimensions

A- width of parking bay and access zone:
2400mm minimum

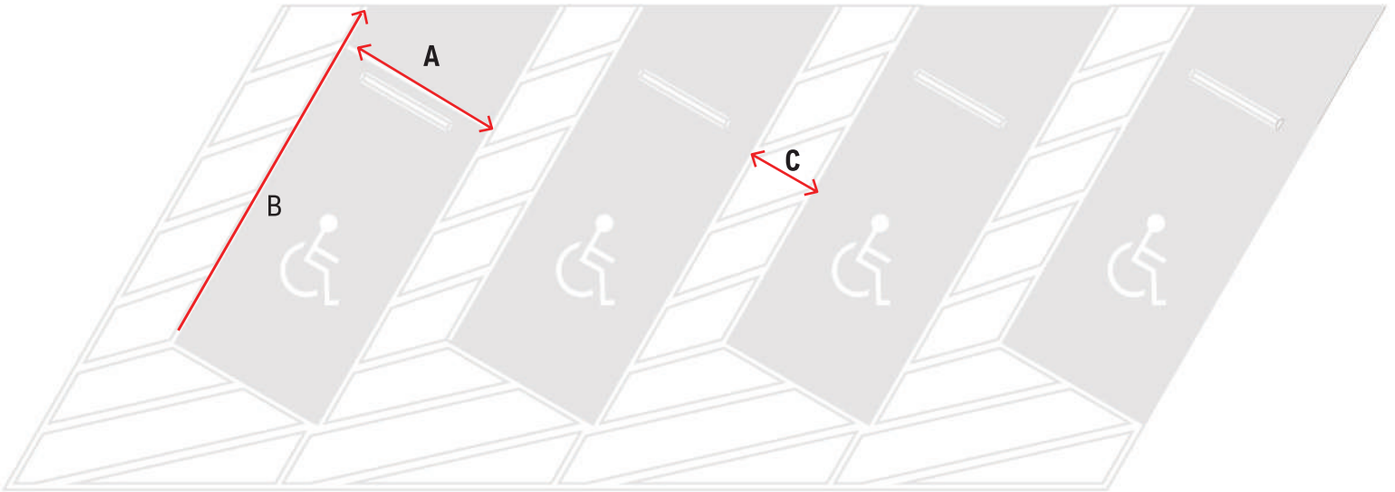
B- parking bay length:
6100mm minimum

C- side access zone:
minimum of 1500mm (if renovation)
or 2100mm (if new)



A 1 8 DIAGONAL SPACE

- Diagonal space should have access zones to both sides and rear.
- Access zone to at least one side is mandatory.
- Access zones to side must extend entire length of parking bay.
- Side access zones can be shared with the adjacent parking bay

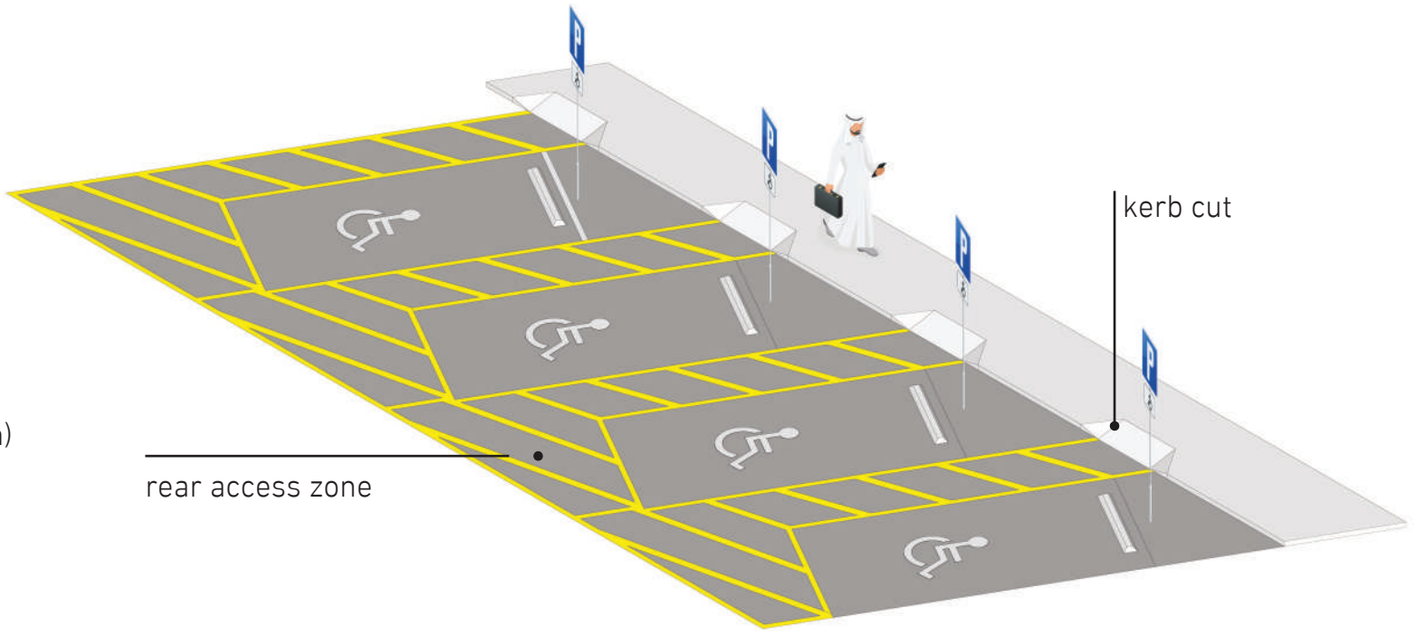


Dimensions

A- width of parking bay and access zone:
2900mm minimum

B- parking bay length:
6350mm minimum

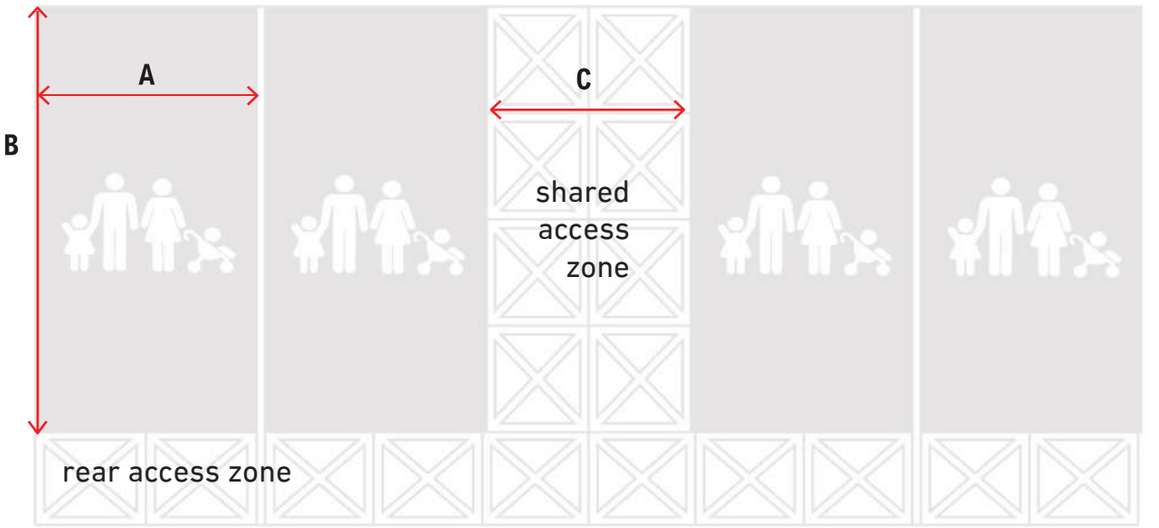
C- side access zone:
minimum of 1500mm (if renovation) or 2100mm (if new)



A 1 9 LIMITED MOBILITY SPACE

- Limited mobility spaces are for people who may require extra time and space for vehicle access. This includes families with small children, expectant mothers, caregivers, people using walkers, canes and crutches.

- In renovation situations or where restricted space, it may be permitted to share access zone with adjacent parking bay.

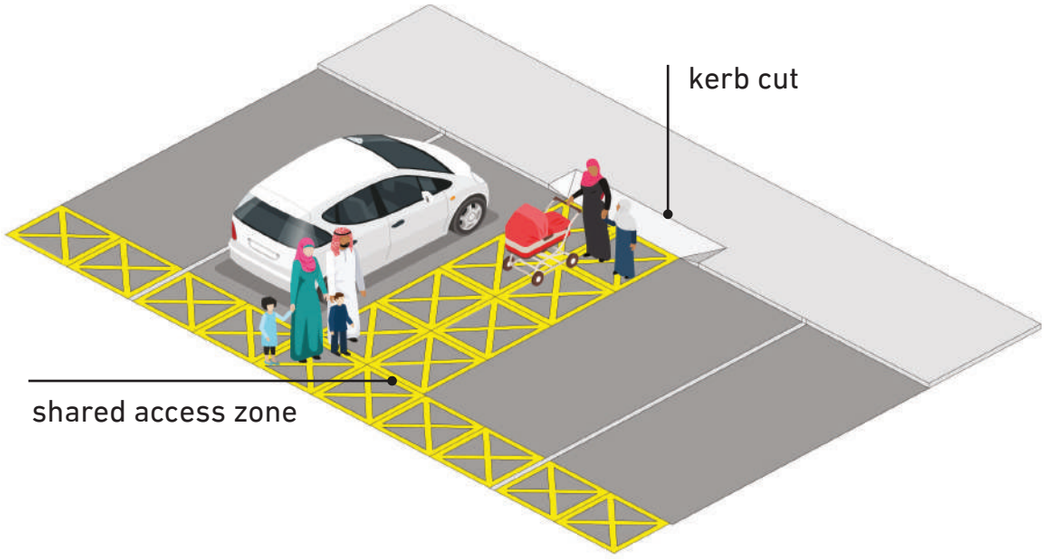


Dimensions

A- width of parking bay and access zone:
2400mm minimum

B- parking bay length:
6100mm minimum

C Access zone:
1200mm minimum



A

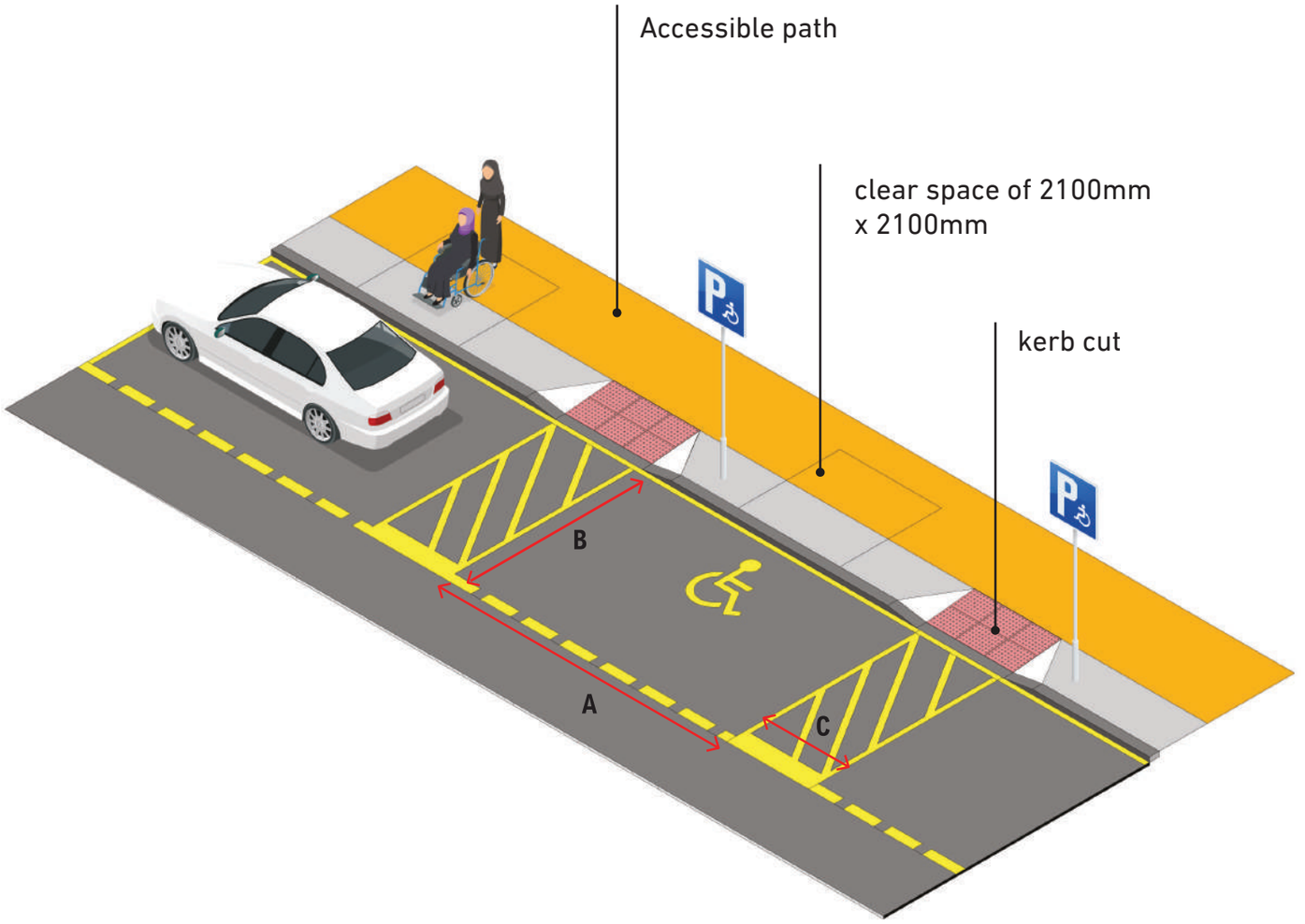
2

Drop Off

2

A 2 1 ON-STREET DROP OFF ZONES

- Located as close as possible to an accessible entrance or other destination.
- Drop-off waiting areas should be well shaded from sun.
- Floor surfaces should be firm, stable and a maximum of 2% gradient for running and cross slope.
- An access zone should be provided on the passenger side.
- Minimum overhead clearance of 3600mm.
- A kerb cut should be used where there is a kerb.



Dimensions

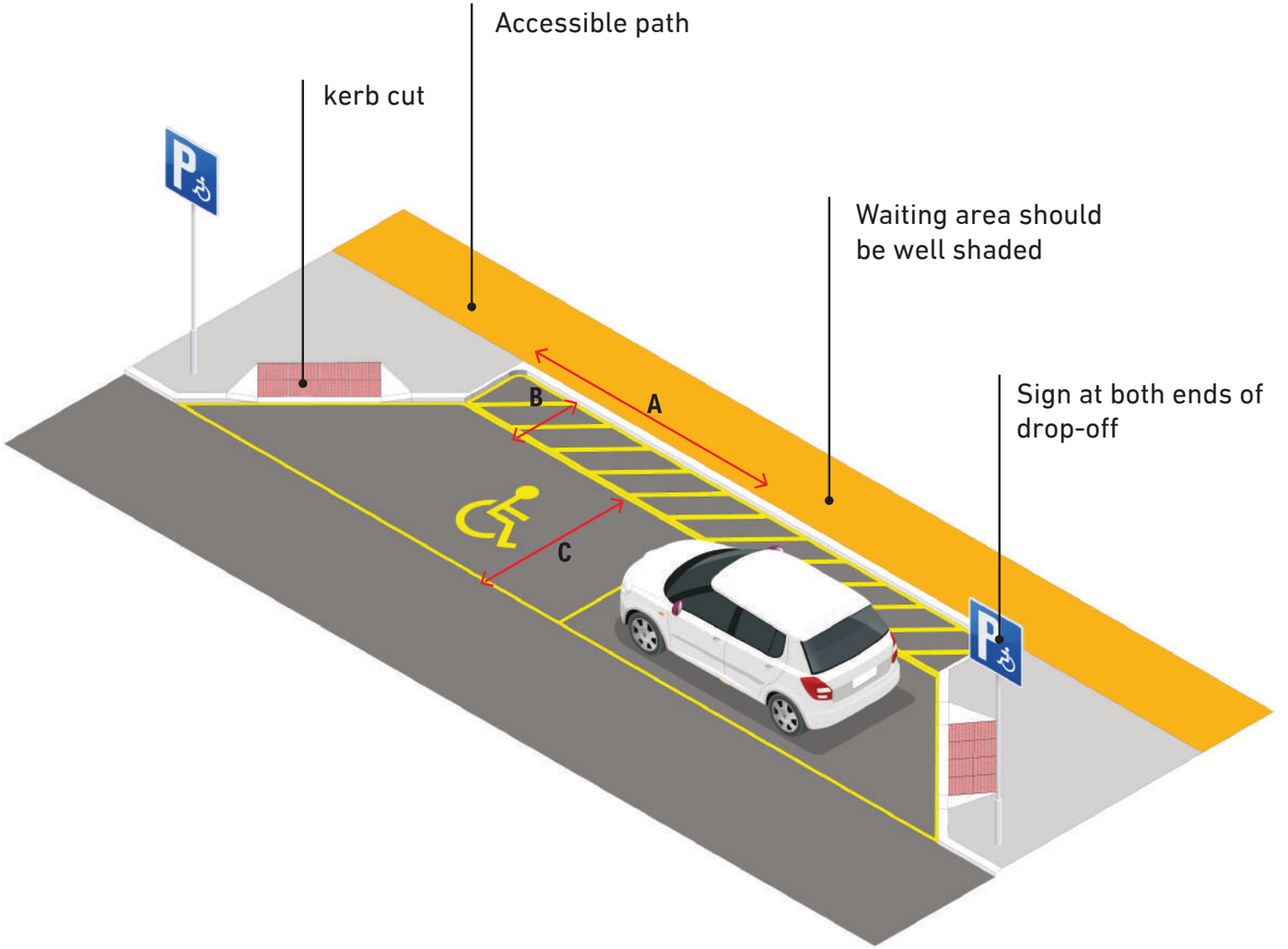
A- length of parking bay:
5400mm minimum

B-width of parking bay:
3900mm minimum

C- width of access zone:
2100mm minimum

A 2 2 OFF-STREET DROP OFF ZONE

- Located as close as possible to an accessible entrance.
- Drop-off waiting areas should be well shaded from sun.
- Floor surfaces should be firm, stable and a maximum of 2% gradient for running and cross slope
- An access zone should be provided on the passenger side.
- Minimum overhead clearance of 3600mm
- A kerb cut should be used where there is a kerb



Dimensions

A- length of loading bay:
7000mm minimum

B- Width of access zone:
1500mm minimum

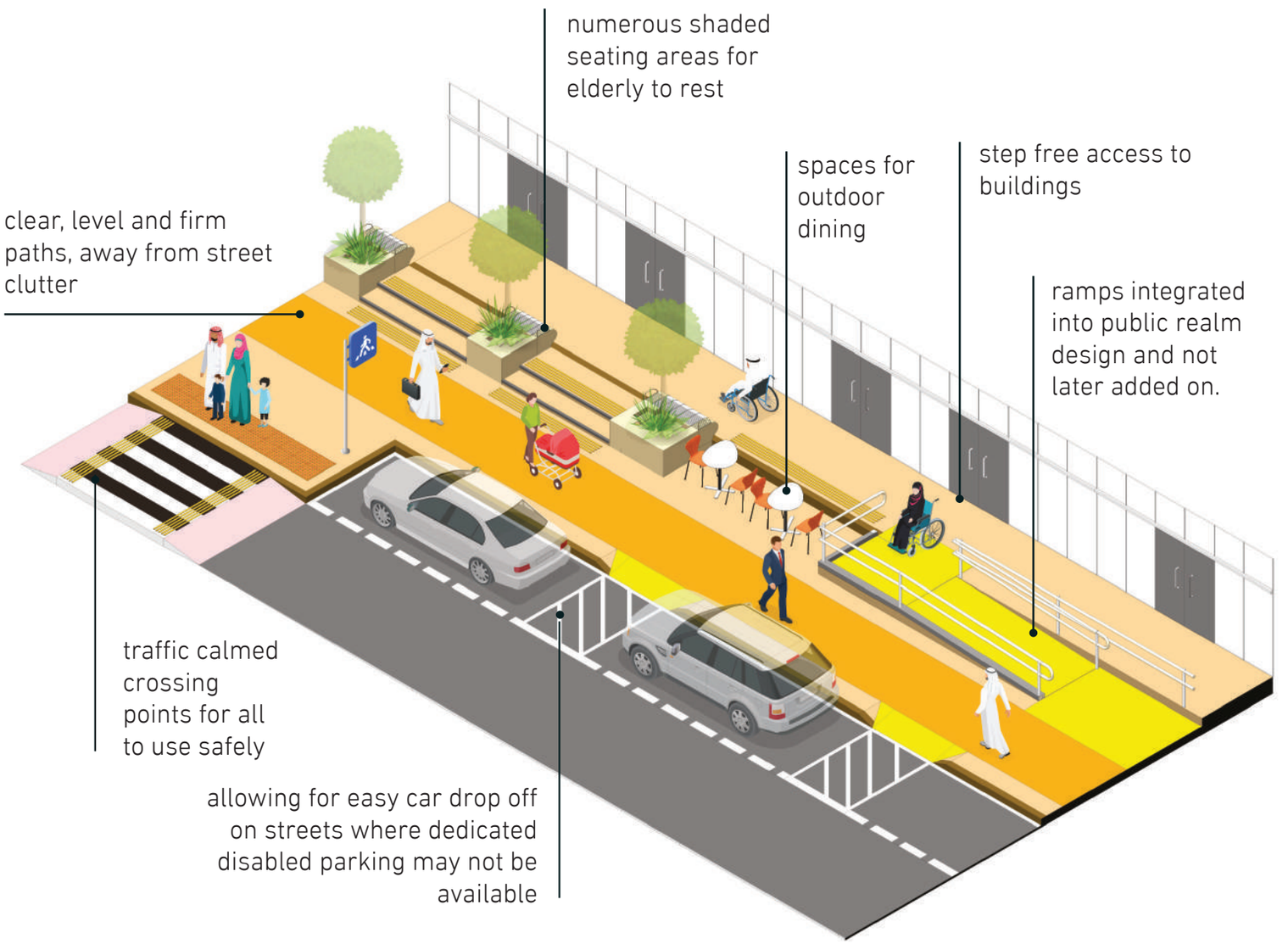
C- width of parking bay:
3900mm minimum

Complete Streets

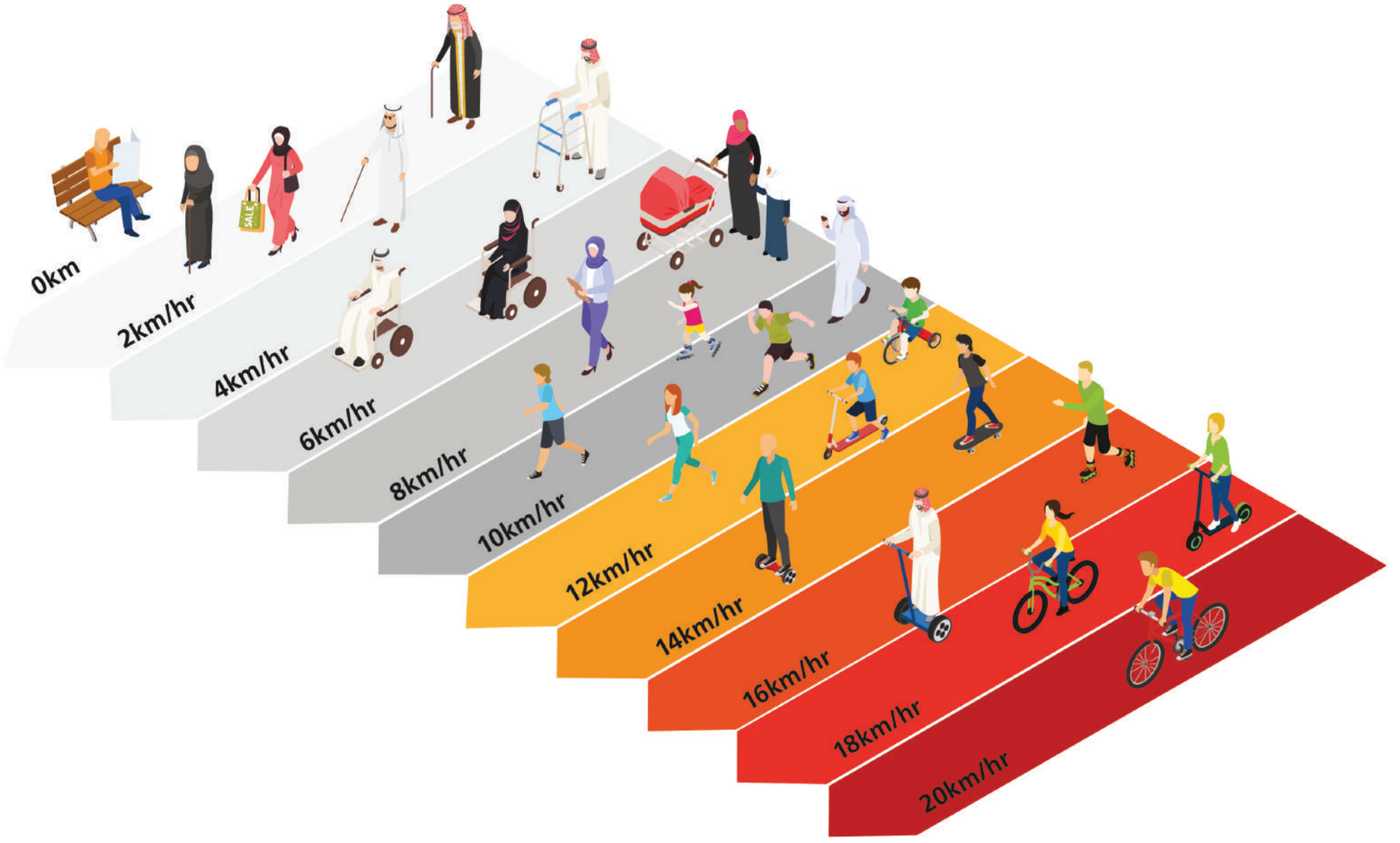
A

A 3 1 INTEGRATED COMPLETE STREETS

- Universal design is about creating streets that incorporate accessible features in a way that can not be seen by the users.
- Changes in level should be incorporated and where possible, used to make a feature
- No level difference between street and building is the ideal but is often not existing situation in Saudi Arabia



A 3 2 SHARING SPACE SAFELY



A

Accessible External Paths

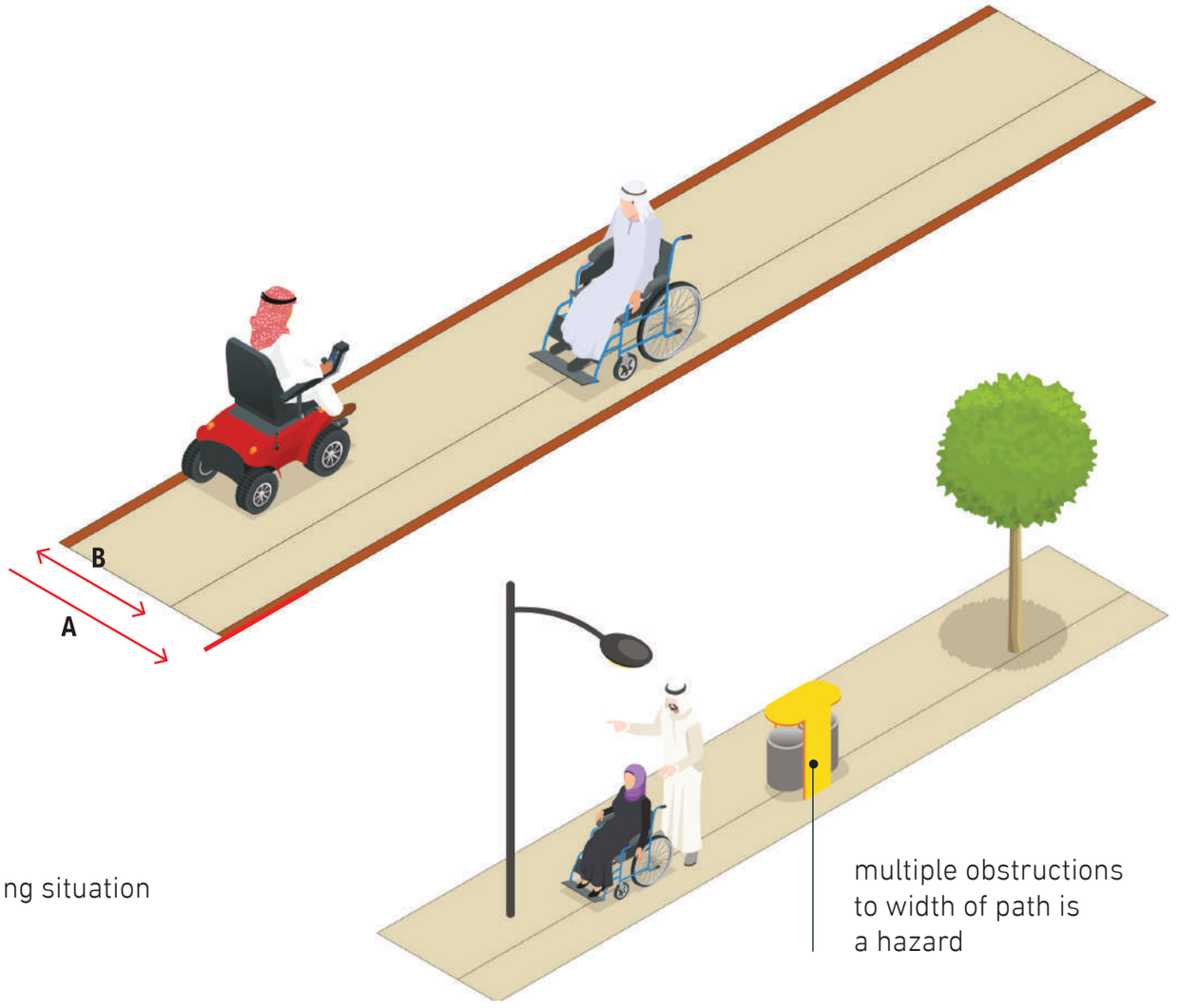
A 4 1 PATH WIDTH

- The clear width of an accessible path should be above 1800mm.
- When there is proven to be restricted space, a minimum of 1200mm may be allowed.
- Passing places should be provided if below 1800mm
- Materials of contrasting colour and texture should be used to define the edge of an accessible path.

Dimensions

A- width of path:
1800mm minimum

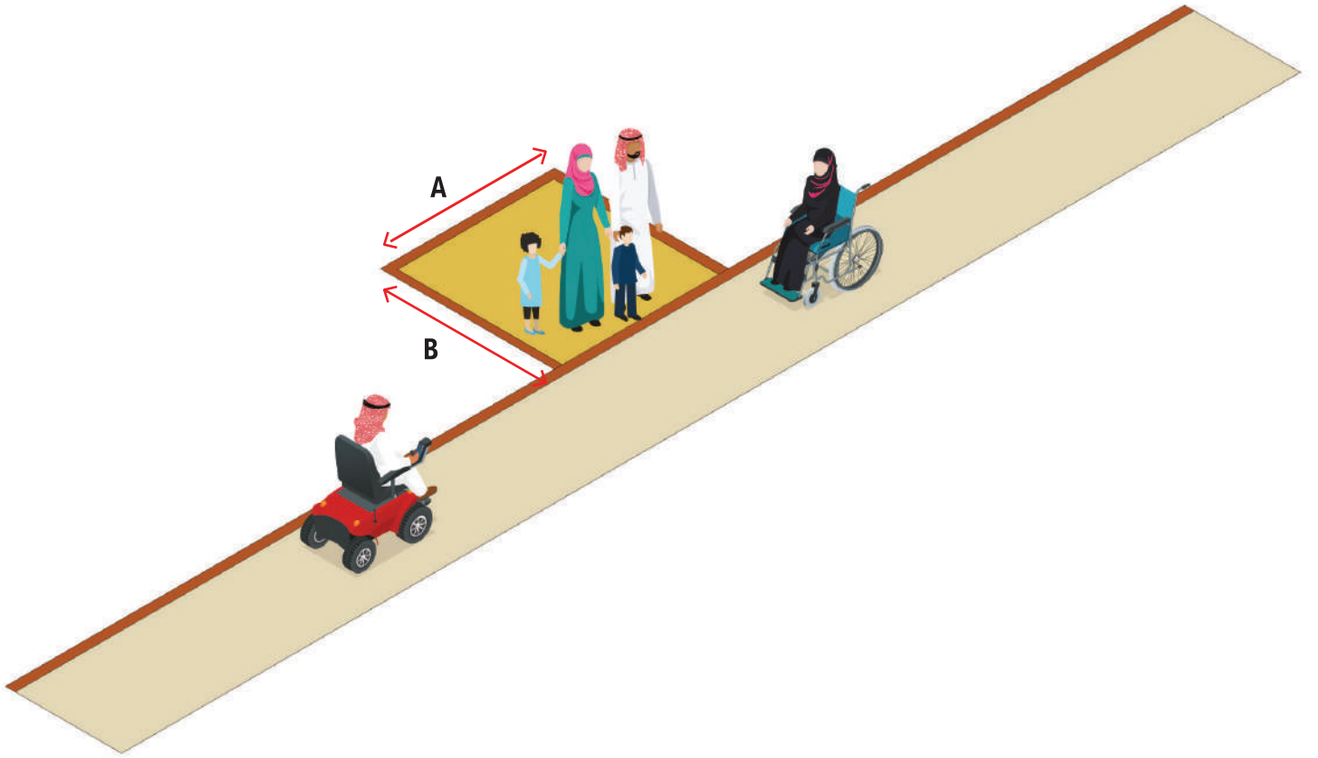
B- width of path in renovation (if passing places provided):
1200mm minimum



Existing situation

A 4 2 PASSING PLACES

- Where the size of path is below 1800mm then there needs to wider passing places for two wheelchairs to pass easily.
- Passing places should be spaced at not more than 30 metres apart.
- Passing areas should be set back from accessible paths so not to cause obstruction to movement
- Passing areas should be shaded from sun and protected from sand
- Consider locating other furniture like waste receptacles, water fountains and shade structures in passing areas, ensuring do not reduce the width of the accessible path or cause overhead obstruction.



Dimensions

A- width of passing place:
1800mm minimum

B- depth of passing place:
1800mm minimum

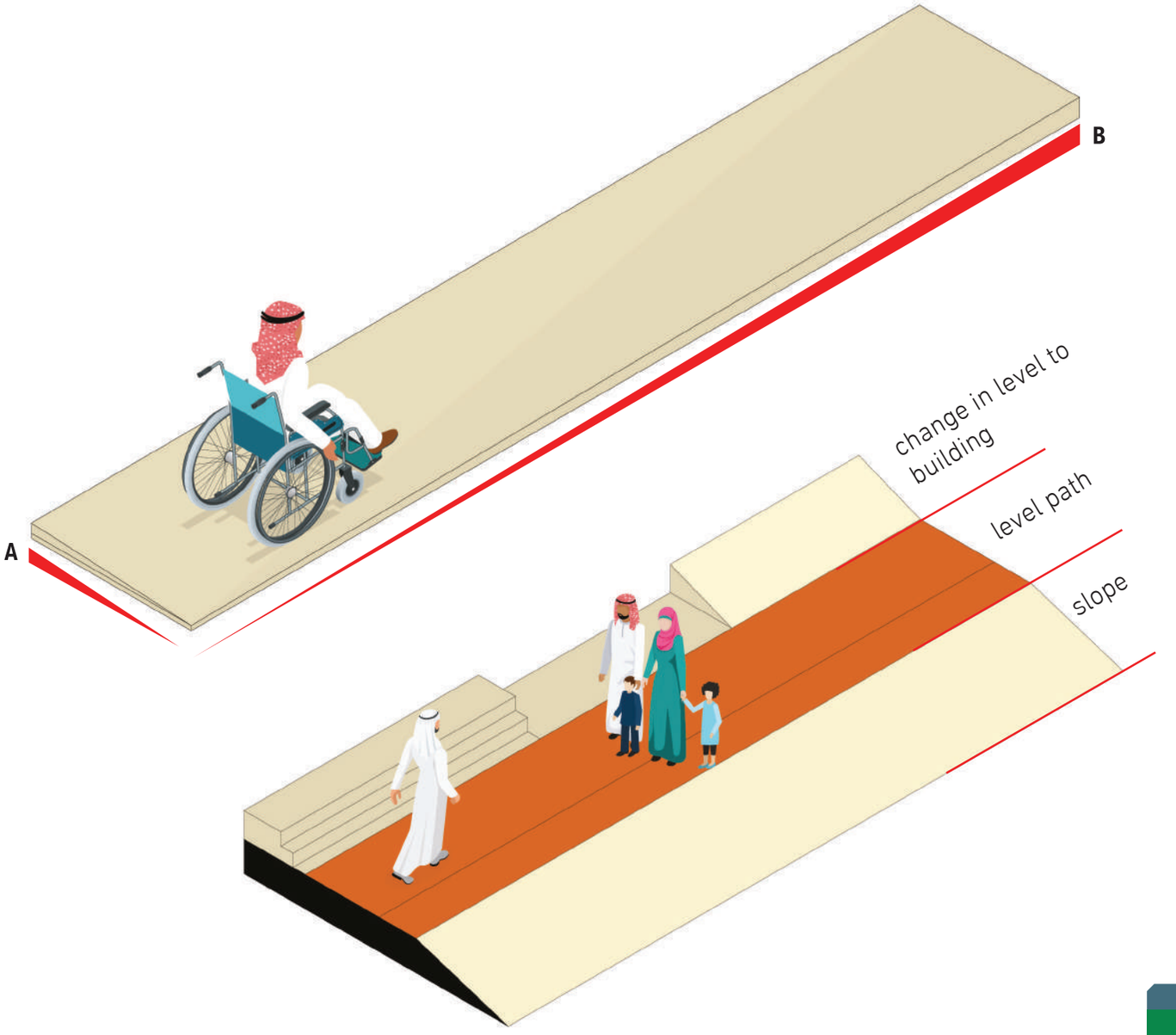
A 4 3 PATH GRADIENT

- Where possible, accessible paths should avoid change in level or slopes.
- Cross slope should be avoided whenever possible.
- Paths with running slope steeper than 4% are classified as ramps.

Gradient

A- running slope:
4% maximum.

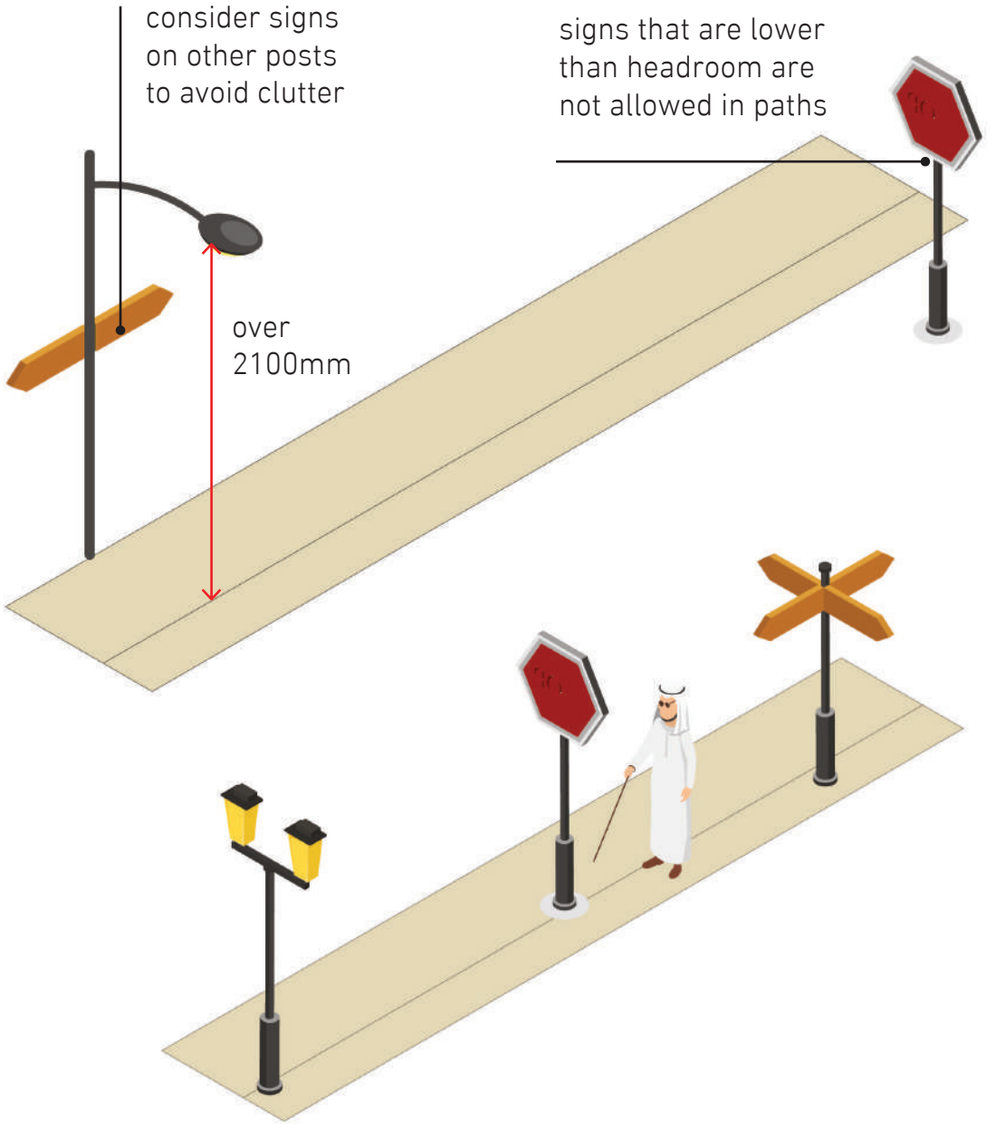
B- cross slope:
2% maximum.



A 4 4 OBSTRUCTIONS TO HEIGHT

Clear Headroom

- The clear height for headroom in accessible paths is minimum 2100mm above floor.
- No objects that are between 650-2100mm should protrude more than 100mm into accessible paths.
- Any object below 650mm can protrude into the space but must not reduce the total width of path below the allowed d
- This height measurement is taken from the leading edge of the object as shown in diagram
- Any doorways such as park gates or collonades on external paths should be a clearh height of a minimum 1980mm and preferred more than 2100mm from floor.



Existing situation

A 4 5 OBSTRUCTIONS IN THE GROUND

OBSTRUCTIONS IN THE GROUND

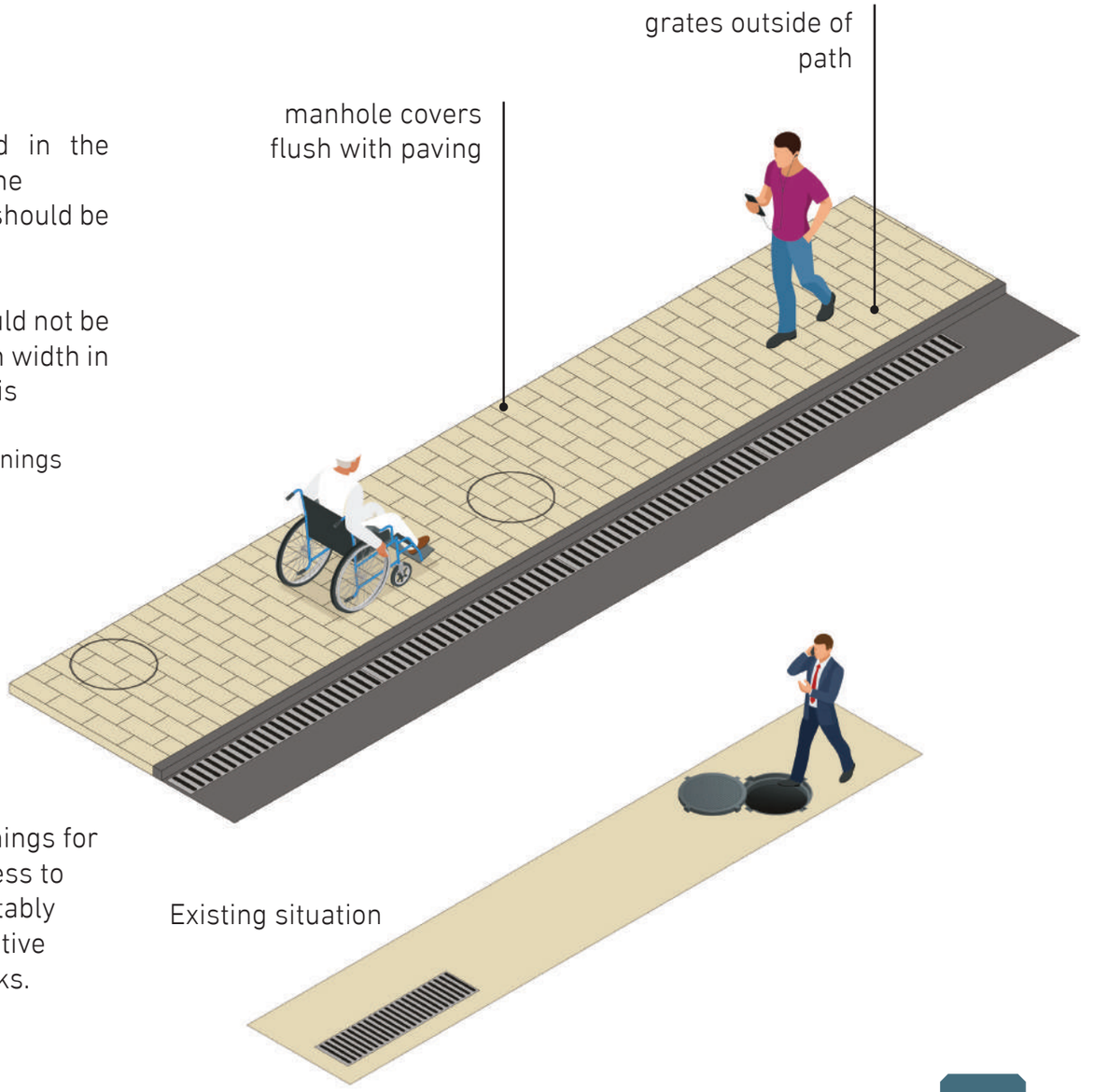
- Openings can include grates or grilles for landscape or drainage.
- Small holes can catch canes and wheels and should be avoided.
- Large unmarked openings such as for tree pits or where construction is not completed will not be allowed in or adjacent to accessible paths.
- Following should not be located in accessible paths:
  o Drainage inlets
  o Catch basins
  o Tree grates
- Where these are already located in accessible path, they should be either relocated or a new accessible path found

Drainage Grates

- Where grates are unavoidably located in the accessible path, the following guidance should be followed
- Grate openings should not be larger than 13mm in width in at least one of its axis
- The longest grate openings should be oriented perpendicular to direction of travel

Temporary openings

- Any temporary openings for construction or access to utilities must be suitably guarded with protective barriers during works.

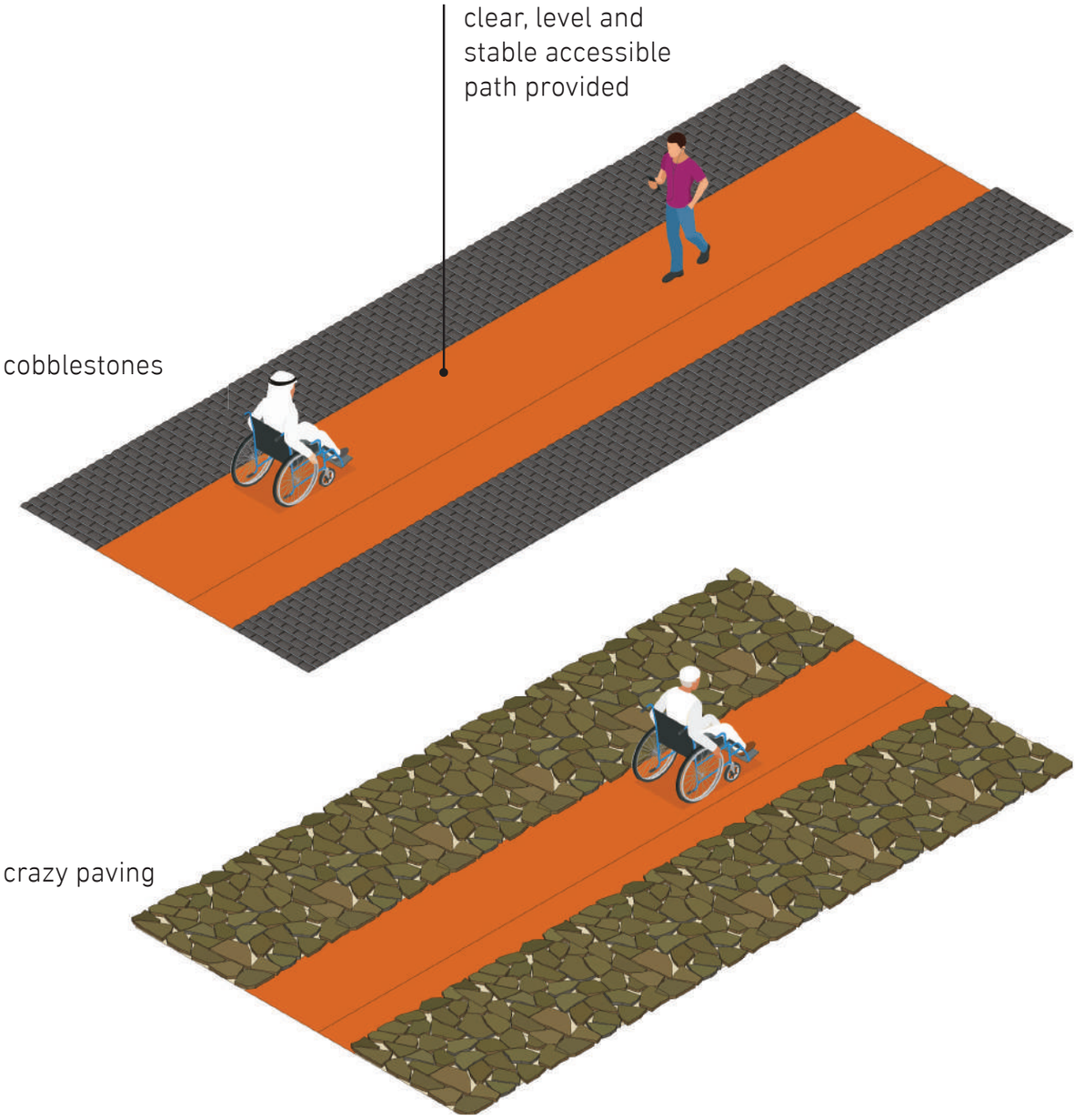


A 4 6 UNEVEN SURFACES

- Uneven surfaces may be caused by manhole covers, loose bricks, holes in paving, gaps in paving where not constructed
- The use of irregular surface materials can cause trip hazard and should be avoided. Examples include crazy paving, cobblestones, loose gravel and any other material that is not firmly fixed or can be moved.
- Where uneven surfaces exist (such as historic areas) then a level and stable accessible path should be provided as an alternative route.

Pavers

- Joints between pavers with squared edges should not exceed 6mm
- Joints between pavers with bevelled edges should not exceed 13mm between top edges of adjacent bevels



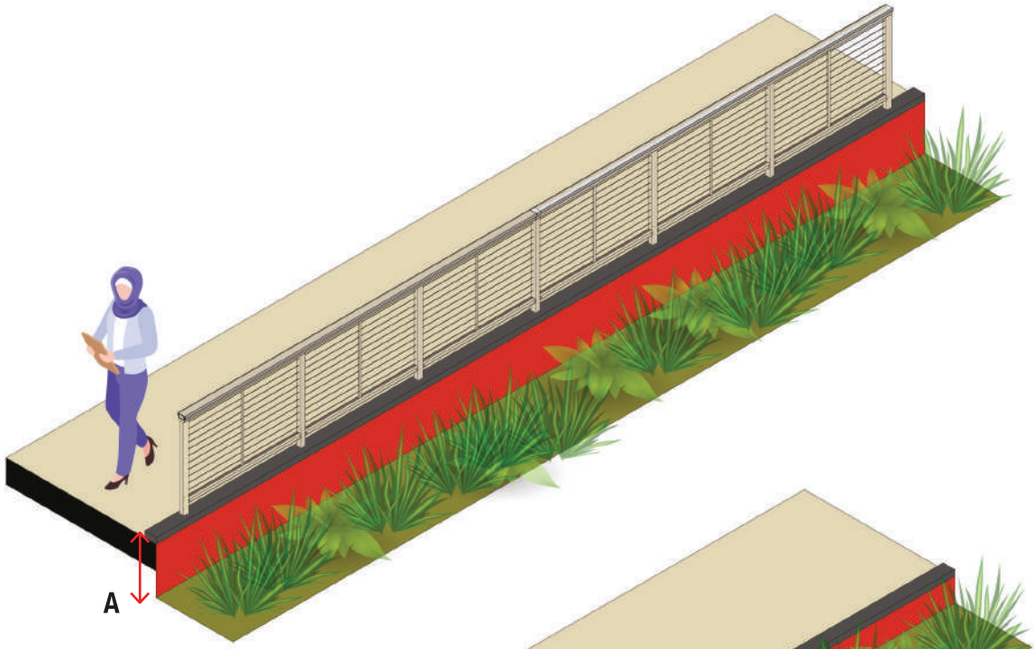
A 4 7 LEVEL CHANGES BESIDE PATHS

- If there is a change in level to the side of an accessible path that is between 200mm and 600mm then edge protection is required to avoid dangerous falls
- Edge protection should be a colour contrasted kerb at minimum of 75mm height
- If the change in level to side of accessible path is greater than 600mm then a guard rail that complies with Saudi Building Code is required.

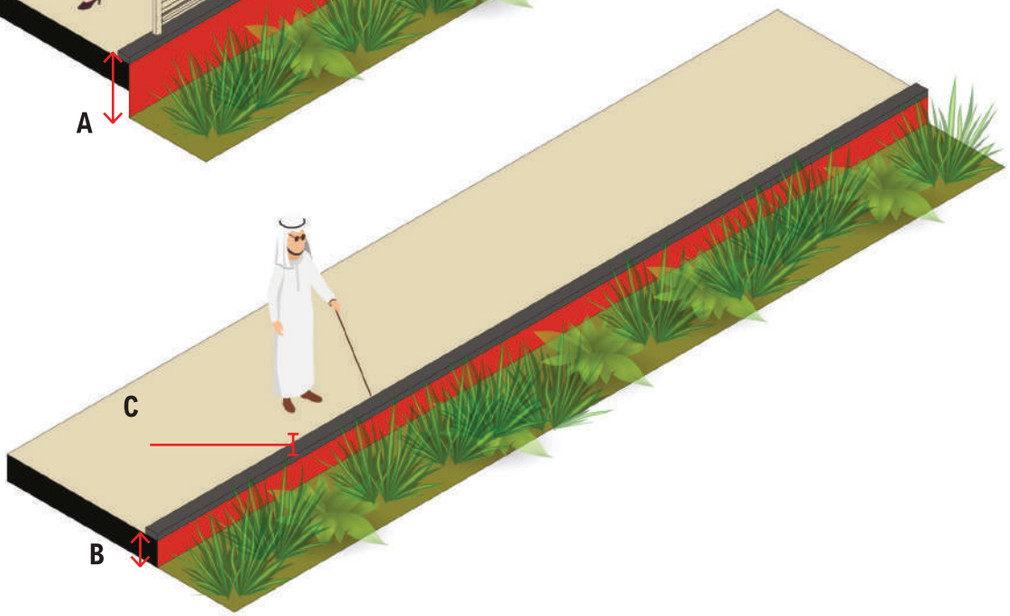
Dimensions

A- height of drop: greater than 600mm
B- height of drop: greater than 600mm
C- size of kerb: 75mm minimum

Change of level greater than 600mm



Change of level less than 600mm



A 4 8 RESTING PLACES

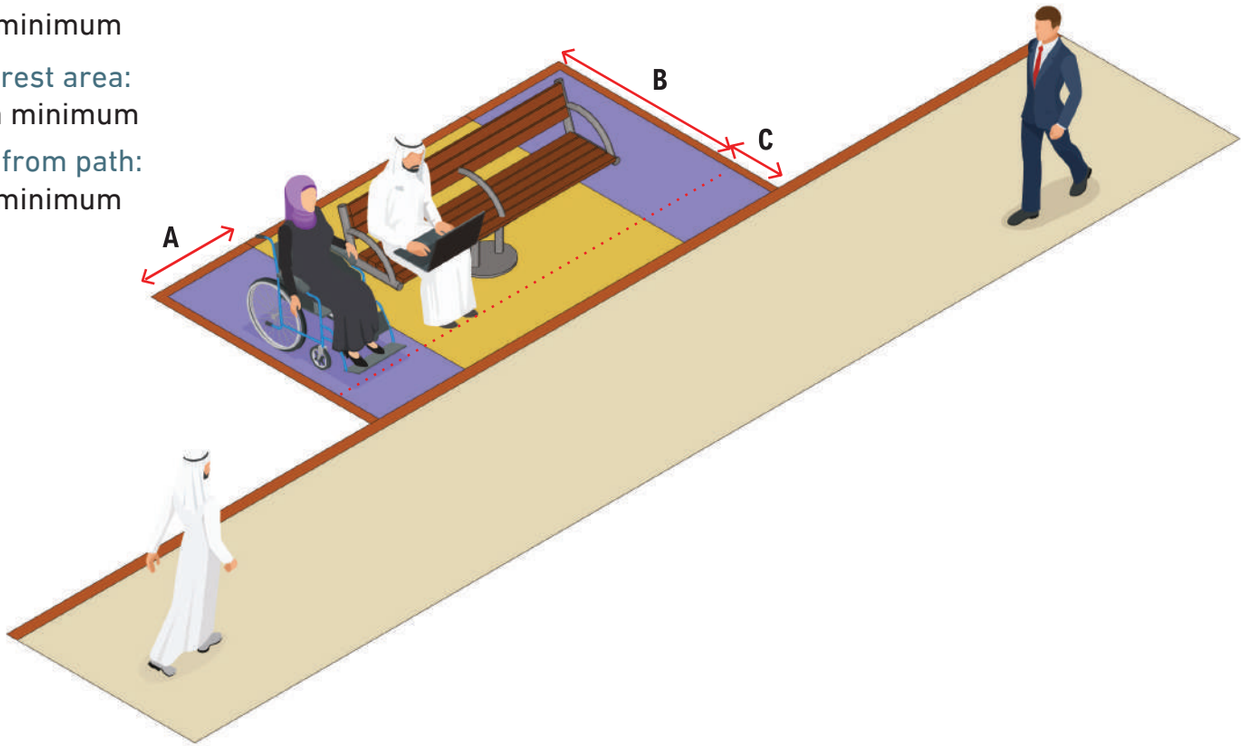
- Rest areas should be located at no more than 50m apart on accessible paths.
- Space for wheelchair users beside seats should be allowed for in the design and dimensions of rest areas.
- Rest area surfaces should be firm, stable and level.
- Rest areas should be set back from accessible paths so not to cause obstruction to movement
- Rest areas should be shaded from sun and protected from sand
- Seating areas can be located under trees for extra shade.
- Consider the location of rest areas beside landmarks to easily identify.
- Consider locating other furniture
- like waste receptacles, water fountains and shade structures in rest areas, ensuring do not reduce the width of the accessible path or cause overhead obstruction.

Dimensions

A - width of wheelchair area:
900mm minimum

B - depth of rest area:
1500mm minimum

C - set back from path:
600mm minimum

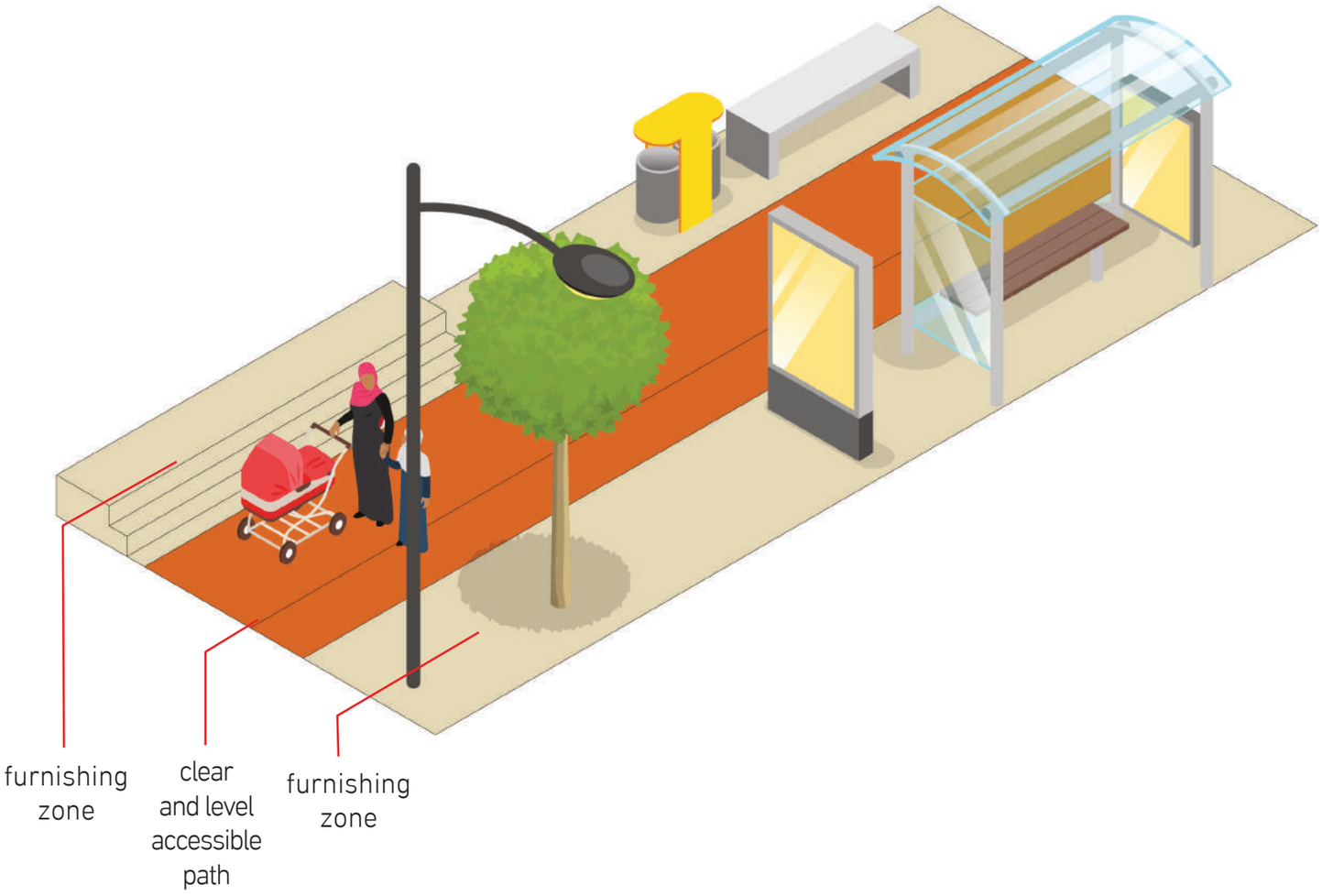


Street Furniture

A

A 5 1 STREET FURNITURE POSITION

- Street furniture should be placed adjacent to the accessible path but should not reduce its width to below minimum requirements.
- For consistency, street furniture should be placed along a continuous zone of the public realm to allow it share space with other objects that do not obstruct the accessible path. For example, seating, landscape, light poles, shade structures, bus stops can all be clustered along a furnishing zone in the public realm, leaving the accessible path clear.
- Consider clustering of street furniture, seats with trees or light posts for example
- Street furniture such as seats, bus stops and cycle stands should be shaded



A 5 2 BENCHES

- Seats should be wide enough for people and their partners.
- Arm rests should always be provided.
- Benches to be fixed to ground.
- Space alongside the accessible benches should be provided for wheelchair users to utilise

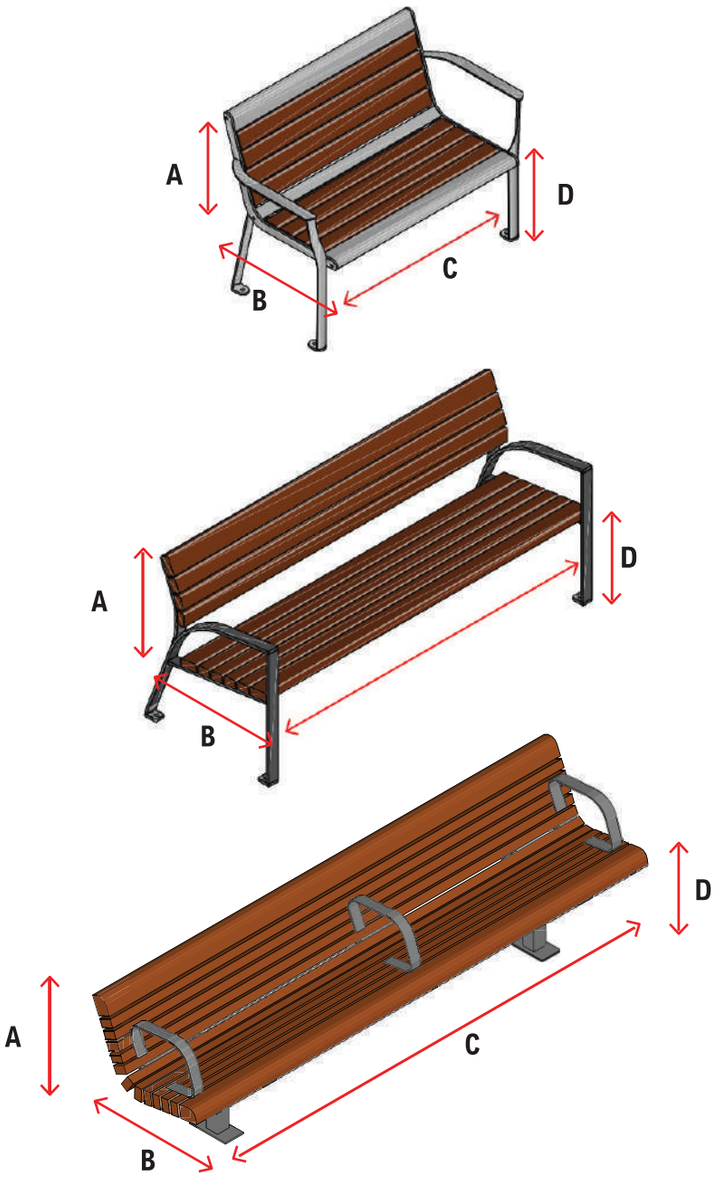
Dimensions

A- height of back support: 450mm minimum

B- depth of seating surface: 500mm-600mm

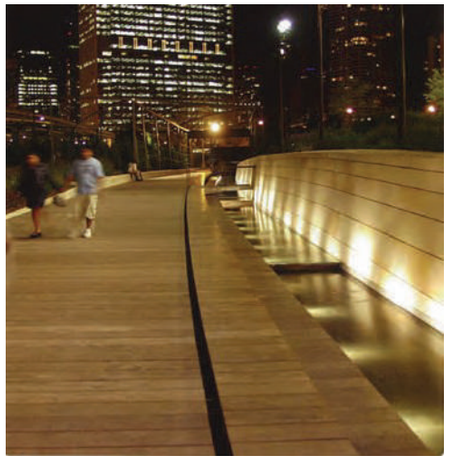
C- length of seating surface: 1100mm minimum

D- height of seating surface above ground: 450mm - 500mm



A 5 3 EXTERNAL LIGHTING

- Lighting levels in the accessible paths are important in maintaining good visibility and ensuring that any obstacles are clearly visible.
- Lighting shall provide bright, safe lighting levels with good uniformity of light.
- A minimum illumination level of 100 lux should be achieved across the accessible path network.
- The use of uplighting into the accessible path should be avoided to prevent glare to pedestrians and other users.
- Lighting which is directed away from the path to softscape is accepted.
- Lighting shall provide white light and high colour rendering to enhance users ability to recognise shapes and colours.
- Artificial lighting systems shall be designed to maintain a level of illumination that is suitable for people with sight impairments as well as all other users.
- All new lighting shall be designed to minimise the effect of obtrusive light at night and
minimise the impact during daylight hours.
- The use of LED lighting should be provided with pedestrian scale lighting (3-4m high poles) utilised.
- Reliance on spill from traffic lighting should be avoided.
- Lighting columns should be located outside the accessible path of travel.



A 5 4 BOLLARDS

- The use of bollards should be restricted to instances where they are absolutely necessary.
- They should be visually contrasting to the surface material and at a height of at least 1000mm. They should be at least 900mm apart and not linked with chain or rope.

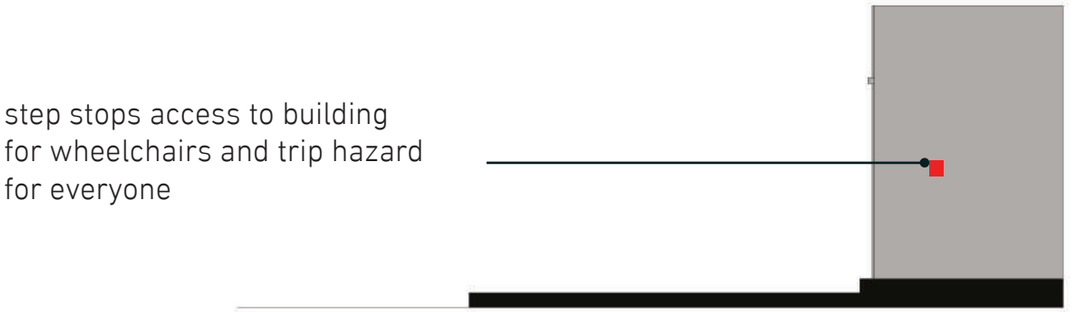
Figure 1
Different ways of creating bollards that contrast visually with their surroundings using full colour/ texture change or bands of colour change.

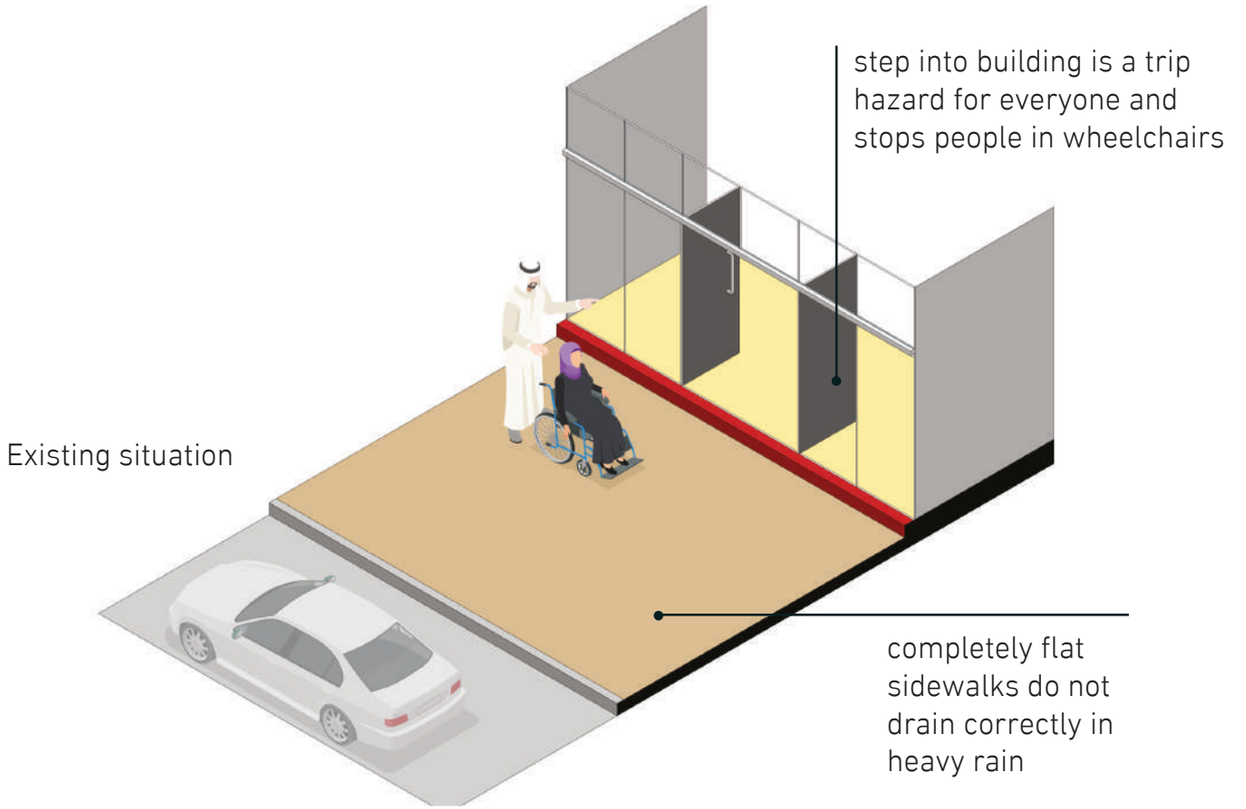
A

Sidewalk Levels

A 6 1 SIDEWALK LEVELS TO BUILDING ENTRANCES

- The difference in levels between buildings and external areas is one of major problems for people with physical mobility issues in Riyadh.
- Ensuring there is smooth and level transition between building entrances and external space is critical.
- The following pages show a number of solutions to creating gentle slopes into buildings.
- The solutions are for government public land. For building solutions, refer to 'building entrance levels' in Part B.

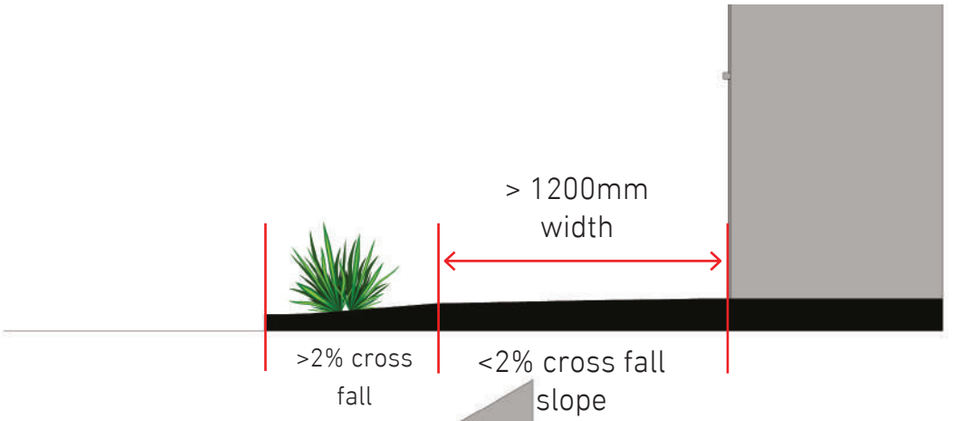




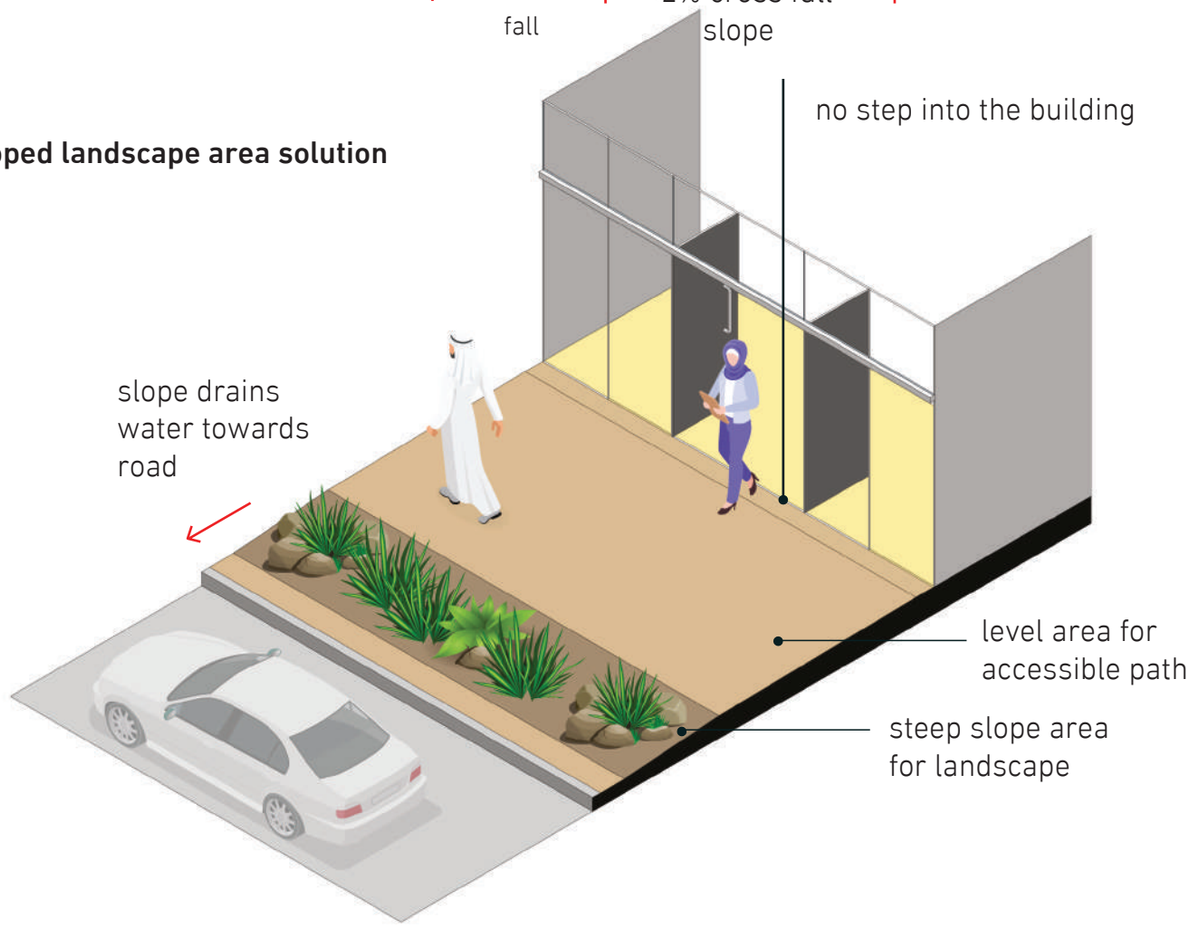
A 6 1 LEVELS TO BUILDING ENTRANCES

- Where level difference exists, slope up external space to overcome a single step entrance to a building.
- Ensure the accessible path cross slope does not exceed 2%.
- Any steeper gradients can be achieved outside of the accessible path area and can be used for landscape or street furnishing.

Cross section



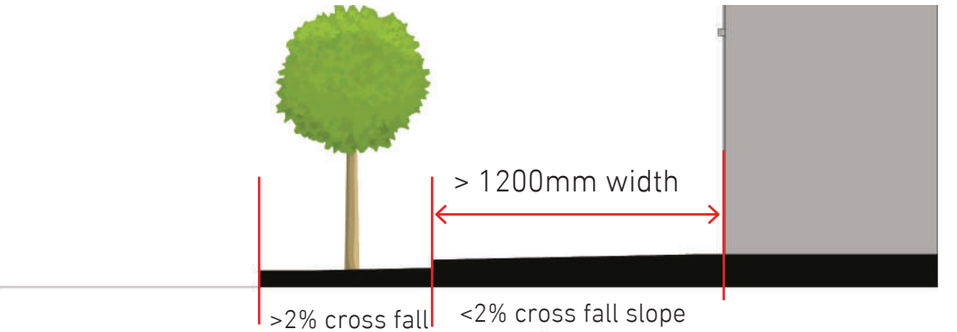
Sloped landscape area solution



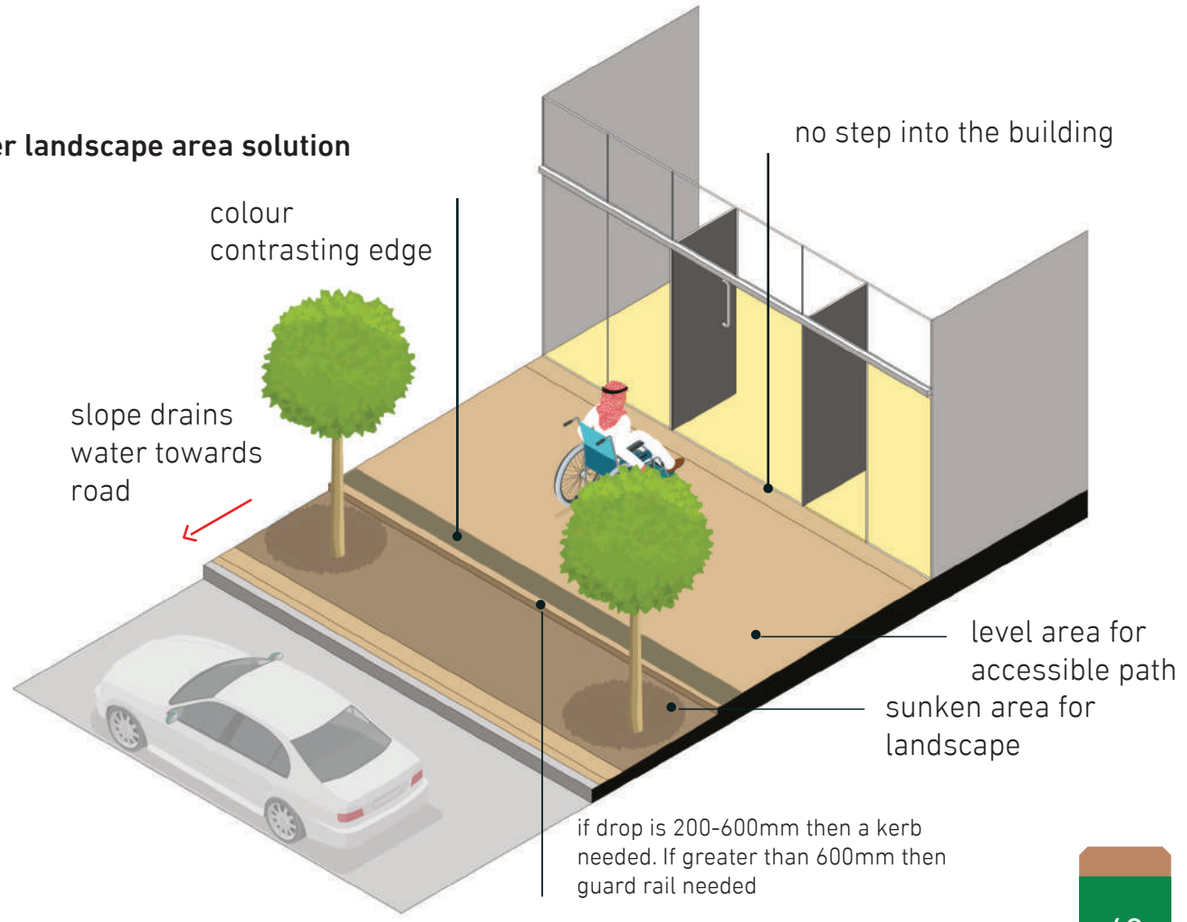
A 6 1 LEVELS TO BUILDING ENTRANCES

- Where level difference exists, slope up external space to overcome a single step entrance to a building.
- Ensure the accessible path cross slope does not exceed 2%.
- Any steeper gradients can be achieved by creating a drop in levels outside of the accessible path area.
- A contrasting strip using different colour or materials is needed to edge of accessible path.
- If the level difference is greater than 200mm then a kerb of at least 75mm is required.
- If the change in level to side of accessible path is greater than 600mm then a guard rail that complies with Saudi Building Code is required.

Cross section



Lower landscape area solution



A

External Ramps

A 7 1 RAMP GRADIENTS

- Where running slope of path is greater than 4% then it is classed as a ramp
- Curved ramps are not advised.
- Ramps should be 950mm - 1100mm in width between handrails.
- ramps and landings to be evenly illuminated to minimum 100 lux.

Gradient of slopes

- Cross slope should be avoided.
- Running slopes in renovations may be allowed up to 8.3% (1:12).

Surface Materials

- Landing areas and ramp surfaces should be firm, stable and slip resistant.
- Polished or unnecessarily slippy materials such as polished marble are not permitted for ramps

Level landings

- Level landing areas should be provided at top and bottom of all ramps.
- On longer ramps, intermediate landing areas every 9 metres.
- Maximum slope of landing areas to be 1:50 (2%) in any direction.
- Windows or doors on landing areas should not impact movement.
- Landings may reduce to 1800mm x 1800mm in renovations.

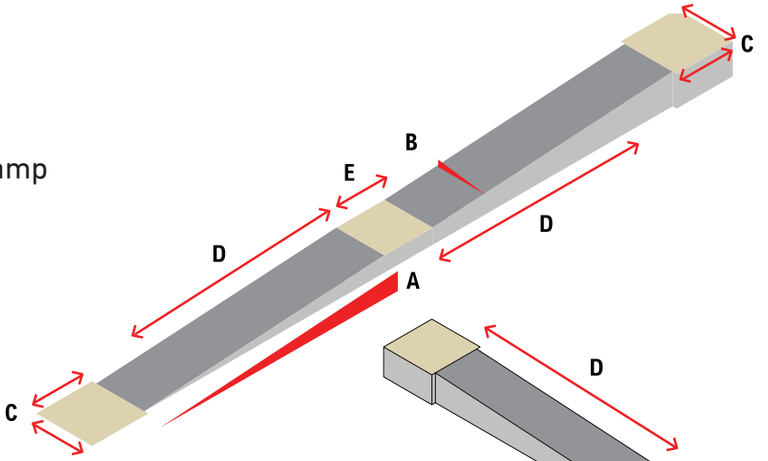
Gradient

A- running slope:
1:16-1:25 (6.25 -4%)
B- cross slope: 2% maximum

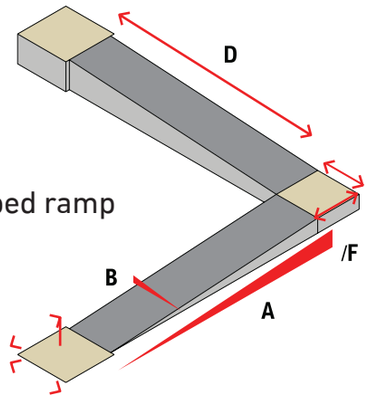
Dimensions

C- top and bottom landings:
2100mm x 2100mm minimum
D- ramp length between landings:
9 metres maximum.

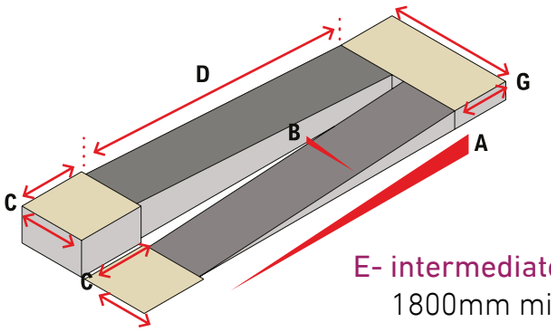
Straight ramp



L-shaped ramp



U-shaped ramp with switchback



E- intermediate landing depth on straight ramp:
1800mm minimum

F- intermediate landing area on L-shaped ramp:
1800mm x 1800mm minimum

G- intermediate landing area on U-shaped ramp:
1800mm x 2400mm minimum

A 7 2 RAMP HANDRAILS & EDGE PROTECTION

Kerb Edges

- Edges of ramps and landing areas should be protected with wall, guard or screen
- Guard rails should comply with Kingdom of Saudi Arabia Building Code.
- Colour contrasting strip 40-60 mm wide across the full width of the ramp at the top and bottom of the ramp

Ramp Handrails

- A ramp run that has a rise greater than 150 mm should have handrails located on both sides of the ramp.
- Handrails shouldd return to post or wall.

Handrail Dimensions

A- overhang of handrail: 300mm minimum.

B- lower handrail: 600-750mm.

C- upper handrail: 875-925mm.

D- width between handrails: 950-1100mm.

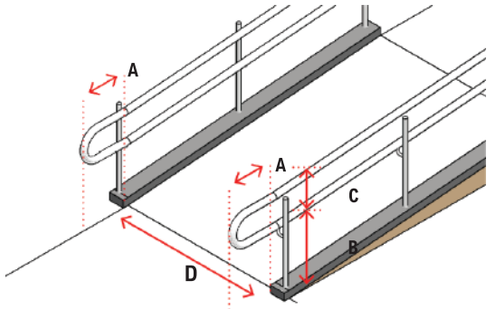
Ramp Edge Dimensions

E- gap between screen and ramp: 50mm maximum.

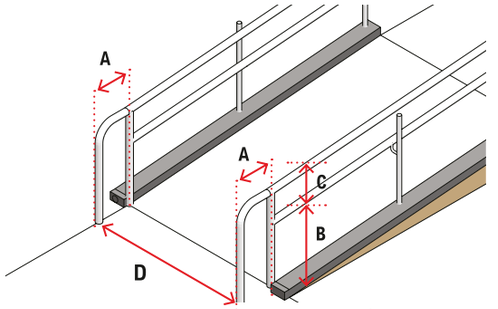
F- gap between lower rail and ramp: 75mm maximum.

G- height of kerb edge: 75mm minimum.

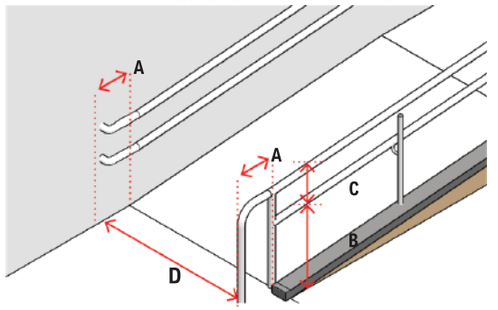
Ramp handrails



handrail return to post

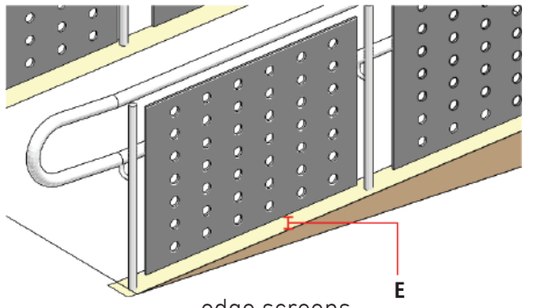


handrail return to floor

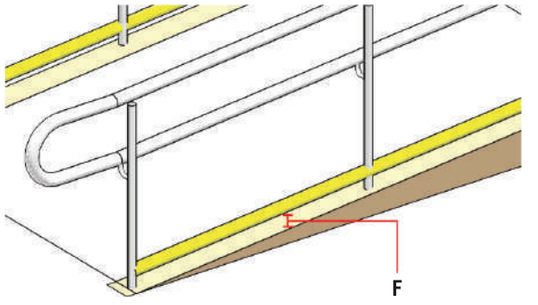


handrail return to wall

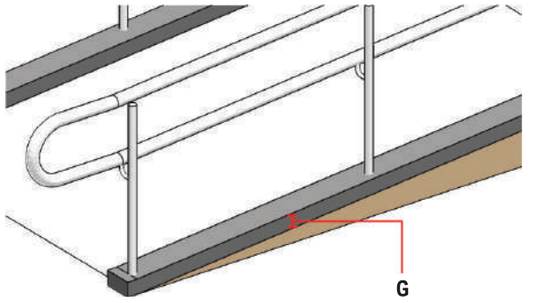
Edge protectio



edge screens



lower rail edge

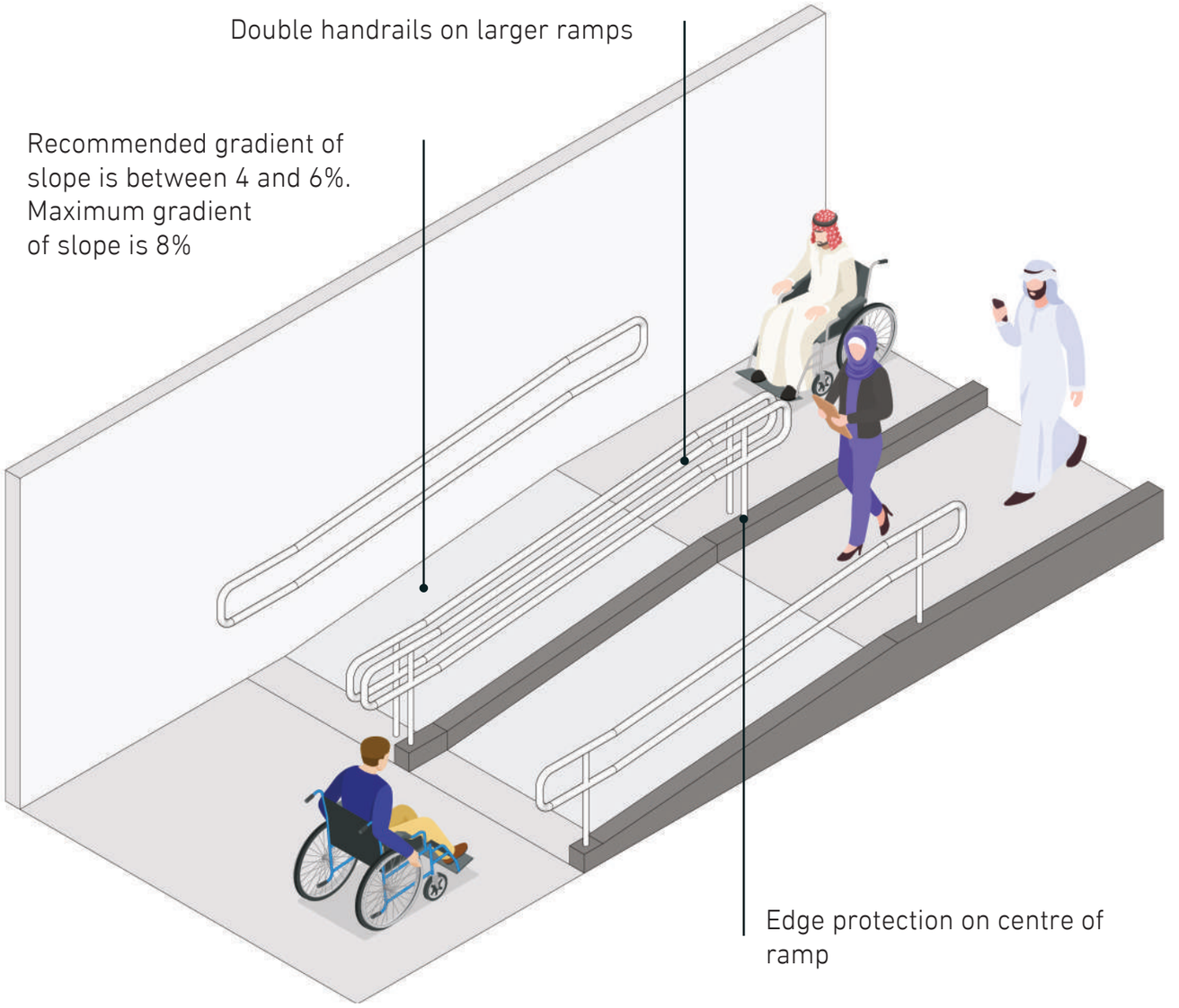


kerb edge

A 7 3 DOUBLE RAMP HANDRAILS

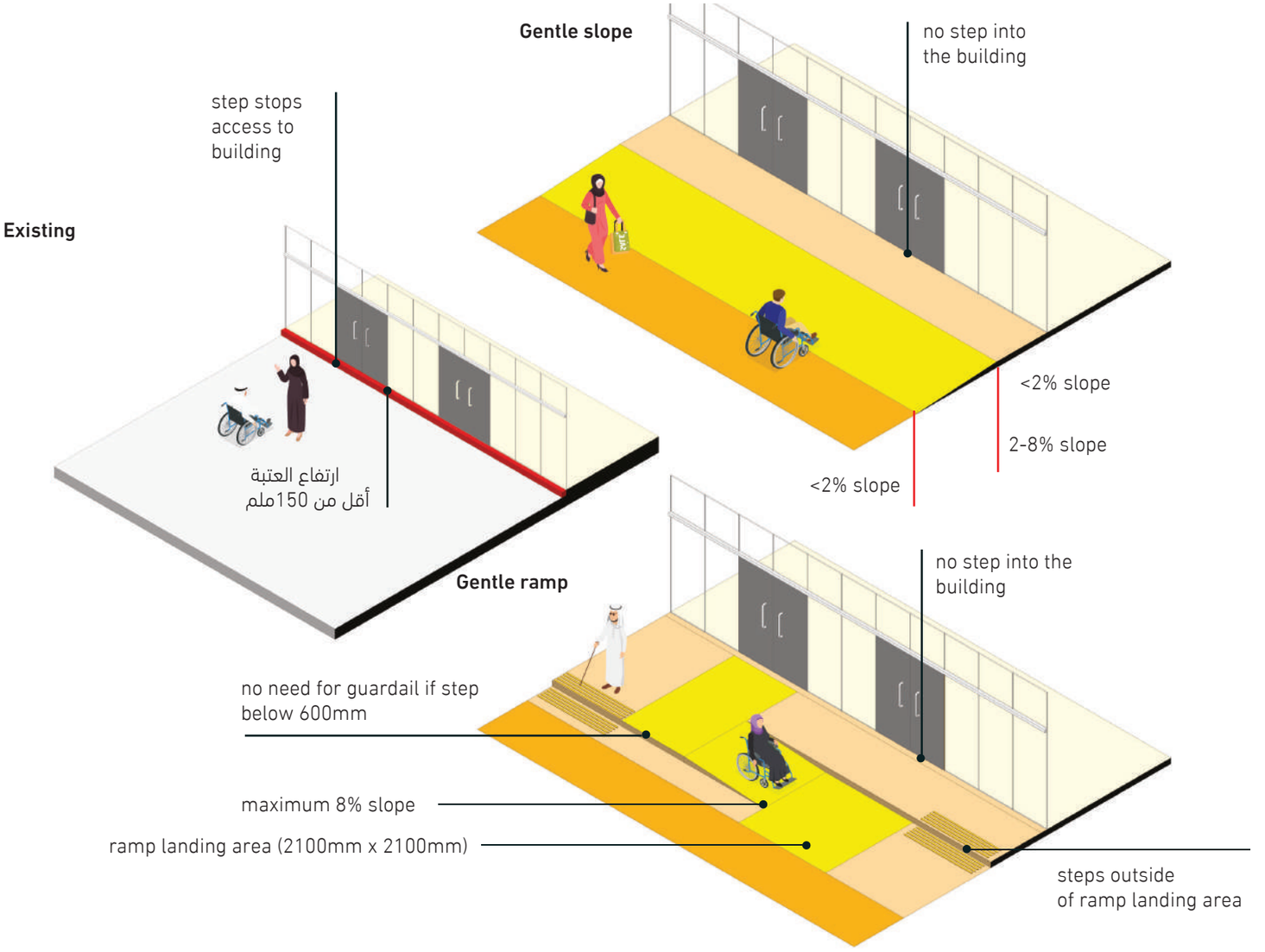
Handrails

- A ramp run that has a rise greater than 150 mm should have handrails located on both sides of the ramp
- Upper and lower handrails should be provided on each side of the ramp
- Upper handrail located at 875-925 mm
- Lower handrail located 600-750 mm above the ramp surface.
- The clear width between ramp handrails should be 950-1100 mm apart



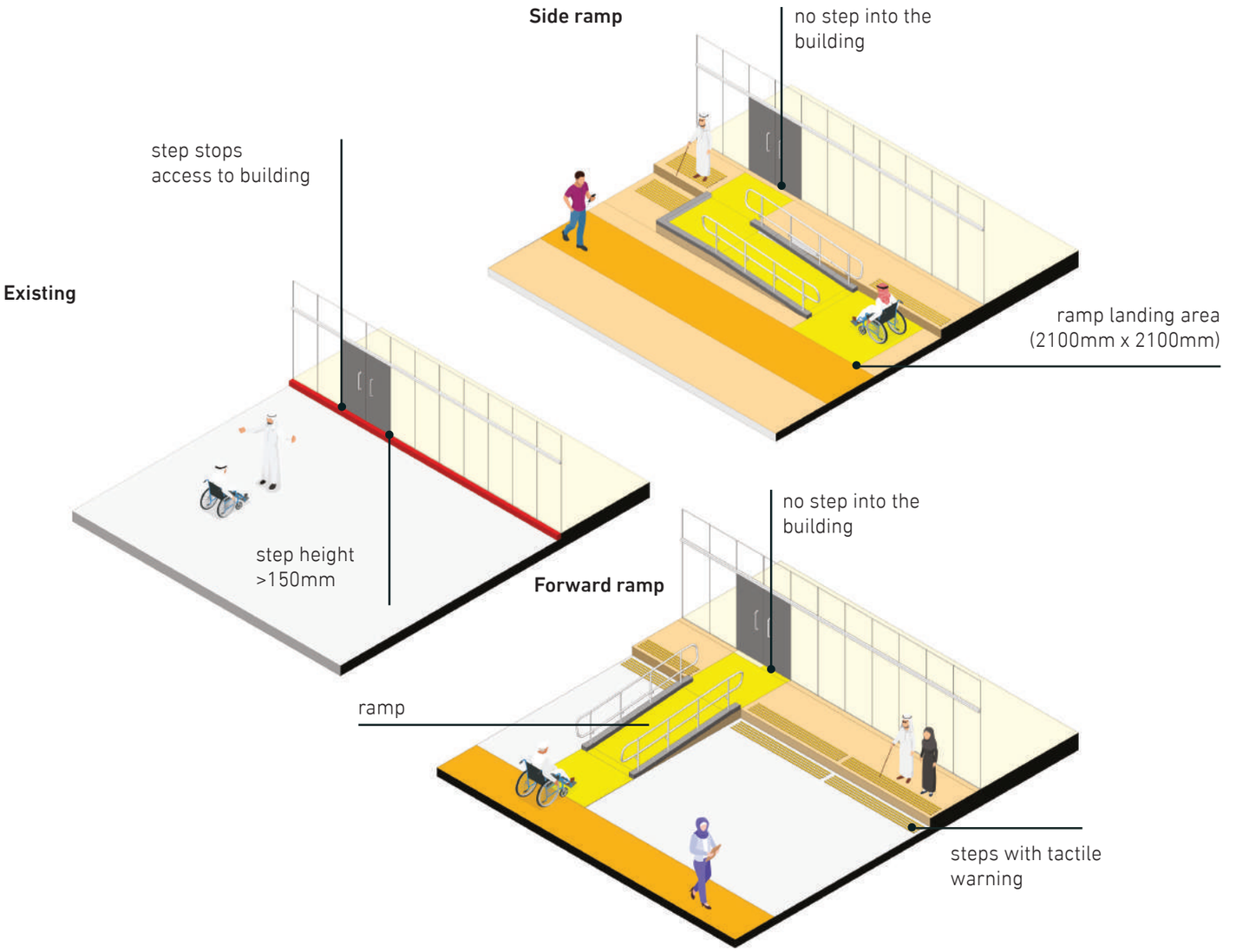
A 7 4 RAMPS TO ENTRANCE WITH STEPS LESS THAN 150MM

- If rise is less than 150mm it is possible to provide gentle ramps without handrails



A 7 4 ACCESS TO BUILDINGS WITH STEPS GREATER THAN 150MM

- If rise is more than 150mm it is necessary to provide ramps with handrails

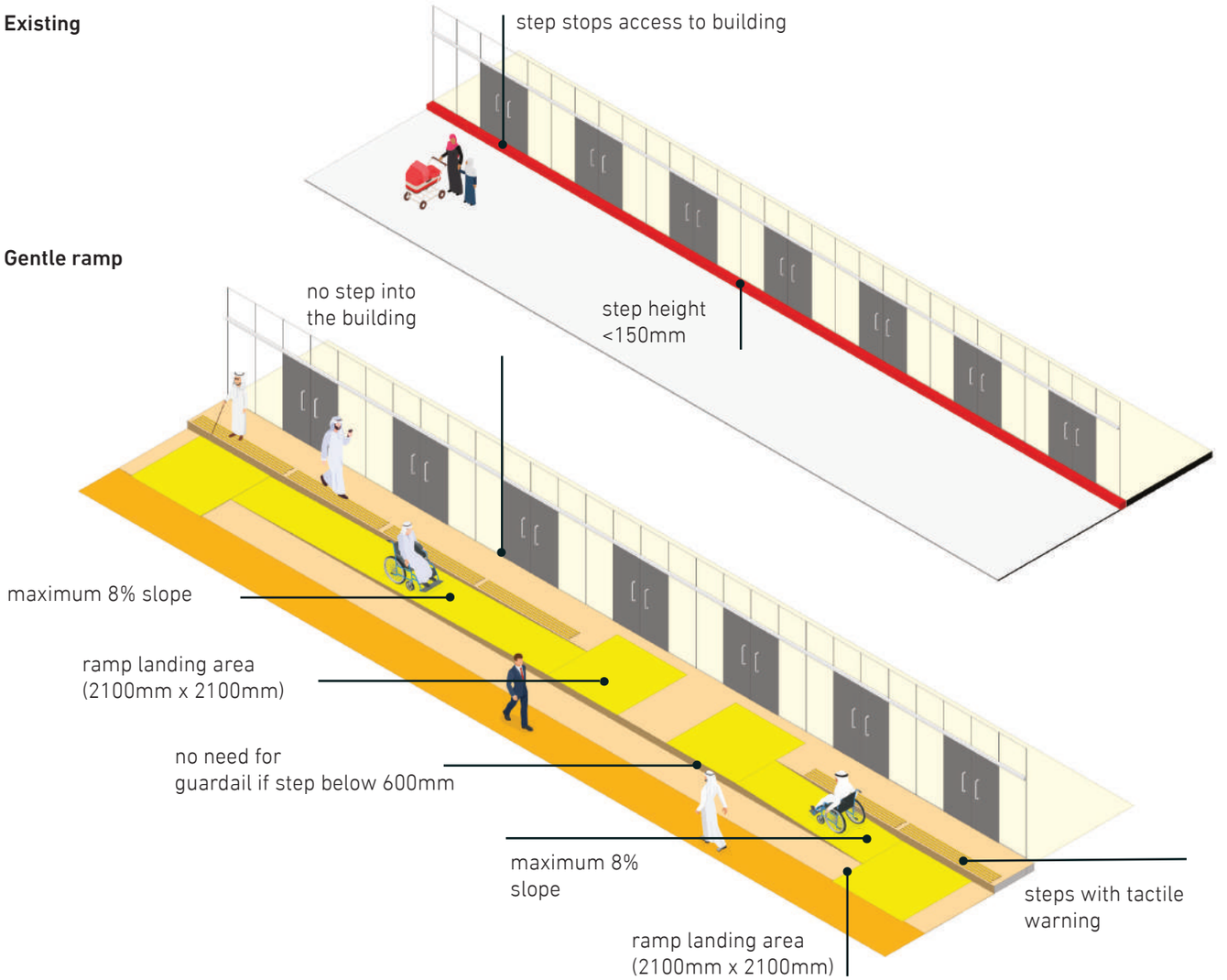


Accessible path (>1200mm)

Ramp and landing area

A 7 4 ACCESS TO MULTIPLE ENTRANCES WITH STEPS LESS THAN 150MM

- Where mulitple entrances are needed at less than 150mm above external area, then ramps can lead up to raised path.

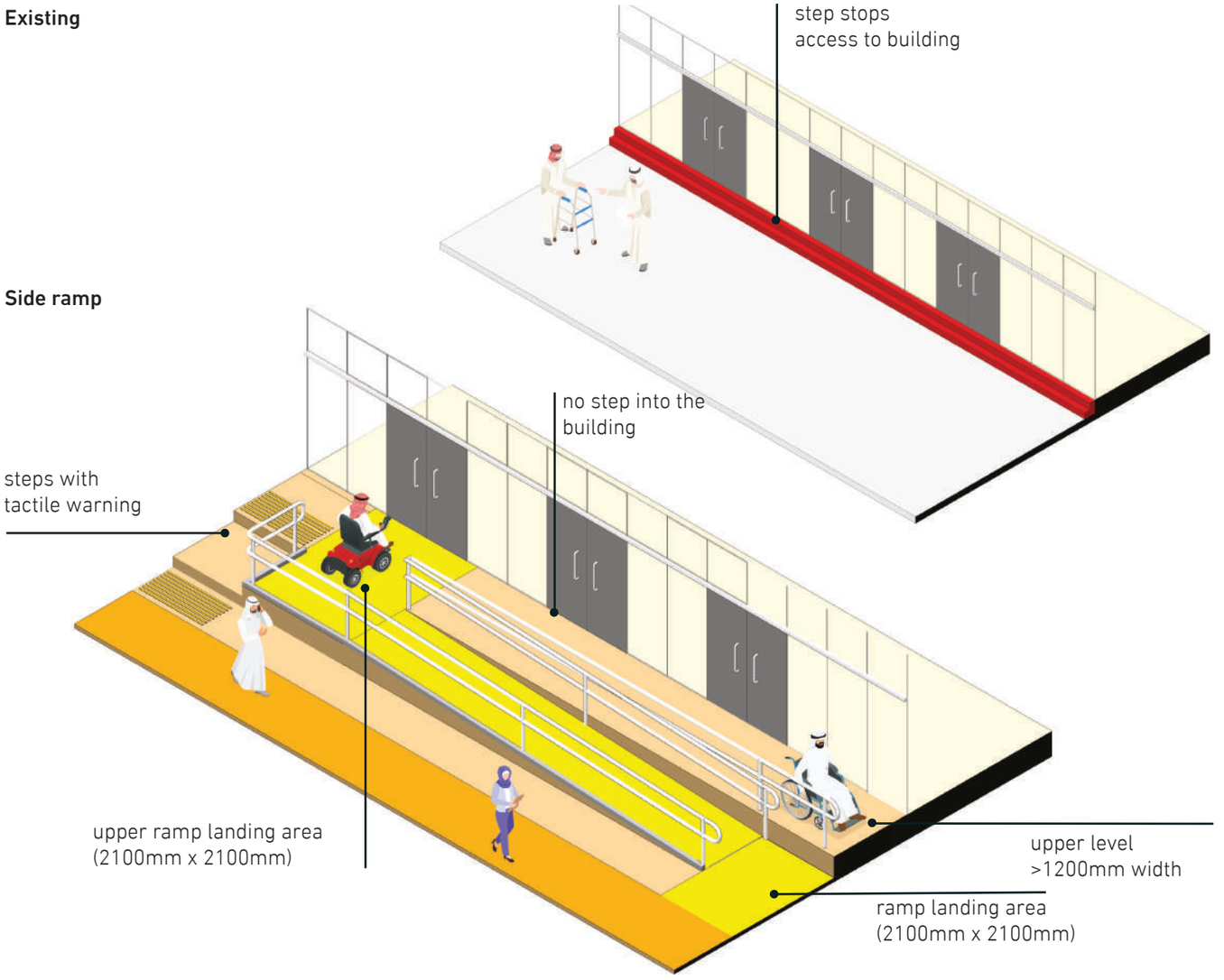


Accessible path (>1200mm)

Ramp and landing area

A 7 4 ACCESS TO MULTIPLE ENTRANCES STEPS GREATER THAN 150MM

- Where mulitple entrances are needed at more than 150mm above external area, then ramps with handrails can lead up to raised path.
- If there is a change in level to the side of an accessible path that is between 200mm and 600mm then edge protection is required to avoid dangerous falls
- Edge protection should be a colour contrasted kerb at minimum of 75mm height
- If the change in level to side of accessible path is greater than 600mm then a guard rail that complies with Saudi Building Code is required.

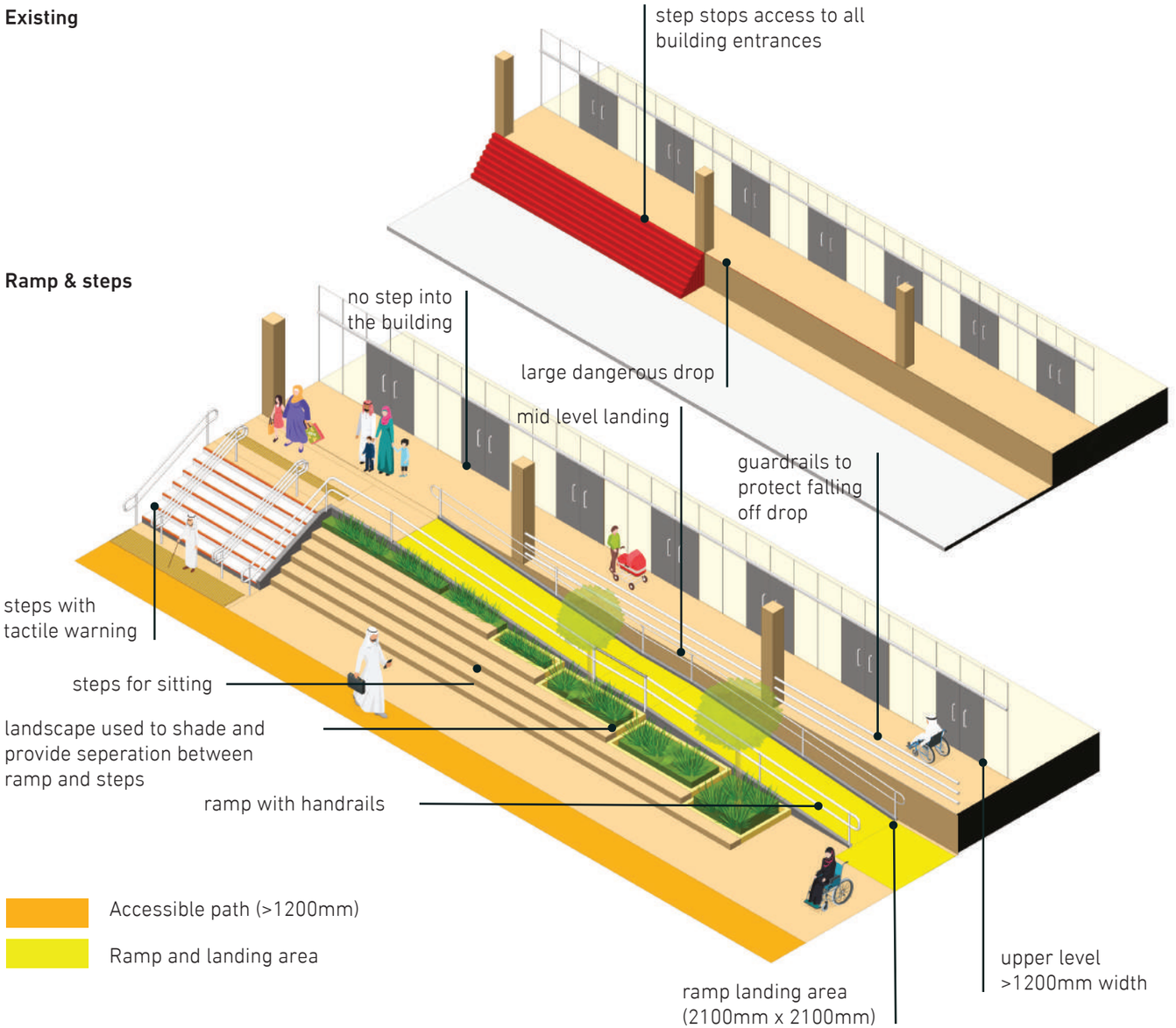


Accessible path (>1200mm)

Ramp and landing area

A 7 4 ACCESS TO HIGH LEVEL COLONNADE

- Where collonnades are are needed at more than 150mm above external area, then ramps with handrails can lead up to raised path.
- If there is a change in level to the side of an accessible path that is between 200mm and 600mm then edge protection is required to avoid dangerous falls
- Edge protection should be a colour contrasted kerb at minimum of 75mm height
- If the change in level to side of accessible path is greater than 600mm then a guard rail that complies with Saudi Building Code is required.



External Steps

A 8 1 EXTERNAL STEPS HANDRAILS AND LANDING AREAS

- Pattern surfaces should be avoided around stairs.
- Circular stairs should be avoided.
- Windows or doors should not open into landing areas by stairs
- Headroom of 2100mm
- On large stairs, intermediate landing areas with tactile warnings to be provided.

Handrails

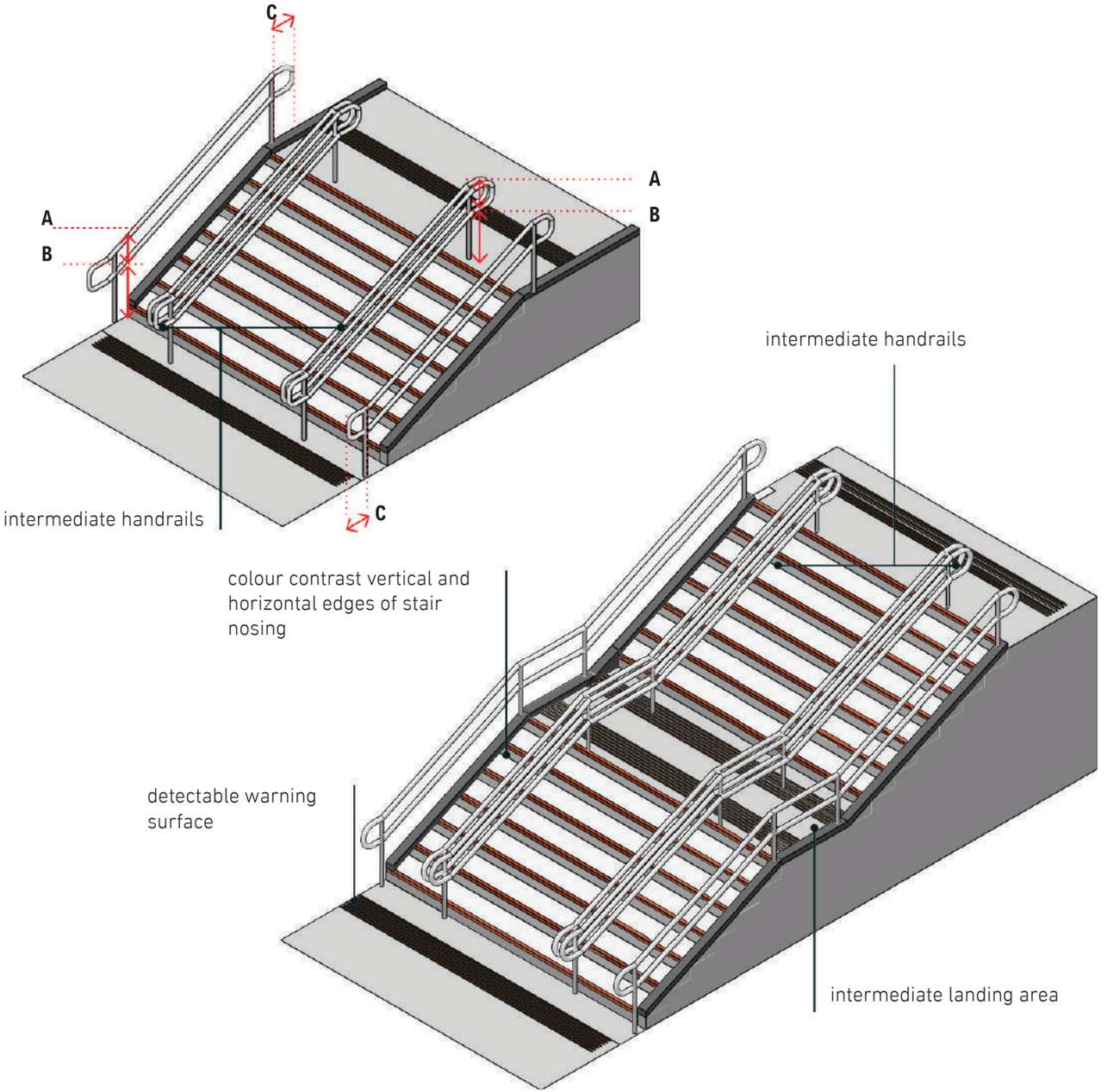
- Dual height handrails on both sides of exterior steps
- Handrails on continuous inside edge of stairs with a switchback
- Wide stairs need intermediate handrails

Handrail Dimensions

A- lower handrail: 600-750mm.

B- upper handrail: 875-925mm.

C- overhang of handrail: 300mm minimum.



A 8 2 EXTERNAL STEPS DIMENSIONS

Tread & Risers

- Heights (rise) and tread depths (run) of stairs to be uniform.
- Open risers should b avoided.
- Stair treads & landings should be finished with non-slip material.
- Stair treads, including nosings, should be illuminated with a minimum of 100 lux,
- Colour or material contrast to differentiate between the horizontal and vertical surfaces.

Nosing

- If stair nosing is needed, it should not project to cause trip hazard
- Colour or material contrast to differentiate between the horizontal and vertical surfaces.

Tactile surface dimensions

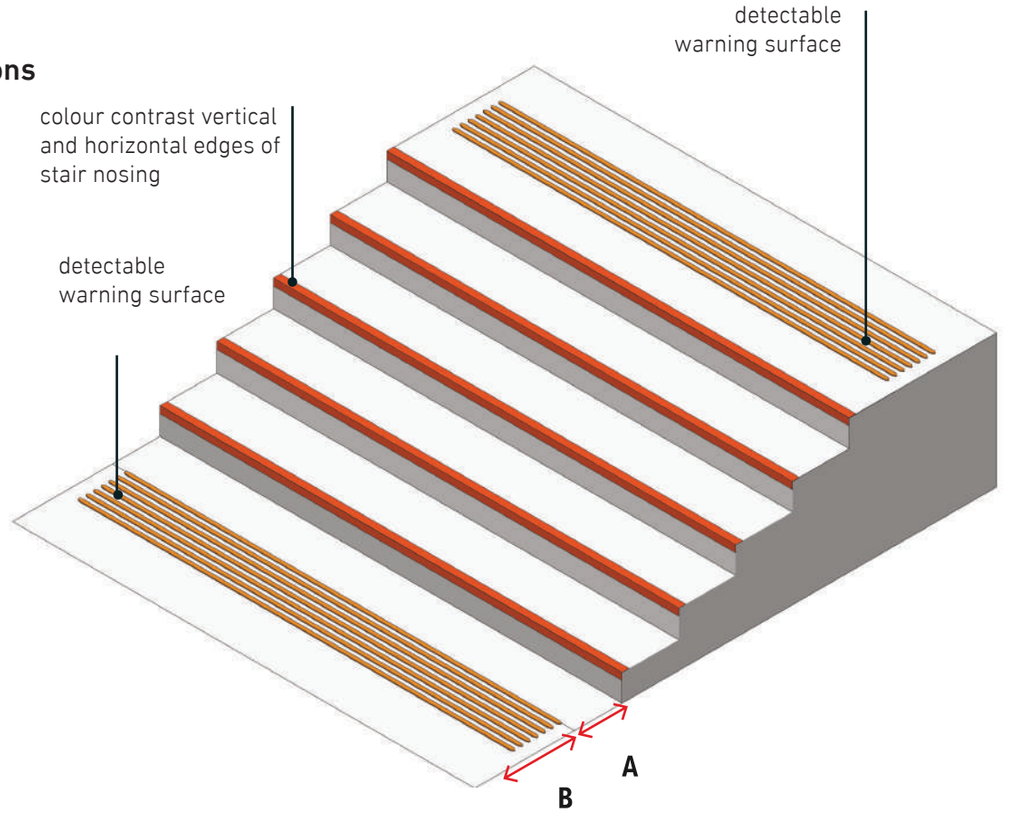
A- gap from stair:
300mm.

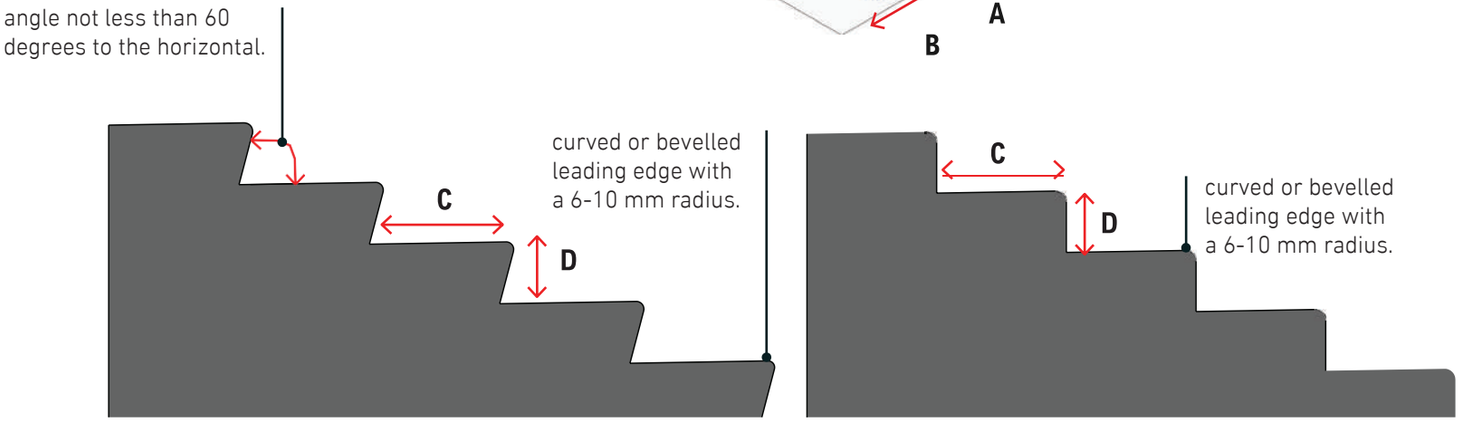
B- depth of surface:
600-900mm.

Run & Riser Dimensions

C- uniform run:
280-350mm

D- uniform rise:
125-180mm





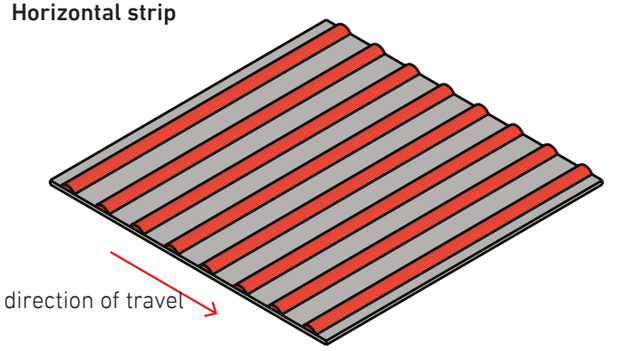
A

Tactile Warning Surfaces

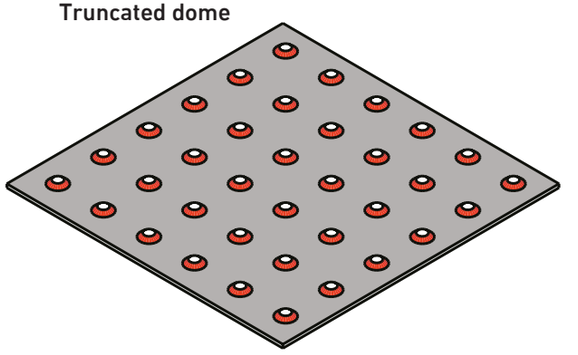
A 9 1 TACTILE WARNING SURFACE TYPES

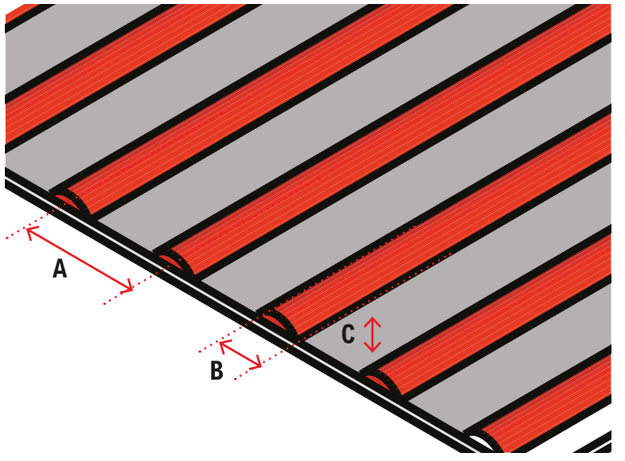
- The truncated dome warning paver needs to be used at road crossings
- Detectable tactile warning surfaces at kerb cuts should be 150-300mm back from kerb edge.
- Warning paving should extend full width of kerb cut and be 600mm deep.
- The change of level between kerb cut and roadway should be 10-15mm high
- Truncated dome tactile surfaces should extend full width of the walkaway and be 600mm deep.
- The dome of strip should be colour contrasted with background
- The paving slab can also contrast with background.

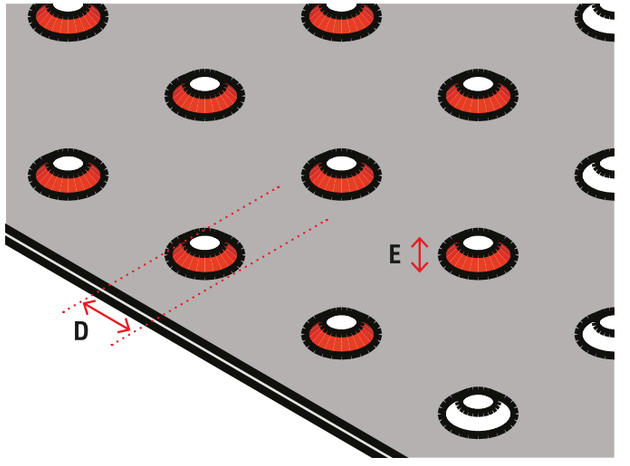
Horizontal strip



Truncated dome







Horizontal Strip Dimensions

A- separation of strips: 50mm.

B- width of strip: 20mm.

C- height of strip: 6mm.

Truncated Dome Dimensions

D- diameter of dome: 25mm.

E- height of dome: 5mm.

A

Road Crossings

A 10 1 KERB CUTS

- Accessible path gradients should be maintained at kerb cuts where possible.
- Truncated dome detectable warning surface to be used.
- Floor materials need to be firm, stable and slip resistant.

Drainage

- Kerb cuts should avoid water pooling by draining water away from path of travel.

Flared sides

- The flared sides of kerb cuts should be distinct colour contrast to surrounding surfaces.

Tactile Warning Paving

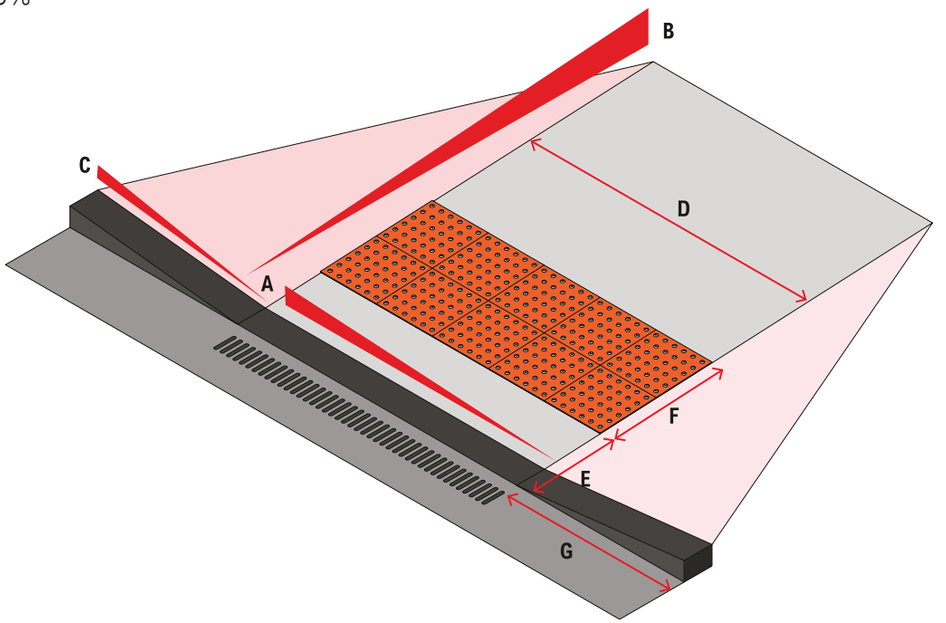
- Detectable tactile warning surfaces at kerb cuts required
- Warning paving should extend full width of kerb cut
- The change of level between kerb cut and roadway should be 10-15mm high

Gradient

A-crossfall of path:
5% maximum (measured at base of kerb cut)

B- running slope of path:
2-5% maximum (up to 8.3% may be permitted if renovation situation)

C- kerb cut flare slope:
8.3% maximum.



Dimensions

D- width of path:
1500mm minimum.

E- gap from edge:
300mm minimum.

F- length of tactile paving:
600mm minimum.

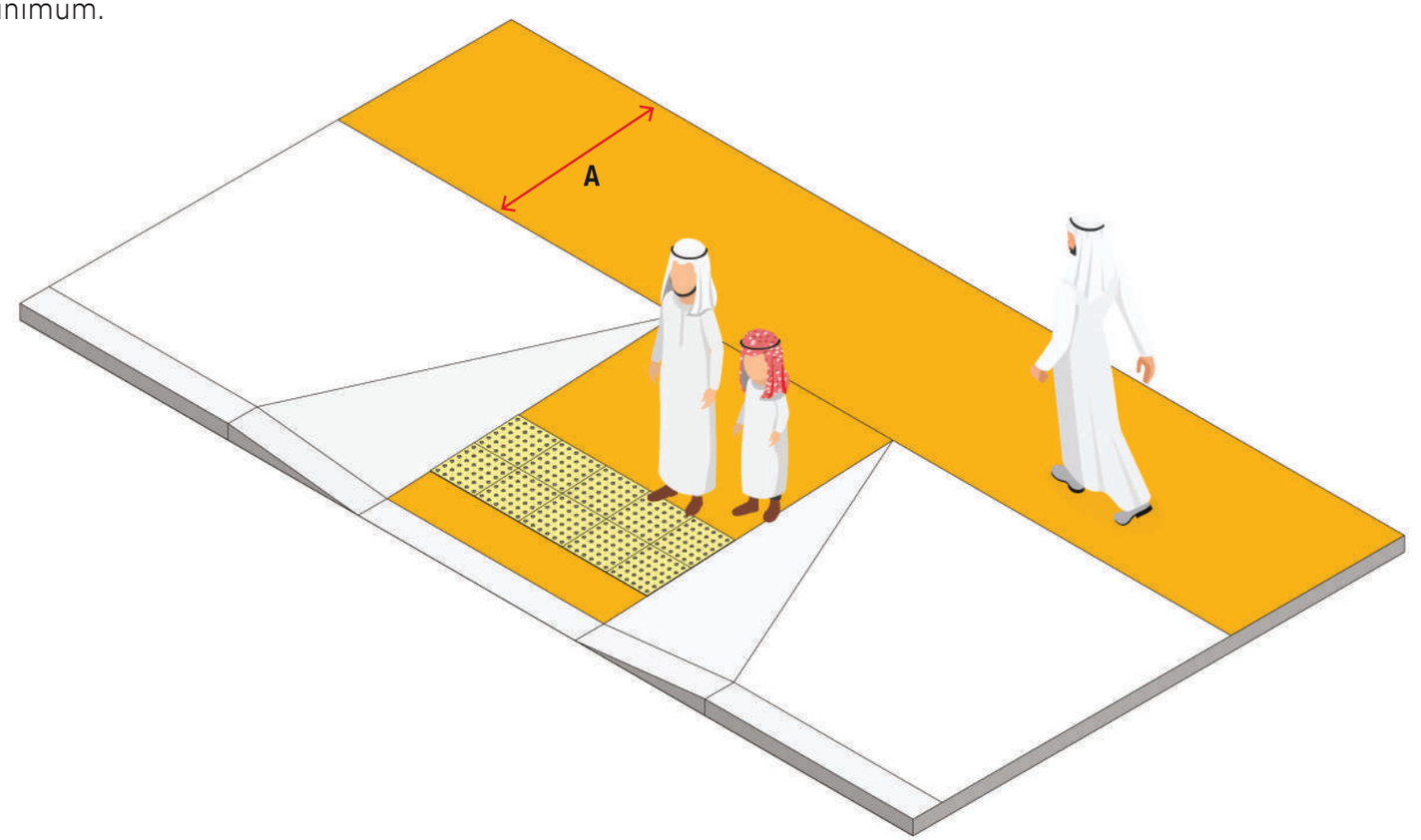
G- length of kerb flare:
900mm minimum
(measured at the kerb end of the flare)

A 10 2 KERB CUT AT SINGLE CROSSING

- Kerb cuts should not reduce the width of adjacent accessible paths to below standard

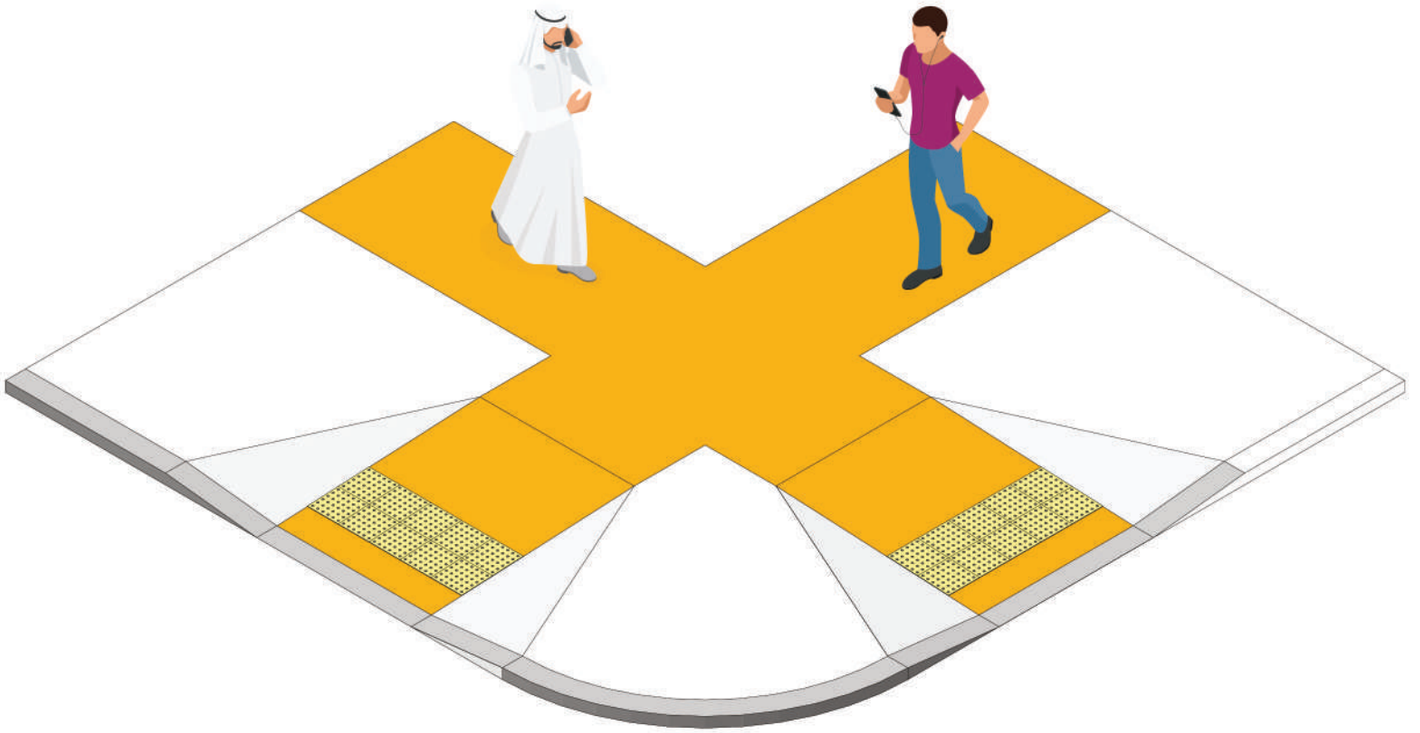
Dimensions

A- width of path:1220mm minimum.



A 10 3 KERB CUT ON CORNER CROSSING

- Where multiple kerb cuts are necessary, they should allow for straight line of travel.
- Do not use kerb cuts that wrap around a corner as can confuse the permitted line of travel.



A 10 4 MEDIAN REFUGE AREAS

- Medians and middle islands should be provided wherever possible.
- Medians and middle islands need to be large enough for wheelchairs and mobility scooters.
- Refuge ares should be shaded.

Tactile surfaces

- A tactile detectable warning surface should be provided at each edge of accessible path where it meets the roadway.
- The accessible path on narrow medians can be same elevation as roadway. Tactile warning surfaces are absolutely necessary in such cases to highlight to walkers to stop and wait.

Floor materials

- Surfaces should be firm, stable and slip-resistant.
- The accessible path should be a colour and texture that contrasts with surrounding materials

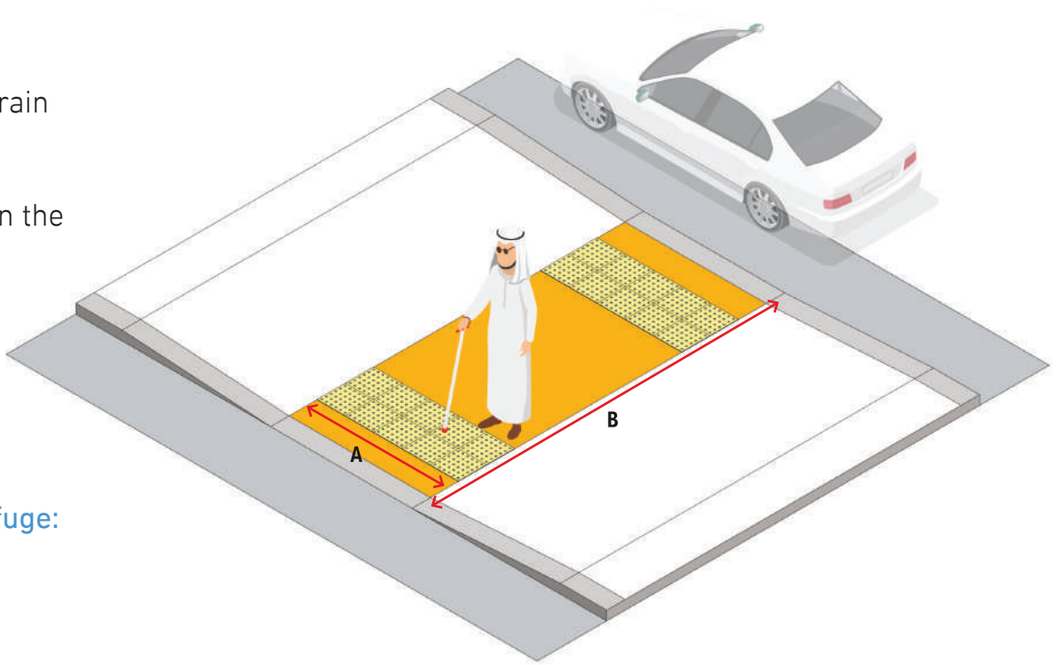
Drainage

- Median design should drain water away from island
- Water should not pool on the path of travel

Dimensions

A- width of path:
1500mm minimum.

B- depth of the median refuge:
1400mm minimum.



A 10 5 END MEDIAN REFUGE AREAS

- On larger roads, medians and middle islands should be provided wherever possible as allow slower walkers time to cross the road or wait and rest.
- Medians and middle islands need to be large enough for wheelchairs and mobility scooters.
- Refuge ares should be shaded.

Tactile surfaces

- A tactile detectable warning surface should be provided at each edge of accessible path where it meets the roadway.
- The accessible path on narrow medians can be same elevation as roadway. Tactile warning surfaces are absolutely necessary in such cases to highlight to walkers to stop and wait.

Floor materials

- Surfaces should be firm, stable and slip-resistant.
- The accessible path should be a colour and texture that contrasts with surrounding materials

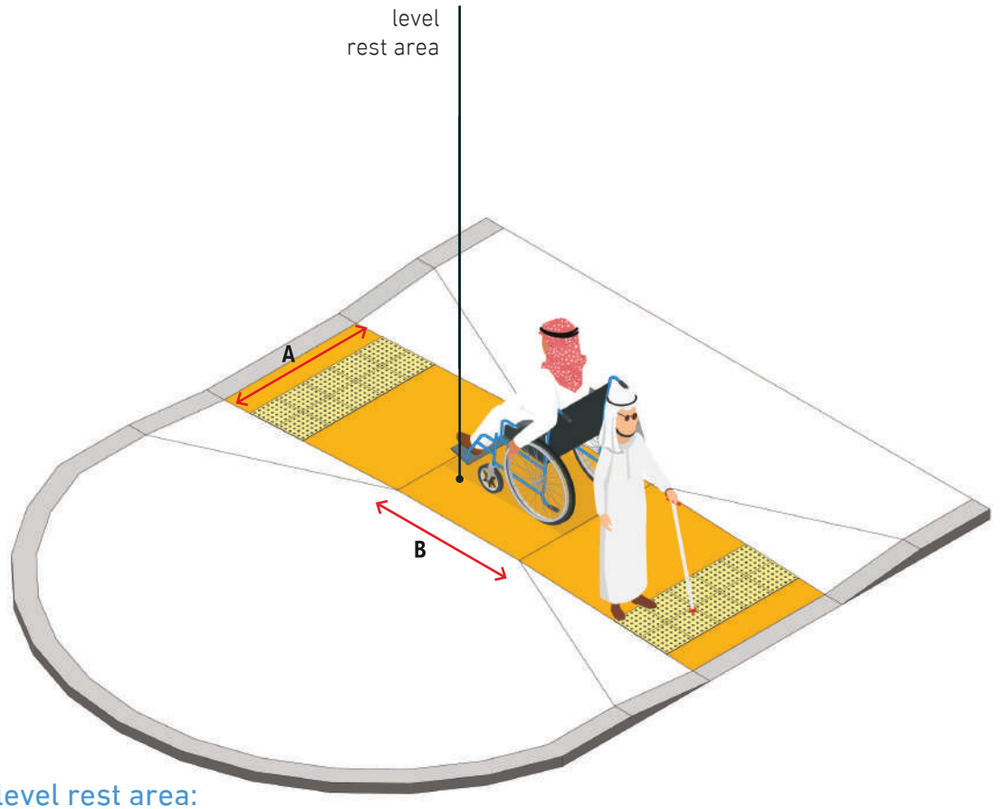
Drainage

- Median design should drain water away from island
- Water should not pool on the path of travel

Dimensions

A- width of path:
1500mm minimum.

B- depth of the median refuge level rest area:
1400mm minimum.



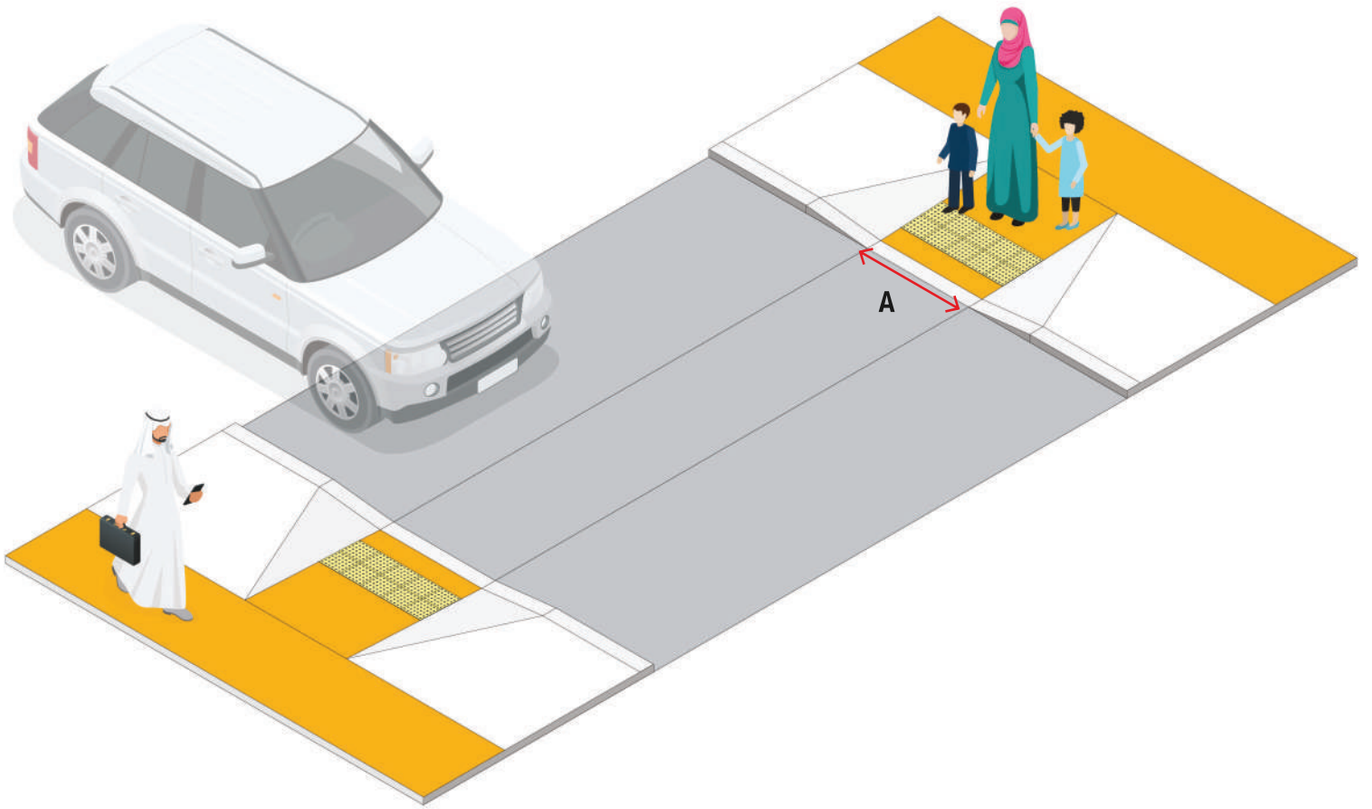
A 10 6 UNCONTROLLED CROSSING POINT

- Uncontrolled crossing points must have truncated dome tactile warning surfaces at each waiting area

Dimensions

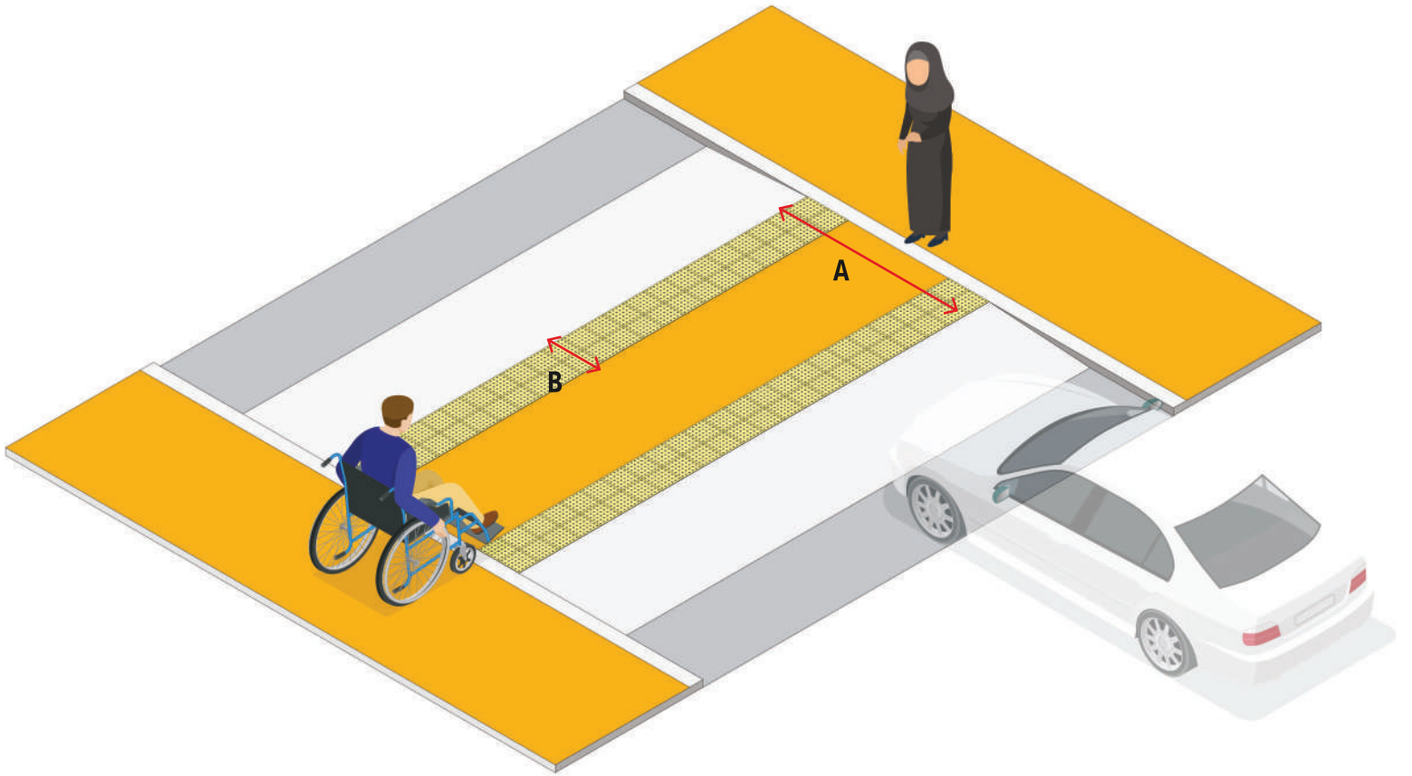
A- width of path:

1500mm minimum.



A 10 7 RAISED CROSSING POINT

- Raised solutions are useful in slowing traffic and avoiding need for kerb cuts. However, care must be taken to ensure that the edge of the kerb is clearly defined to raise awareness to the danger for people with sight difficulties.
- The floor material of the path should be visually and tactile different from the adjoining surfaces
- Raised pedestrian crossings should have a truncated dome detectable warning surface that is continuous along the edges of walking surfaces where they abut the vehicular roadway.



Dimensions

A- width of path: 1500mm minimum.

B- depth of the tactile warning surface: 600mm minimum.

A

Landscape & Open Space

A 11 1 STREET LANDSCAPE

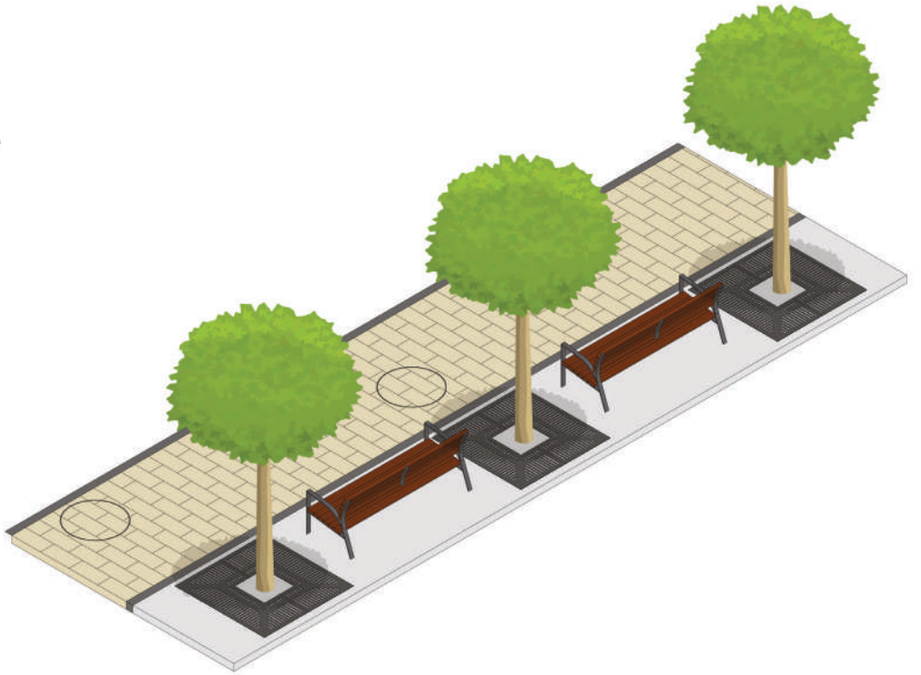
- Trees are encouraged to shade the accessible path and building entrances
- Plants should not overhang into airspace of accessible paths below 2100mm
- Plants with thorns should not encroach into accessible paths
- Plants that drop large seed pods should not be used adjacent to accessible paths as can cause hazard to wheelchairs.
- Tree pits should not be left open as can cause a trip hazard adjacent to accessible paths

Landscape areas beside accessible paths

- Edge of planting areas should be clearly defined with colour contrasting ground material
- Planting areas that are below the level of accessible path should be clearly defined using colour contrasting kerbs that are 75mm above surface so can be detected by walking cane.

Hazardous plants

- Plants with thorns and sharp edges should be kept minimum of 900mm away from -accessible paths and seating areas
- Plants that drop large seed pods should not overhang accessible paths



A 11 2 PLANTING IN URBAN PARKS

- Whilst the use of plants is to be encouraged in Riyadh, the design of softscape schemes should have regard to the potential harmful effect of certain plants. The design of
- softscaping areas shall meet the following requirements:

- Plants with thorns or spikes (such as Bourgainvillea) should not be used adjacent to the accessible path.

- Trees that produce dense shade through a large dense canopy are preferred over poor-shading trees. Trees planted in ground should be located outside the accessible path. Where the tree pit is located immediately adjacent to the accessible path the pit should have a walkable surface to avoid a trip hazard close to the accessible path.

Plants that provide fragrance should be located close to paths to heighten sensory experience for users.

- Shade canopy is a key consideration in the selection of tree species such that at three year maturity the canopy will block 75% of sunlight. Where trees are provided alongside the accessible path trees must have a clear stem height of at least 2.3m on pedestrian paths and 2.5m on cycle routes and shared use paths.

- It is recommended that the soft scape palette be drawn from the following plant list, noting the restrictions on use.

Figure 1: Planting areas have been integrated into this accessible ramp to provide visual interest and shade.

Source: Lab for Planning & Architecture for the Municipality of Las Palmas de Gran Canaria in Spain

A 11 3 CHILDREN'S PLAYGROUNDS

- Playgrounds that offer a variety of different types of play options (visual, auditory and tactile) should be provided to meet the needs of different age groups.
- All play areas should include accessible play facilities that can be used by all. At least 50% of equipment at ground level should be universally accessible and recognised as such by the International Play Equipment Manufacturers Association (IPEMA).
- It is recommended that all fixed play equipment will be shaded with a fixed shading device.
- In order to appeal to a wider range of users, and in particular those with sensory needs, it is recommended to provide audio oriented play pieces such as wind chimes, talking tubes and cocoon type facilities such as a swing or a hammock or a 'cave' type space.
- Playground surfaces should be firm, stable, level, be nonabrasive, and drain rapidly.
- Surfaces below playground equipment, including swings, slides and climbing structures, should be level, freedraining, and provide a softer, resilient landing surface in case of a fall

Figure 1: An accessible and inclusive playground can accommodate people of all age and ability

A 11 4 Considerations for Landscape and Plant Materials

Trees, shrubs, flowers, ground cover, and grasses that are suitable for Riyadh›s environment, as outlined in the Riyadh Trees and Plants Guide developed by the Royal Commission for Riyadh City, can be used. Below are the considerations that should be taken into account when designing landscape and plant materials

نباتات وأشجار الرياض
الهيئة الملكية لمدينة الرياض
ROYAL COMMISSION FOR RIYADH CITY
www.rp.riyadhenv.gov.sa

PALM TREES			
	Botanical Name	**Common Name**	**Notes**
1	Phoenix dactylif	Date Palm	Leaf spikes from young species – no leaves should inhibit a clear zone of 2.1m from ground floor on pedestrian only paths and 2.3m from ground on cycle paths and shared use paths.
2	Chamaerops humilis	European / Mediterranean Fan Palm	
3	Washingtonia filifera	California Fan Palm	
4	Washingtonia robusta	Mexican Fan Palm	
		TREES	
	Botanical Name	**Common Name**	**Notes**
1	Vitex agnus castus	Chaste Tree	Fragrant
2	Plumeria obtusa	Temple tree	potential sap alergy
3	Plumeria rubra acutifolia	Red Plumeria	potential sap alergy
4	Prosopis cinerea (syn Prosopis spicigera)	Ghaf Tree	has thorns - use away from paths
5	Tabebuia argentea	Tree of gold	
		SHRUBS	
	Botanical Name	**Common Name**	**Notes**
1	Carissa grandiflora	Natal Plum	poisonous berries, hedge use only
2	Cestrum nocturnum	Night Jasmine	Fragrant

A 11 4 Considerations for Landscape and Plant Materials

GRASSES			
	Botanical Name	**Common Name**	**Notes**
1	Agave parryi	Parry's agave	All succulents are characterised by leaf spines and should therefore not be used immediately adjacent to the accessible path.
2	Agave victoriae-reginea	Queen Victoria agave	
3	Aloe africana	Spiny aloe	
4	Aloe claviflora	Kraal aloe	
5	Aloe debrana		
6	Aloe repestris	Bottlebrush aloe	
7	Aloe striata	Coral aloe	
8	Aloe virens		
9	Echeveria elegans	Mexican rose	
10	Echinocactus grusonii	Golden barrel cactus	
11	Echinopsis huascha	Red torch cactus	
12	Ferocactus echidne	Sonora barrel	

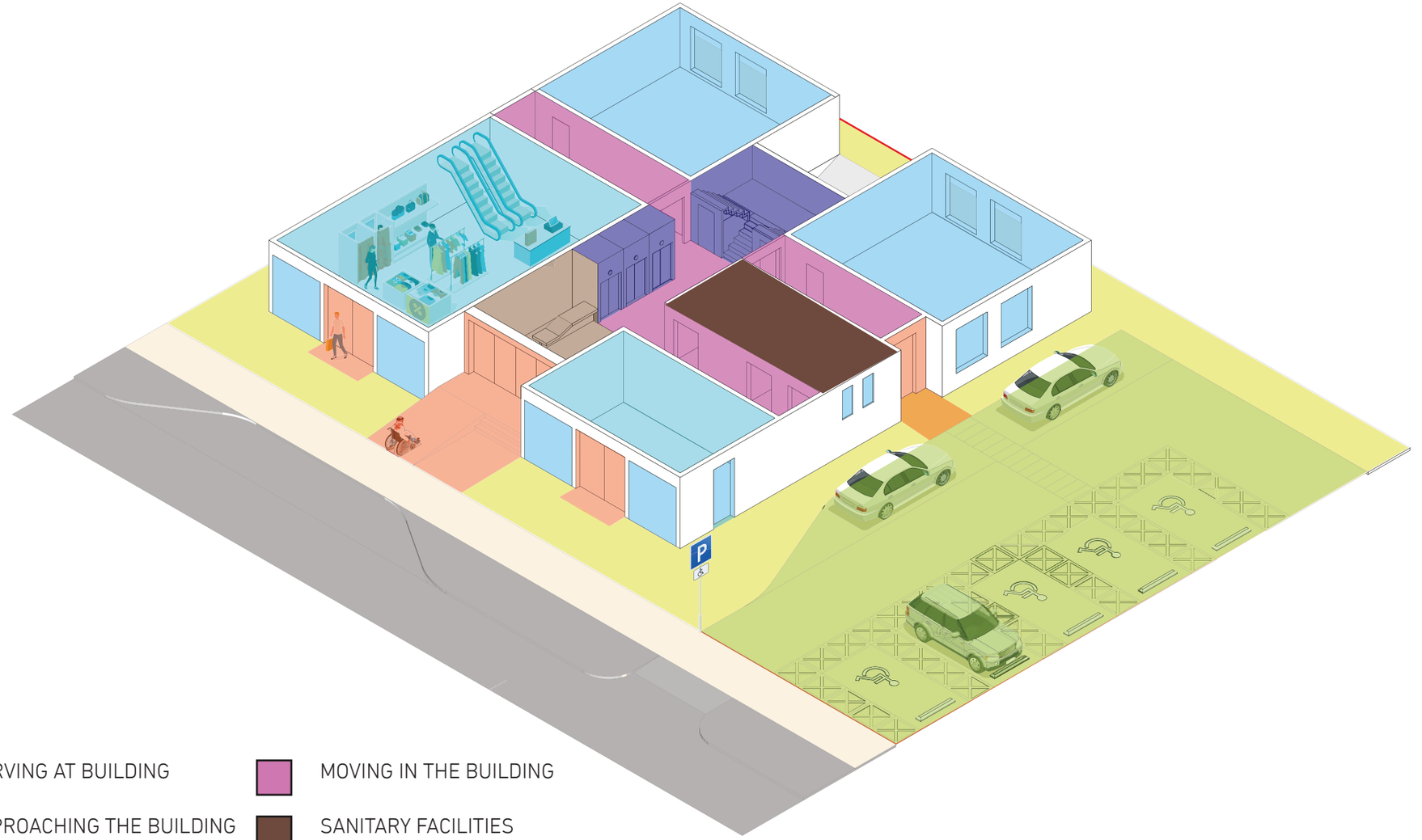
B

BUILDINGS

Locating the Building Entrance

B

B 1 BUILDINGS JOURNEY



ARRVING AT BUILDING

APPROACHING THE BUILDING

ENTERING THE BUILDING

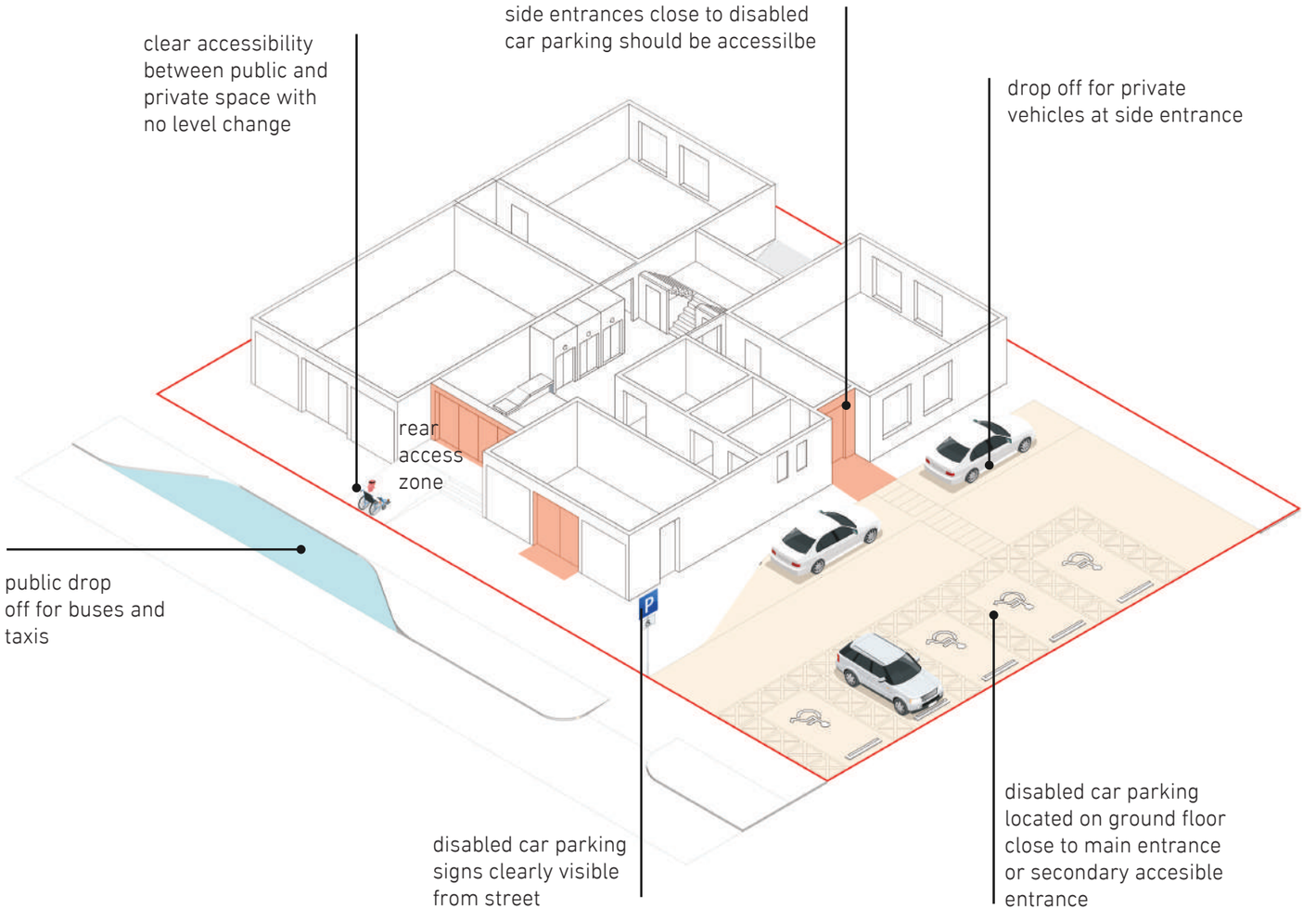
MOVING IN THE BUILDING

SANITARY FACILITIES

USING & ACCESSING ROOMS

B 1 1 POSITION OF BUILDING ENTRANCES

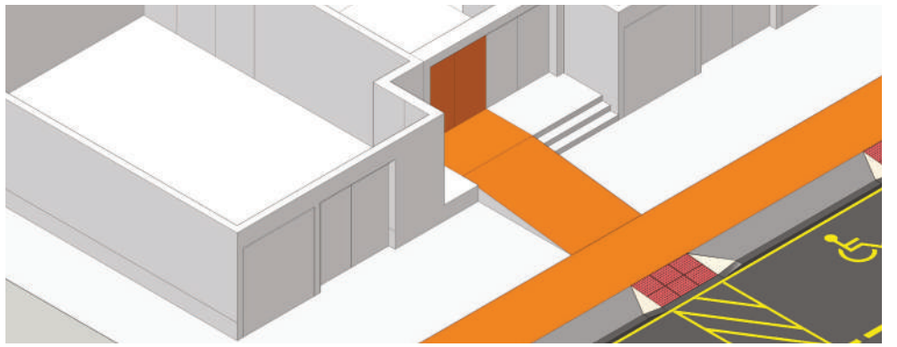
- All public entrances to buildings should be accessible and should comply with the following regulations.
- In a renovation situation and where it is technically infeasible to comply fully, primary entrances and at least 50% of remaining staff and public entrances should comply with the following regulations.
- People with disabilities should be able to gain access to building by any entrance
- Separation between accessible and non-accessible entrances is not recommended unless in exceptional circumstances that the main entrance can not be fully accessible and a secondary entrance is required.

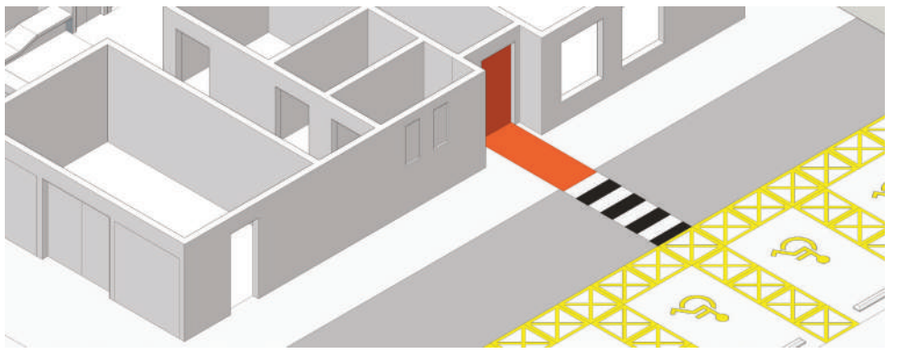


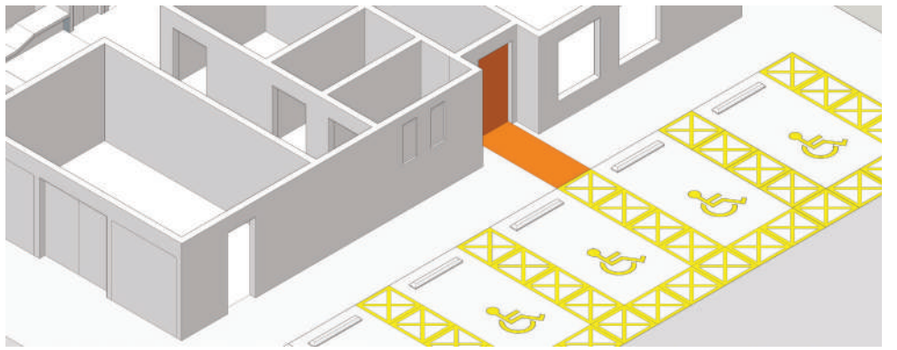
B 1 2 ROUTES TO BUILDING ENTRANCES

- Accessible paths should be accessed via a dropped kerb in adjoining pavement
- The area around accessible car parking space should be firm, stable surface
- The maximum gradient of parking bay and access zones is 2% for running and
- cross slopes
- Accessible and limited mobility parking bays should have access zones on all sides and rear of
- vehicle
- A shaded accessible path to be provided between disabled car parking spaces and building entrance.

- It is critical to provide an accessible path that is of gentle slope, free from level changes and without any obstructions between the main following locations:
  - Between drop-off space and main entrance
  - Between disabled car parking spaces and main entrance
  - Between car parking spaces and main entrance
  - Between street and main entrance
  - Between public transport and main entrance







Building Entrances

B

B 2 1 BUILDING SIGNS

Signs

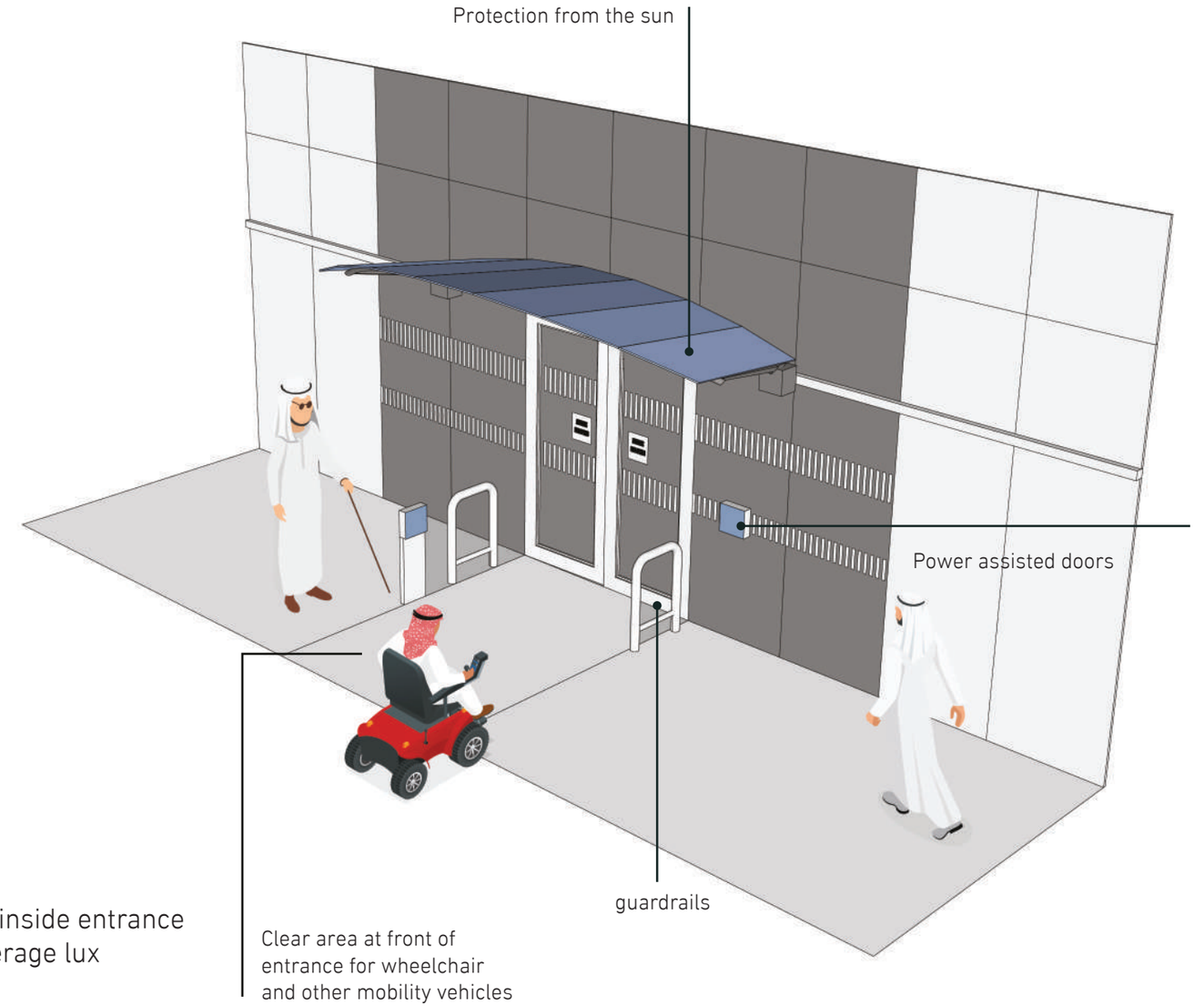
- Building entrances should be identified by clearly visible signs.
- The building address should be clearly visible at main entrance.
- If the entrances is not accessible, signage should provides direction to the closest accessible entrance.

Entrance Canopies

- Accessible pedestrian entrances should be protected from the weather, particularly the sun.
- The use of canopies or recessed entrances should be considered.
- Canopies are also useful in identifying the main entrance for people with sight difficulties.

Illumination

- Entrances should be minimum 150 lux on exterior
- A illumination transition zone immediately inside entrance door should be provided. This shouldbe average lux between exterior and interior space



B 2 2 ENTRANCE FINISH & MATERIALS

- Colour and materials of building entrances should contrast with background.
- Accessible paths of travel leading to pedestrian entrances should be marked with colour and texture contrast to the surroundings.

Glass Facades

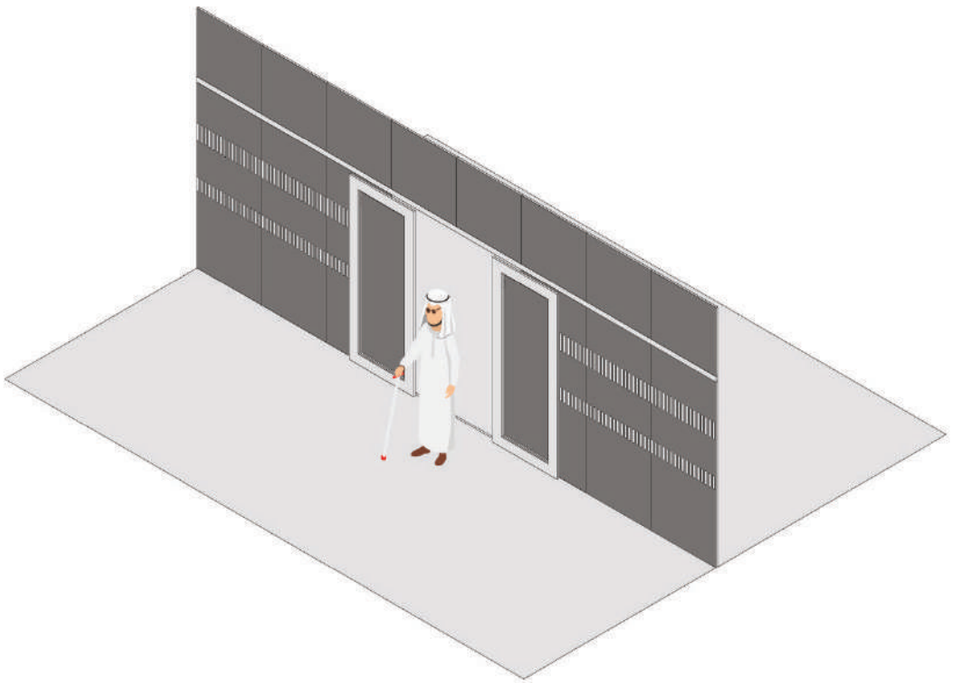
- There should be easily seen strips or markings at eye height on any glazed doors and entrance facades.

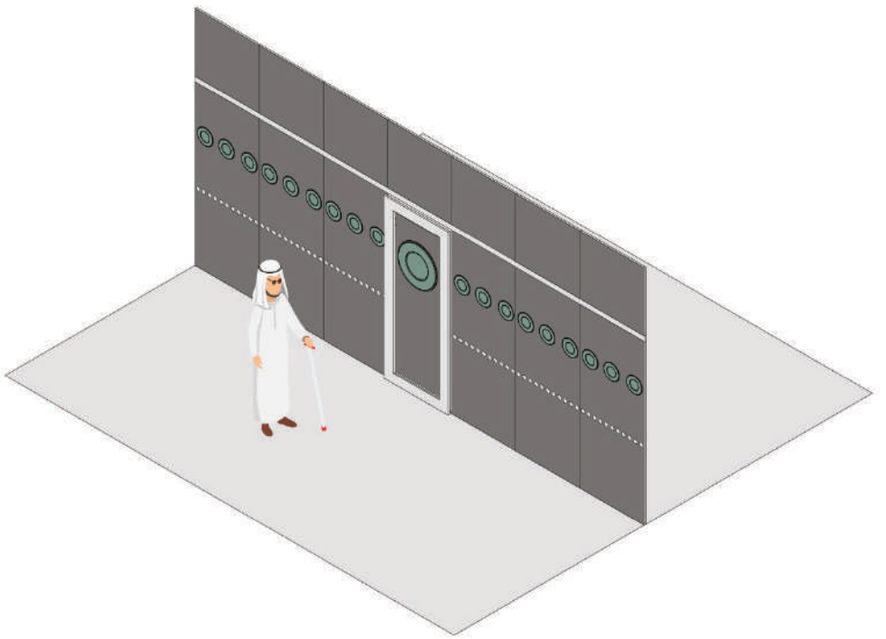
Door Frames

- When using large glass facades, it is necessary to make the opening sliding door very clear.
- Consdier the use of a door frame that is colour contrasting to the glass pane.

Internal Entrance Finish

- Entrance area walls and ceilings should be finished in a plain light matt colour.





B 2 3 EXTERNAL DOOR ARRANGEMENT

Door Arrangement

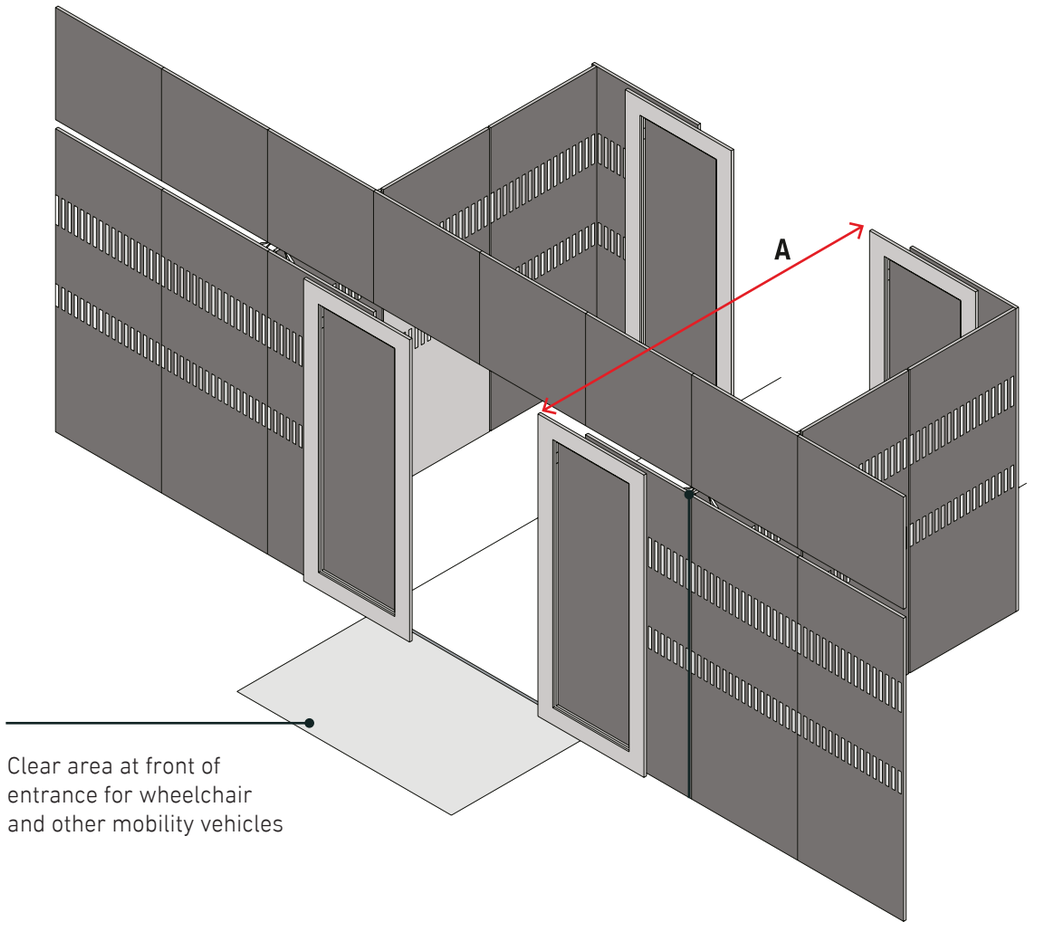
- Design features such as double door air lock should be considered for climate control without need for revolving doors.
- When two doors are installed in a linear series, they have a minimum space of 1200mm between the two doors when door is in fully open position.

Manoeuvring Space

- A clear manoeuvring space should be provided to allow people in wheelchairs to reverse of adjust position when opening doors. It will also assist slow moving people or other physical disability adjust their position when passing other people.
- Clear floor space should not be obstructed by other swinging doors.
- One way swinging doors should have a manoeuvring space on both sides as per the below dimension guidelines.

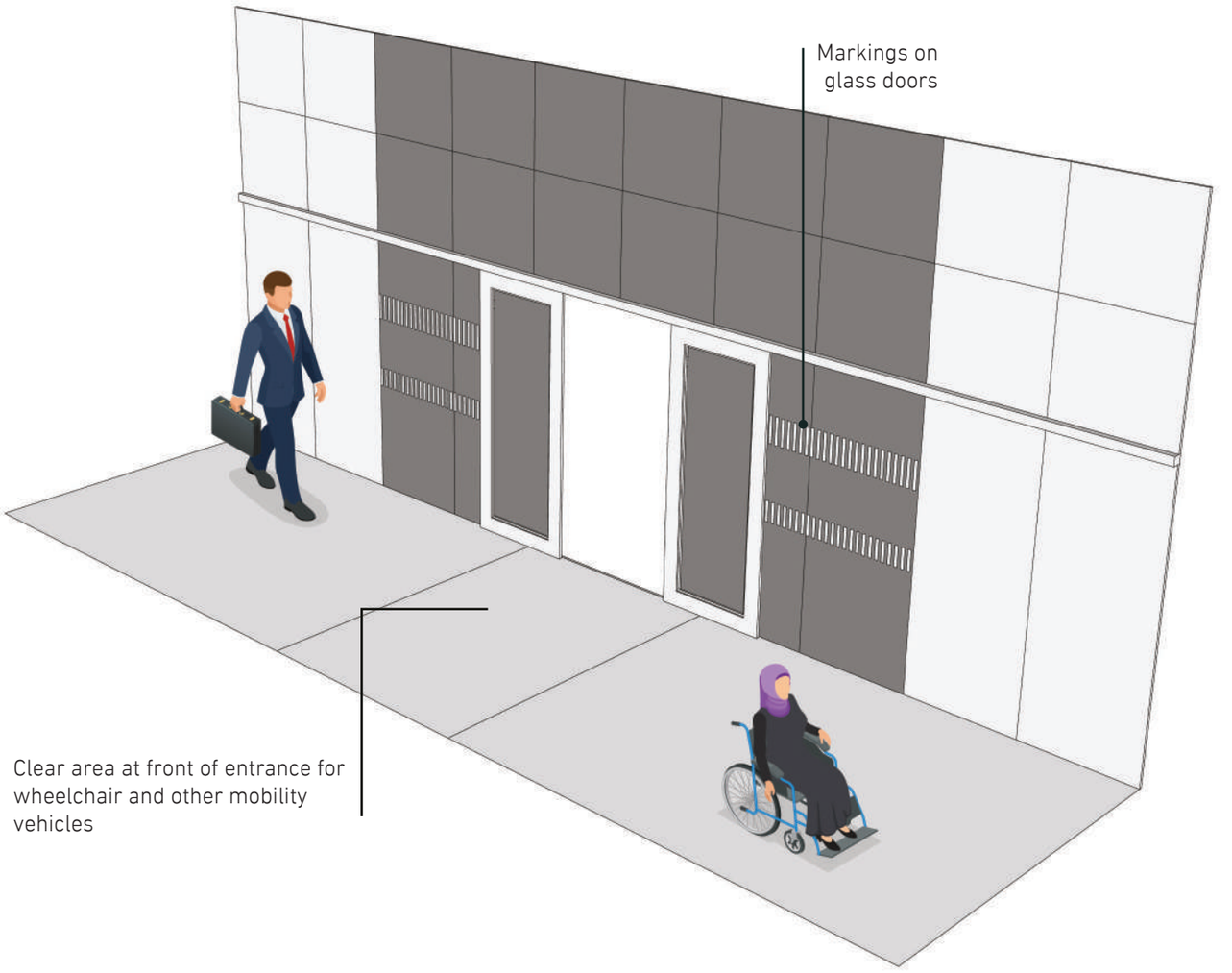
Dimensions

A- minimum space between doors in linear series:
1200mm minimum



B 2 4 AUTOMATIC SLIDING DOORS

- Automatic sliding doors can be very accessible as can be used adjacent to accessible paths without guard rails.
- Fully automatic sliding doors, activated by a presence and motion detector that opens door when people approach entrance are the preferred door type for all publicly accessible buildings.
- Automatic doors should open early enough to ensure person approaching is aware. The sensor should ensure door is fully open when person is no closer than 1400mm away.
- Automatic doors should stay open long enough to allow safe entry and exit, especially important for slow moving people such as the elderly.



B 2 5 AUTOMATIC POWER ASSISTED SWING DOORS

- Where automatic sliding doors are not used, an alternative is automatic swing doors operated by a button close to the door.
- The direction of the door swing should be configured to maximise the usability of a space and limit hazards to other pedestrians
- The opening motion and protection of swing doors needs to be considered.
- If doors open outwards into accessible paths or manoeuvring spaces, then guardrails are required to alert people.

- **Power operated doors should be installed at following locations:**

• building entrances

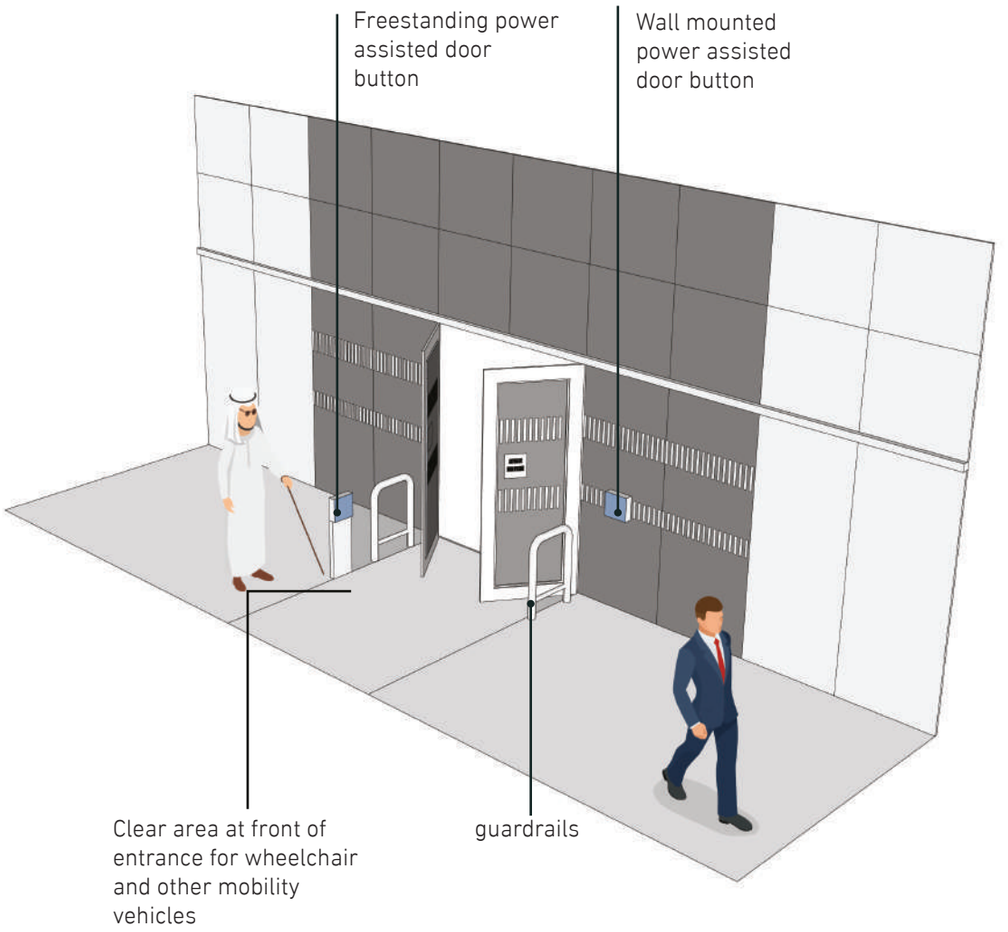
• family toilet rooms

• at lease one male and one female toilet facility per floor, that contains an accessible stall, when there is no family toilet room on the same floor

• change rooms that contain accessible toilet and shower facilities

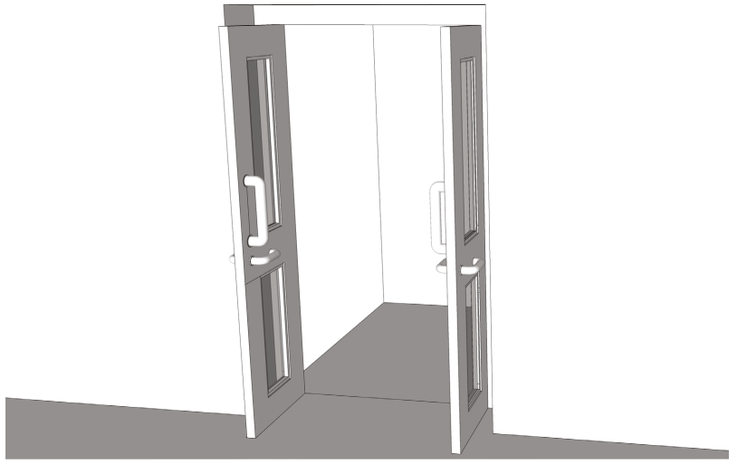
• private accessible change rooms

• doorways connecting primary circulation routes, with the exception of doors that are held-open using electromagnetic devices.

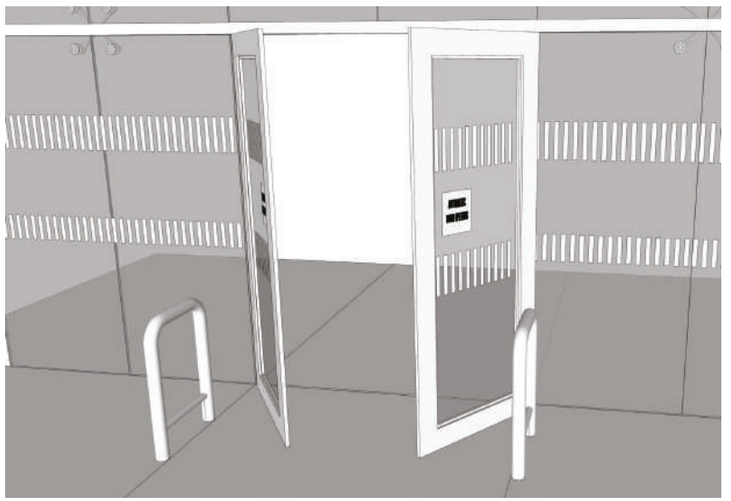


B 2 6 MANUAL POWER ASSISTED SWING DOORS

- Where automatic motion is not possible or security needs require controlled access, a manually operated system can be used. Controls may be push pad, code number pad, swipe card, fob, etc.
- The controls should be at height between 750-1000mm.
- The panel should be mounted on wall or post and set back 1400mm from the leading edge of opening door.
- Key pad should be large and easy to operate with tactile identification.



B 2 7 MANUAL SWING DOORS



- Manual swing doors should not be used on accessible entrances such as main entrances or entrances from car parks with accessible parking spaces.
- Manual swing doors are not recommended for external entrances due to the force needed to open up in strong winds.
- If required, main entrance or external doors should be double leaf swing doors.

B 2 8 AUTOMATIC POWER ASSISTED SWING DOORS

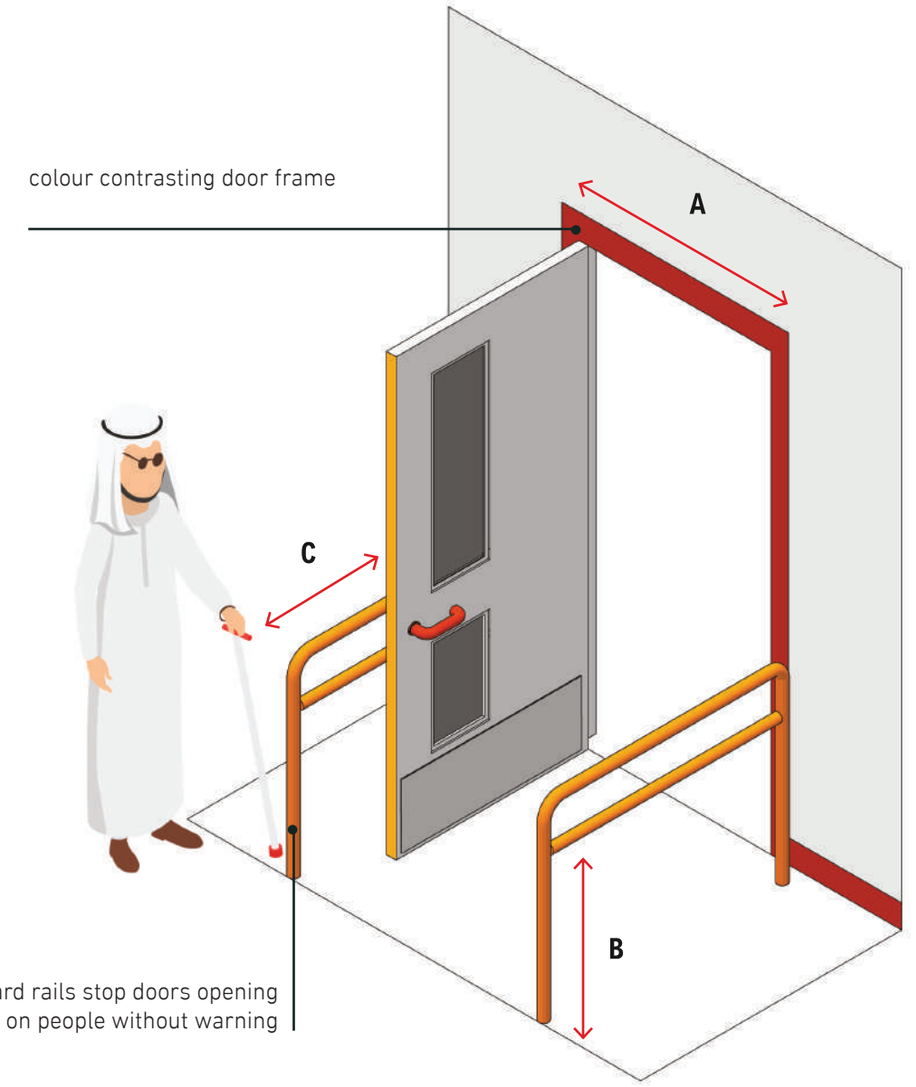
- Refer to Kingdom of Saudi Arabia Building Code for further guidance on guard rail design

Dimensions

A- door width clear space:
minimum 900mm.

B- height of lower rail:
maximum 680mm.

C- extension of guard rail beyond door when opened:
minimum 300mm.



B 2 9 REVOLVING DOORS

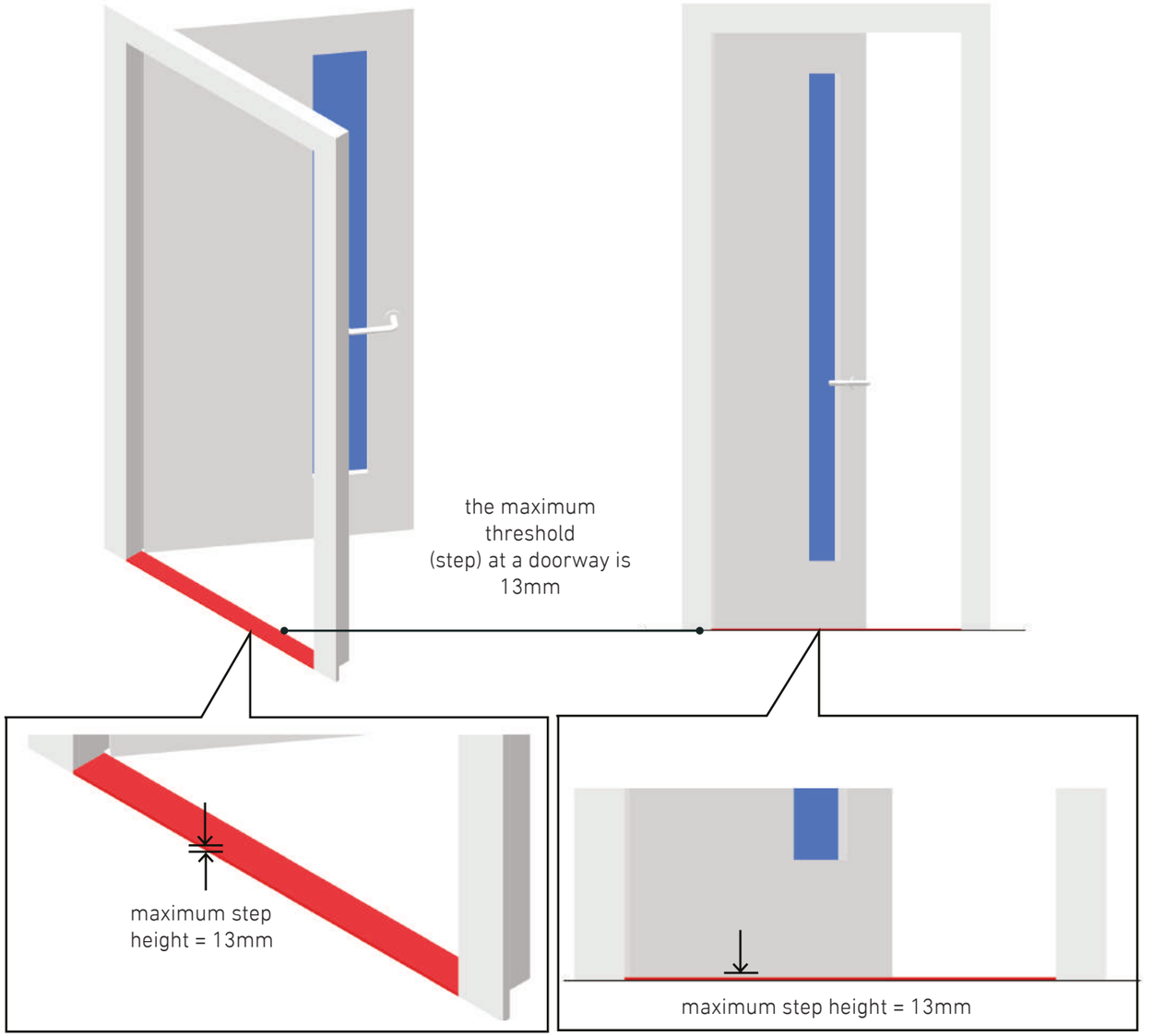
- Revolving doors are not considered accessible. Where used, there must be alternative entrance closely located.
- Large revolving doors where the clear width is compliant with regulations and the revolution time is slow may be accepted.

B

Entrance Door Levels

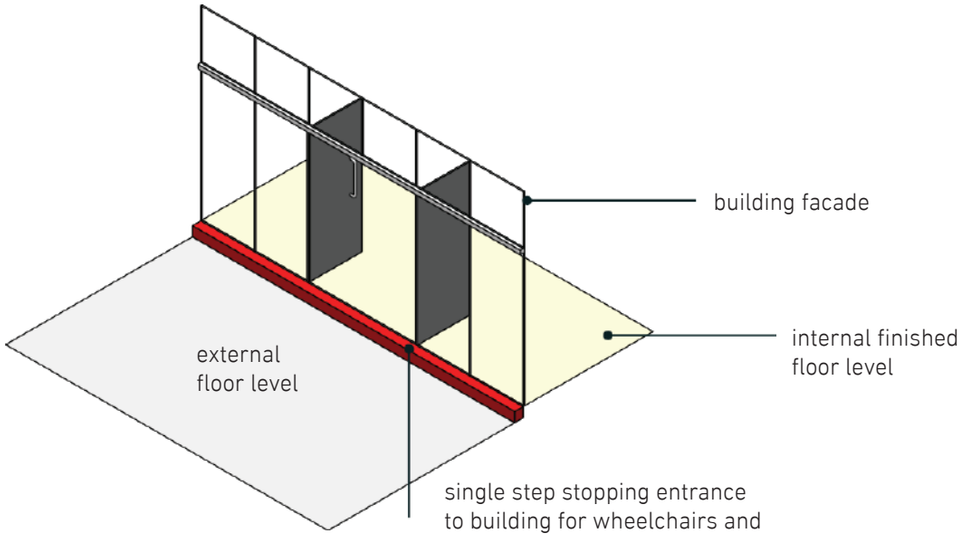
B 3 1 ENTRANCE DOOR THRESHOLD

- Thresholds to doors should not exceed 13mm
- The external surfaces and internal finished floor levels should be exactly flush with each other whenever possible. Any changes in level, no matter how small may cause trip hazard or problems for wheelchair users.
- Where there is any slight unavoidable difference between the external area and internal floor finishes, the design of thresholds must create a smooth and gentle sloping transition between both spaces.
- Where a slight level change is needed for weather protection or difference in floor heights of adjoining rooms, the maximum level change is 15mm. Where provided, any upstand of more than 5mm is to be chamfered or pencil rounded.

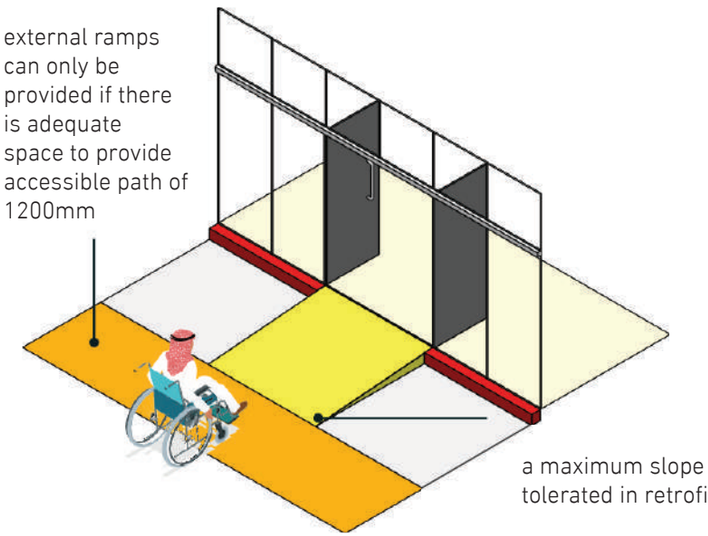


B 3 2 SOLUTIONS TO STEPS AT ENTRANCES

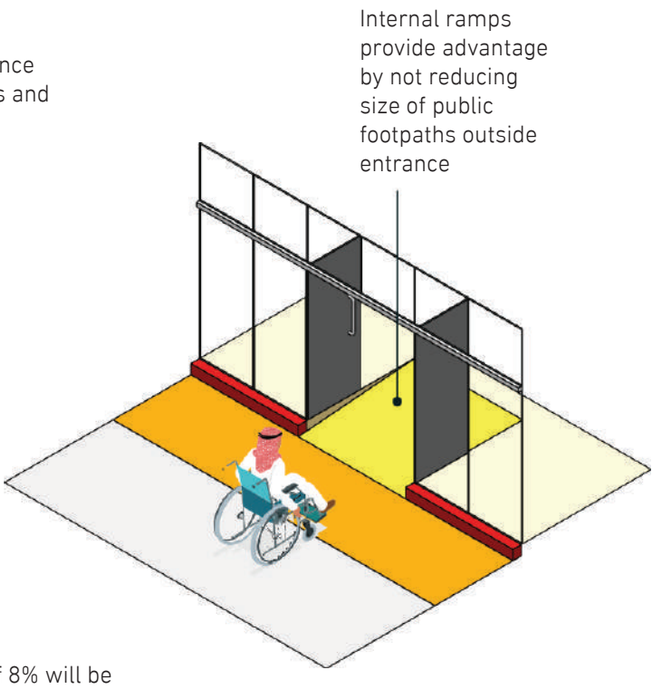
- Any change in level should be avoided between the external area and internal area. Steps to enter building are not acceptable and if at all needed, an alternative accessible entrance must be provided to the building.
- Single steps to enter building are not acceptable as cause trip hazard for all users and are difficult for wheelchair users to climb.
- Where level change is needed for weather protection, the maximum height is 13mm.



single step obstruction



External ramp solution

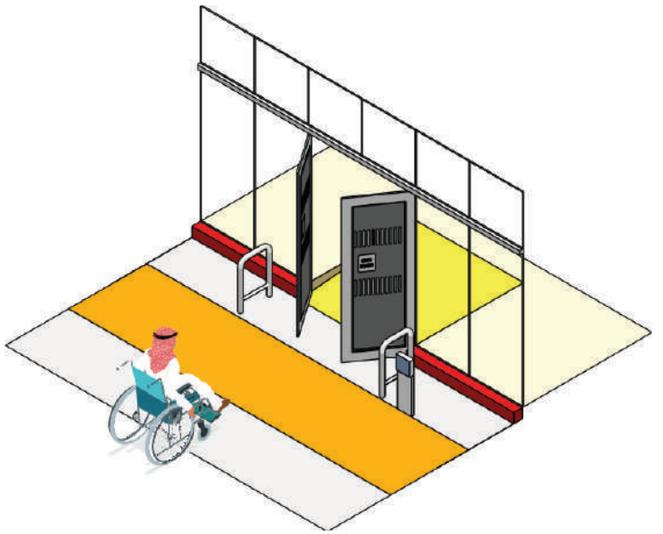


Internal ramp solution

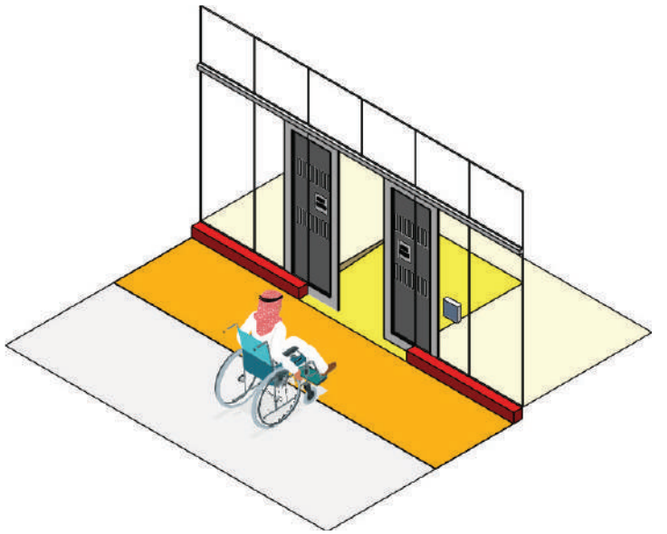
B 3 2 SOLUTIONS TO STEPS AT ENTRANCES

External area floor surface

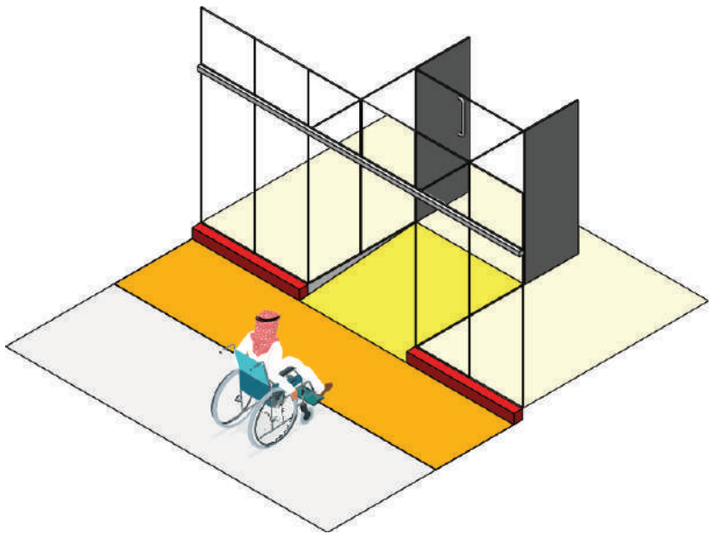
- The floor surface should not impede the travel of wheelchair users.
- External floor surfaces should be laid flush with the threshold of the doorway and at same level as internal floor surface to avoid any trip hazards to all users.
- Any floor mats outside or inside of external doors should be firmly fitted to floor to avoid slipping or tripping on corners.
- Coir matting should be avoided as difficult for wheelchair users to roll over.



Internal ramp with power assisted doors



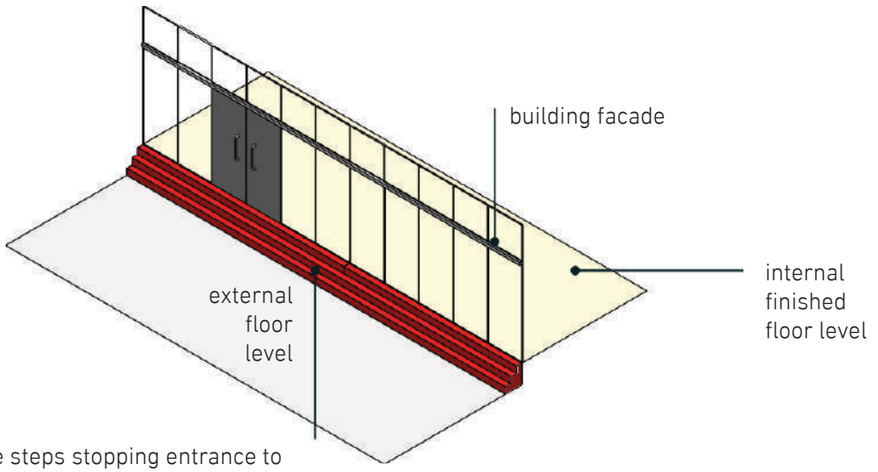
Internal ramp with automatic sliding doors



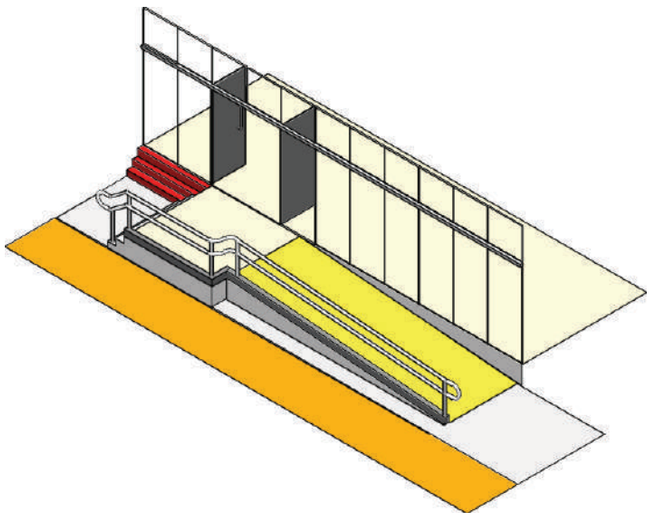
Internal ramp with recessed porch

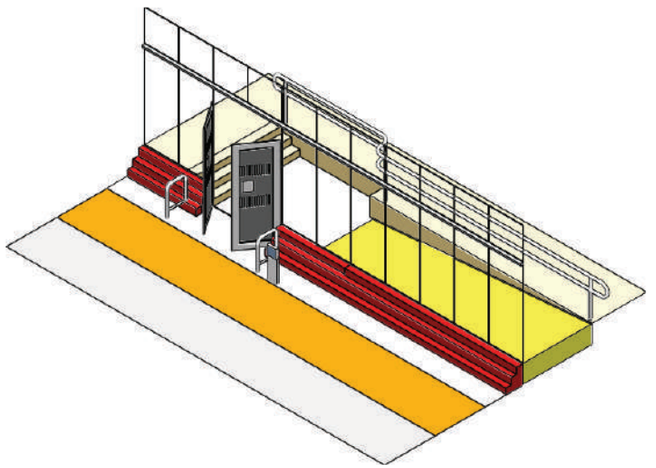
B 3 2 SOLUTIONS TO STEPS AT ENTRANCES

- Any change in level should be avoided between the external area and internal area. Steps to enter building are not acceptable and if at all needed, an alternative accessible entrance must be provided to the building.
- Single steps to enter building are not acceptable as cause trip hazard for all users and are difficult for wheelchair users to climb.
- Where level change is needed for weather protection, the maximum height is 13mm.



multiple steps stopping entrance to building for wheelchairs and causing hazard of falling hazard for all others

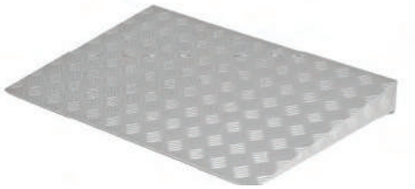




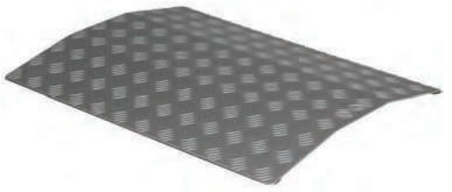
B 3 3 TEMPORARY OR PORTABLE SOLUTIONS TO OVERCOMING DOOR THRESHOLDS

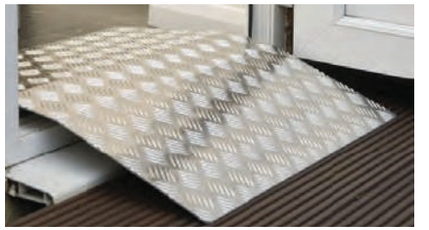
- There are a variety of purchasable solutions to overcoming low level differences in the door threshold
- These are only expected to be temporary solutions and should be used while a fixed permanent solution is developed
- Such solutions can only be used for low level change such as single or two step change

Semi permanent threshold ramps

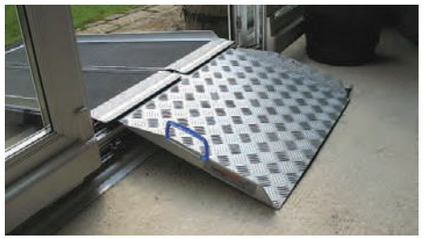


Doorline wedge

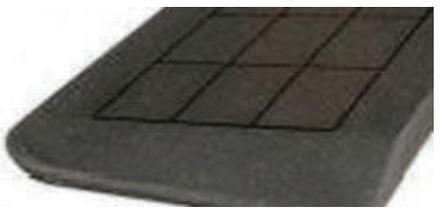




Doorline Bridge Ramp

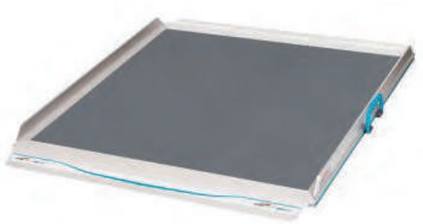


Doorline multi-ramp

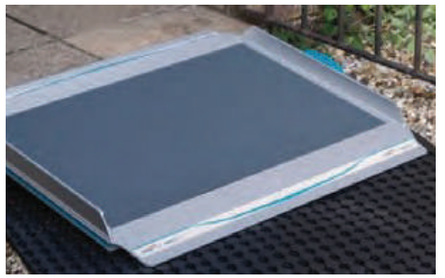


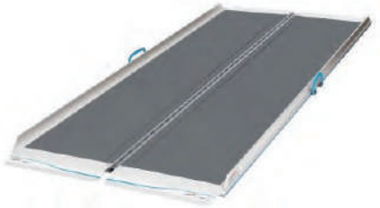
B 3 4 TEMPORARY OR PORTABLE WHEELCHAIR RAMP SOLUTIONS TO OVERCOMING LEVELS

Portable wheelchair ramps

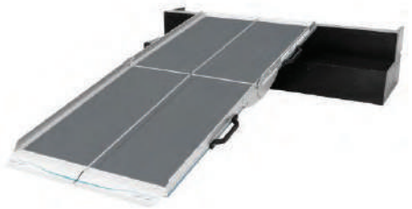


Single sheet ramp





centre fold ramp



Double bi-fold ramp

Movable channel ramps

short rigid ramp

telescopic ramp

telescopic combi-ramp

Ramps to Building Entrances

B

B 4 1 Forward Entrance Ramp (NO CHANGE IN DIRECTION)

Surface Materials

- Landing areas and ramp surfaces should be firm, stable and slip resistant.
- Polished or unnecessarily shiney materials such as polished marble is not permitted for ramps

Level Landings

- Landing areas should be provided at top and bottom of ramps
- Landing areas to be provided every 9 metres on longer ramps
- Maximum slope of landing areas to be 1:50 (2%) in any direction
- Top and bottom landings to be minimum 2100mm x 2100mm
- In exceptional circumstances, the size of landings can reduce to 1500mm x 1500mm
- Mid ramp landing areas should be minimum 1800mm deep\

Running slope

- The running slope should be between 1:16-1:25 (6.25% - 4%)

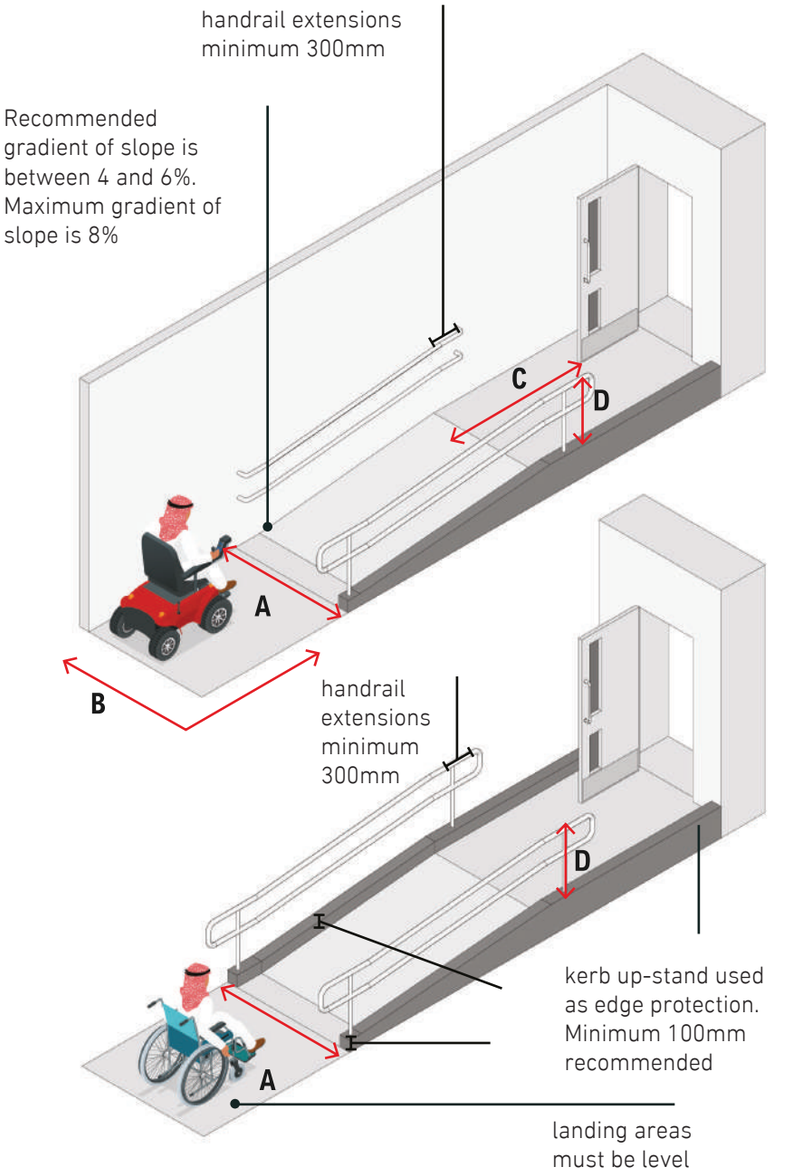
Dimensions

A- width of ramp (within handrails):
1200mm minimum (ideal 1500mm)

B- width and length of bottom landing area
- width 2100mm
- length 2100mm

C- width and length of bottom landing area
- width 2100mm
- length 2100mm

D- handrails height (from floor):
- top handrail 875-925mm
- bottom handrail 600-750mm



B 4 2 SIDE ENTRANCE RAMP (CHANGE IN DIRECTION)

- In exceptional circumstances, aslope of 1:12 (8.3%) is allowed if can prove there is no other option

Horizontal Length of Ramp

- The maximum horizontal length of a ramp, measured between ramp landings, should not exceed 9 meters.

Cross slope

- Cross slope should be avoided or minimized as much as possible.
- A maximum slope of 1:50 or 2% is permissible if no other option available.

Edge protection

- A kerb at minimum of V0 mm above the ramp surface on any side of the ramp where no solid enclosure or guard is provided

Level landings

- Landing areas should be provided at top and bottom of

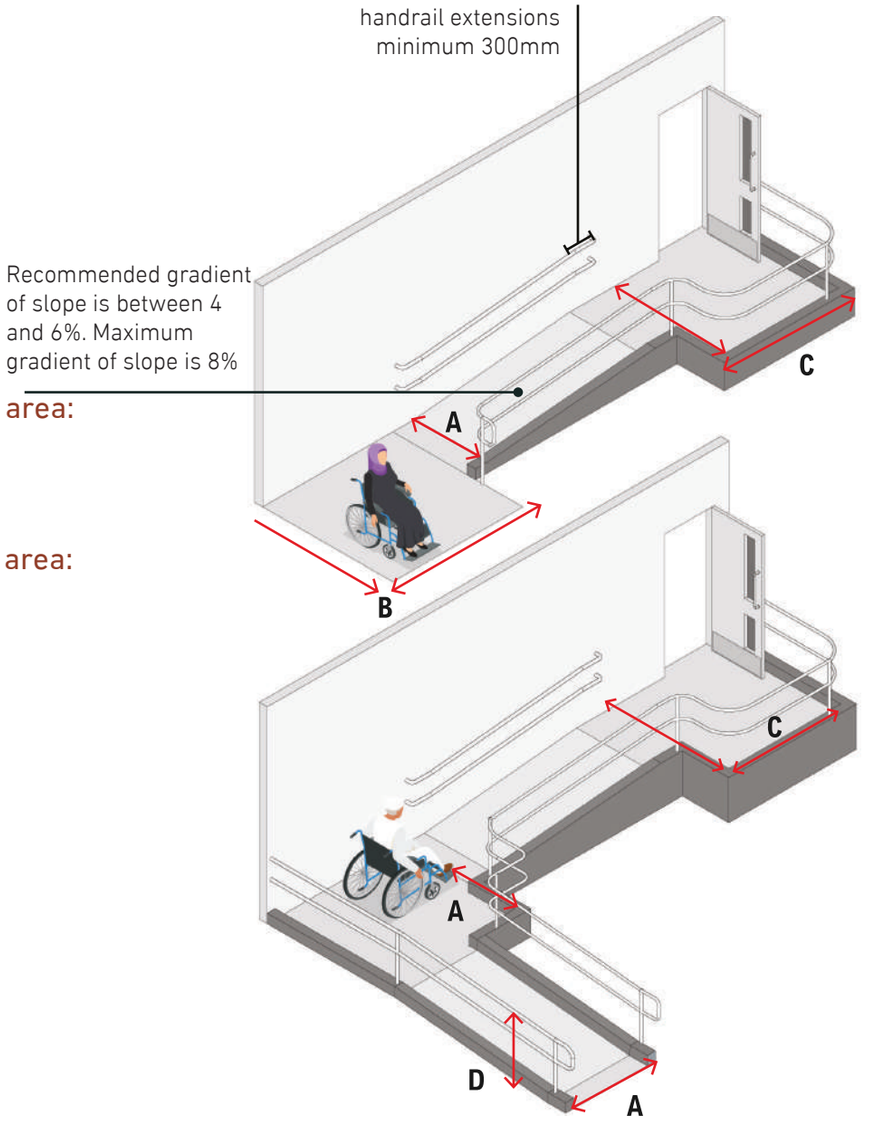
Dimensions

A-width of ramp (within handrails):
minimum 1200mm (ideal 1500mm)

B- width and length of bottom landing area:
- width 2100mm
- length 2100mm

C- width and length of bottom landing area:
- width 2100mm
- length 2100mm

D- handrails height (from floor):
- top handrail 875-925mm
- bottom handrail 600-750mm



B 4 3 RAMPS & STAIRS

Ramps

- Landing areas to be provided every 9 metres on longer ramps
- Landings should be provided at each change of direction
- Maximum slope of landing areas to be 1:50 (2%) in any direction
- Top and bottom landings to be minimum 2100mm x 2100mm
- In exceptional circumstances, the size of landings can reduce to 1500mm x 1500mm
- Mid ramp landing areas should be minimum 1800mm deep x 2400mm wide
- Intermediate landings at the switchback of a U-shaped ramp (180° turn), should be a minimum of 1800 mm deep and 2400 mm wide.
- Intermediate landing located at the corner of an L-shaped ramp (90° turn), the depth and
- width of the landing should be a minimum of 1800 mm.

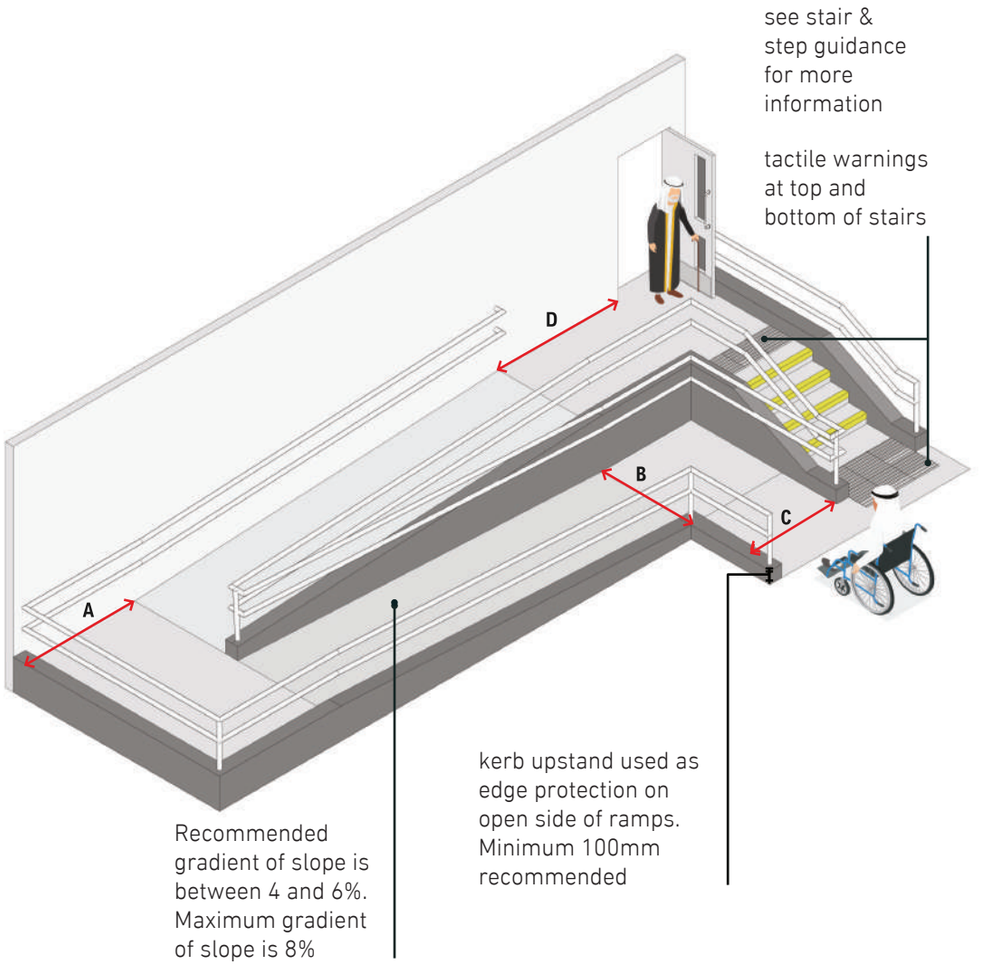
Dimensions

A- depth of intermediate landing area
minimum 1500mm (ideal 1800mm)

B- width & length of bottom landing area
- width as per the width of ramp
- length 2100mm

C- width of entrance to ramp:
- minimum 1500mm (ideal 2100mm)

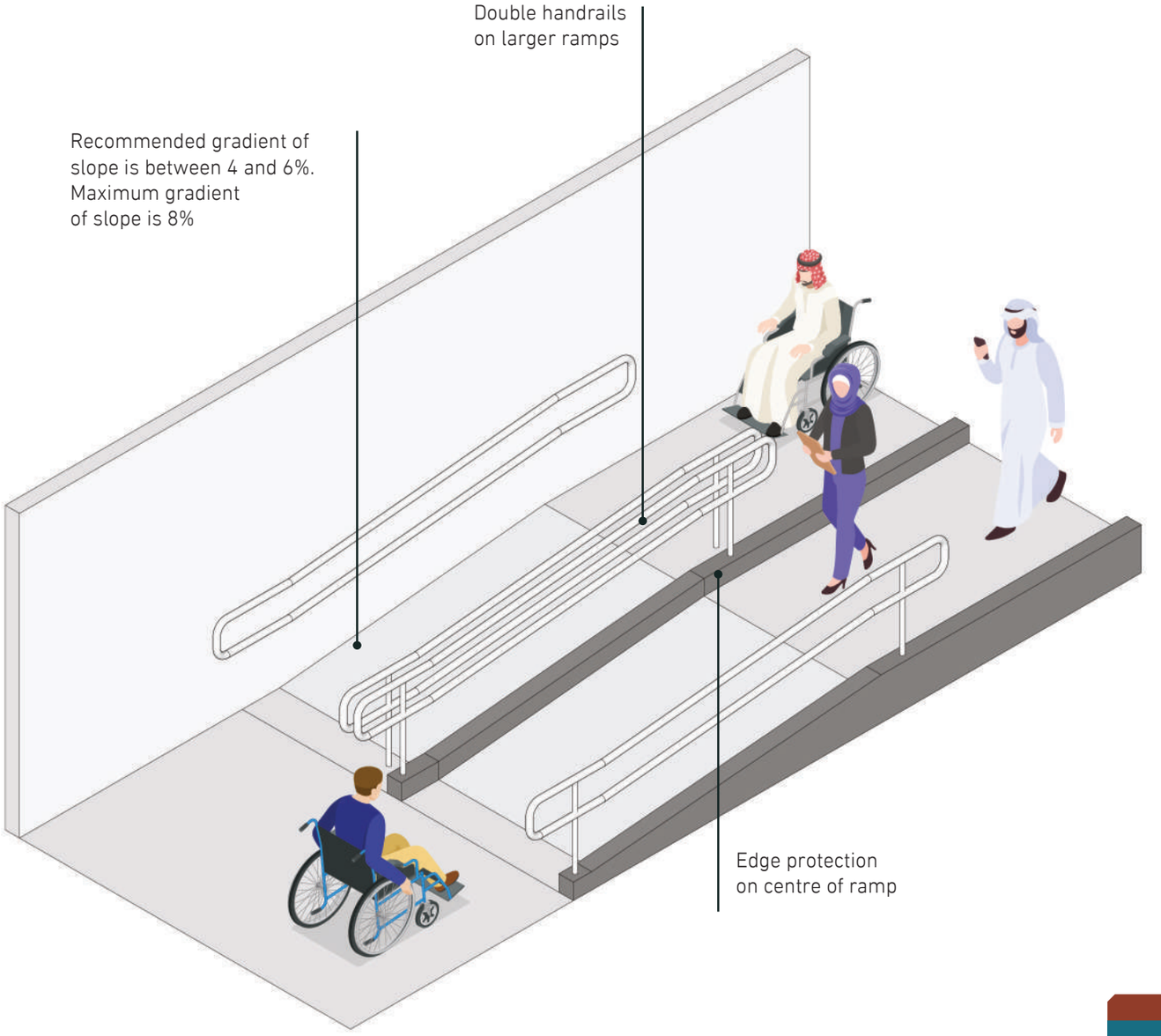
D- length of top landing area outside swing of opening door:
- minimum 1500mm



B 4 4 DOUBLE RAMP

Handrails

- A ramp run that has a rise greater than 150 mm should have handrails located on both sides of the ramp
- Upper and lower handrails should be provided on each side of the ramp
- Upper handrail located at 875-925 mm
- Lower handrail located 600-750 mm above the ramp surface.
- The clear width between ramp handrails should be 950-1100 mm apart

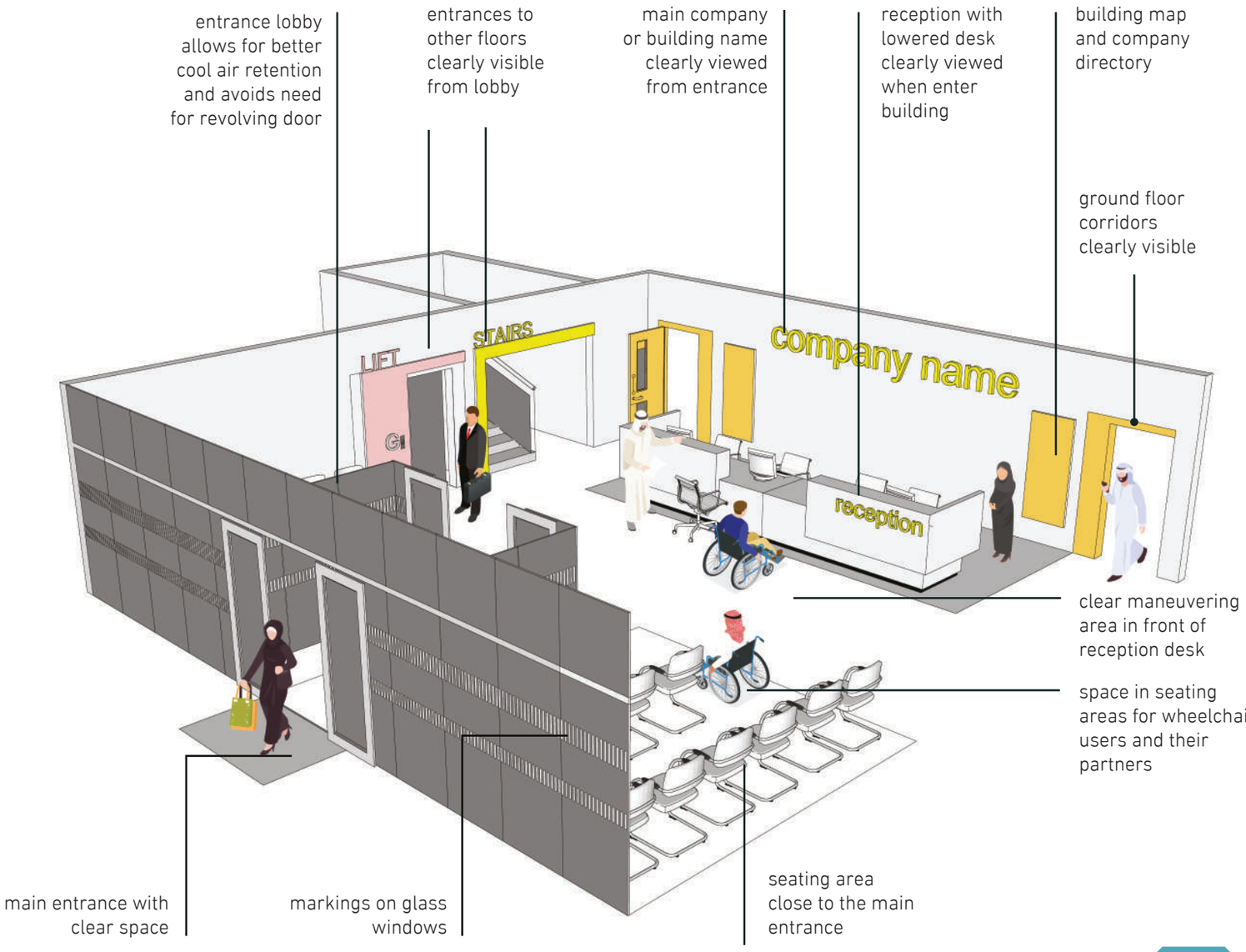


B

Entrance Lobby or Foyer

B 5 1 ENTRANCE LOBBY / FOYER

- In general, lobbies should be logically arranged and of adequate size to allow for the ease of circulation of however many people expected to use the building.
- If the reception area is not located in the main lobby when enter building, clear signage may be needed in public buildings to direct towards reception desks.
- Signs to key facilities such as lifts, stair, toilets should also be included in the entrance lobby.



B 5 2 GATES & TURNSTILES

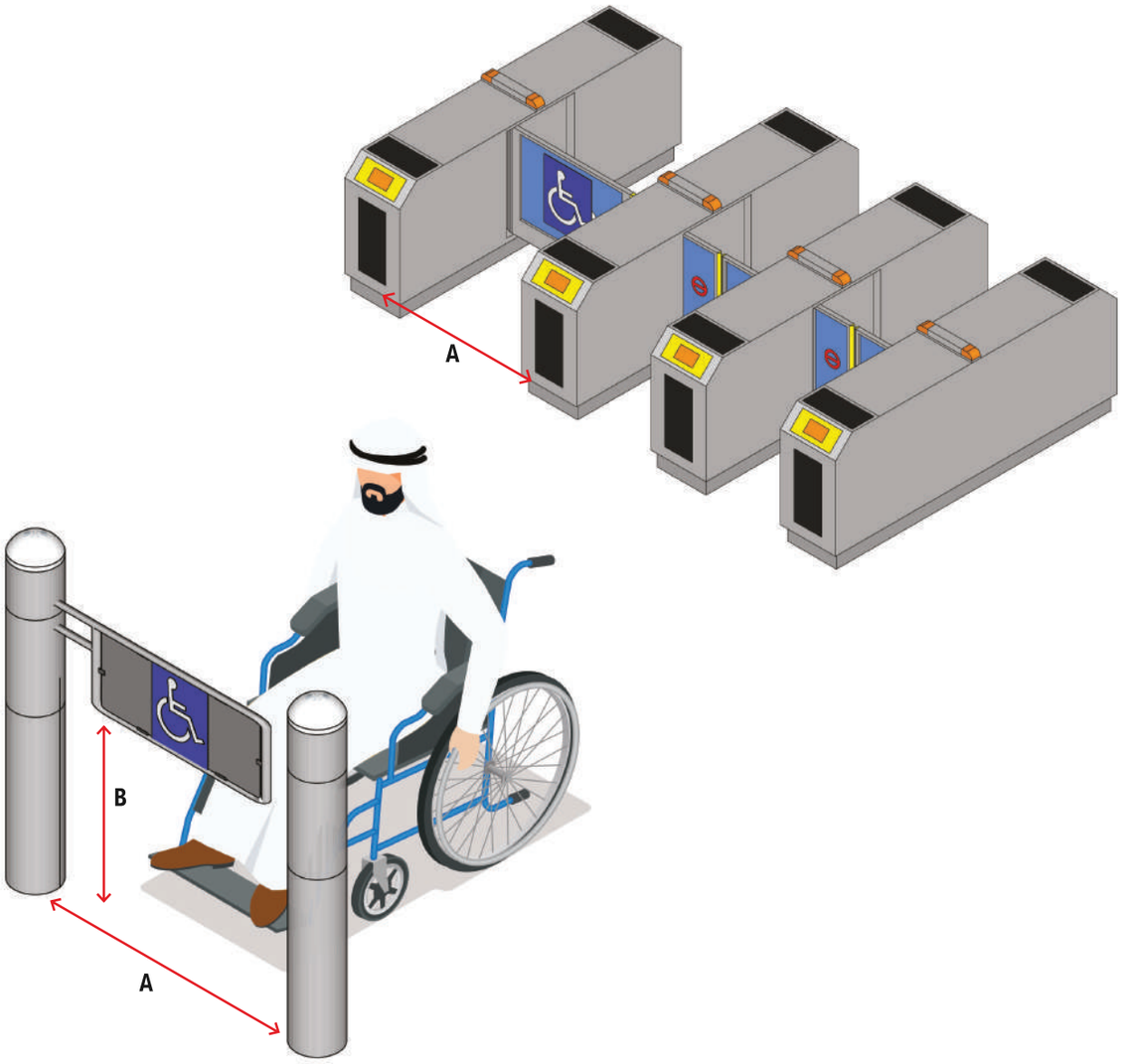
Turnstiles & Ticket Control Barriers

- When turnstiles or ticket control barriers are provided, at least one hinged gate wheelchair accessible entrance should be provided.
- The dimensions should be minimum of 800mm wide and 1200mm long.

Dimensions

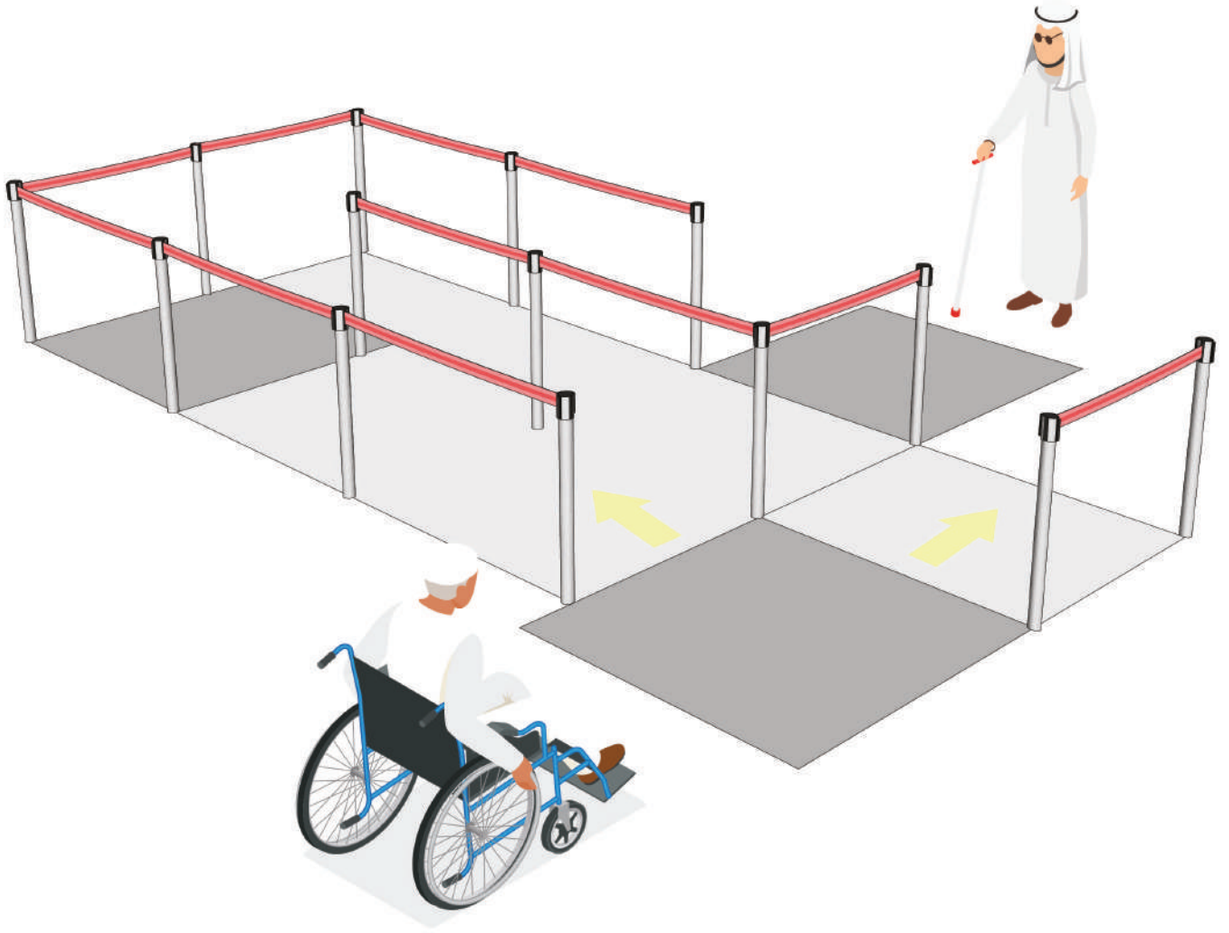
A- clear width: 900mm minimum.

B- height of barrier: 650mm maximum.



B 5 3 QUEUING AREAS

- The distance between the reception service desk and queuing barrier/rail should be at least 1800mm.
- Permanent barriers should have a rigid top and bottom rail. The top rail should be strong enough for people to lean on to rest. The bottom rail designed as a tapping rail with the lower edge no more than 150mm above floor level.
- The base of queuing barrier should not present a trip hazard.
- Queuing barriers and rails should contrast visually with surrounding surfaces.



B

Reception Desks

B 6 1 RECEPTION DESK LOCATION

- Reception desks should be located in logical and easily located position within entrance lobby so all visitors can clearly identify the helpdesk.
- The approach to reception desks should be direct, clear and unobstructed.
- Signs should be used to direct towards reception desks if obstructed from obvious view as enter building.
- Visual contrast between counter surface, edgings and adjacent floor and wall surface is recommended.
- A clear manoeuvring space should be provided to both the staff and customer side.

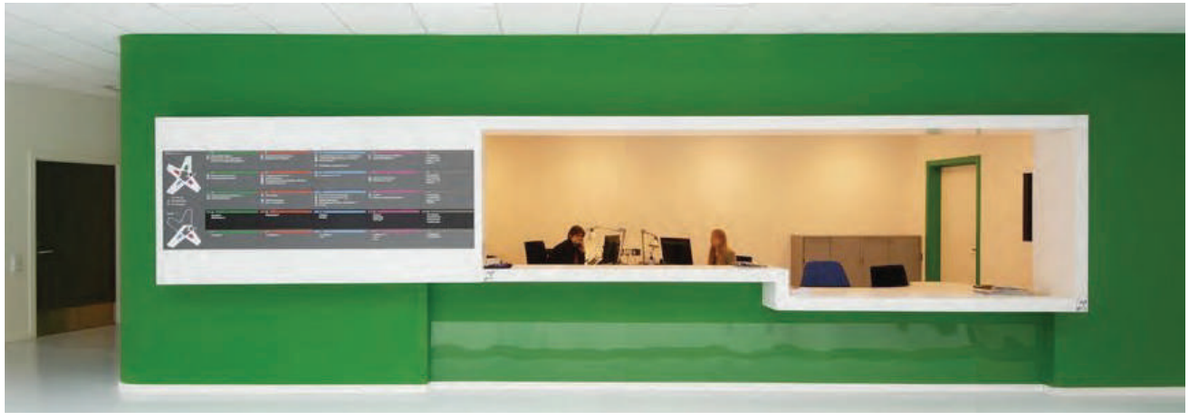


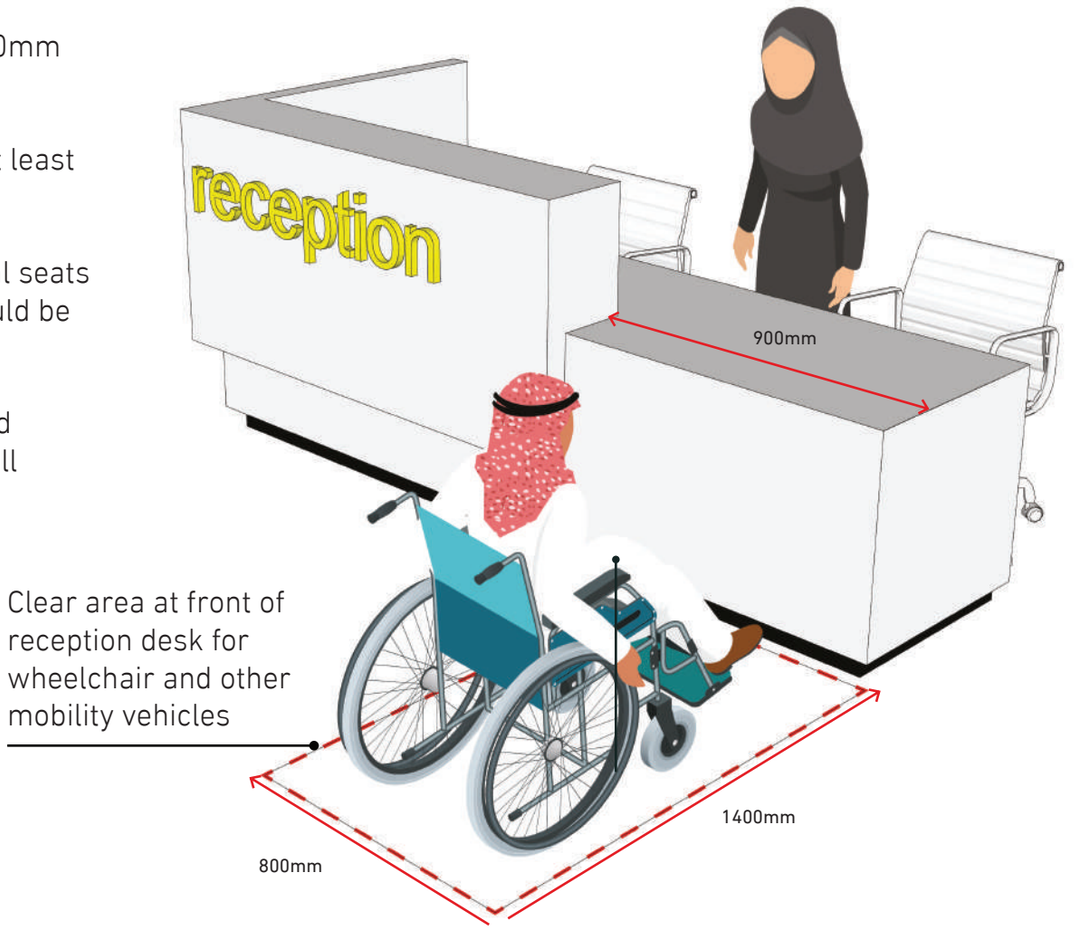
Figure 1: This reception desk has a clear area in front of reception desk lowered counter.
Source: House of Disable People's Organization by Cubo + Force4

Figure 1: A box office counter at cinema as lowered desk for wheelchair users
Source: The Roses Theatre, Tewkesbury

Figure 2: The lowered counter with large knee reces allows wheelchair users to gain close access to the receptionist in this hotel
Source: Holiday Inn

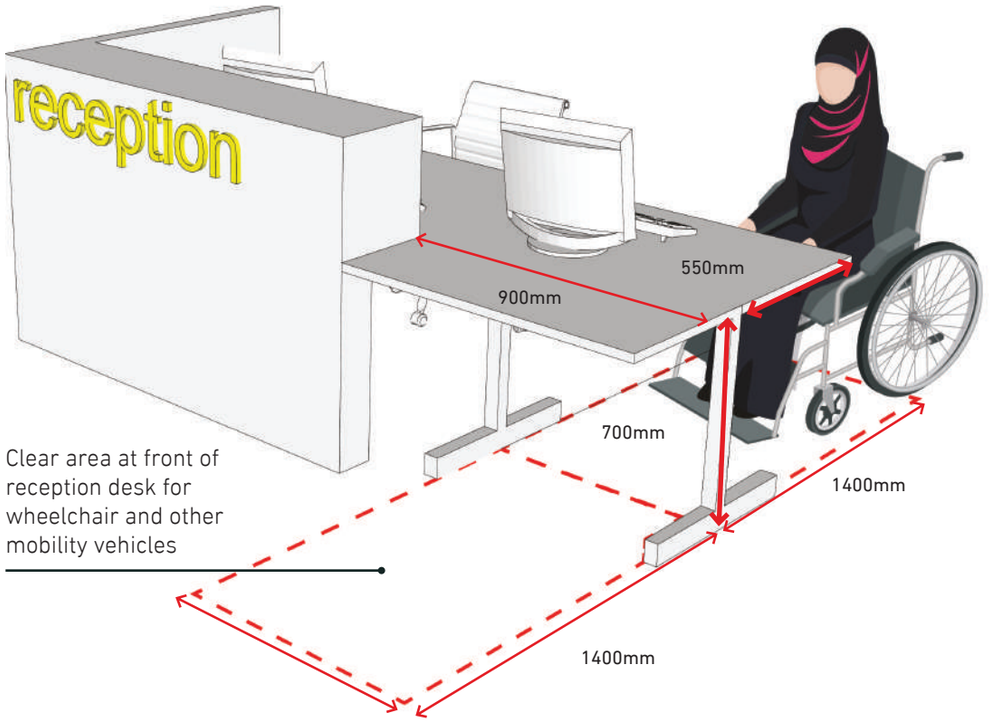
B 6 2 RECEPTION DESK WITH KNEE RECESS

- Reception desks and counters should be designed to be accessed and used by wide range of people's ability and height on both customer and staff side.
- The floor level should be the same on both the staff and customer side of desk.
- Counters and desks should be set at two heights:
- Maximum 760mmm high for people seated and a knew recess at least 700mm high 950- 1100mm for people standing
- Knee recess should be 500mmdeep on customer side and 650mm deep on the staff side.
- The counter depth where there is space for a wheelchair user should be at least 700mm
- The lower section of counters should be at least 1800mm wide.
- Provision of additional seats at lower counter should be considered.
- All exposed edges and corners should be well rounded.



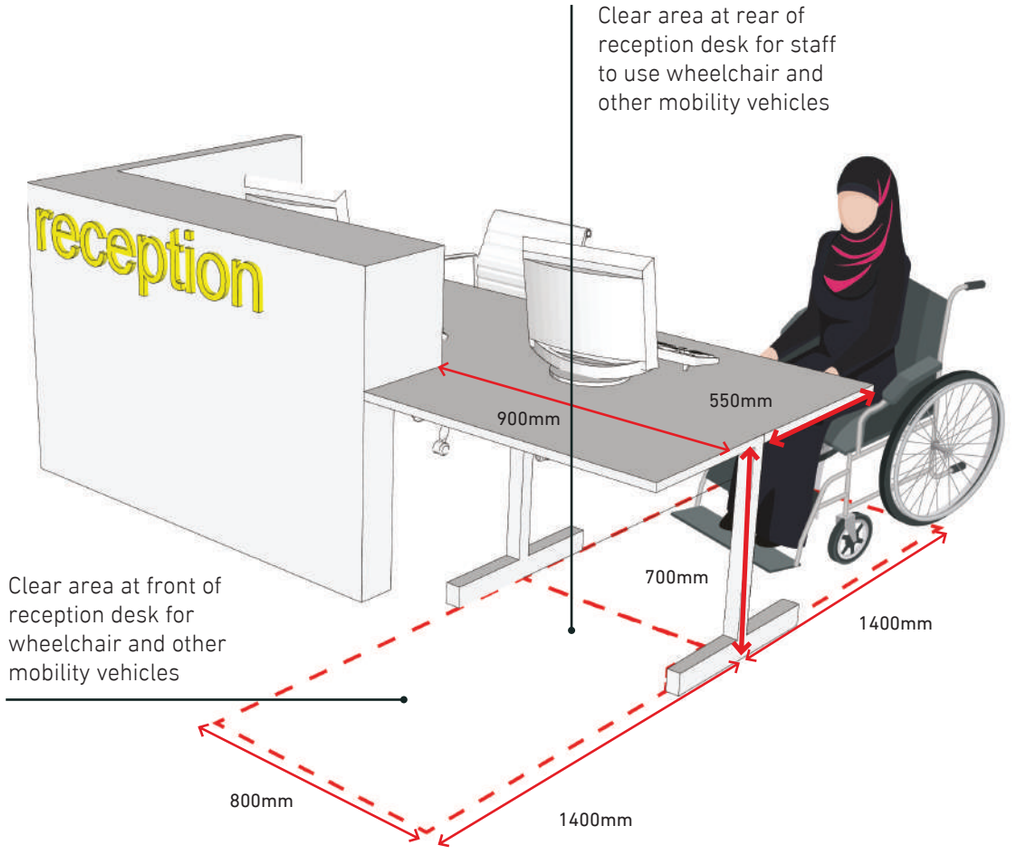
B 6 3 RECEPTION DESK WITHOUT KNEE RECESS

- Reception desks and counters should be designed to be accessed and used by wide range of people's ability and height on both customer and staff side.
- The floor level should be the same on both the staff and customer side of desk.
- Counters and desks should be set at two heights:
- Maximum 760mmm high for people seated and a knew recess at least 700mm high 950-1100mm for people standing
- Knee recess should be 500mm deep on customer side and 650mm deep on the staff side.
- The counter depth where there is space for a wheelchair user should be at least 700mm
- The lower section of counters should be at least 1800mm wide.
- Provision of additional seats at lower counter should be considered.
- All exposed edges and corners should be well rounded.



B 6 4 RECEPTION DESK WITH DOUBLE KNEE RECESS

- Reception desks and counters should be designed to be accessed and used by wide range of people's ability and height on both customer and staff side.
- The floor level should be the same on both the staff and customer side of desk.
- Counters and desks should be set at two heights:
- Maximum 760mmm high for people seated and a knew recess at least 700mm high 950-1100mm for people standing
- Knee recess should be 500mm deep on customer side and 650mm deep on the staff side.
- The counter depth where there is space for a wheelchair user should be at least 700mm
- The lower section of counters should be at least 1800mm wide.
- Provision of additional seats at lower counter should be considered.
- All exposed edges and corners should be well rounded.



Internal Building Circulation

B

B 7 1 INTERNAL CORRIDORS

- • Clear width of corridors should be 1200mm
- Running slope is 4% maximum and cross slope 2% maximum.
- Outward opening doors in frequently used corridors should be recessed.

Dimensions

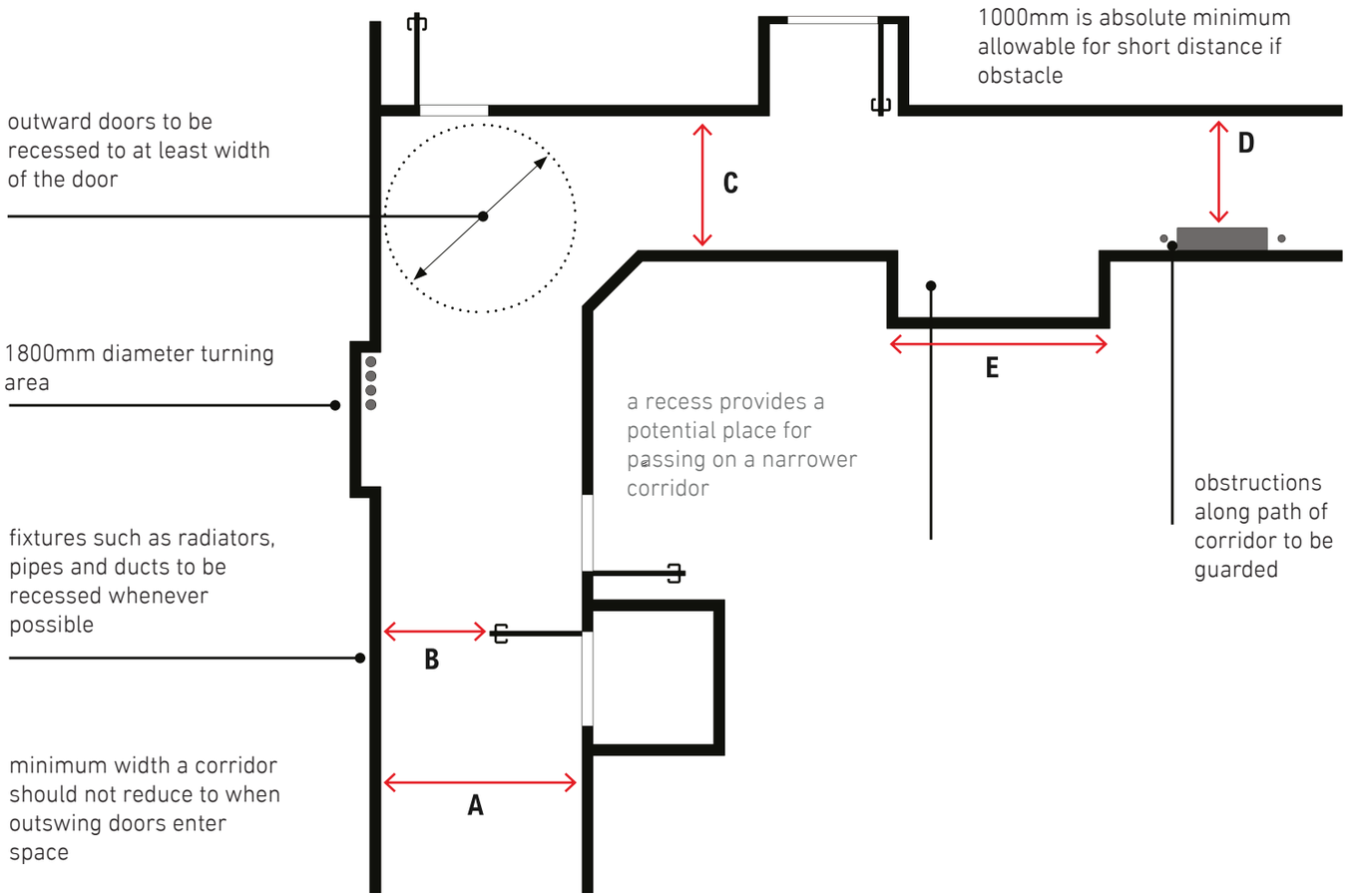
A- width of corridor:
1800mm minimum.

B-width outside swinging door:
900mm minimum.

C-minimum corridor width:
1200mm minimum.

D- width outside obstructions:
1000mm minimum.

E- recess length:
1800mm minimum.



B 7 2 PASSING PLACES ON CORRIDORS

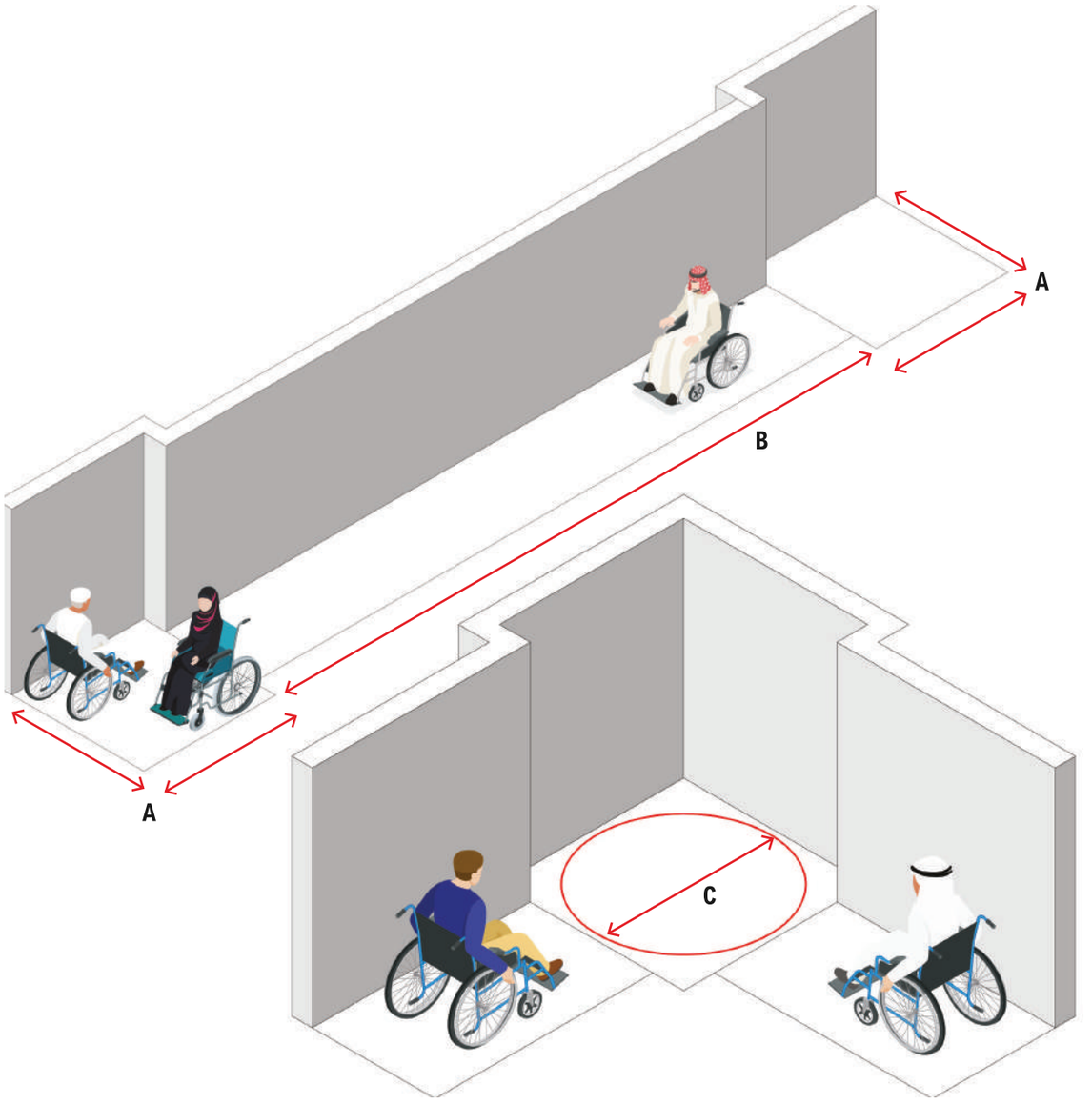
- Any corridors that are below 1800mm width must provide passing places at least every 30m.
- Passing places must be 1800mmx1800mm.
- Turning areas should be provided at junctions to enable people to change direction and return along route.

Dimensions

A- size of passing place:
1800mm minimum.

B- interval between passing places:
30m minimum.

C- diameter of turning circle:
1800mm minimum.



B 7 3 INTERIOR RAMPS

- Where running slope of internal corridors is greater than 4% then it is classed as a ramp
- Curved ramps are not advised.

Gradient of slopes

- Cross slope should be avoided.
- Running slopes in renovations may be allowed up to 8.3% (1:12).

Gradient

A- running slope: 1:16-1:25 (6.25 - 4%)

B- cross slope: 2% maximum

Surface Materials

- Landing areas and ramp surfaces should be firm, stable and slip resistant.
- Polished or unnecessarily slippy materials such as polished marble are not permitted for ramps

Dimensions

C-top and bottom landings:
2100mm x 2100mm minimum.

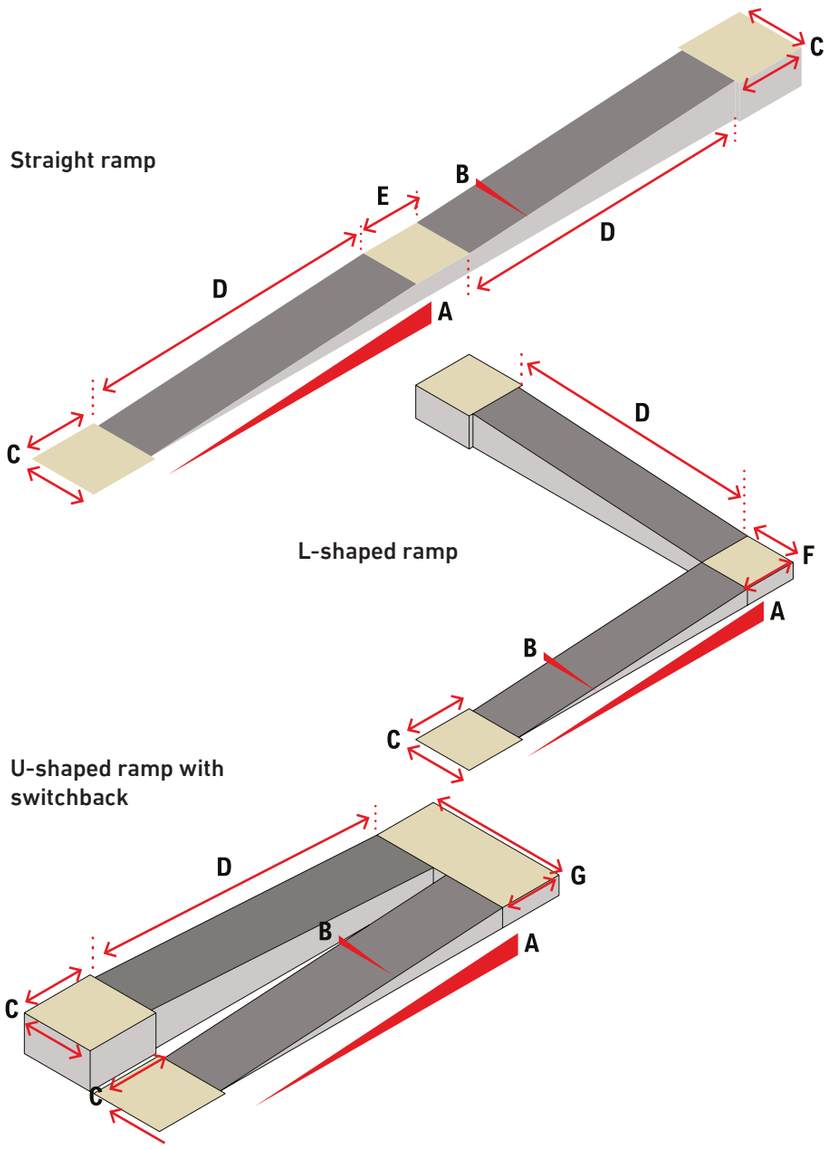
D- ramp length between landings:
9 metres maximum

E- intermediate landing depth on straight ramp:
1800mm minimum.

F-intermediate landing area on L-shaped ramp:
1800mm x 1800mm minimum

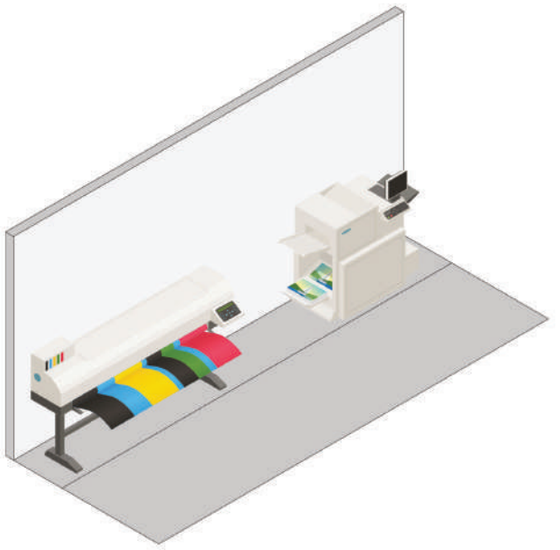
L-shaped ramp:
1800mm x 1800mm minimum

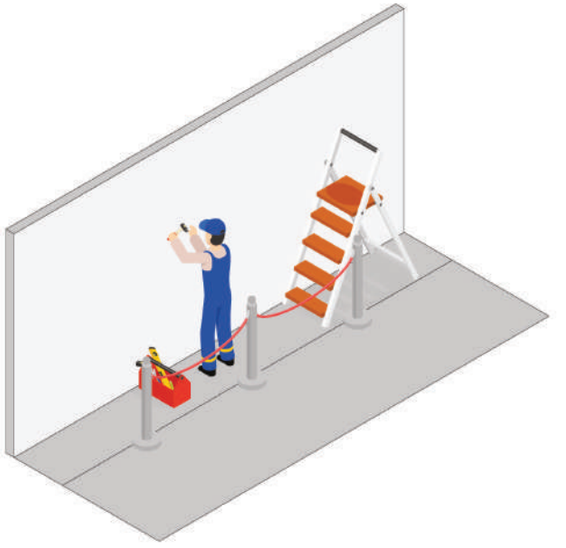
G - intermediate landing area on U-shaped ramp:
1800mm x 2400mm minimum



B 7 4 OBSTRUCTIONS IN CORRIDORS

- Corridors should be unobstructed along entire length. Items that protrude into circulation space should be recessed outside of corridor path.
- Corridors should be wide enough to allow people to pass each other and turn 180 degrees.



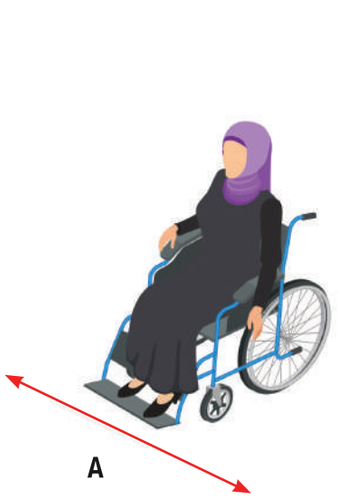


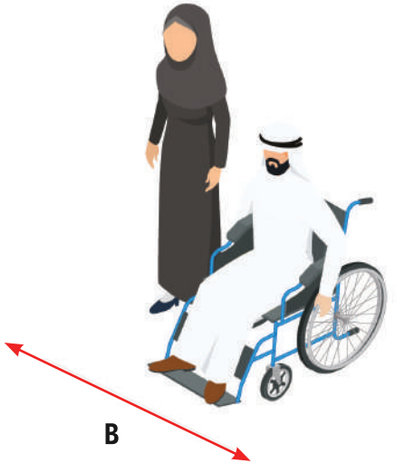
Access Width Dimensions

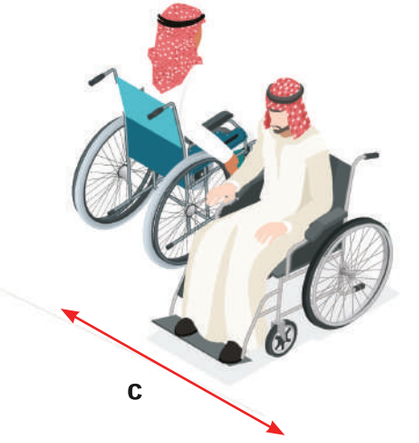
A- single wheelchair user:
1200mm minimum.

B- wheelchair user and partner:
1400m minimum.

C- two wheelchair users passing:
1800mm minimum.







B 7 5 PROTRUDING OBJECTS IN CORRIDORS

Protruding Objects

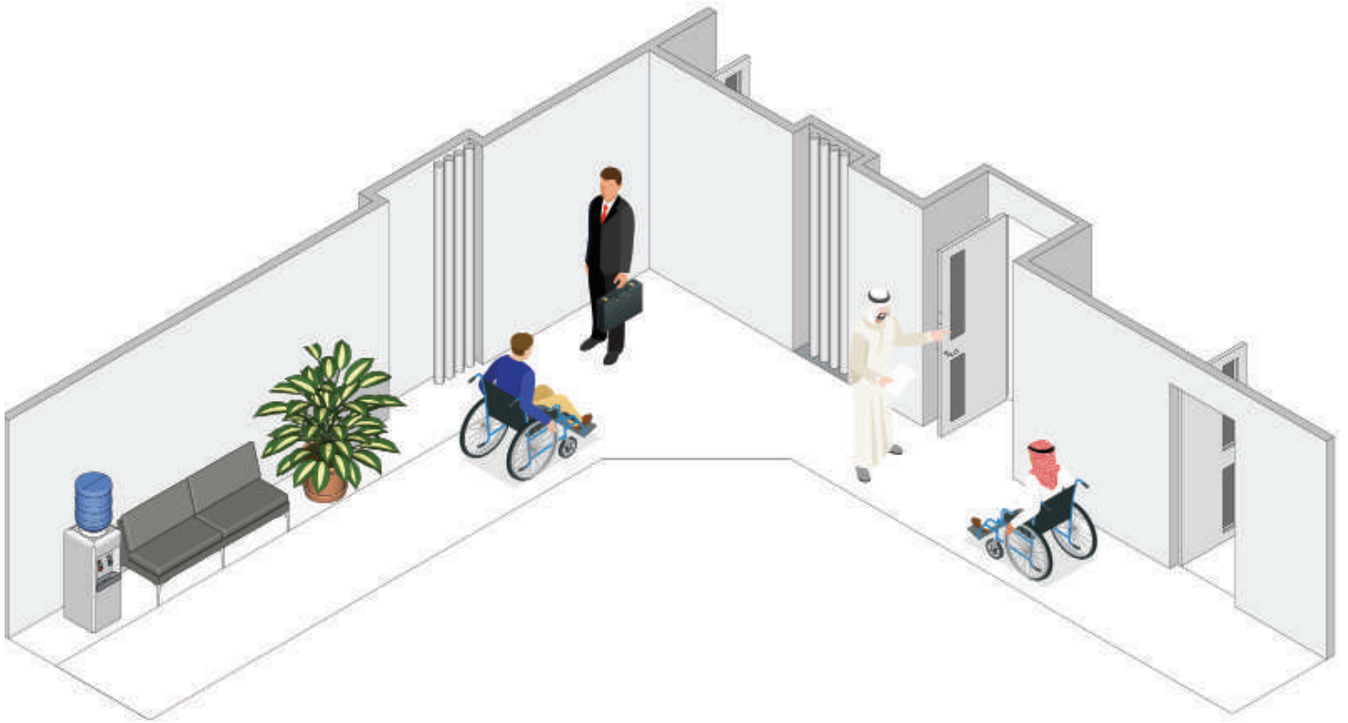
- The leading edge of any protruding object found between 650-2100 mm above the ground should not extend more than 100 mm into pedestrian areas.

- An object with a leading edge at or below 650 mm from the ground may protrude any distance.

Freestanding Objects

- Where overhanging or protruding elements on freestanding objects are between 650-2100 mm above the ground, they should not encroach more than 300 mm into pedestrian areas.

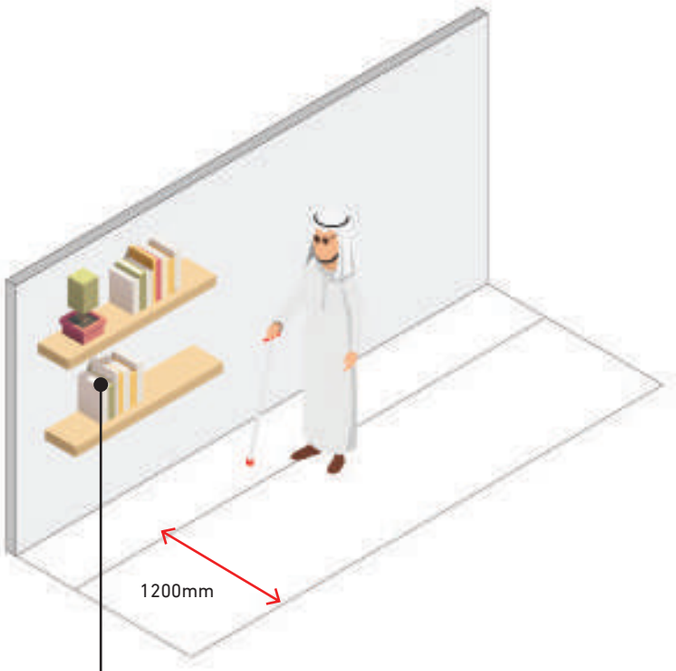
- The bottom edge of a freestanding object, with a space of more than 300 mm between supports, should not be more than 650 mm above the ground.



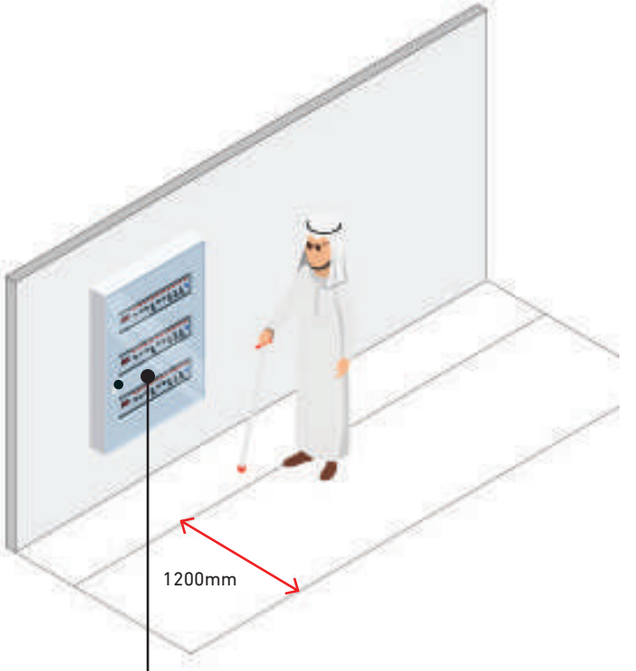
B 7 6 PROTRUDING WALL OBJECTS

Protruding Objects

- The leading edge of any protruding object found between 650-2100 mm above the ground should not extend more than 100 mm into pedestrian areas.
- An object with a leading edge at or below 650 mm from the ground may protrude any distance.



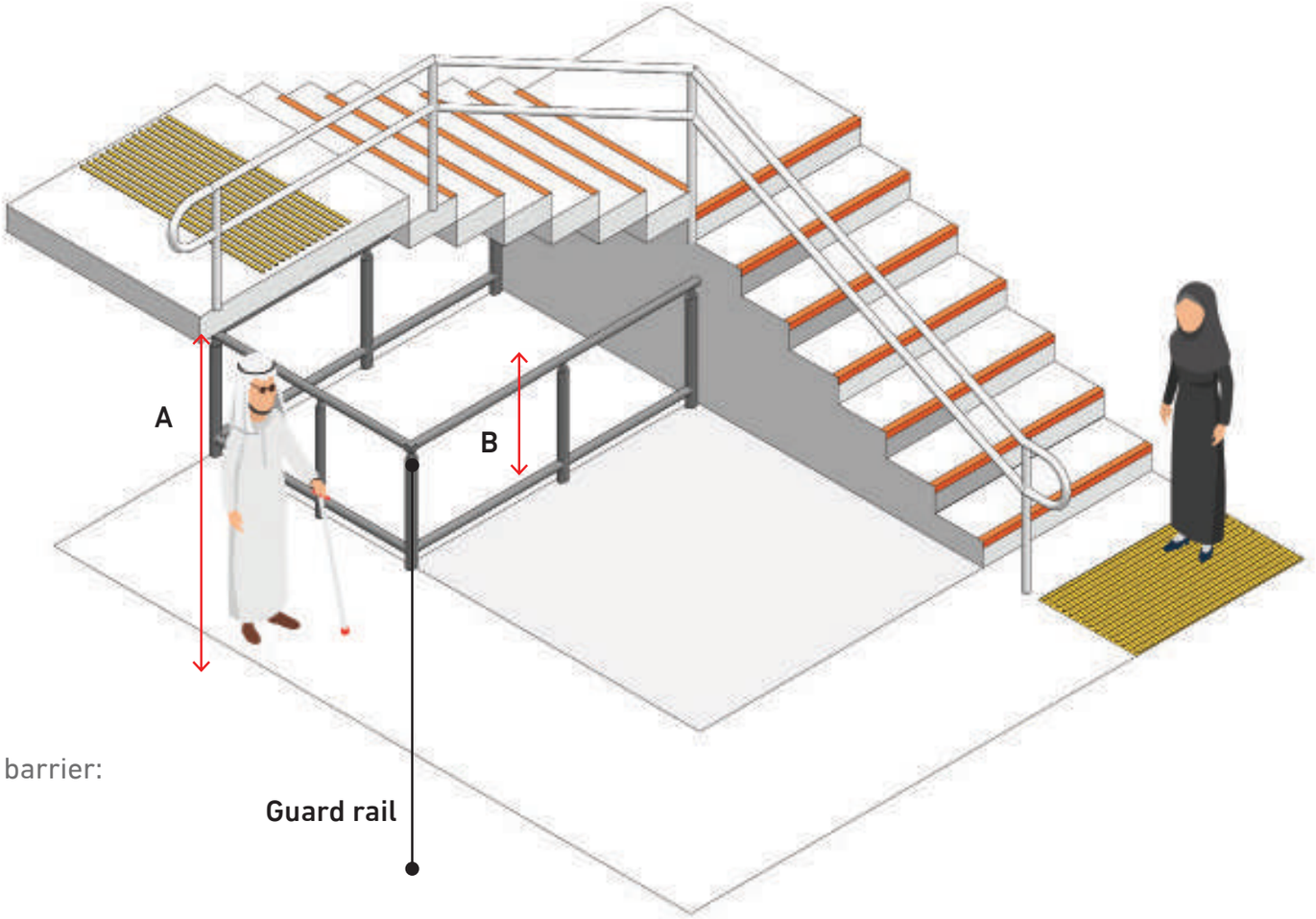
if wall objects protrude more than 100mm, the accessible route should not reduce below 1200mm



wall objects projecting into accessible paths must have colour contrast leading edge and guardrails on larger objects

B 7 7 OVERHEAD PROTRUDING OBJECTS

- The clear height for headroom in pedestrian areas should be a minimum of 2100 mm above the floor.
- Where the headroom of an area that adjoins an accessible route is reduced to less than 2100 mm, a detectable guard, guardrail or other barrier is needed
- The guard should be firmly fixed, colour contrasted & have solid or horizontal railings



Dimensions

A- clear headroom:
2100mm minimum.

B- height of leading edge of guard rail or barrier:
650mm minimum.

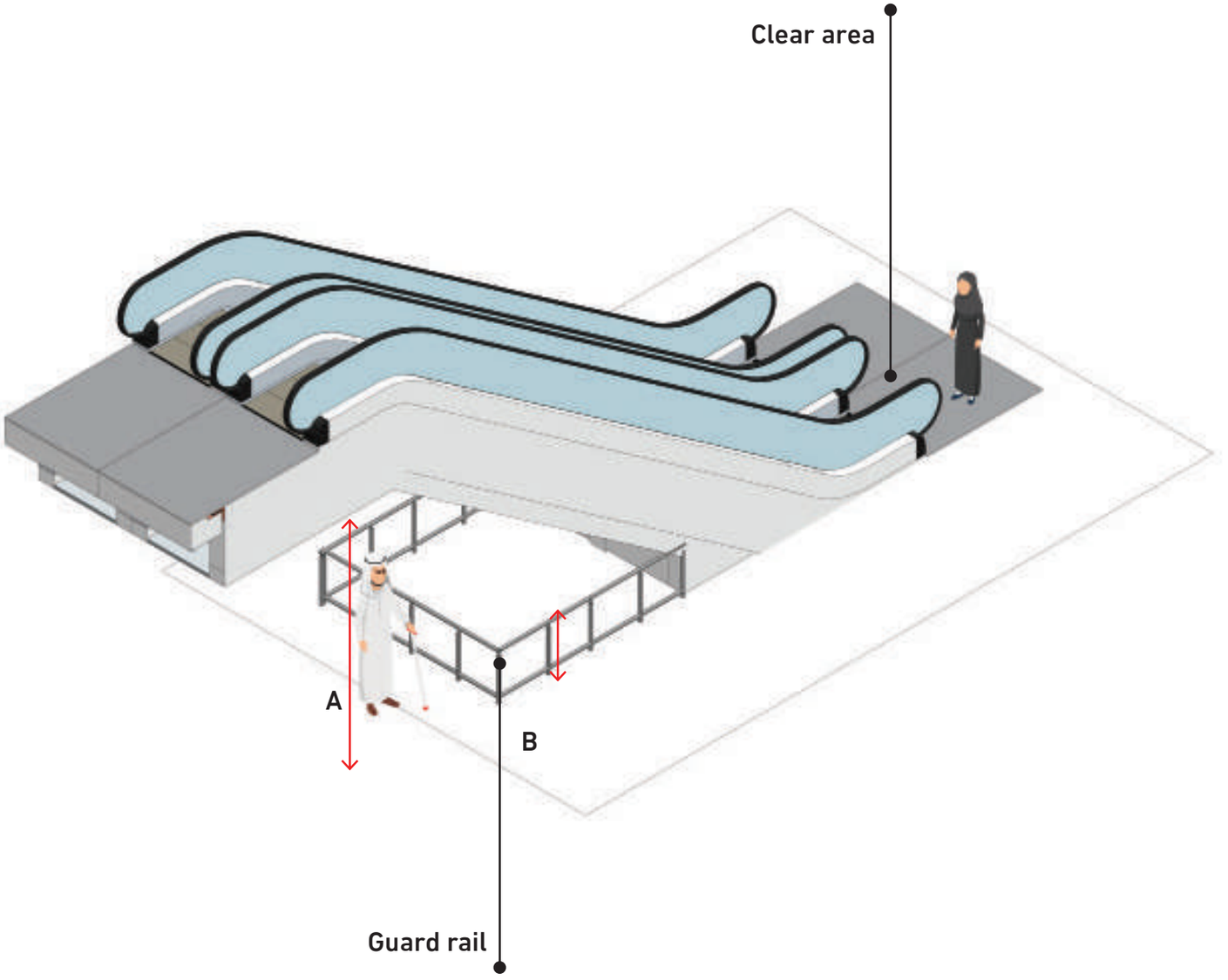
B 7 7 OVERHEAD PROTRUDING OBJECTS

- The clear height for headroom in pedestrian areas should be a minimum of 2100 mm above the floor.
- Where the headroom of an area that adjoins an accessible route is reduced to less than 2100 mm, a detectable guard, guardrail or other barrier is needed
- The guard should be firmly fixed, colour contrasted & have solid or horizontal railings

Dimensions

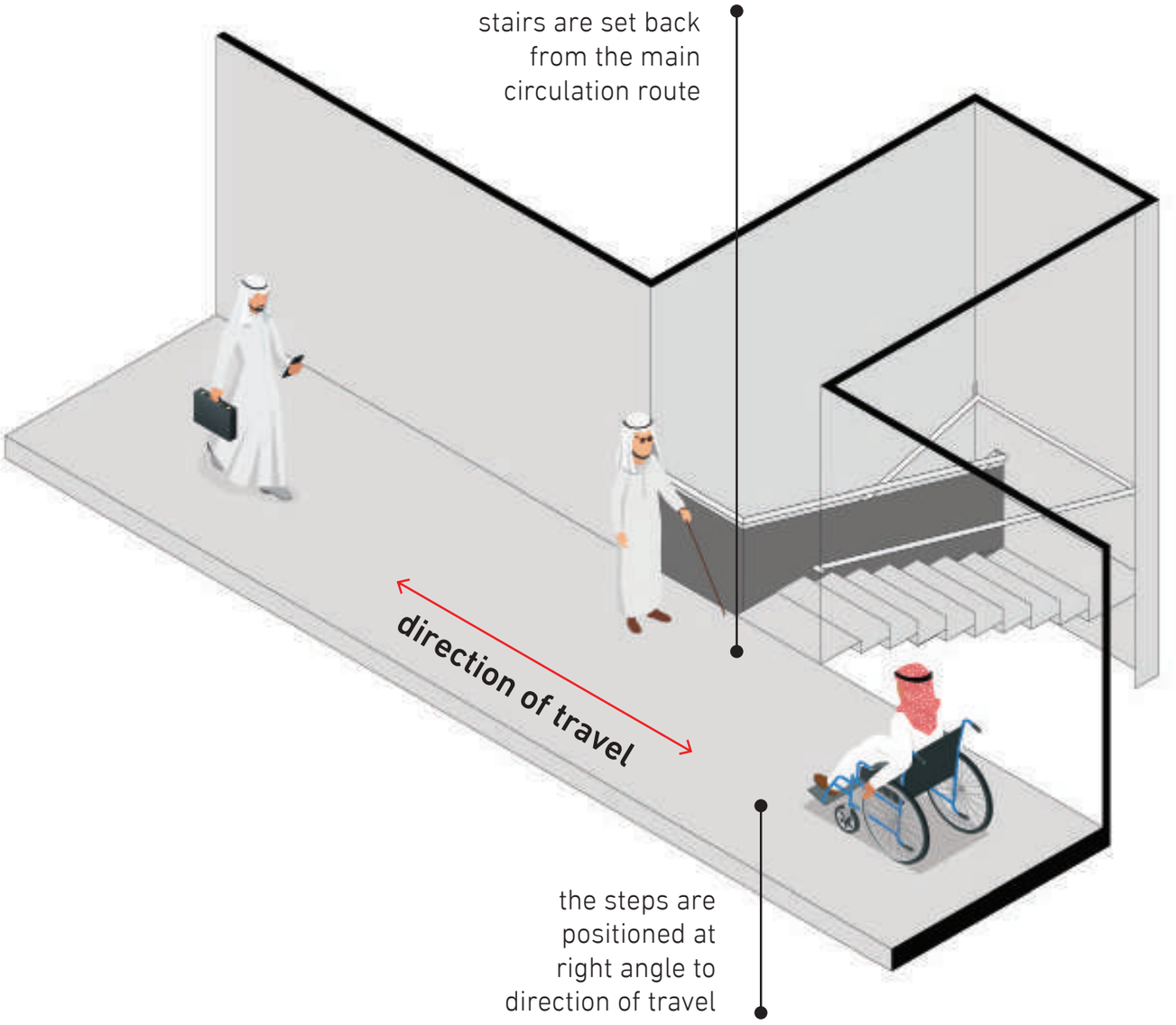
A- clear headroom:
2100mm minimum

B- height of leading edge of guard rail or barrier:
650mm minimum



B 7 8 STAIRS ON CORRIDORS

- The location of steps and stairs should positioned away from principal circulation routes.
- The position of stairs should ideally be at a deliberate change in direction of travel, such as right angle to circulation route.



Manoeuvring Space at Doors

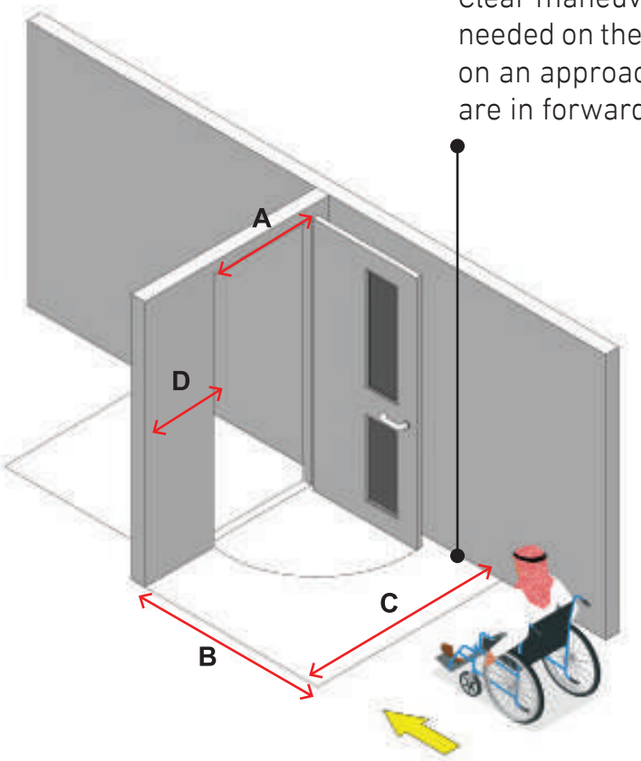
8

B 8 1 CLEAR MANEUVERING SPACE AT SWING DOORS

- A clear manoeuvring space should be provided to allow people in wheelchairs to reverse of adjust position when opening doors. It will also assist slow moving people or other physical disability adjust their position when passing other people.
- Clear floor space should not be obstructed by other swinging doors.
- One way swinging doors should have a manoeuvring space on both sides as per the below dimension guidelines.

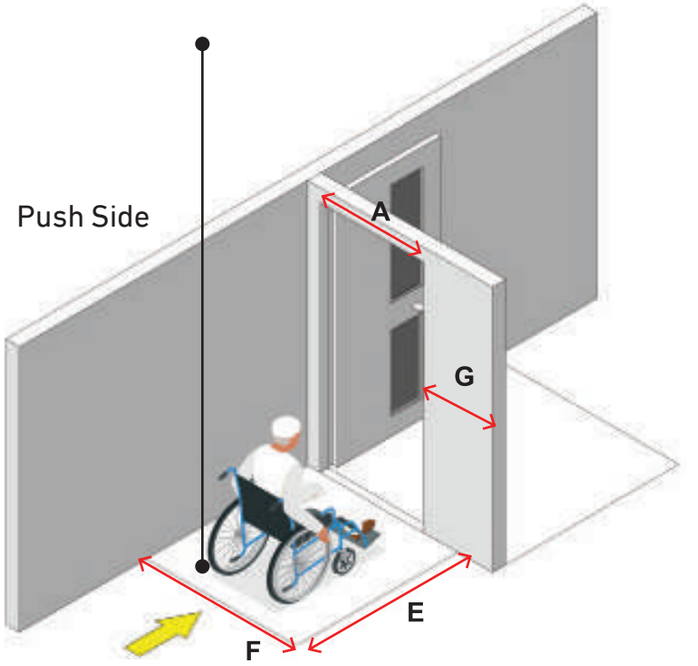
Pull Side

Clear maneuvering space needed on the pull side of door on an approach where doors are in forward sequence



Clear maneuvering space needed on the push side of door on an approach where doors are in forward sequence

Push Side



Dimensions

A- door width clear space minimum 900mm.

Pull Side

B- minimum 1500mm

C- minimum 1600mm

D- minimum 600mm

Push Side

E - minimum 1500mm

F- minimum 1250mm

G- minimum 300mm

B 8 2 LATCH SIDE OF SWING DOORS

Dimensions

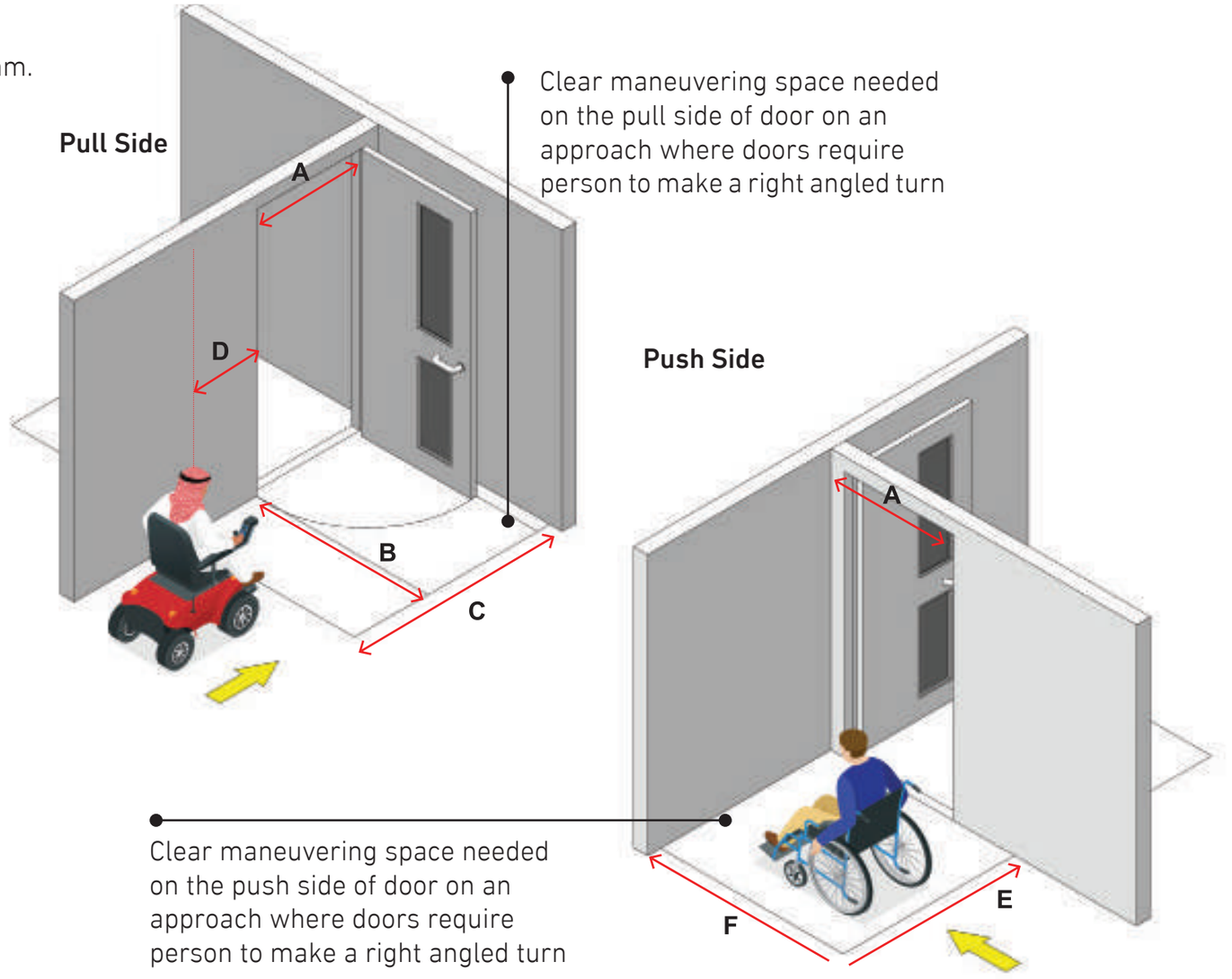
A- door width clear space: minimum 900mm.

Pull Side

B- minimum 1400mm
C- minimum 600mm
D- minimum 600mm

Push Side

E- nimum 1500mm
F- minimum 1250mm



B 8 3 HINGE SIDE APPROACH OF SWING DOORS

Dimensions

A- door width clear space:
minimum 900mm

Pull Side

B- minimum 2100mm

C- minimum 2100mm

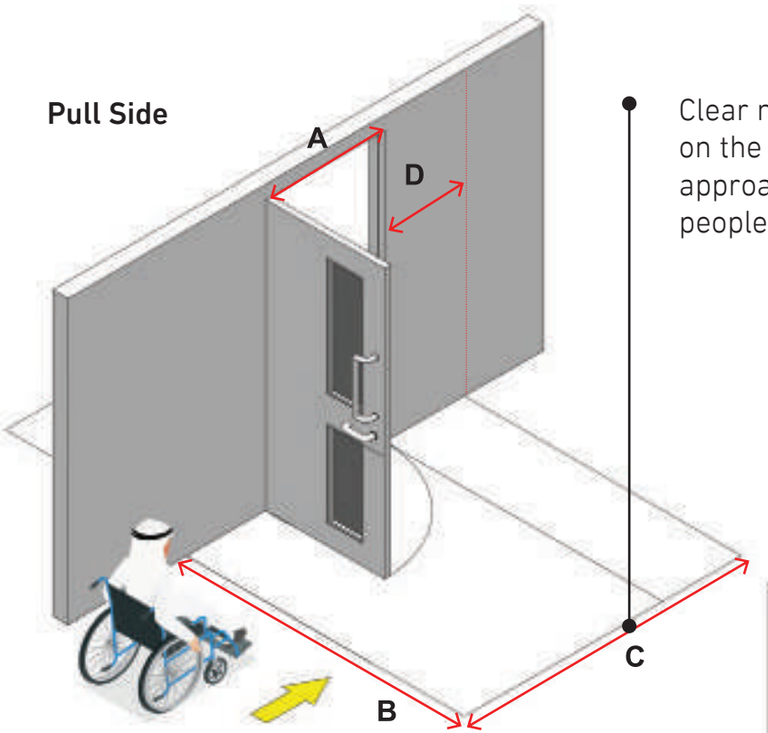
D- minimum 600mm

Push Side

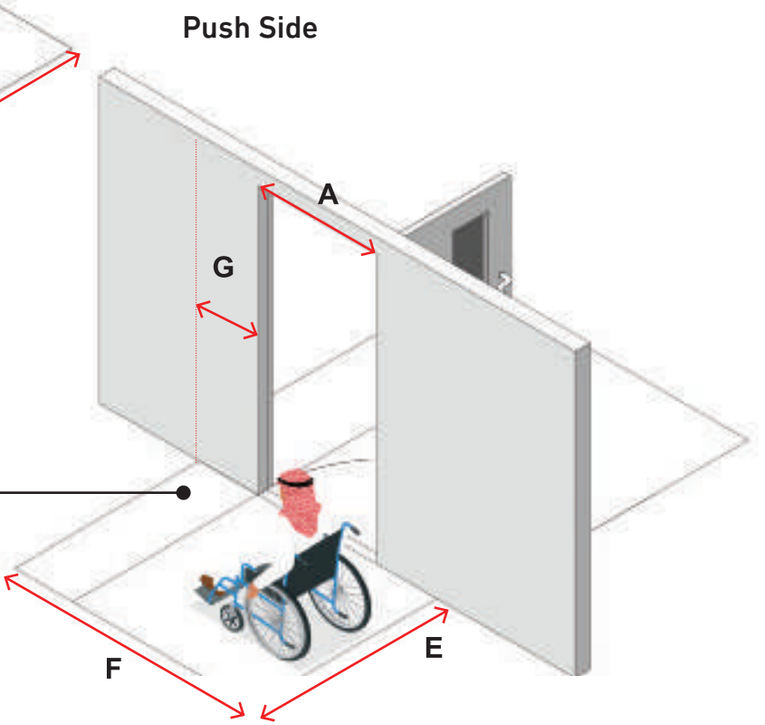
E- minimum 1400mm

F- minimum 1800mm

G- minimum 450mm



Clear maneuvering space needed on the pull side of door on an approach where doors require people to make right angled turn



Clear maneuvering space needed on the push side of door on an approach where doors require people to make right angled turn

B 8 4 FRONT SIDE APPROACH AT SLIDING DOORS

Dimensions

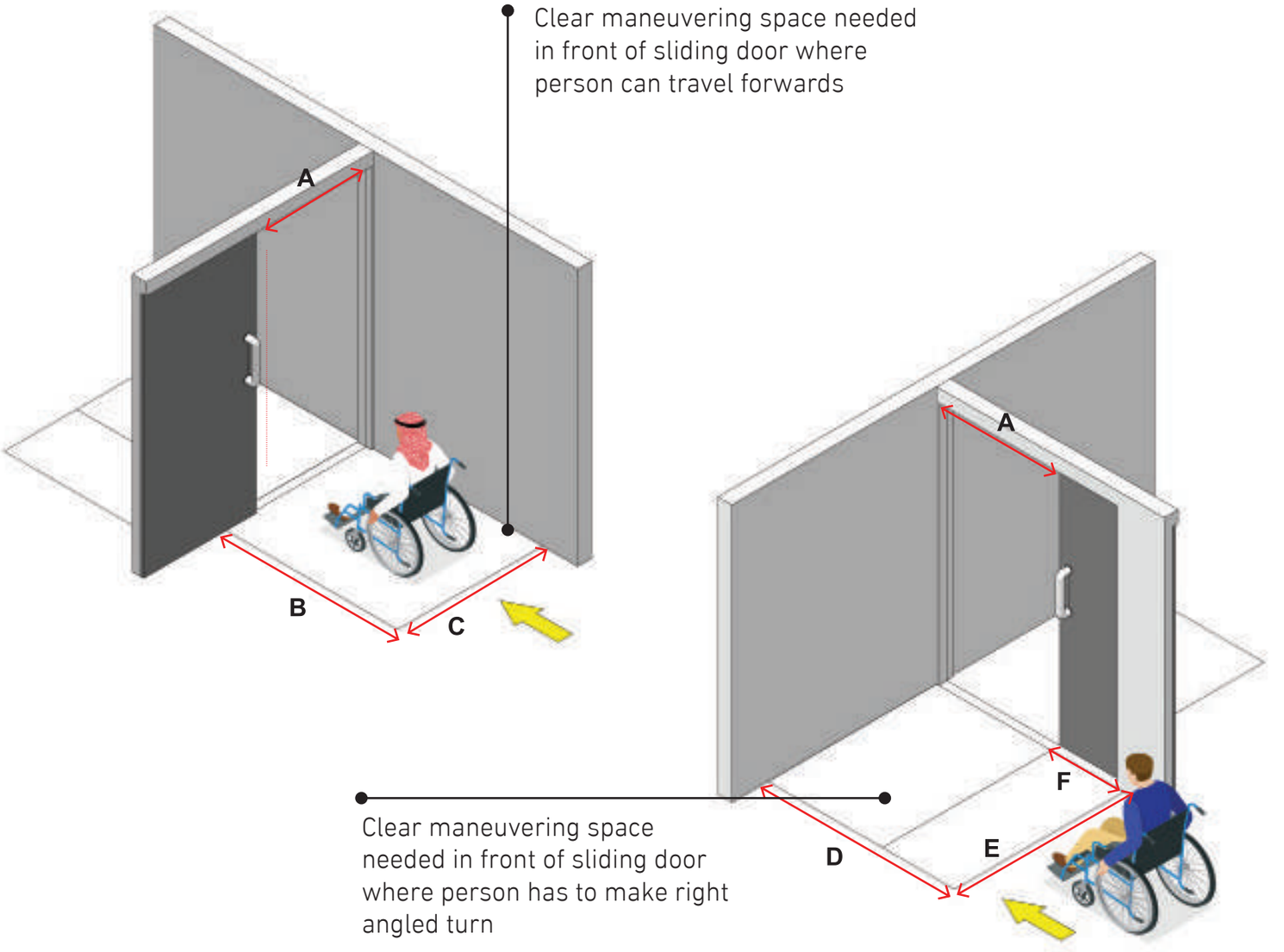
A-door width clear space
minimum 900mm

Forward travel

B- minimum 1400mm
C- minimum 1200mm

Right angle turn

D- minimum 600mm
E- minimum 1550mm
F- minimum 600mm



B 8 5 APPROACH AT FORWARD SERIES OF DOORS

Dimensions

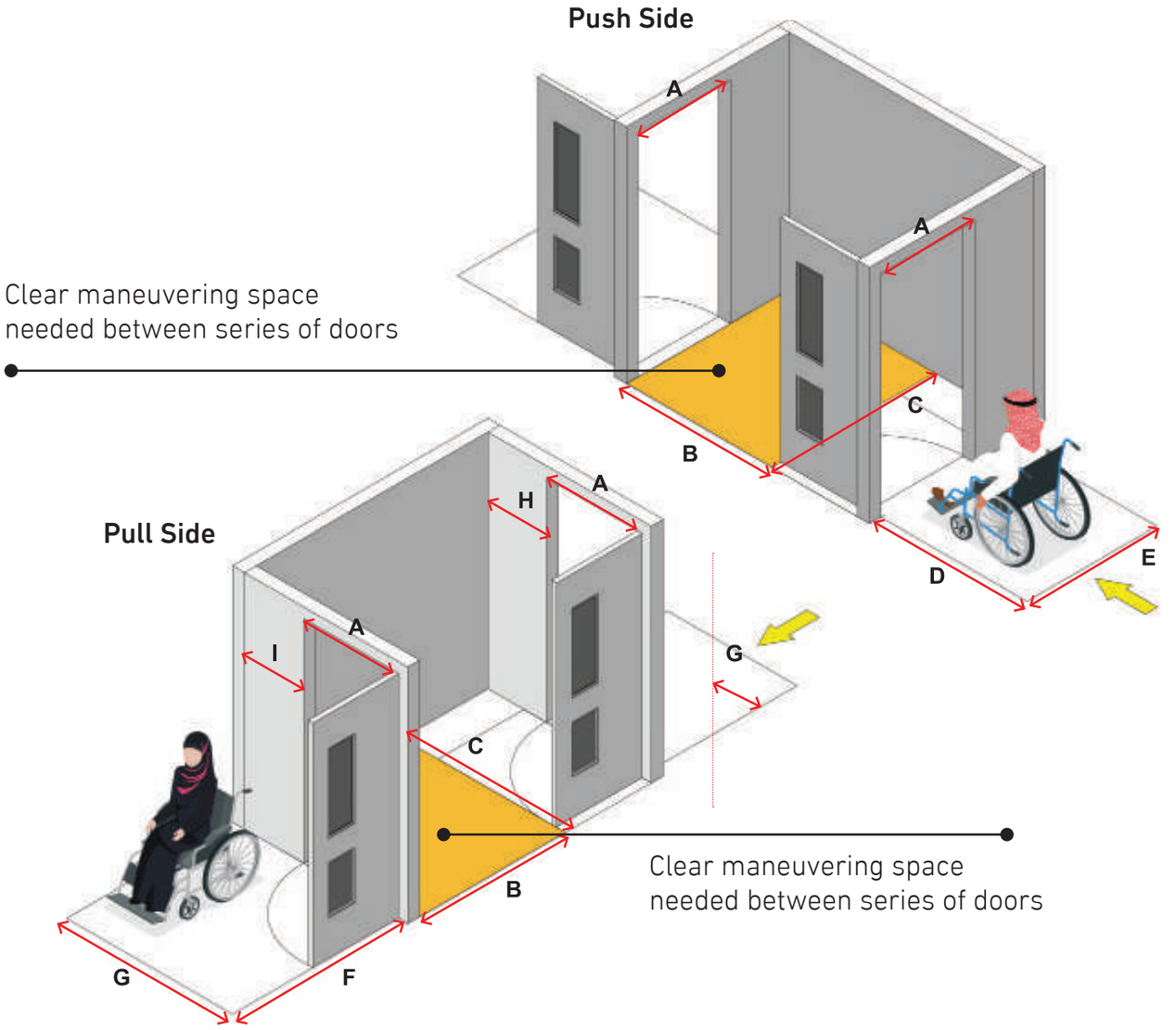
A- door width clear space
minimum 900mm
B- minimum 1400mm
C- minimum 1250mm

Push Side

D- minimum 1400mm
E- minimum 1250mm

Pull Side

F- minimum 1500mm
G- minimum 1600mm
H- minimum 600mm
I- minimum 600mm



B 8 6 APPROACH AT TURNING SERIES OF DOORS

Dimensions

A- door width clear space:
minimum 900mm.

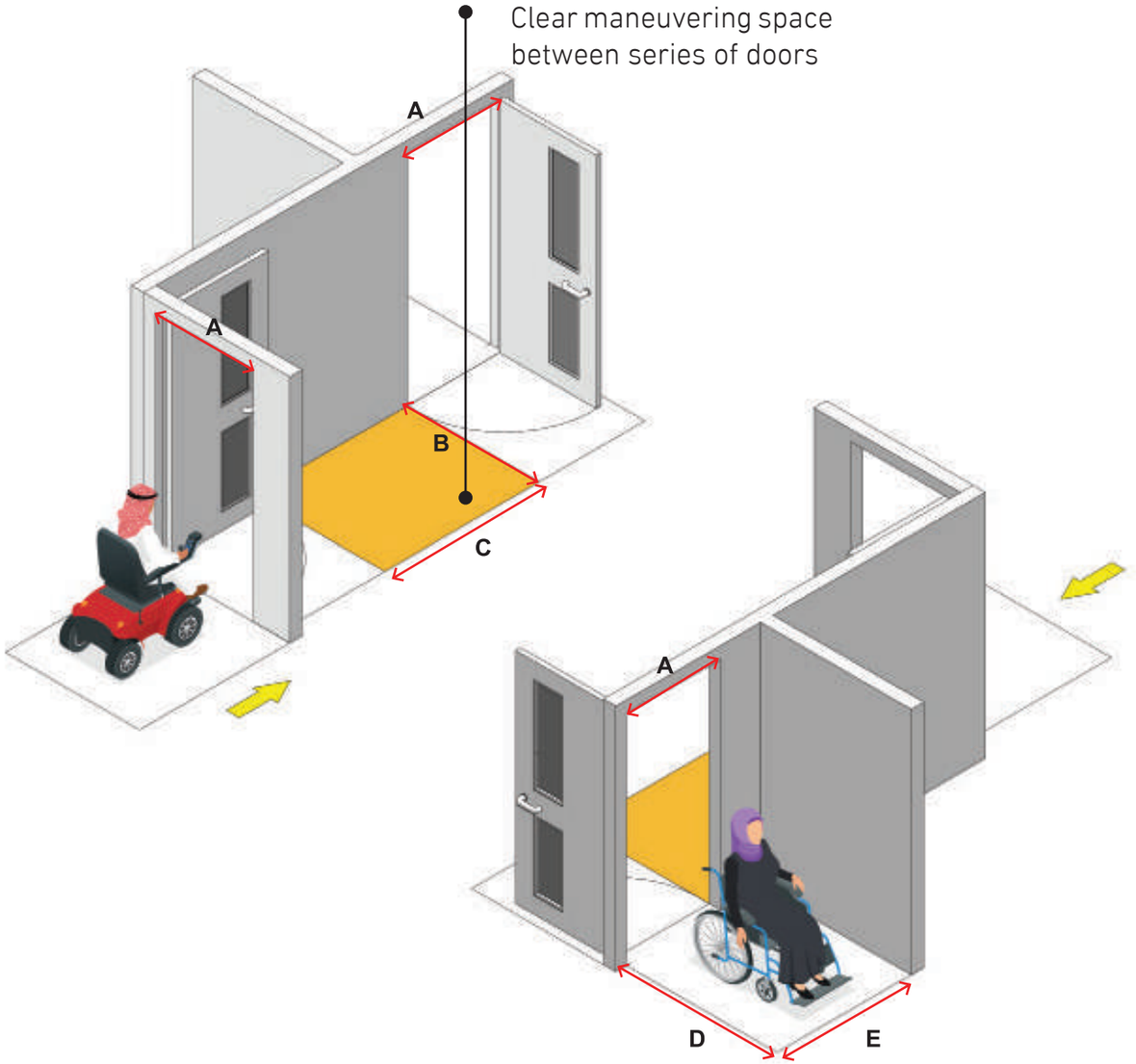
B- minimum 1400mm.
C- minimum 1400mm.

Push Side

D- minimum 1400mm.
E- minimum 1250mm.

Pull Side

F- minimum 1500mm.
G- minimum 1600mm.
H- minimum 600mm.
I- minimum 600mm.



B 8 7 APPROACH ON PULL SIDE OF TURNING SERIES OF DOORS

Dimensions

A- door width clear space minimum 900mm.

B- minimum 1400mm.

C- minimum 1250mm.

Pull Side

D- minimum 1400mm.

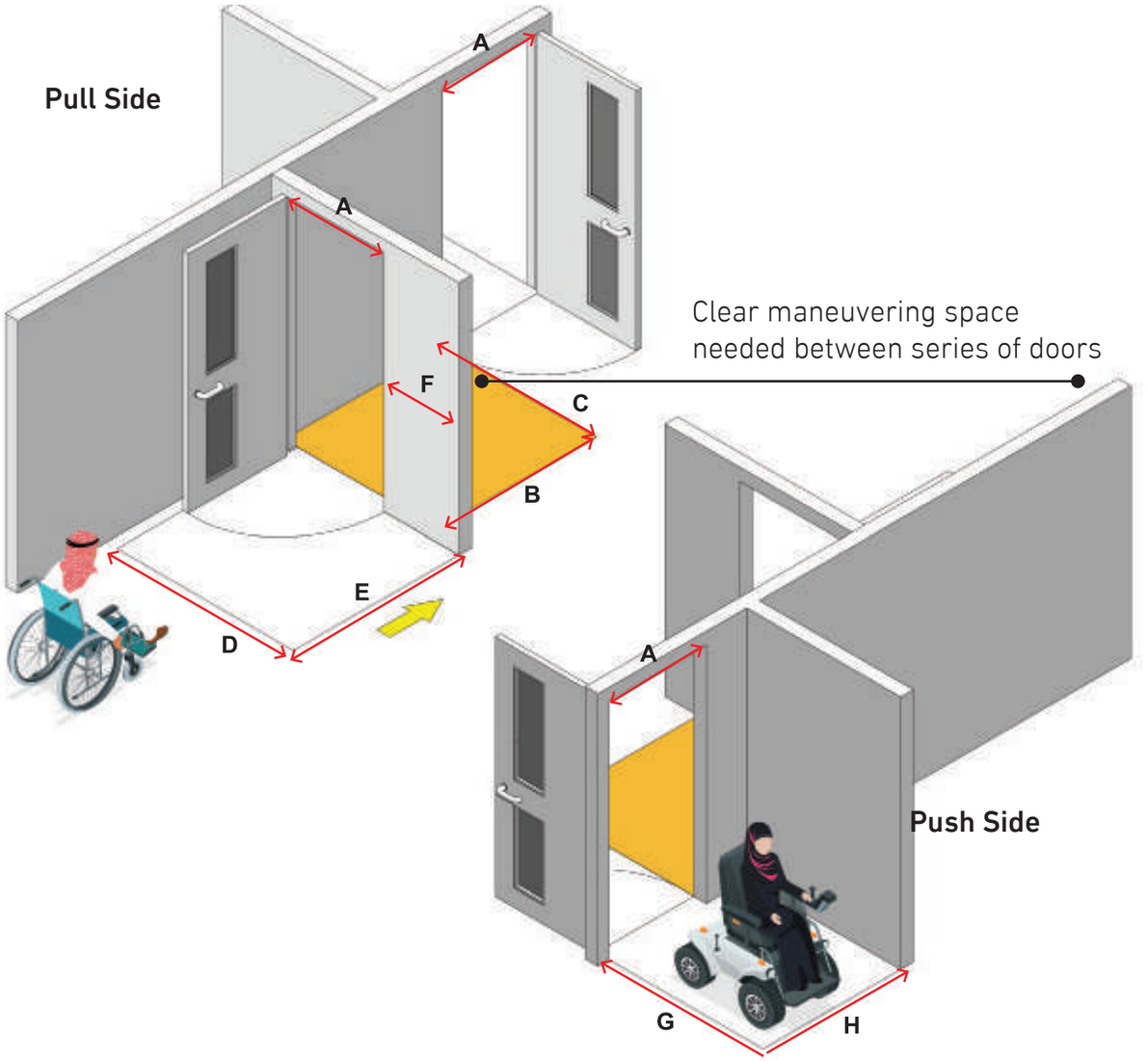
E- minimum 1500mm.

F- minimum 600mm.

Push Side

G- minimum 1400mm.

H- minimum 1250mm.



Internal Stairs

9

B 9 1 INTERNAL STAIR DIMENSIONS

- Where change in level is 300mm or greater, steps should be provided in addition to ramp.
- The maximum number of steps between landings is 12.
- Spiral stairs and tapered treads should not be provided for use by the general public.
- The minimum headroom above the stair pitch line is 2100mm.
- Single steps should be avoided as cause a trip hazard.
- Open risers should be not be used in public buildings.
- Surface finishes should be firm, easy to clean and maintain.
- The steps should be finished in slip-resistant material.
- The finish should visually contrast with landing surfaces to help identify the top and bottom of the flight. If different materials are used their frictional characteristics should be similar to avoid trip hazard.

Tactile surface dimensions

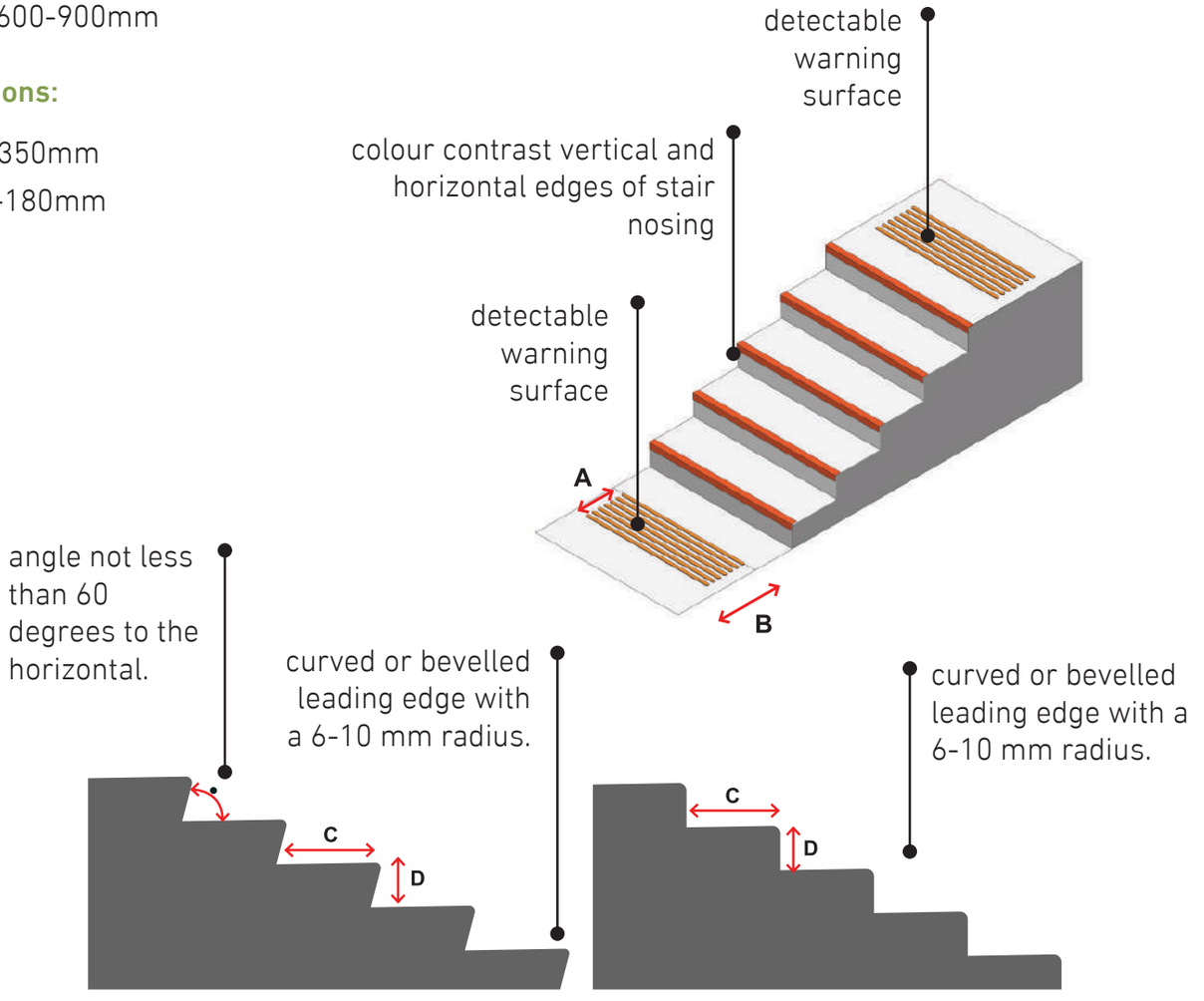
A- gap from stair: 300mm

B- depth of surface: 600-900mm

Run & Riser Dimensions:

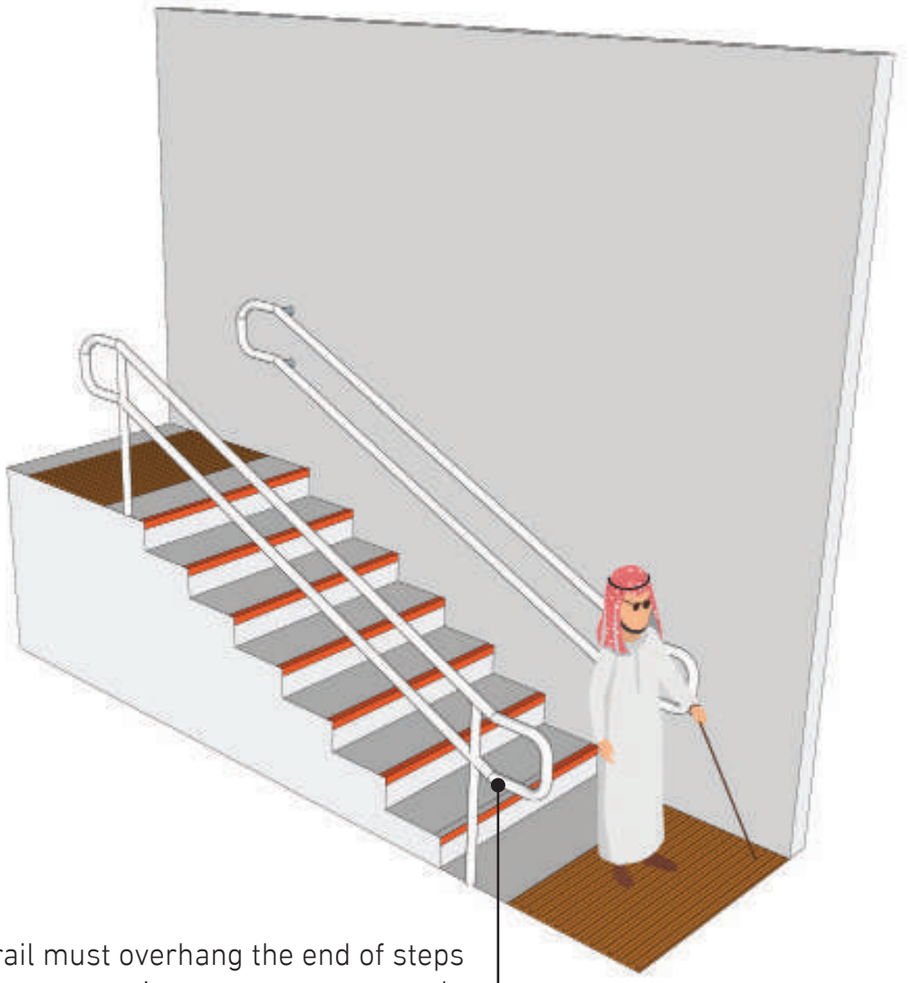
C- uniform run: 280-350mm

D- uniform rise: 125-180mm



B 9 2 INTERNAL STAIRS (SINGLE FLIGHT)

- The maximum number of steps between landings is 12.
- Spiral stairs and tapered treads should not be provided for use by the general public.



Handrail must overhang the end of steps to give awareness to people

B 9 3 MULTIPLE FLIGHT STRAIGHT STAIRS

- The maximum number of steps between landings is 12.
- Intermediate landing area to be provided on internal stairs over 12 steps.
- Pattern surfaces should be avoided around stairs.
- Circular stairs should be avoided.

  Windows or doors should not open into landing areas by stairs
- Headroom of 2100mm
- On large stairs, intermediate landing areas with tactile warnings to be provided.

Handrails

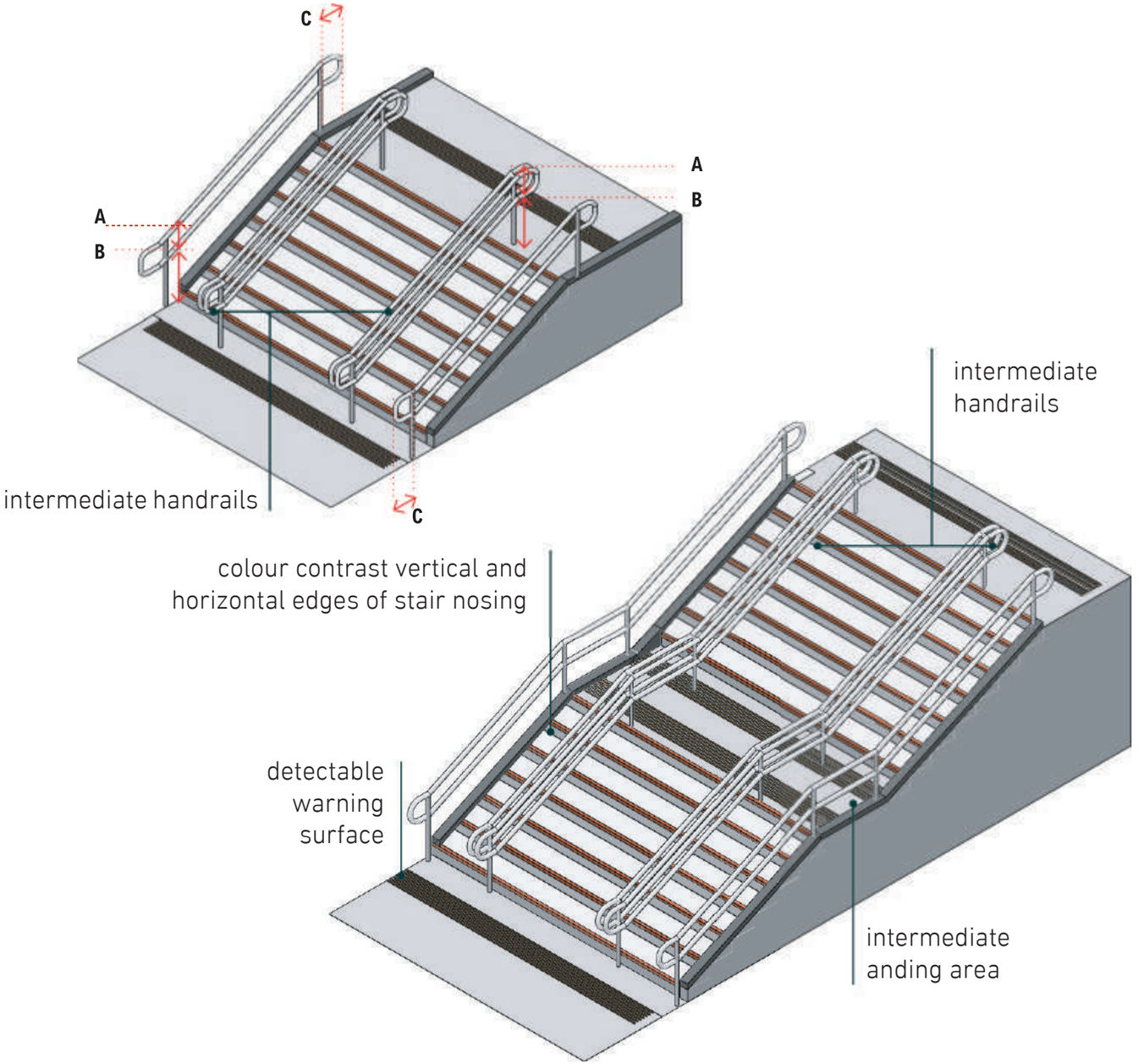
- Dual height handrails on both sides of interior steps
- Handrails on continuous inside edge of stairs with a switchback
- Wide stairs need intermediate handrails

Handrail Dimensions

A-lower handrail: 600-750mm.

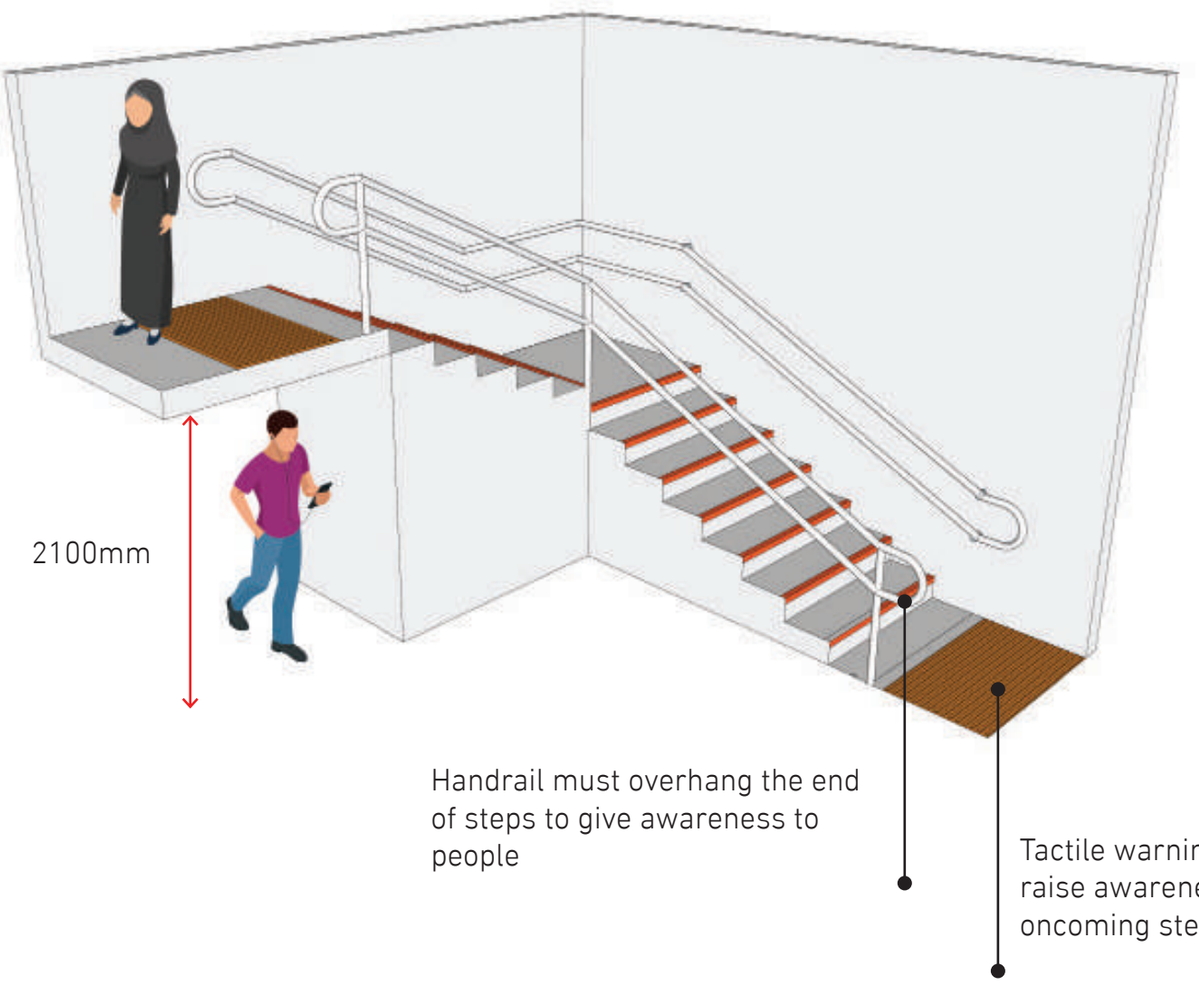
B-upper handrail: 875-925mm.

C-overhang of handrail: 300mm minimum.



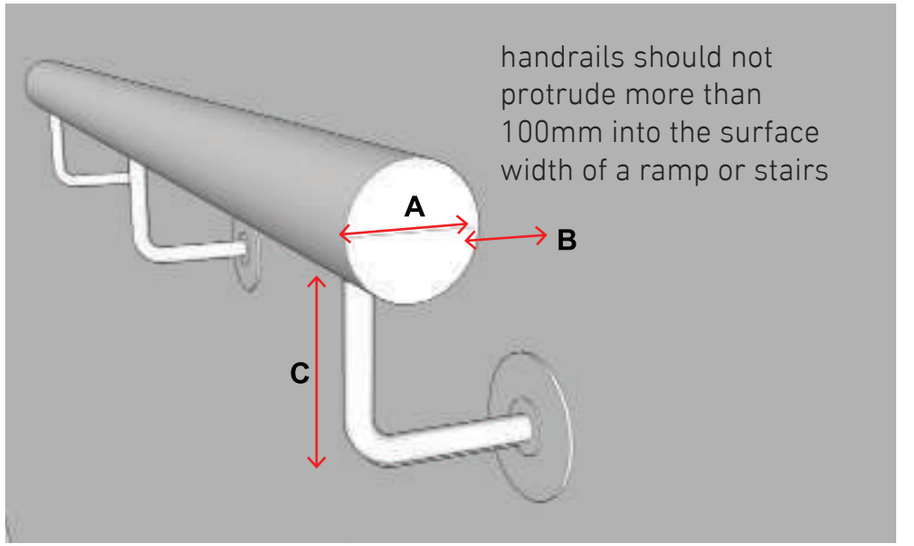
B 9 4 MULTIPLE FLIGHTS TURNING STAIRS

- The maximum number of steps between landings is 12.
- Spiral stairs and tapered treads should not be provided for use by the general public.
- Where stairs have more than 36 risers in consecutive flights there should be at least one change in direction between flights.



B 9 5 HANDRAILS

- For both steps and ramps handrails are to be installed. For ramps or steps wider than 2000mm a intermediate handrail shall be used.
- Stairs and ramps with a change in level greater than 500 mm must have continuous handrails on both sides with a 300 mm horizontal extension at its ends. When the stair widths are greater than 2100 mm an additional intermediate handrail should be installed. The width between intermediate handrails should be at most 2100 mm.
- In ramps, the distance between the handrails shall be ideally 1000 mm. This allows the usable width of 1200mm plus 100mm either side for the handrail.
- The handrail should be mounted at a height of 900 mm. An additional handrail shall be provided at a height between 650 mm and 750 mm.
- The handrails must be safely secured. Handrails must have an anatomical design that allows adjustment to the hand with a circular section of 30 mm to 40 mm diameter or an equivalent gripping surface. Handrails must be separated from the wall surface at least 40 mm. The handrail section and its mounting system should not interfere with the continuous gripping surface.
- Handrails must have a contrasted reflectance of at least 30 points LRV against its background.
- All handrail materials exposed to sun radiation shall not reach temperatures that may result in burning or uncomforted for users.



Dimensions

A- diameter of handrail:
32-50mm.

B- gap to wall:
50-75mm.

C- height of bar:
50mm minimum.

Elevators & Platform Lifts

B

B 10 1 ELEVATOR PROVISION

- Elevators (or lifts) should be provided in all buildings with more than one floor.
- Where a lift serves only two floors, it should be provided with a system to sense entry into the cab and to move automatically to the next floor without the need for manual activation.
- The location of lifts is clearly identifiable from the building entrance and the routes to lifts should be step free, direct and free from obstructions.
- The number of elevators to be provided within building will relate to its size, floorplans, anticipated usage and size of lift core if larger building. Buildings that may require additional vertical circulation may include hospitals and health facilities.
- Elevators in new buildings should all be accessible and accommodate all types of visitors, staff and permanent users. There should be no instance where lifts are B 10 1 undersized or inaccessible in new buildings.
- All lifts in a building have appropriate provisions for the ambulant disabled and people with sensor impairments.
- Lift doors should be colour contrasted to adjacent surfaces.
  Lift sills should be colour contrasted to adjacent floor surfaces.

Figure 1: Elevators are a critical component of vertical and horizontal circulation in many buildings, providing full access across floors for people who are physically impaired. This is particularly important in hospitals where wheelchairs can be a temporary or new form of movement for people.

B 10 2 CLEAR LANDING AREA

- A clear manoeuvring space of 1500 x 1500mm must be provided in front of all elevators
- Elevator call buttons should be provided at height between 900-1200mm. They should be at least 500mm from the return wall.
- The mounting plate for the lift call buttons should contrast visually with the wall and the buttons contrast visually with the mounting plate.
- Call button symbols should be embossed to facilitate tactile reading and light up when pressed.
- Floor indicator displays should be provided at height of 1830mm.
- To should be possible to hear and see visual and audible indications of the lift arrival, direction of travel and the location of the available elevator where more than one elevator provided.

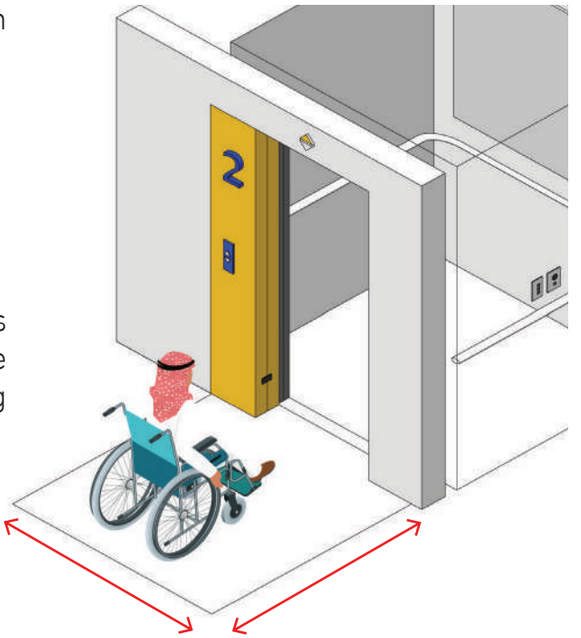


Figure 1: There is a clear and unobstructed area outside of the lift in this otherwise busy lobby that is serving a WC, storage cupboard and lift. The floor of this office is subdued and a single consistent colour to avoid confusion with the wayfinding elements of this lift lobby.
Source: 100 Broadview Lobby by Quadrangle Architects & Interiors

	Recommended	Minimum	Recommended size
1	1500x1500mm	1200x1500mm	One door cabin
2	1500x1500mm	1200x1500mm	Cabin with two opposing doors
3	2000x2000mm	1500x1500mm	Cabin with two doors in 90 degree angle

Table 1: The table below should be followed when determining the size of elevators depending on the number and arrangement of doors.

B 10 3 ELEVATOR PROVISION

Elevator Doors

- Doors should be visually contrasting against walls through material and/or colour.
- Minimum dwell time of door opening is 5 seconds.
- Doors should be fitted with re-opening activators. Sensors should be set at two levels to ensure it detects lower items within doorway.

Cabin Interior

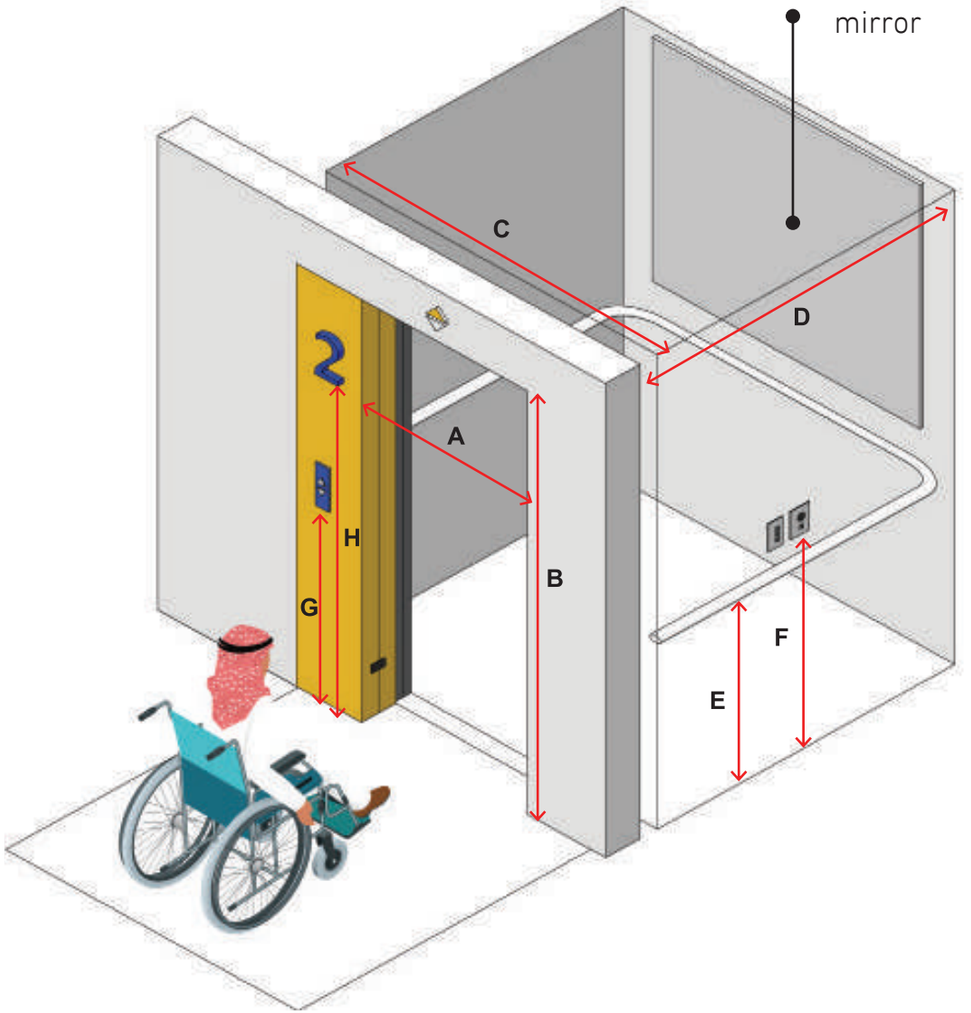
- Controls, landing sill, and floor should be illuminated by a minimum of 200 lux
- A mirror should be inside elevators on the wall opposite to the door. It should cover the entire back panel from the handrail to ceiling.
- At least two handrails should be provided
- Materials and lighting should be carefully considered to not cause glare, unnecessary reflection and confusing shadows.
- Control panels should be located (horizontally or vertically) on the side wall of the lift car at a height of between
- Visual displays and audible announcements should be provided to indicate the floor level reached.

Door Dimensions

A- door width clear space minimum 950mm
B- clear headroom: 2100mm minimum

Cabin Dimensions

C- cabin width: 1725mm minimum.
D- cabin depth: 1525mm minimum.
E- handrail height: 800-900mm.



Controls Dimensions

F- Lift control height: 900-1200mm.
G- Call button height: 895-945mm.
H- Lift number: 1475-1525mm.

B 10 4 PLATFORM LIFTS

- Lift platforms are only needed within existing buildings where there is not the available space for an elevator to provide vertical circulation of between 2 and 4 metres.
- In new buildings, the design of floorplans should not require provision of lift platforms.
- For open cabins, the maximum height distance that platforms can travel is 2m.
- If a platform lift is a fully enclosed cabin then the maximum travel distance is 4m.
- A lateral space of interaction in front of lift-calling button shall be at height of between 700-1200mm.
- At least two handrails should be provided

Dimensions

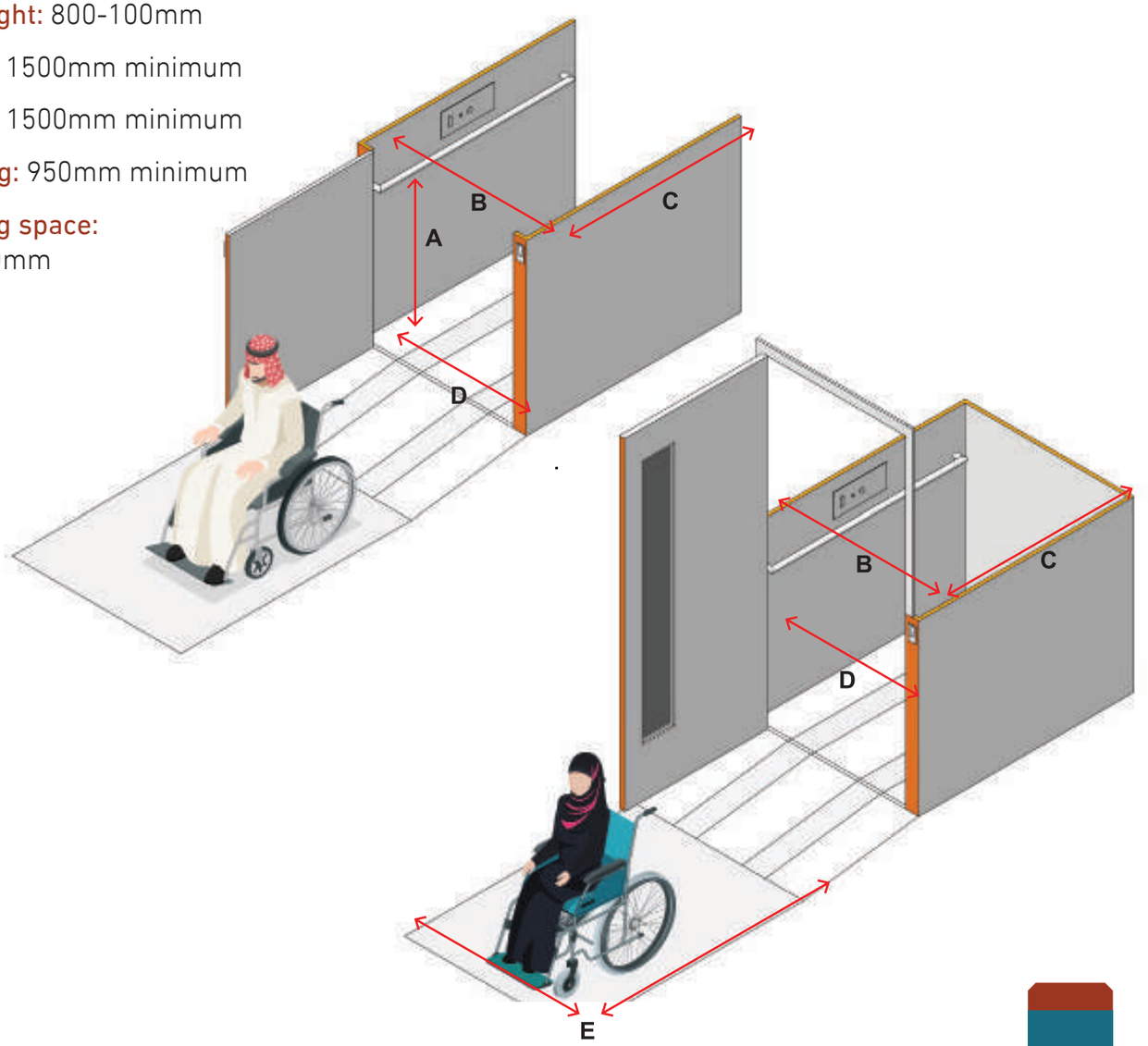
A-handrail height: 800-100mm

B-cabin width: 1500mm minimum

C-cabin depth: 1500mm minimum

D-door opening: 950mm minimum

E-maneuvering space:
1500mx1500mm



B

Sanitary Facilities

B 11 1 SANITARY FACILITIES

- All toilet rooms should be identified with clear signage
- Accessible toilets should be located on accessible routes that are direct and obstruction free.
- Accessible toilets should be provided as close as possible to the main entrance of building and / or waiting areas of buildings.
- Accessible toilet stalls can be located inside toilet blocks or where space permits or be in form of self-contained separate toilet room at entrance to toilet block.
- Toilet flush controls should be automatic,

Figure 1: Examples of different ways of laying out an accessible bathroom / WC

B 11 2 SANITARY DOORS & LOCKS

- All toilet doors should have a clear width of 900m.
- Door furniture should have a reflectance contrast with the walls of at least 30 points LRV
- A collapsible coat hangar should be installed between 1100 –1200mm from floor. It should not project more than 50mm from wall.

Door Latch

- Every cubicle door shall be provided with a latch operable with the elbow. It should be between 900 – 1000mm from floor.
- The latch operating and locking mechanism should also be capable of being released or opened from the exterior in the case of an emergency.

Door Handles

- Doors should open outwards on all toilet cubicles
- Outward-swinging entrance doors should have a 140 mm long “D”-shaped door pull, located on the interior (push-side) of the door, with its centreline 200-300 mm from the hinged end of the door. The door pull should be located 900-1000 mm above the floor.
- A horizontal handle bar with length of 300mm should be provided at height of between 900-1000mm. It should be positioned 300mm from the hinge side of inside of door and by latch side on the outside of door.

B 11 3 FAMILY TOILET ROOMS

Amount of Family Rooms

- At least one family toilet room, in addition to accessible commonuse public toilets,should be provided for each gender in:
  - in all public buildings; and
  - on every floor level in assembly buildings where the floor incorporates common use public toilets containing four or more toilet and/or urinal fixtures.

Family Room Facilities

- Accessible family toilet rooms should be located on accessible routes
- Doors entering family toilet rooms should have power door operators
- A clear space having a diameter not less than 2100 mm should be provided inside every accessible family toilet room.
- Accessible family toilet rooms should contain a water closet and accompanying transfer space

Dimensions

A- door width clear space:
minimum 900mm.

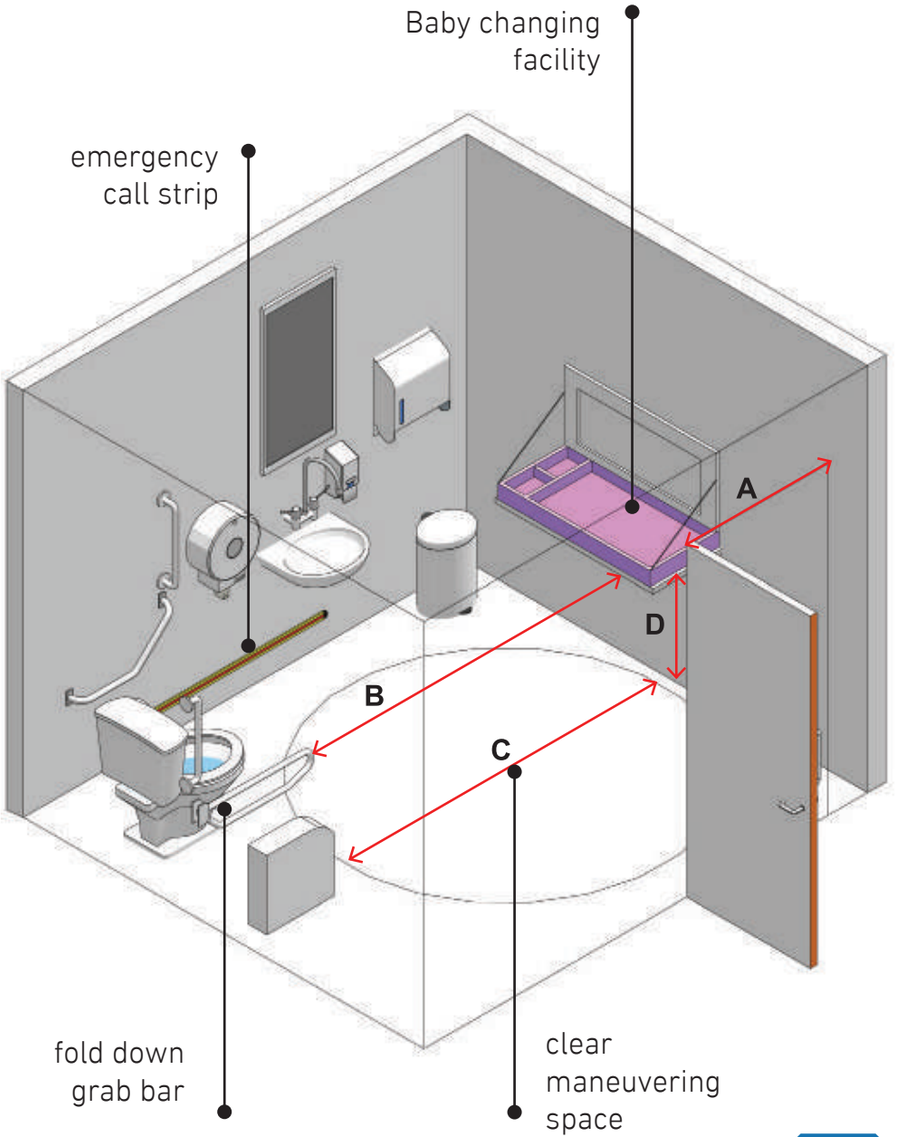
B- distance between table and nearest obstruction:
minimum 1000mm

C- maneuvering space:
minimum 2100mm diameter

D- baby change table height:
850 -1200mm from floor.

Baby Changing Table

- Where baby change tables are provided, they should be of a fold down type with the change surface a maximum of 850 mm above the floor.
- No operable mechanisms of the baby change tables should be located higher than 1200mm above the floor.
- The change table should be designed to carry a maximum load of
- 1.33 kN (300 lbs).
- A shelf for a diaper bag should be provided an located to within reach requirements



B 11 4 CHANGING PLACES

The following standards are advocated by the Changing Places Consortium in the UK, a leading charity campaigning for changing places to be introduced in all public facilities including:

- Shopping malls
- Arts venues, such as museums, galleries and theatres
- Hospitals
- Transport hubs like train stations, airports and motorway service stations
- Leisure and sports complexes
- Sports stadiums and arenas
- Entertainment venues, restaurants and cinemas
- Attractions, such as theme parks and zoos

Their standards are in addition to the typical features of an accessible toilet, such as an emergency alarm and grab rails. A Changing Places toilet should have the following specialist equipment:

A height adjustable, adult sized changing bench

- The changing bench should be a minimum length of 1800mm
- The bench must be heightadjustable
- The bench can be either freestanding or wall mounted.

A tracking hoist system

- A track hoist system (either wall or ceiling mounted) is strongly preferred.
- The hoist should provide access to the toilet, washbasin, changing bench and open space to transfer.

Adequate space in the changing area

- The changing places facility should be 3m x 4m (or the equivalent floor space of 12sqm), with a minimum ceiling height of 2.4m.

A centrally placed toilet with space either side for the carers

- A toilet should be placed in a peninsular arrangement, at least 1m away from the wall on either side.
- The toilet should have a seat height of 480mm
- The toilet can be a standard manual toilet.
- A close coupled or wash-and-dry toilet could be provided, but is not a requirement.

Screen or curtain

- A dignity screen/curtain should be provided to allow the disabled person and carer some privacy
- Wide tear off paper roll to cover the bench

Wide tear off paper roll

- should be provided in a dispenser to the adjacent bench

Waste Bin

- A large waste bin for disposable pads

A non-slip floor

- Non-slip floor materials to be used

Washbasin

- Standard washbasins are acceptable.
- If possible, a height adjustable model should be provided.
- The washbasin should have clear knee space below the bowl.
- If the washbasin is not height adjustable, the basin should be installed 720-740mm from the floor.

Shower/floor drain

- Showers are not a requirement of Changing Places.
- A shower/floor drain should be considered for specific relevant type of managed buildings such as leisure centres and tranport hubs.

B 11 4 CHANGING PLACES

Requirements of a Changing Places Toilet as in the British Standards:
BS8300:2009:

- adequate space for a disabled person when they are not in their wheelchair, their wheelchair and one or two carers – 12sqm (3m x 4m)
- an adult sized, height adjustable changing bench, wall mounted or free standing
- a ceiling tracking or a mobile hoist
- a peninsular (centrally placed) toilet
- a privacy screen or curtain
- a large bin for pads
- an emergency alarm
- a paper roll
- a non slip floor

Image courtesy of PAMIS, a member of the Changing Places Consortium (pamis.org.uk)

Image courtesy of Closomat, manufacturer and supplier of accessible bathroom/ toilet equipment (closomat.co.uk)

Image courtesy of OpeMed, official sponsor of the Changing Places Campaign (opemed.net)

Image courtesy of AMP, a directory for Changing Places installers (accessandmobilityprofessional.com/)

B 11 4 CHANGING PLACES

The following is a typical design of a changing places room that can support the changing of a larger child or adult.

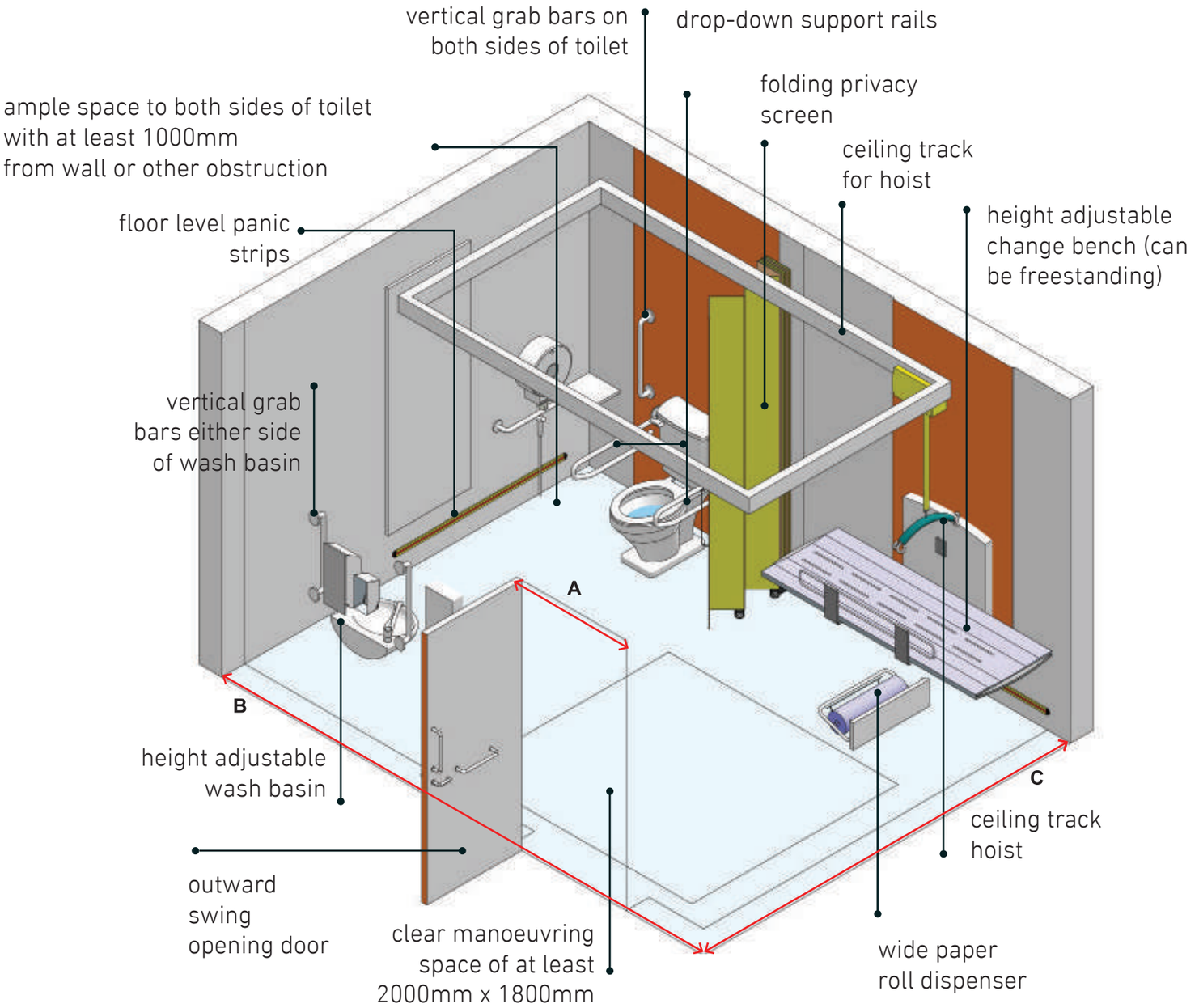
Dimensions

A-door width clear space:
minimum 900mm

B-depth of room*:
minimum 4000mm

C-length of room*:
minimum 3000mm

* layout may change but minimum dimensions are 3000 x 4000mm

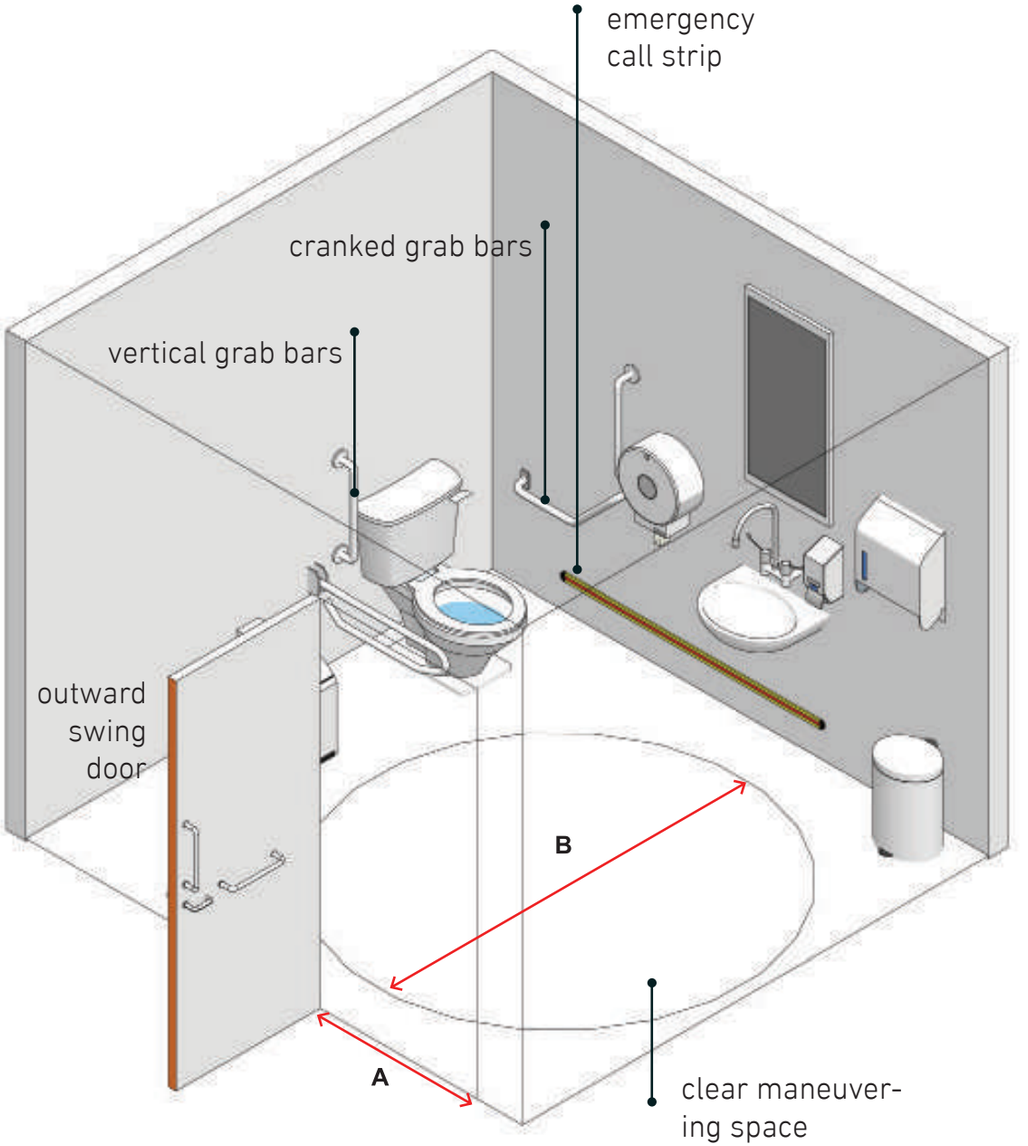


B 11 5 ACCESSIBLE TOILET WITH WASHROOM

Dimensions

A- door width clear space
minimum 900mm (850mm in renovations).

B- clear maneuvering space
21000mm diameter.



B 11 6 ACCESSIBLE TOILET STALLS

Amount

Total number of stalls within washroom	Minimum required number of accessible toilet stalls
1 - 2	1
3 - 5	1
> 5	2

Doors

- Doors should swing outwards from toilet stall.
- Inward doors allowed if clear floor space of 800mm wide and 1400mm deep
- Gravity hinges should return door to closed position

Transfer space

- Minimum of 900mm wide on one side of water closet
- Clear from obstructions

In-stall washbasin

- Washbasins should be located on the wall beside the toilet, with its closest edge 275mm from the front edge of the toilet fixture.
- The depth of the washbasin should be a maximum of 400mm.
- The top of the washbasin should be no higher than 825 mm above the floor and provide a minimum of 700 mm clear knee space beneath.

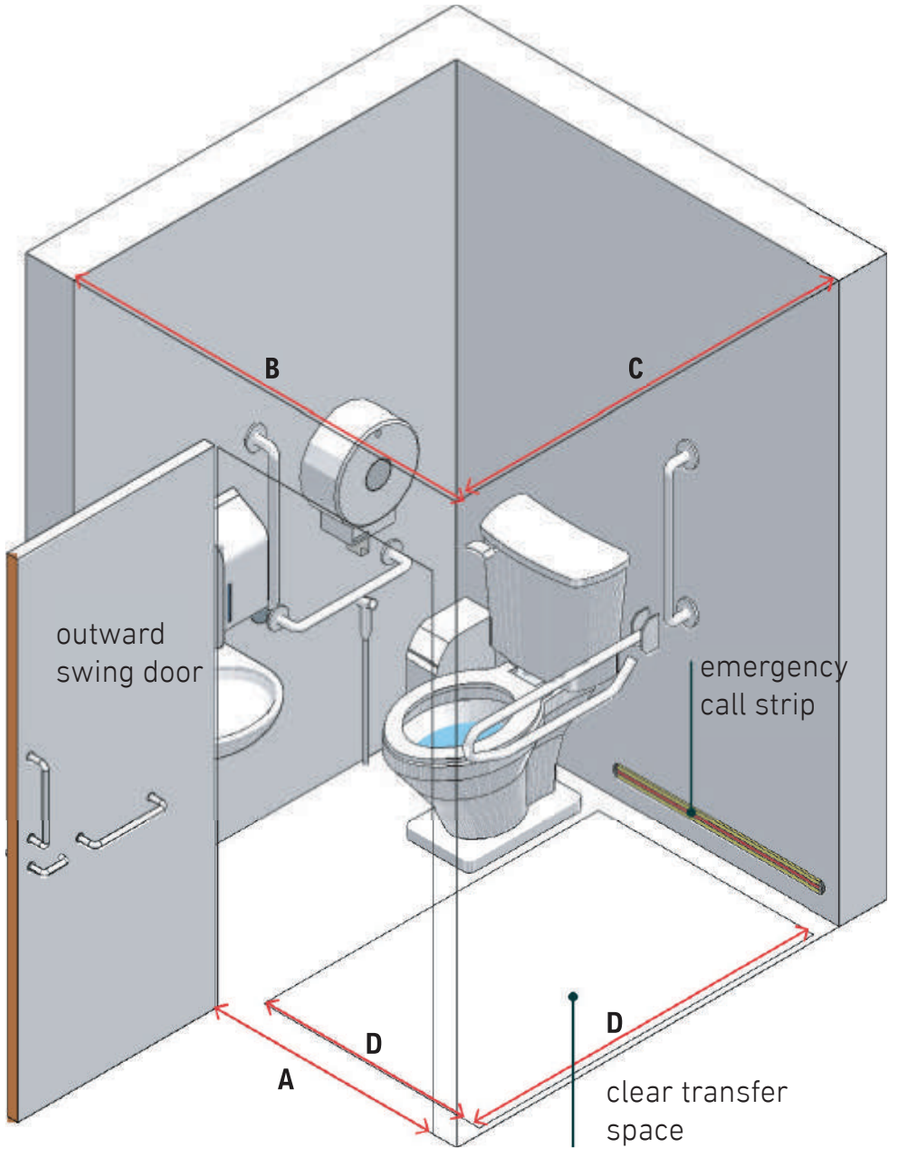
Dimensions

A- door width clear space
minimum 900mm (850mm in renovations)

B- Depth of stall
minimum 1800mm

C- Width of stall
minimum 1800mm

D- transfer space
900mm x 1400mm minimum



B 11 7 LIMITED MOBILITY TOILET STALLS

Amount

Total number of stalls within washroom	Minimum Required Limited Mobility Toilet Stalls
1 - 2	0
3 - 5	1
> 5	2

Doors

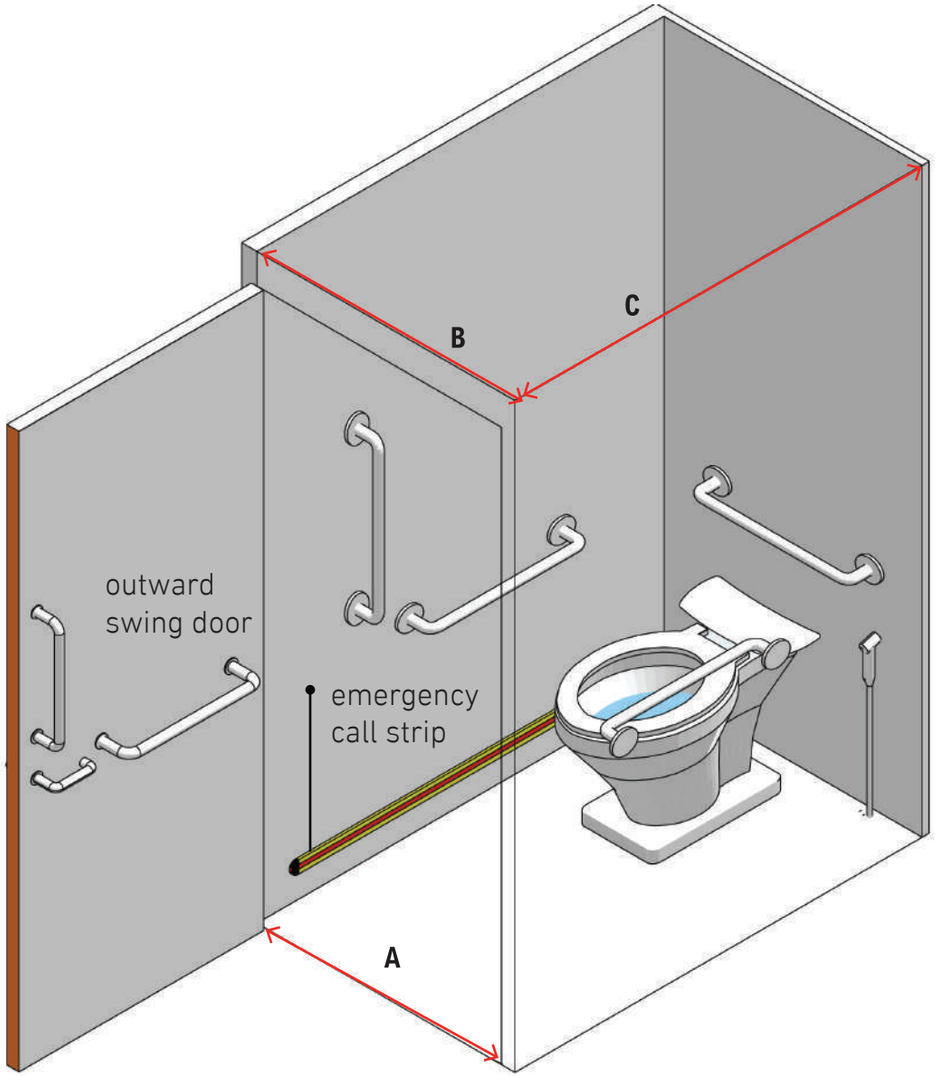
- Doors should swing outwards from toilet stall.
- Inward doors allowed if clear floor space of 800mm wide and 1400mm deep
- Gravity hinges should return door to closed position

Dimensions

A- door width clear space
minimum 900mm (850mm in renovations).

B- Depth of stall
minimum 1800mm.

C- Width of stall
900mm minimum.



B 11 8 WATER CLOSETS

- Western-style (seated) water closet (WC) fixtures are required within accessible and limited mobility toilet stalls.
- Flush controls should be automatic.
- Toilet seats should not be springactivated
- A back support should be provided where no seat lid or tank is included on a water closet

Ablution Hose

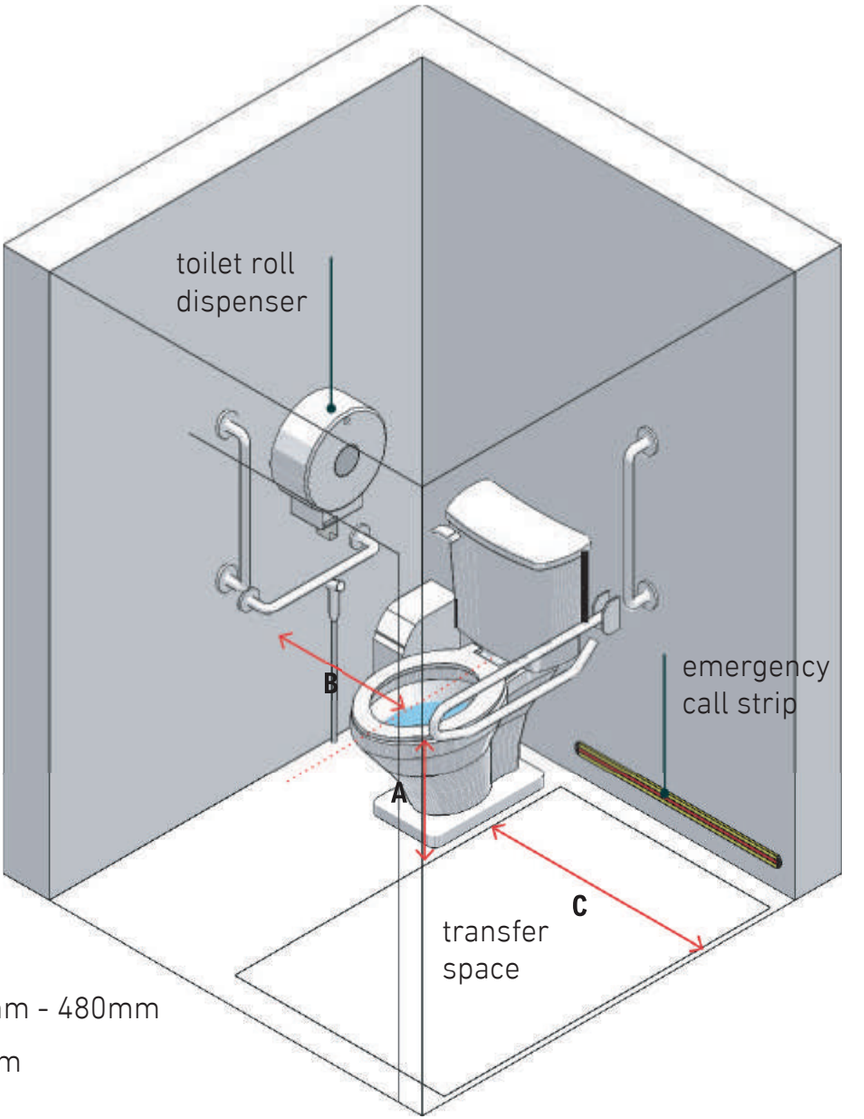
- An ablution-hose should be provided at every toilet fixture, with a wall-attachment for the hose head.
- The hose-head attachment should be located to the left of the toilet
- Ablution hose heads should be positioned no more than 200 mm back from the front edge of the toilet fixture

Toilet Roll Dispenser

- Toilet paper dispensers should be mounted on the side
- wall closest to the water closet. Toilet paper dispensers should be located below the grab bar a minimum of 600 mm above the floor with the clearance between the toilet
- paper dispenser and grab bar a minimum of 60 mm. Toilet paper dispensers should
- be positioned in line with to a a maximum of 300 mm in front of the toilet seat.

Transfer space

- Minimum of 900mm wide on one side of water closet
- Clear from obstructions



Dimensions

A- top of seat: 430-460mm

B- centre line of WC to closest wall: 450mm - 480mm

C- transfer space to wal: 900mm minimum

B 11 9 GRAB BARS FOR WATER CLOSET

- Two grab bars should be located in each accessible toilet stall.
- One grab bar should be located behind the toilet
- The second grab bar should be located on the side wall closest to the toilet fixture.
- The side grab bars should be of a "cranked" design or a horizontal and vertical grab bar.

Dimensions of side grab bar

A- length of horizontal grab bar:
300mm minimum.

B- length of vertical grab bar:
300mm minimum.

C- height of grab bar:
800mm from floor.

D- gap between WC:
150mm minimum.

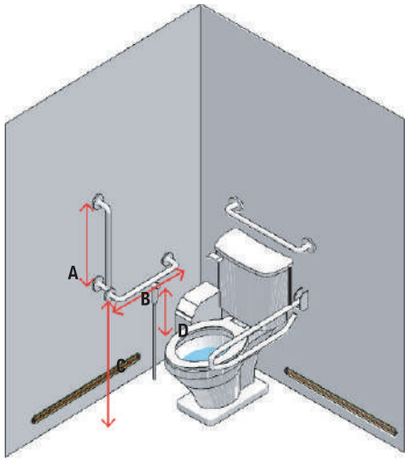
Dimensions of rear grab bar

E- width of grab bar:
600mm minimum.

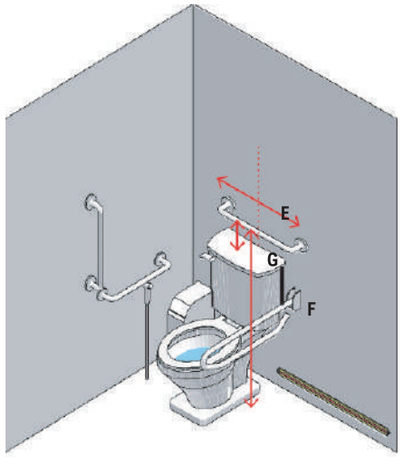
F- gap between WC:
150mm minimum.

G-height of grab bar:
800mm from floor.

Side grab bars



Rear grab bar



Crank design grab bar

Fold down grab bar

B 11 10 WASH BASINS AND ACCESSORIES

Amount

Total number of washbasins provided within the washroom	Minimum required number of accessible washbasins	Minimum required Number of washbasins for standing users
1	1	0
2	1	1
3	1	2
< 4	at least 50% of total	-

- Washbasins and vanity counters should have a knee space beneath
- Should be a minimum 800mm wide and 1400mm deep clear floor space in front of accessible washbasins;

Accessories

- In general accessories should have operable portions between 900-1200mm above floor.

Faucets

- Faucets should be electronically controlled or have a single long lever-style handle that is operable with a clenched fist.
- Faucets should not self-close
- Hot water and drain pipes beneath accessible washbasins should be insulated.

Dimensions

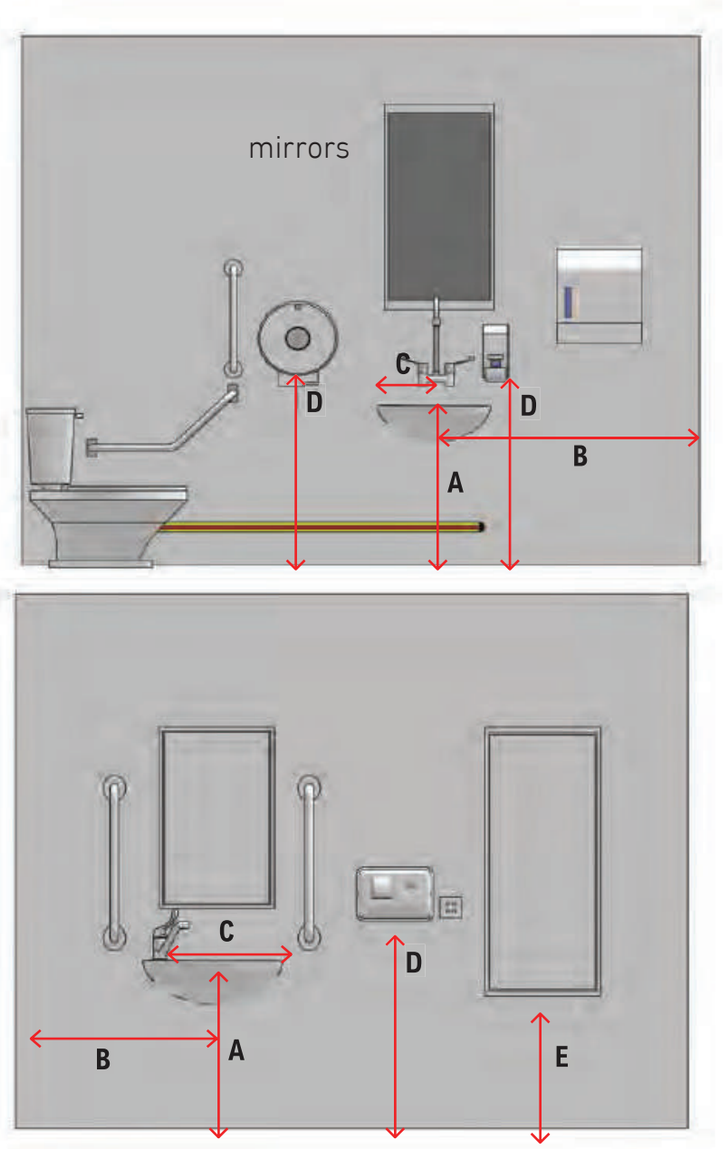
A- top of washbasin:
850mm from floor

B- centre line of wash basin to closest wall:
450mm minimum

C- centre line of faucet to edge of wash basin:
500mm maximum

D- height of dispensers and dryers:
maximum 1200mm above floor

E- mirror height:
1000mm maximum above floor



B 11 11 EMERGENCY CALL STRIPS

- A waterproof emergency call strip-switch should be provided on the side wall adjacent to the toilet fixture.
- A second waterproof emergency call strip-switch should be provided on the rear wall adjacent to the toilet fixture.
- Emergency call strips should activate a bell or other signalling device that is monitored from a location within the facility.

Side Strip Dimensions

A- width of strip:
1200mm minimum.

B- cap between wall:
1500mm minimum.

C- height of strip:
200mm from floor.

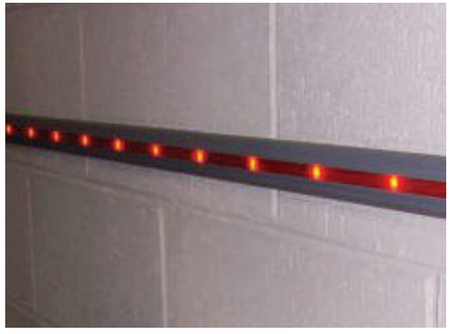
Rear Strip Dimensions

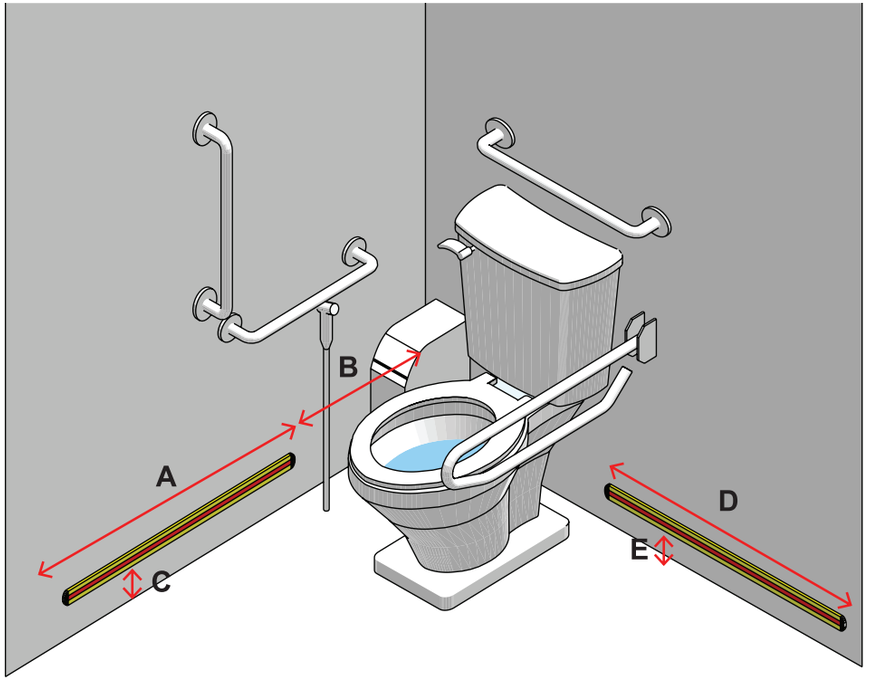
D- width of strip:
750mm minimum.

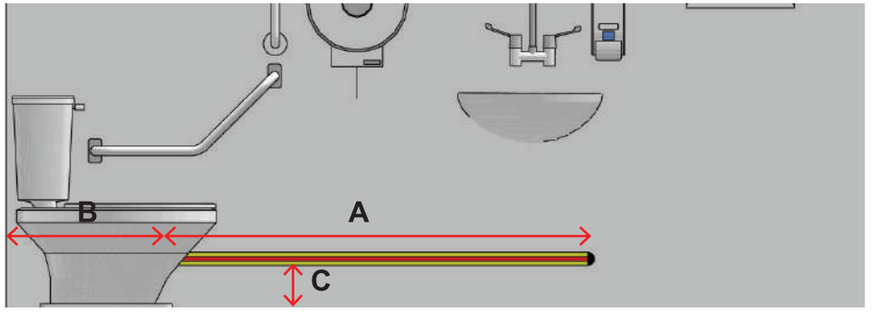
E- height of strip:
200mm from floor.

Emergency call options

A

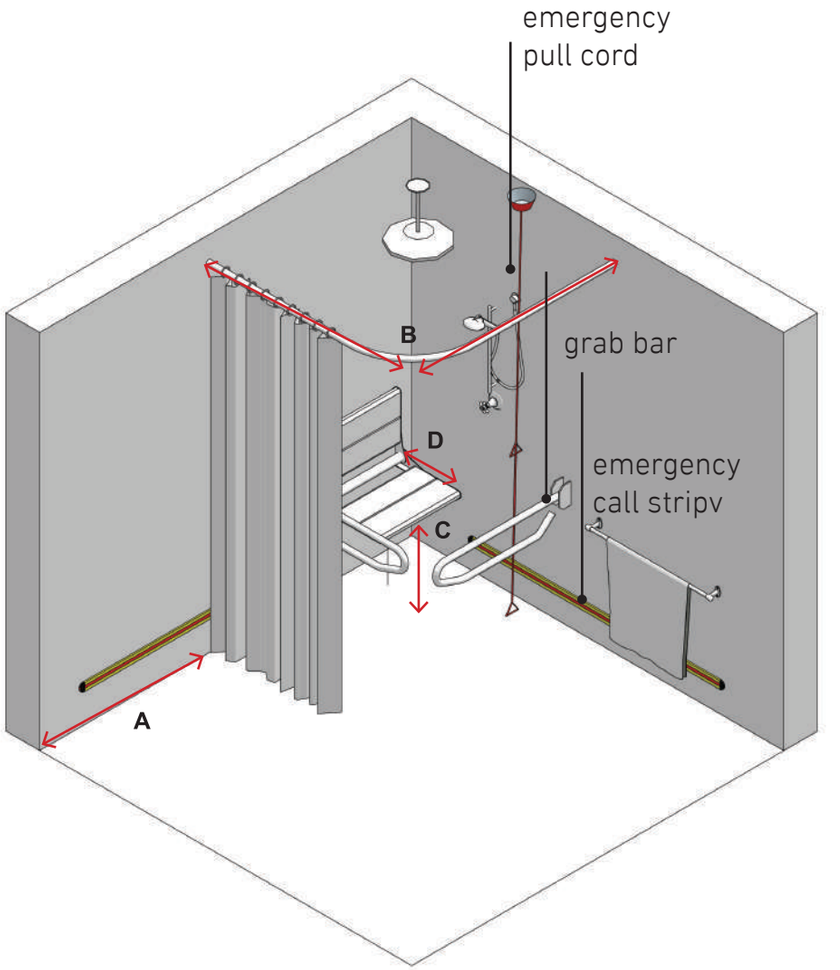






B 11 12 SHOWER STALLS

- An area of 900mm should be provided adjacent to the exterior of shower entrances.
- Interiors of showers should have clear floor space of 1500mm x 900mm deep. Ideally should be 1500mm x 1500mm.
- Floor surfaces located at the interior and exterior of shower stall entrances should be slipresistant.
- Floor slopes for drainage in the shower areas should not exceed a ratio of 2%.
- Shower stall drains should be located below the shower seat or to one side of the floor area in the stall.
- Openings in floor drains should not exceed 13 mm in any direction.
- Shower seats should be provided and colour contrasting to walls.
- The shower stall seat should be designed to carry a minimum load of 1.33 kN.
- Shower stalls should have two grab bars.
- emergency call strip-switch should be provided within shower stalls
- Illumination levels in the shower stall should be at least at 200 lux.
- Access to shower controls and transfer into/out of the shower stall should not be impeded by the shower stall enclosure.
- Shower curtains that do not obstruct the clear floor space in front of the shower are preferred to the use of shower doors.



Dimensions

A- transfer space to side of shower:
900mm minimum.

B- size of shower interiors:
1500mm x 900mm minimum (ideal 1500mm x 1500mm)

C- height of shower seat:
425-475mm from floor.

D- depth of shower seat:
450 mm minimum

B 11 13 SHOWER WITH WC

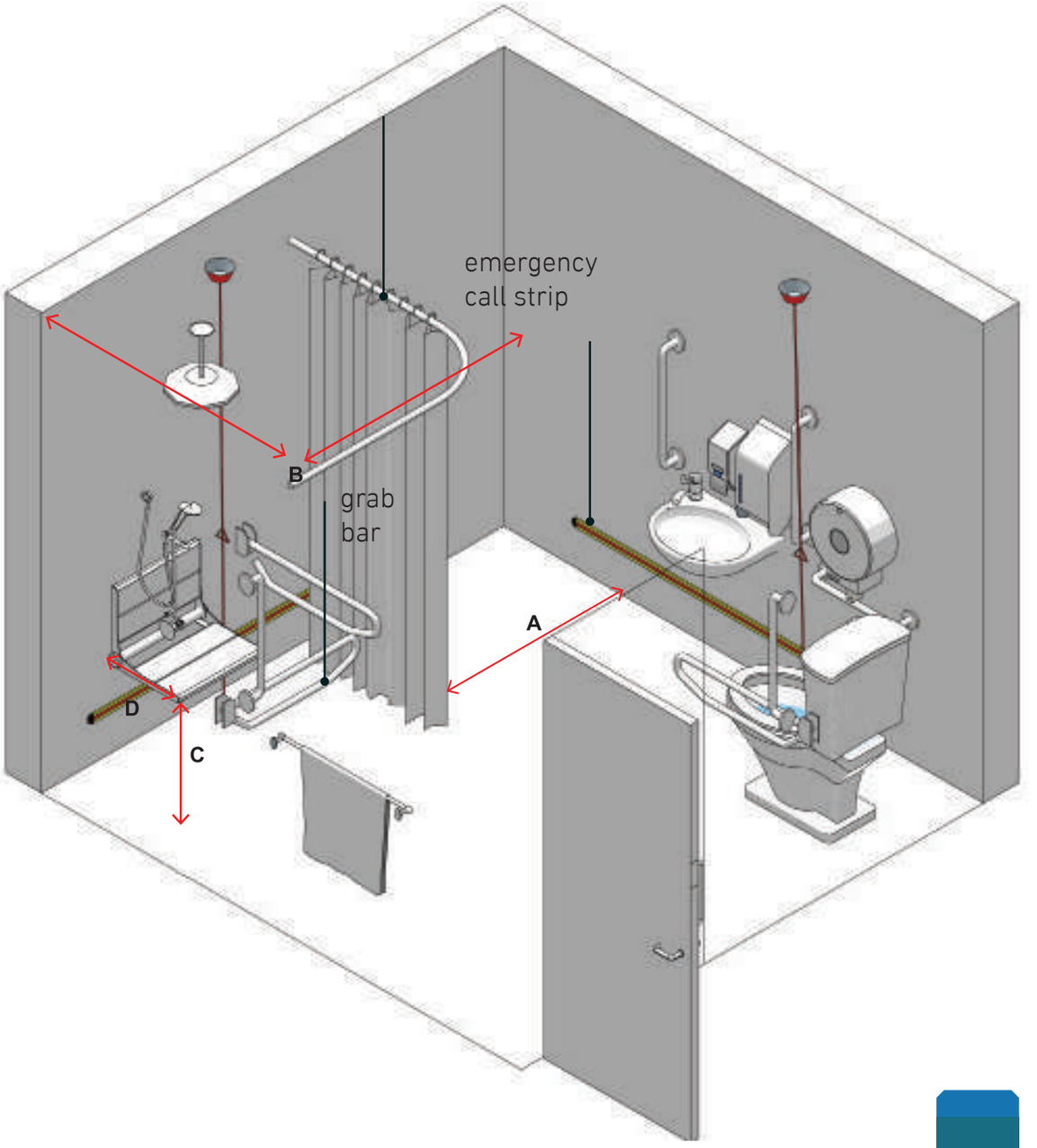
Dimensions

A- transfer space to side of shower:
900mm minimum.

B- size of shower interiors:
1500mm x 900mm minimum
(ideal 1500mm x 1500mm)

C- height of shower seat:
475mm from floor

D- depth of shower seat:
450mm minimum.

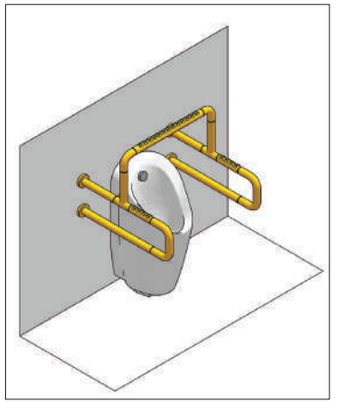


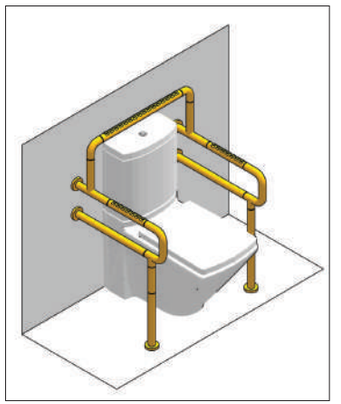
B 11 14 URINAL GRAB BARS

- Full length urinals are preferred for all urinals. The bottom lip should be at maximum height of 425mm from floor.
- Urinals minimum 350mm deep
- At least one accessible urinal should be provided wherever urinals are located
- For accessible urinals, a grab bar should be provided on both sides of the urinal mounted vertically with the centreline at 1000mm high. It should be between 380- 450mm from centreline.
- Where privacy screens are provided between urinals, there should be clearance of 900mm.
- Clear floor space of 800mm x 1400mm provided.

Urinal Stalls

- minimum size 1800mm x 1800mm
- Clear opening width of 900mm
- Doors should swing outwards
- Door locks should be provided on urinal stall doors and should becapable of being locked from the inside



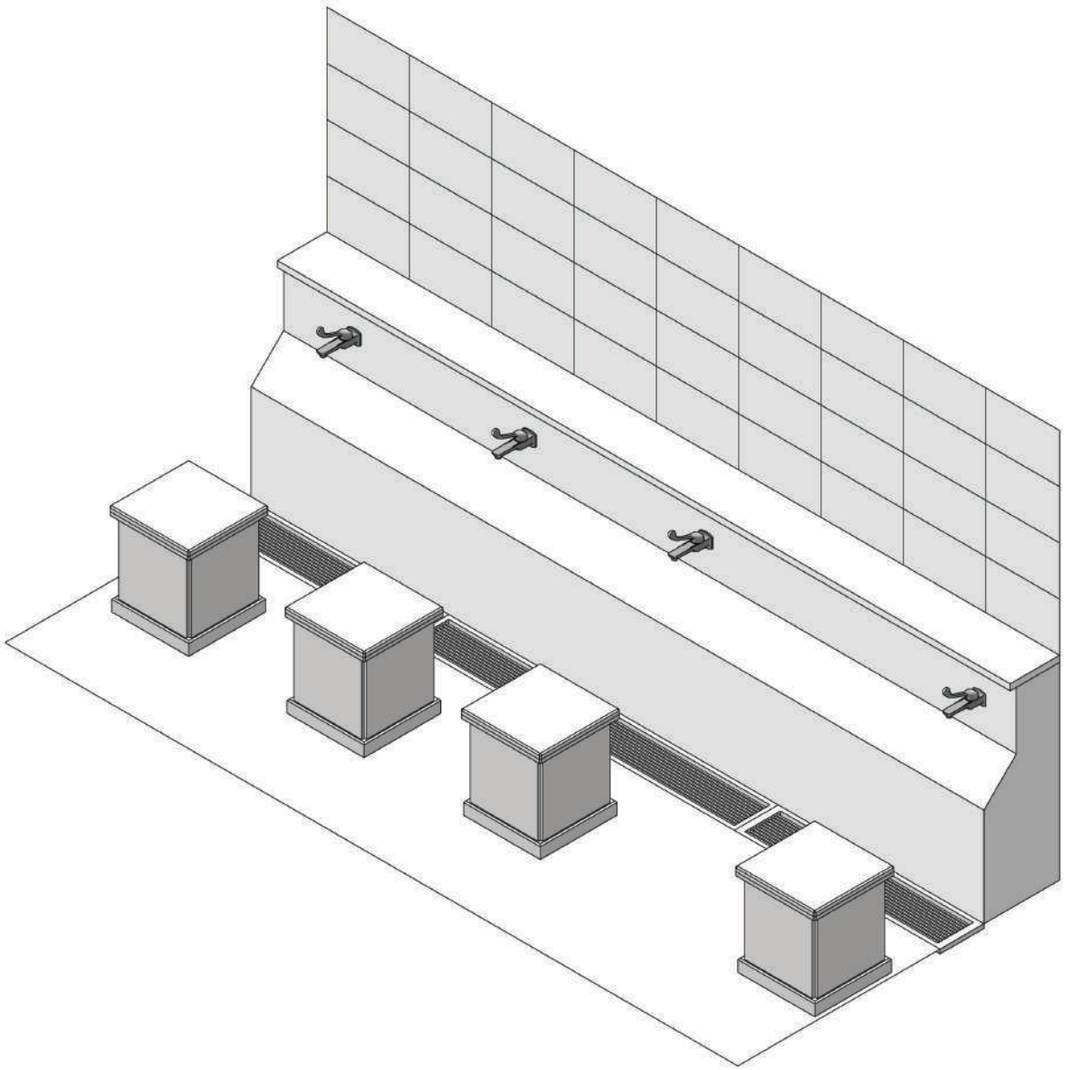
B 11 15 ABLUTION FACILITIES

- Ablution spaces should comply with this section.
- A minimum of 5%, but never less than one, of ablution units should be designated and accessible to people with disabilities.
- A minimum of 5%, but never less than one, of ablution units should be designated Limited Mobility Ablution Units.
- Electronic or sensor faucets for automatic use are recommended.
- Rooms should be provided beside an accessible route and close to the mai entrance.
- Two horizontal grab bars, one in each side of the sink, shall be mounted at height of 700- 800mm. The support length should be equal to length of the sink.
- A bidet shower system, soap and paper dispenser should be mounted near to the sink.
- All accessories of toilets, including bidet shower, should be mounted at the height of 700- 1200mm.
- The approaching space should be at least 1200mm

Figure : The Australian Islamic Centre has a successful combination of space for shoes and ablution.
Source: Australian Islamic Centre by Glenn Murcutt + Elevli Plus

B 11 15 ABLUTION FACILITIES

- Floor finishes within ablution spaces should be slip-resistant when wet, and should be antifungal and anti-bacterial.
- Built-in elements within ablution spaces, such as benches or seats, should be located on the same floor level as the circulation routes.
- Built-in elements should have no sharp edges and incorporate pronounced colour-contrast to differentiate them from the surrounding environment.
- Ablution faucets may be hand operated or electronically controlled



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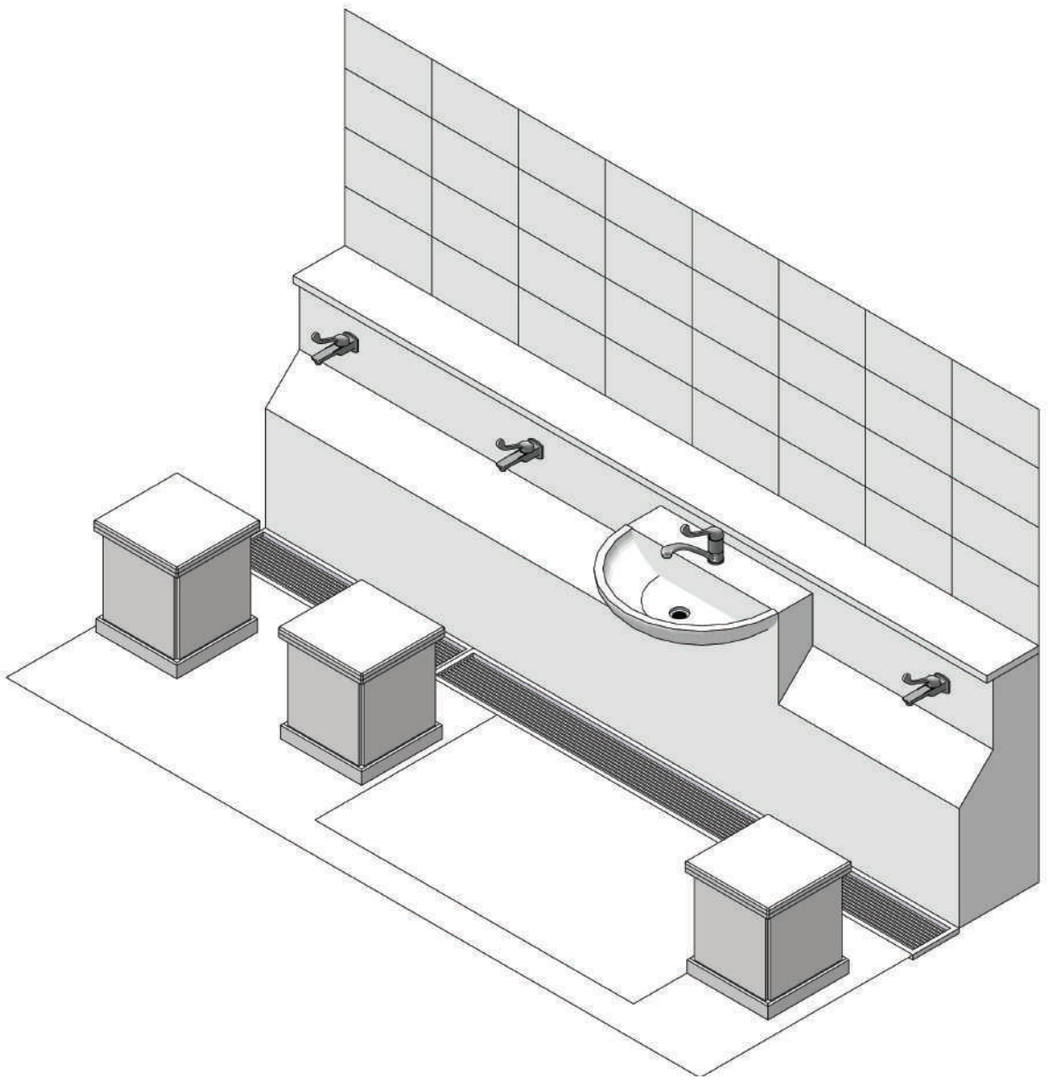


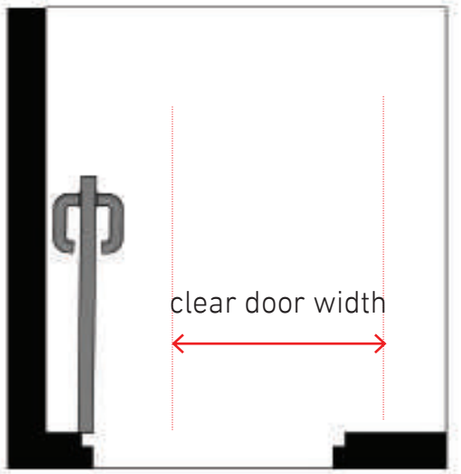
B

Doors

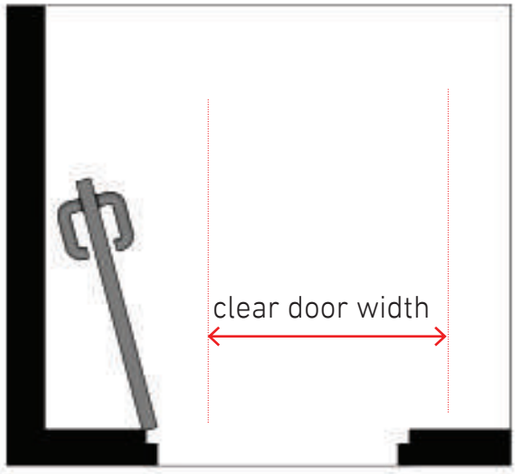
B 12 1 CLEAR DOOR WIDTH

- The clear width of free passage should be measured between the face of the door and the face of the doorstep with the door open at 90 degrees.
- The minimum clear width of external doors is 900mm for all new buildings.
- Clear width is measured between the face of the door, or panic hardware if installed, and the opposing door stop when the door is opened to 90 degrees.
- Lobby doors within the same sequence of main external doors should also be the same clear width

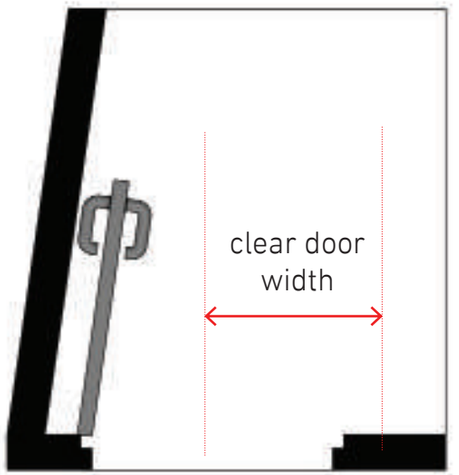
Door open at 90 degrees



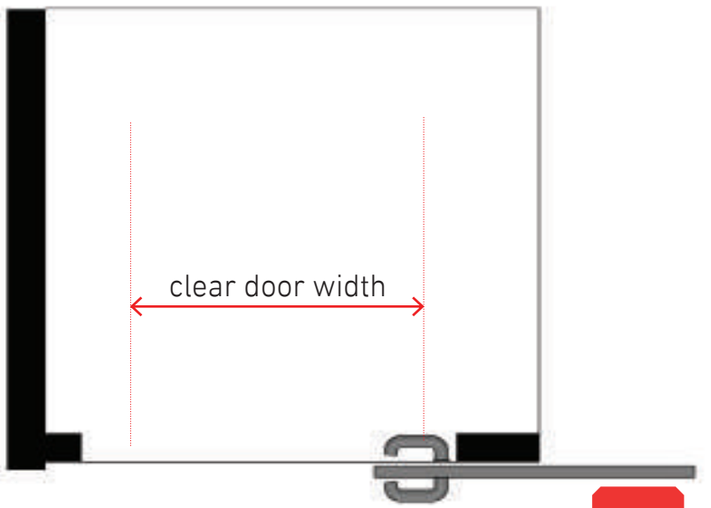
Door opening beyond 90 degrees



Door opening less than 90 degrees



Sliding door



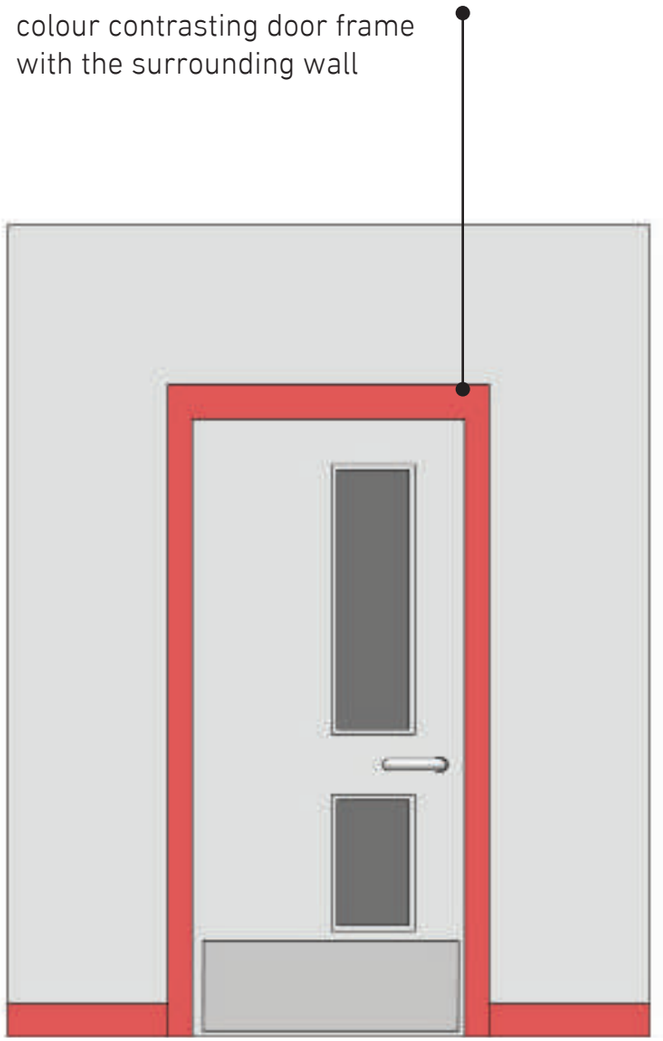
B 12 2 COLOUR CONTRAST OF DOORS & FRAMES

Leading Edge

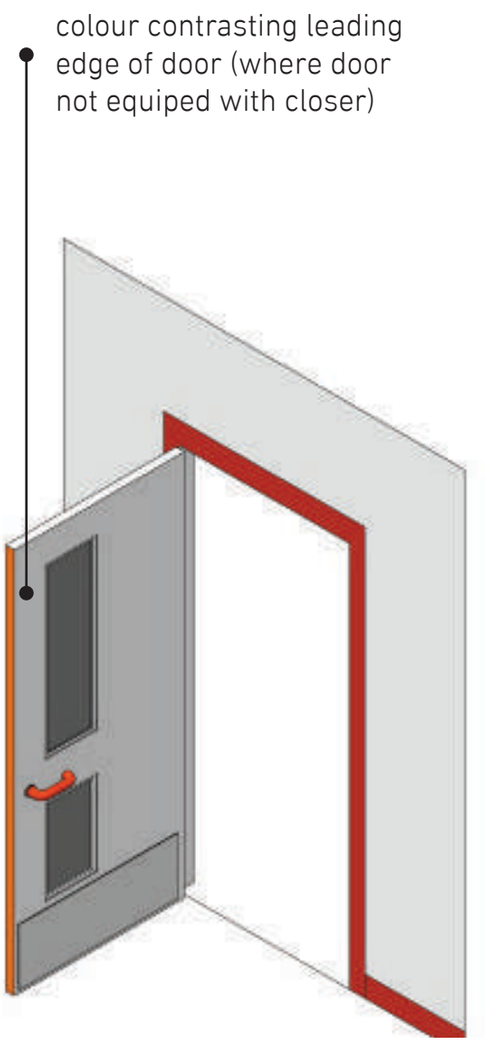
- The leading edge of doors that are to be held open should contrast visually with the door face.
- Outward opening doors along internal access routes should also contrast with door face.

Glazed Doors

- If needed, internal glazed doors require permanent manifestation markings for safety and visibility. Markings should be at two heights, between 850mm - 1000mm and between 1400mm – 1600mm.



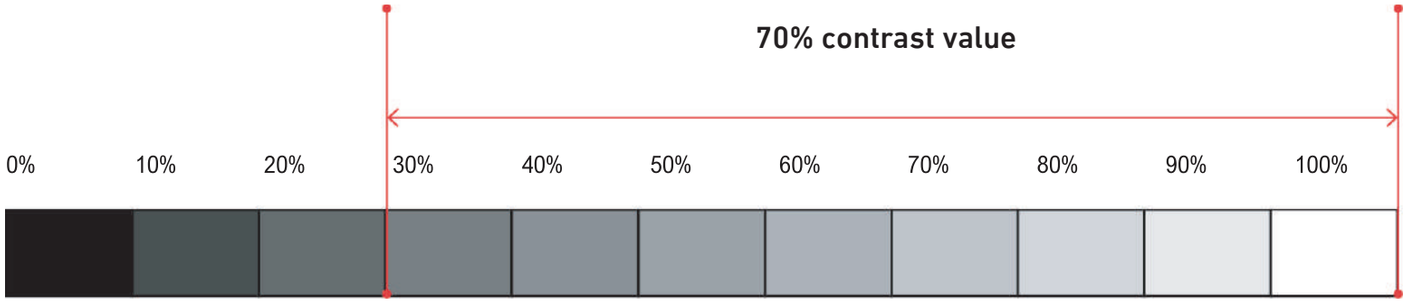
Door Frame

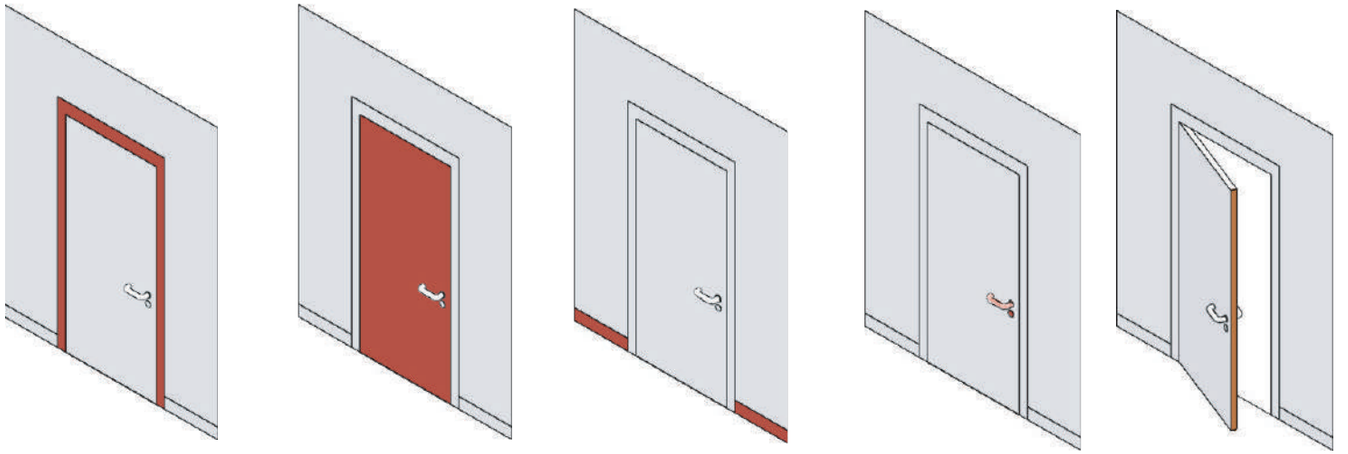


Leading edge of door

B 12 3 DOOR COLOUR CONTRAS

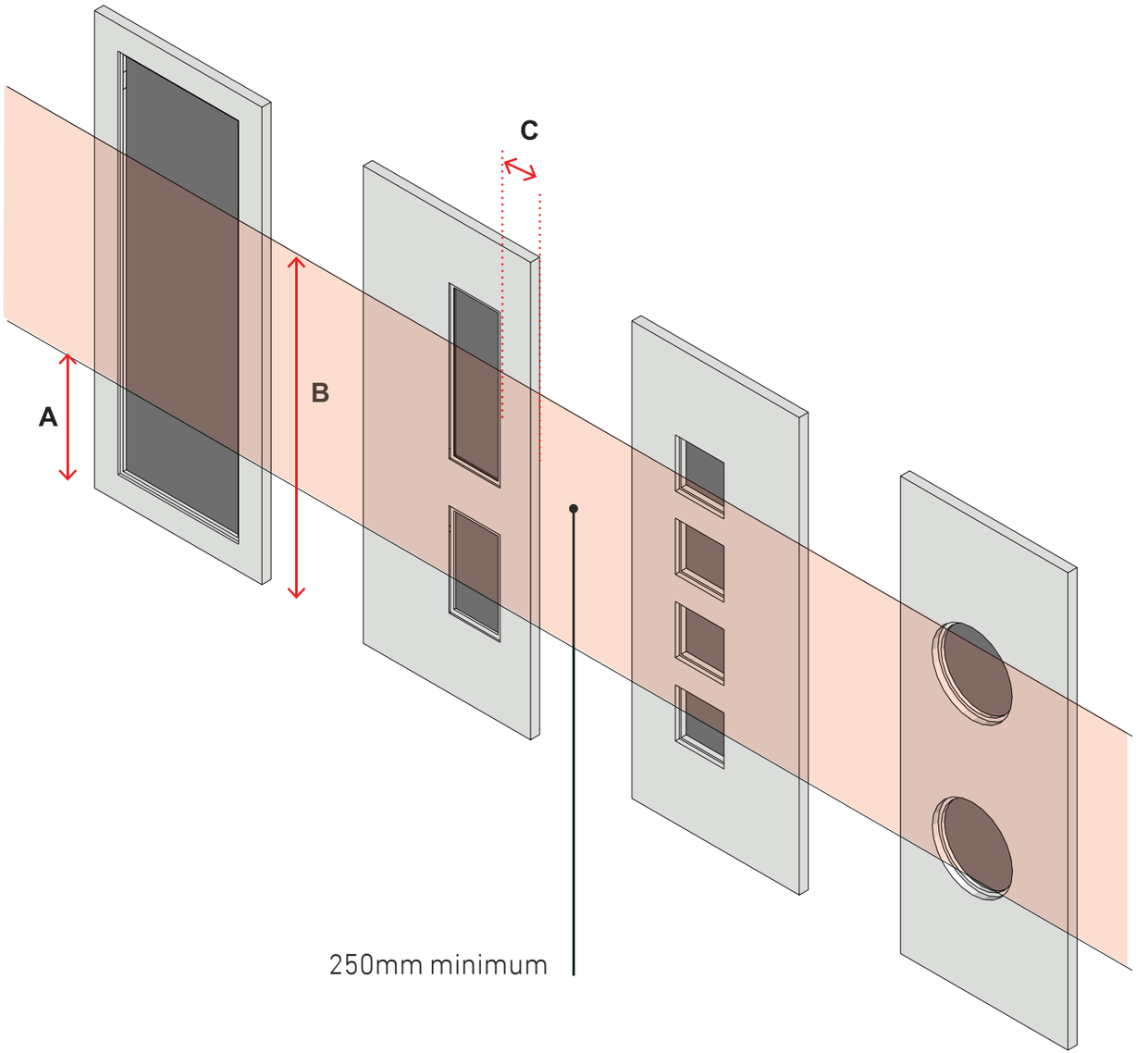
- Where doors are not equipped with a closing device, the vertical edge of the door should be colour contrasted to the face of the door.
- Doors and door frames should have colour contrast to adjacent wall.
- Door handles and other operating mechanisms should colour contrast to the door
- Power activation door pads should be colour contrasted from their surroundings.





B 12 4 VISION PANELS

- Internal doors along corridors should have vision panels if not otherwise glazed.
- If visual privacy is a concern such as at washrooms and change rooms then vision panels are not expected.
- Vision panels should provide a zone of visibility between 500mm and 1500mm.



Dimensions

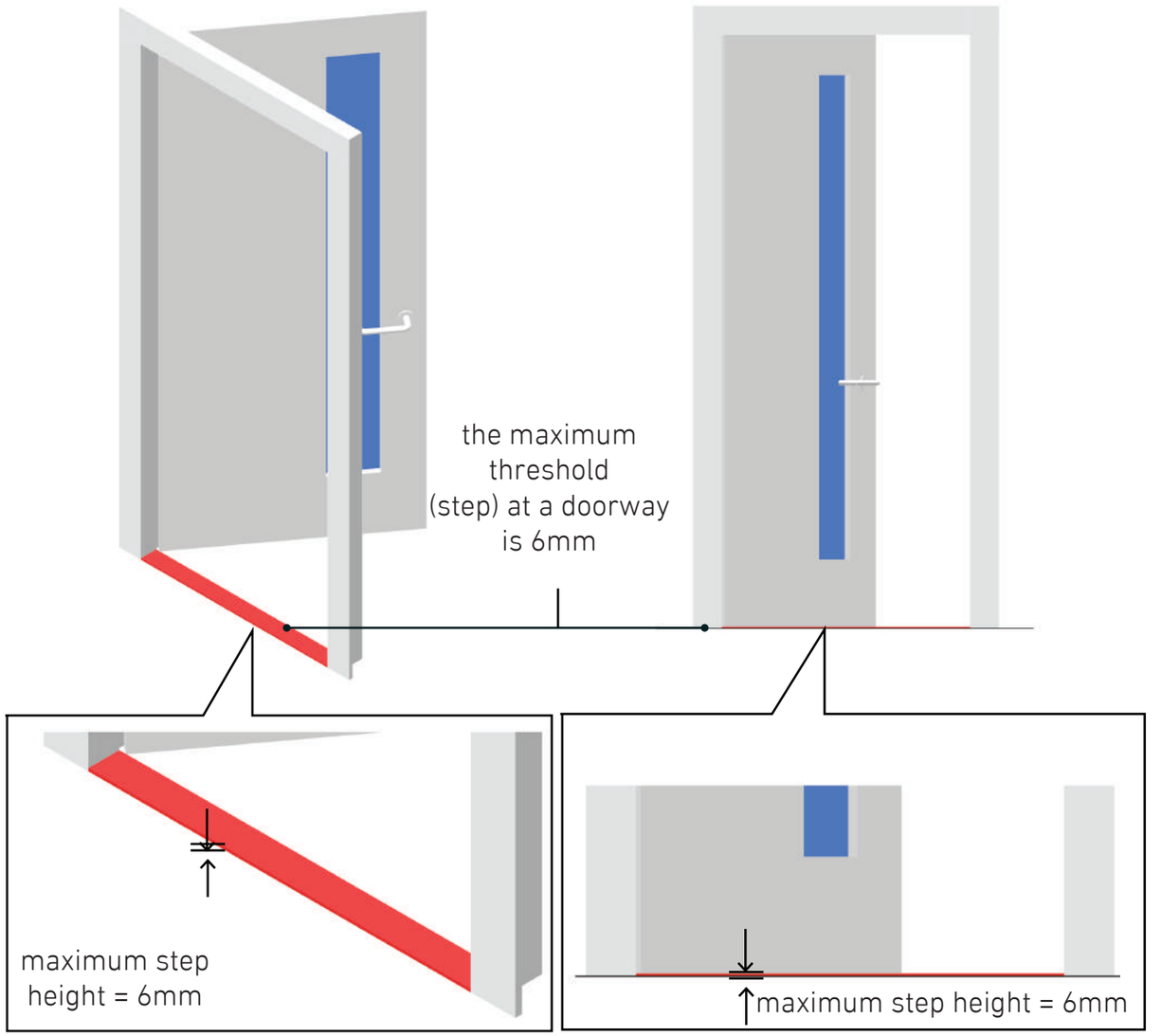
A- lower edge of vision panel above floor:
750mm minimum

B- upper edge of vision panel above floor:
1500mm minimum

C- gap between vision panel and latch side of door:
250mm minimum.

B 12 5 DOOR THRESHOLD

- Thresholds to internal doors should not exceed 6mm



B 12 6 DOOR CONTROLS

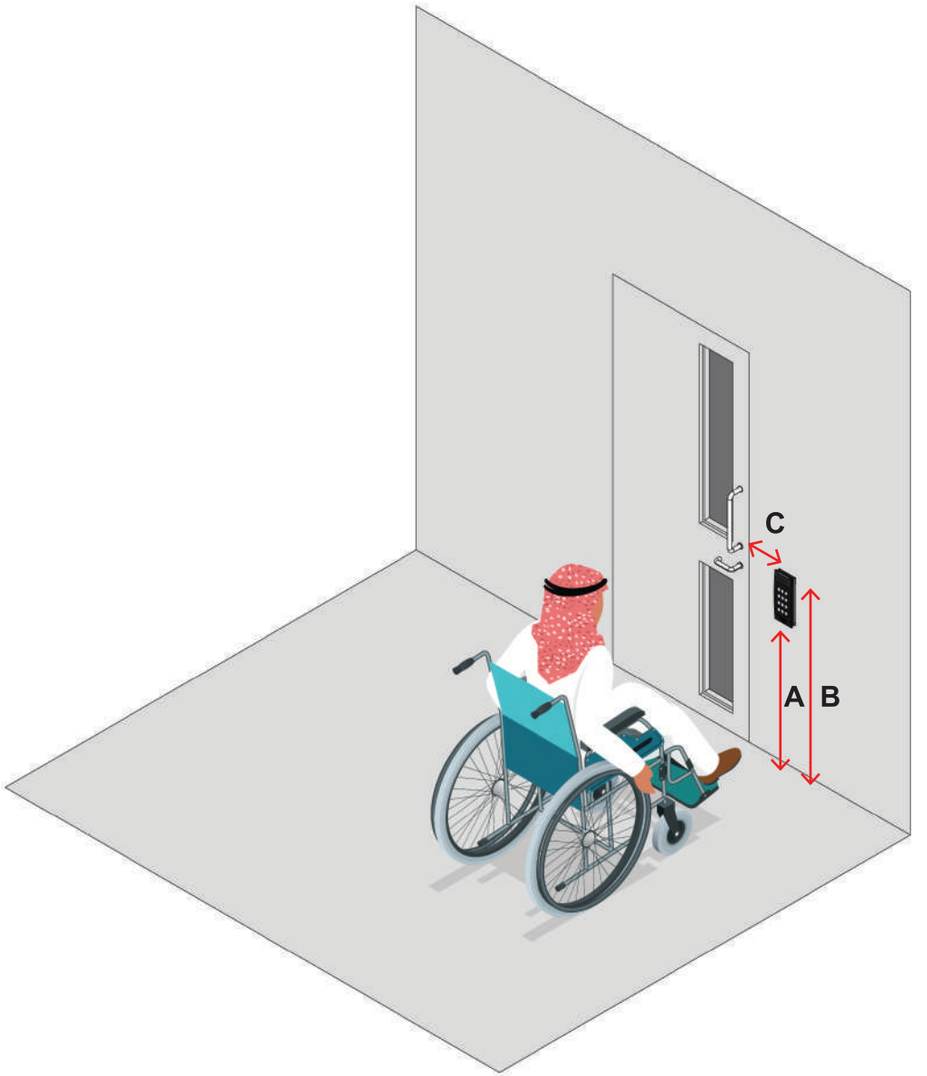
- The position of controls should be logical and sequential.
- They should consider people of various heights and wheelchair users. Ideally when switches are located by doors, they should match the height of door handle.
- Wall mounted light switches should be positioned between 750-1200mm and mounted at least 600mm from any corner.
- Wall mounted controls that require precise hand move-ments should be mounted between 750-1000mm
- Wall mounted controls such as air conditioning controllers should be mounted between 750-1000mm. An additional remote control should be provided to control the air conditioning.
- Electrical sockets should be located between 400-1000mm from floor level and at least 350mm from any wall.
- Additional switches to those normally found by room doors should be considered for larger rooms or multiple entrances.

Dimensions

A- bottom height of control:
750mm above floor.

B- top height of control:
1000mm above floor.

C- gap between door and control:
200mm.



Door Hardware

B

B 13 1 DOOR HANDLE HEIGHTS

Door Handle Height

- Doors which need to be closed behind them, such as an accessible toilet, should have a horizontal grabrail on outward opening side of door. Preferred height is between 800-1050mm.
- Keyways to locks should be positioned above the lever handle. If positioned below then should be at least 72mmm clear of handle
- If turns or snibs are used to operate locks they should incorporate larger winged turns to allow for easier turning for people with reduced manual dexterity.

Dimensions

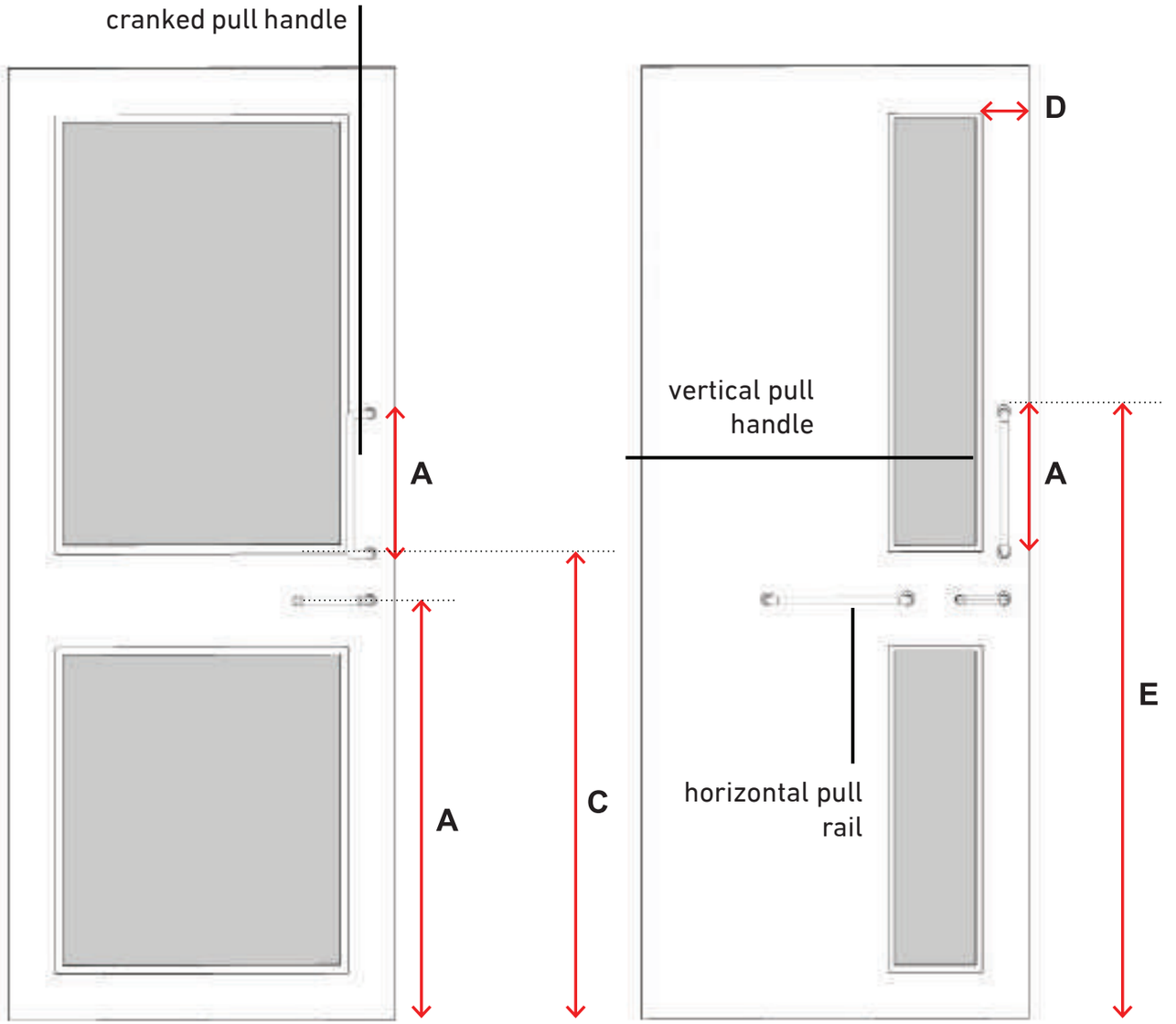
A- **pull handle:** 300mm.

B- **handle height:** 800 - 1050mm.

C-**pull handle height:** 700-1050mm.

D- **vision panel:** 100mm.

E- **vertical pull handle height:**
1300mm minimum



B 13 2 DOOR HANDLE TYPES

Manual Door Opening & Closing Furniture

- Manually operated doors withlatch should have lever handles.
- Manually operated doors without a latch can have a D-pull handle positioned on pull side of door only.
- It should be possible to operate all door opening furniture one-handed, without the need to grasp or twist. Wherever possible, door opening furniture used in conjunction with locks and latches should have a lever action.
- Avoid the use of knob furniture and small symmetrical turn buttons (thumbturns) in favour of levers.
- The torque force required to operate keys and cylinder turns should not exceed 0.5N.m.
- Turnable pad handles may be selected for use with multi-point locking systems.
- As a principle, pull handles should not be fitted to the push side of doors. (back to back fixed pull handles)
- Where a lever handle intercepts the viewing panel, any projecting glazing beads should not interfere with the operation of the lever handle or reduce the effective clearance behind it.
- Handle to contrast visually with the face of door. A light reflectance variation (LRV) difference of 15 points is acceptable

Figure 1:
A typical lever handle is rounded to avoid snagging and can be operable with the elbow
Source: Carlisle Brass Ltd

Figure 2:
A typical pull handle for easy operation at variety of heights
Source: Carlisle Brass Ltd

B 13 3 DOOR HINGES

- Hinges should be selected to suit the mass of door to ensure the door can be easily operated by people of all ability. Designers should also consider additional loading on door or handles for people requiring support. Low friction hinges can reduce opening and closing forces.
- For doors that need to open outwards in an emergency (such as on a toilet door that normally opens inwards) pivot hinges can be used in conjunction with an emergency release bolt
- Where it is important to minimize resistance to door opening and closing hinges with low friction bearings should be selected to carry the appropriate mass of the door

Figure 1:
Double Action Pivot Set allows the door to be opened outwards in the case of an emergency
Source: Carlisle Brass Ltd

Figure 2:
Emergency release door stop
Source: Carlisle Brass Ltd

Figure 3:
Ball Bearing Hinge can spread the load evenly and will help to overcome twisting or warping
Source: Carlisle Brass Ltd

B 13 4 SELF CLOSING DOOR DEVICE

- The use of self-closing devices should be carefully considered due to the difficulty for some people to open or the quick closing mechanism is dangerous for slow moving people.
- As such, the self-closing devices should be avoided where there is no particular reason for their use.
- Where it is not possible for a controlled door closing device to close an entrance door and keep it closed against external forces without exceeding the opening force limits then the following systems should be used:

Power Operated Door.

- A power-operated door – either sliding, folding, balanced or swing, which should be one of th following two types:

A manually activated door.

controlled by a push pad, coded entry system, card

- swipe or remote control device
- An automatically activated door controlled by a motion sensor or a hands-free proximity reader

A low energy swing door.

These may be used on swing doors with lower levels of pedestrian use as they can work in manual mode or provide powered assistance opening, either in push and go or power-assist modes.

Power-operated revolving.

These are not considered accessible; therefore a complementary accessible door should be provided immediately adjacent to the revolving door

An entrance lobby or airlock system.

of inner and outer doors. This guidance recommends the use of double leaf swing doors wherever possible.

- Manual activation controls for power-operated pedestrian doors should be located ata height of between 750 mm and 1 000 mm from finished floor level. In order to be clearly visible, they should contrast visually with the surrounding background

Figure 1:
Surface Mounted H.E. Slim Door Closer has been designed to meet the needs of disabled people.
Source: Carlisle Brass Ltd

B

Windows

B 14 1 WINDOWS

- Windows must not open into accessible paths below 2200mm in height
- Windows in Riyadh need to be well shaded from excessive sunlight but openable to allow fresh air and avoid need for air conditioning at all times. When opened, there should be a filter to reduce amount of sand and other particulates entering window.
- Glazing can extend as low as 9000mm from the floor to allow wheelchair users and people of small stature to view outwards.
- The bottom of openable windows must not reach below 1200mm as this may be safety issue for children opening windows. On buildings over single storey, window handles must not be within reach of children and should be lockable to ensure children can not climb and operate window.

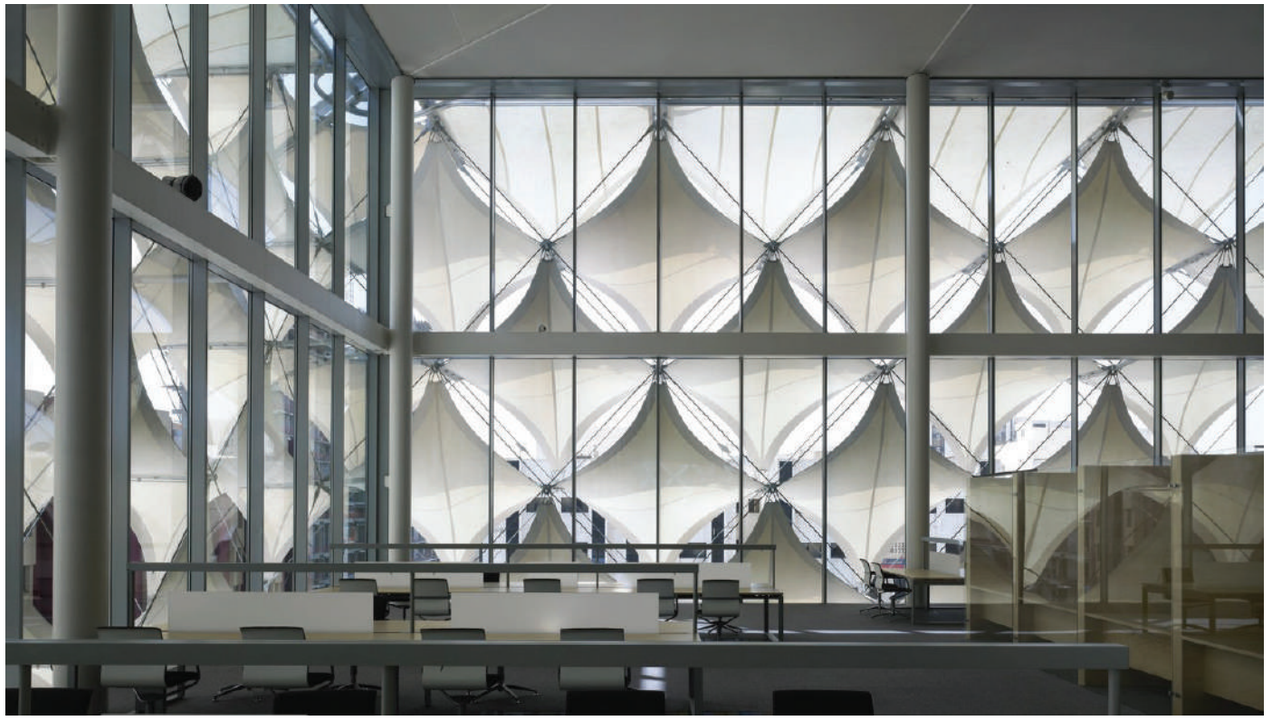


Figure 1: The National Library in Riyadh displays innovative means of shading windows whilst allowing good daylighting
Source: King Fahad National Library by Gerber Architekten

B 14 2 WINDOW HANDLES

- Pressure mechanisms or levels should be operable without wrist turning
- Handle levers should be easy to manipulate with one hand or elbow
- Windows that open with smart devices or electronic function are encouraged. When provided, the windows should also be manually operated if electricity fails.
- Ideally, windows should be opened automatically linked to a smart climate control mechanisms.

B 14 3 ROOM LIGHTING

- Lighting should give good colour rendering for all surfaces within a space. Good colour rendering will optimise light reflectance values (LRVs) and ensure effective visual contrast is achieved where the recommended different in LRV is selected for adjacent surfaces.
- Good lighting should be used in conjunction with other hazard warnings to highlight hazardous areas such as stair wells or changes in level along an internal route.
- Where communication is more important, such as reception desks, lighting should be used to illuminate a person's face in order to assist communications between both people.
- Artificial and natural light positioned behind people will create a silhouette and make it difficult to view peoples faces and hamper communication between people. This should be considered for reception desks and other areas of communication.
- In lecture halls, conference or performance venues, lighting should be positioned to illuminate the speaker's face and to clearly illuminate sign language interpreters.

Sensors & Detection

- Ideally lighting should ideally be automatically activated or deactivated when people enter or leave room.
- Passive infrared sensors can be used to detect dim light and activate booster lighting in low light.
- All artificial and natural lighting should be controllable and adjustable. Where possible all lighting should be controlled by individuals as per their requirements.
- Lighting design should be considered as per the building users. In general older people, blind or partially sighted need more light than others.

Figure 1: This central lobby is flooded with natural light but is designed in a way not to allow overly distracting sunlight into the main space.
Source: Ed Roberts Campus by LMS Architects

Figure 2: Controllable lighting in this mosque at Australian Islamic Centre

B 14 4 SUNLIGHT & GLARE

Natural Daylighting

- In Saudi Arabia, the balance between natural sunlight and shading from excessive sunlight needs to be achieved to create a pleasant and sustainable internal temperature. Natural light is critical to allow for better lighting inside buildings to allow for better communication between people of disability.
- Windows should be cleaned of sand and dirt regularly to ensure natural light is effective as possible.
- Some artificial fluorescent lights create a magnetic field which can cause a humming sound in hearing aids. Using this type of light should be carefully considered, especially in rooms where people spend long times or in libraries or quiet places.

Sun Glare

- Glare can be difficult to control in the Saudi Arabian climate but must be considered at important locations such as entrance lobbies where changes in lighting can be confusing or disorientating.
- Lights should be positioned where they do not cause glare, reflection, confusing shadows or pools of light and dark. Even levels of illumination along a route or across a room are preferred.
- Positioning lighting in unusual or unexpected places can create shadows and misleading visual effects.
- Uplighters positioned at low level or within the floor should be avoided. They can produce glare to people walking or in rooms.

Figure 1
This university building uses a variety of architectural methods in its facade, curtain wall, public space design and ceilings to control sunlight and glare whilst allowing natural daylight.
Source: HOK

Wall, Ceiling and Floor Surfaces

15

B 15 1 WALL & CEILING SURFACE

- In general, wall surfaces should be plain and consistent colours. They should not distract people using rooms, particularly in entrance areas or behind reception desks.
- Like floor surfaces, highly shiny or reflective surfaces can be distracting and should be avoided.
- The Light Reflectance Value (LRV) of wall is at least 30 points different to the LRV of the floor and ceiling to ensure that people with visual impairment can distinguish between the different surfaces.
- Optimum visibility of all doors, handles, fittings, switches should be achieved by visually contrasting with wall surfaces.

Glazed Screen Walls

- If walls are to be glazed, then manifestation markings at two heights should be provided to highlight presence of glass. Low marking should be between 850-1000mm and higher marking between 1400-1600mm above floor level. Markings should contrast visually with glass in different lighting conditions. Marking can be symbol, broken line or repeated pattern.
  If glass used for screens at reception desks or counters then it should have a low light reflectance value.
- The edges of free-standing glazed screens will need to be provided with a high contrast edge strip.
- Textured materials can be used to aid wayfinding provided that users have been made aware of their significance in advance.

Ceiling Surfaces

- Reflective and high-gloss materials or paints should be avoided on ceilings.
- Where required to achieve an acoustically neutral environment the ceiling material has the appropriate acoustic absorption coefficient.

Figure 1: A consistent and subdued pallette of colour and materials are used in this school
Source: Skälby School by Max Arkitekter

Figure 1: The Sweetwater spectrum school is a new national model of supportive housing for adults with autism in USA. All spaces were designed to reduce sensory stimulation and provide a serene environment. Forms are familiar, colors and finishes are subdued, and lighting is mostly indirect.
Source: Sweetwater Spectrum Community by LMS Architects

B 15 2 FLOOR SURFACE

- In general all interior surfaces should be firm, level and slipresistant and suitable for people on foot, in wheelchairs or using walking aids like crutches, walking sticks or frames.
- Shiny, polished or reflective floor surfaces should be avoided whenever possible. Highly polished materials typical of shopping malls and offices can be visually confusing and create glare. They can be difficult to walk on for people of a range of physical abilities.
- Bold patterns or highly contrasting colours on floor surfaces should be avoided. Bold stripes in particular can be confused for steps and should not be used on internal floors.
- Carpets should have a shallow dense pile to allow wheelchairs, pushchairs and trolleys to pass over.
- Junctions between all floor surfaces should be flush. Edges should be firmly fixed to avoid trips.
- Adjoining surfaces should be at the same level and have a similar coefficient of friction. Adjoining surfaces should contrast visually where their coefficient of friction differs significantly.
- Changes in the texture of floor surfaces are used to warn of hazards or provide directional information.
- Where there is change in floor surface, adjacent materials should be level and have similar level of slip resistance.

Light Reflectance Value

- LRV's should be considered when selecting the colour and finish of materials and products. In some circumstances e.g. lighting levels greater than 200 lux on a surface with a LRV of 20 may be acceptable.

Figure 1: The floor of this corridor is purposely undistracting while providing a feint pattern to disguise dirt. The colour is bold enough to contrast with walls but not enough to distract or cause confusion.
Source: Ed Roberts Campus by LMS Architects

B

Room Acoustics

B 16 1 ACOUSTICS & HEARING ENHANCEMENT

Acoustics

- Rooms should be designed with sound absorbing surfaces to reduce transference of noise.
- Acoustic reverberation should be consistent with the table

Hearing Enhancement Systems

- A hearing enhancement system will include induction loops, FM or infrared methods. The system effectively reduces the amount of background noise, allowing people to directly hear the sound transmitted to them without interference.
- They are required for people with hearing difficulties to communicate with people at key areas of buildings, such as meeting rooms, information points, service counters and reception desks.
- In all meeting rooms of over 25 people, all assembly areas and at service counters, hearing enhancement systems should be provided.
- Hearing enhancement systems are compatible with language translation systems.
- Hearing systems should also be provided in theatres, concert halls and auditoriums.
- Where hearing enhancement systems are provided, the international symbol of access for hearing loss should be clearly shown to make people aware that the system is available to connect.

Figure 1: The acoustics of class rooms is of particular importance for schools for autistic children sensitive to sounds and other senses.
Source: disability scoop.com

C

SPECIFIC ROOMS

C 1 MOSQUE & PRAYER ROOM

- An accessible path shall connect main entrance with surrounding area, street, car park, etc.
- All internal circulation routes should be in line with accessible guidance within this guideline.
- The main entrance to mosque should comply with all guidance within this document.
- In addition, a clear area shall be provided at the entrance to prevent shoes from blocking circulation routes. Shoes should be provided with a storage rack away from the main entrance manoeuvring space. If not possible, a 'keep clear' mat must be provided at entrance to avoid any obstructions to entry.
- Seating should be provided beside shoe racks to allow people to remove their shoes
- Seating should be provided within the prayer hall to accommodate people who cannot bend to pray.
- Accessible routes across prayer hall's carpeting should have a low pile to allow for wheelchairs to pass over it.

Figure 1: Mosque interior
Source: Zaha Hadid Architects

C 2 RESTAURANT & DINING HALLS

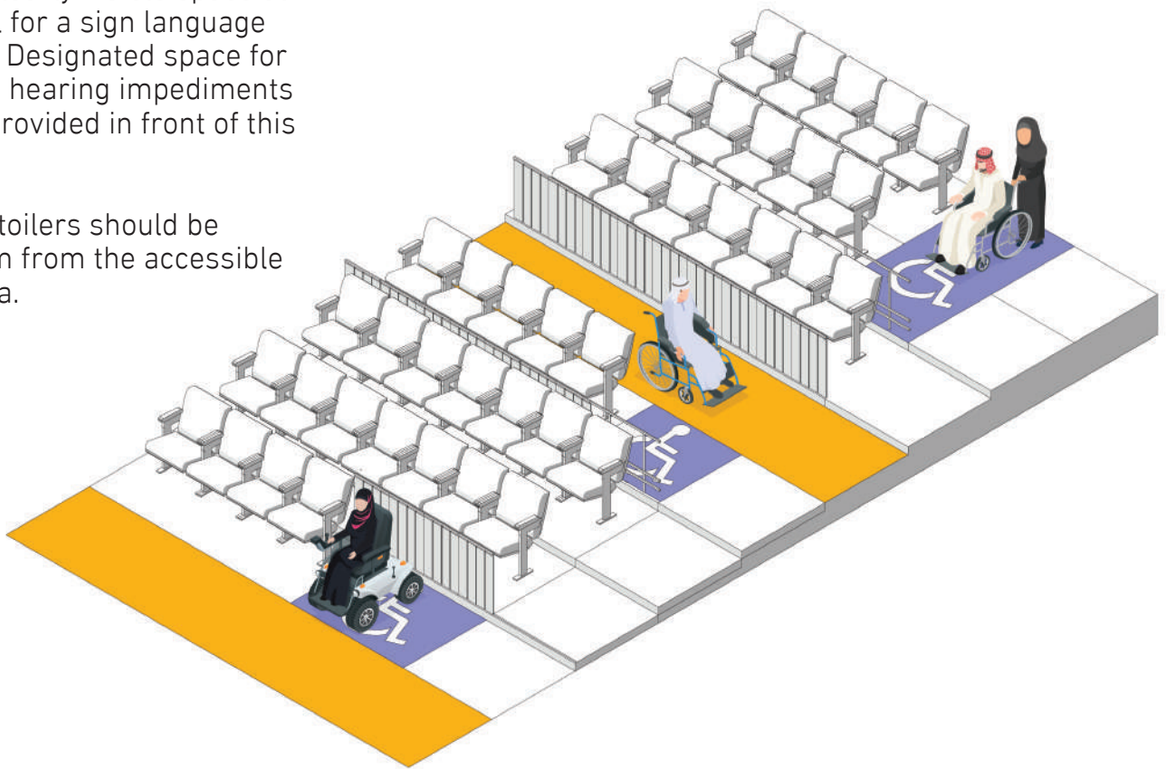
- An accessible path should be provided to at least half of all dining areas.
- At least 10% of seats should be movable.
- Illumination of over 100 lux to be provided to at least 10% of the dining room
- Sound reduction materials to be used in dining room surfaces
- Floors, walls and table surfaces to be made from smooth, washable materials that is easily cleaned and non-absorbent.
- At least 10% of all dining tables to be accessible
- At least 900mm clear width shall be provided to reach these tables.
- Self-service counters to be at height of 900-1200mm from the floor.
- Clear passage of at least 900mm should be provided to all food service areas.

Figure 1: This restaurant has a simple entrance that can be easily opened with power assisted hinges and a level threshold between internal and external floors
Source: Bella Italia

Figure 2: Inside restaurant the seating has been arranged to allow large internal circulation routes for wheelchair users
Source: Bella Italia

C 3 AUDITORIUM & CINEMA

- All cinemas, theatres, lecture halls and other fixed seat facilities must provide accessible seating spaces for wheelchair users, arranged in groups of two spaces.
- In temporary auditorium seating arrangements, such as flexible event spaces, conference facilities, etc then temporary spaces should still be provided.
- An accessible seating space should be connected to an accessible path.
- Level wheelchair spaces should be at least 865mm x 1420mm if approached frontally. If the approach is lateral then the dimension range is 865mm x 1500mm.
- A level manoeuvring space of 1500mm x 1500mm must connect each accessible space.
- Both the wheelchair accessible space and manoeuvring space should have longitudinal gradient of less than 1%.
- Aisle seats to have foldable armrests.
- Accessible spaces should be marked with international symbol for access (ISA), even if a temporary space.
- In cinemas and theatres, there should be clearly visible space at front of hall for a sign language interpreter. Designated space for people with hearing impediments should be provided in front of this space.
- Accessible toilers should be within 150m from the accessible seating area.



C 4 LIBRARY

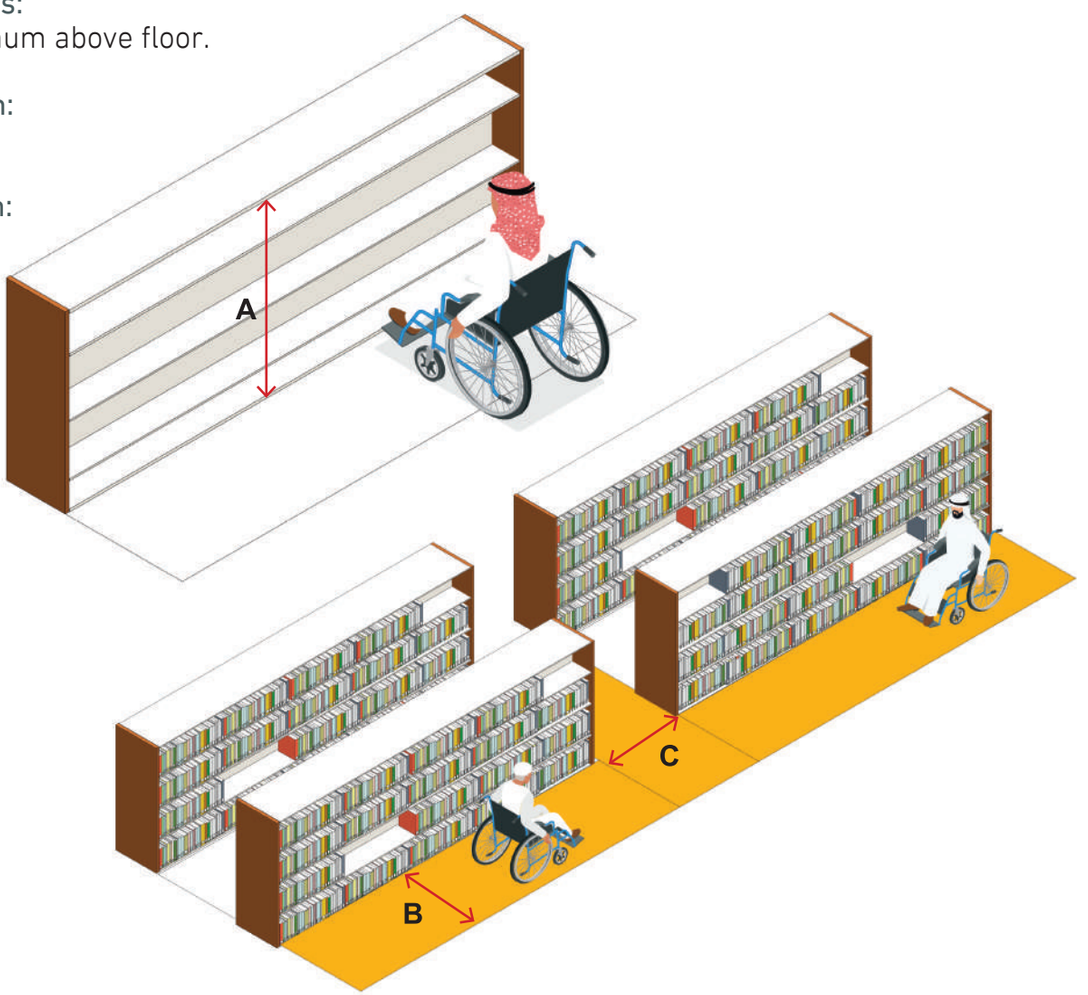
- At least 10% of study carrels, fixtures and fixed seating, but never less than one, should be accessible and should comply with this guideline.
- At library check-out areas, at least one check-out lane should be accessible and comply with this section.
- At least 50% of computer catalogues or workstations should be accessible and should comply with this guideline.
- Fixed seating, tables, and study carrels should be accessible and on an accessible route.
- Where shelving is provided at fixed study carrels, seating, or near tables, the shelving should be a maximum of 1350 mm above the floor.

Dimensions

A- Height of shelves:
1350mm maximum above floor.

B- clear aisle width:
1200mm.

C- clear aisle width:
1200mm.



C 5 SWIMMING POOL

- Swimming pools should have accessible path between changing facilities and the swimming pool.
- Swimming pools should have at least one accessible means of entering water.
- A ramp or assisted elevation chair or hoist should be made available in large swimming pool facilities, schools or hotels.
- Outdoor and indoor pools should have underwater illumination if night use is foreseen.
- Depth scale signs to be clearly shown around pool.
- Accessible changing rooms and showers for each gender to be provided as per section B15 of this document.

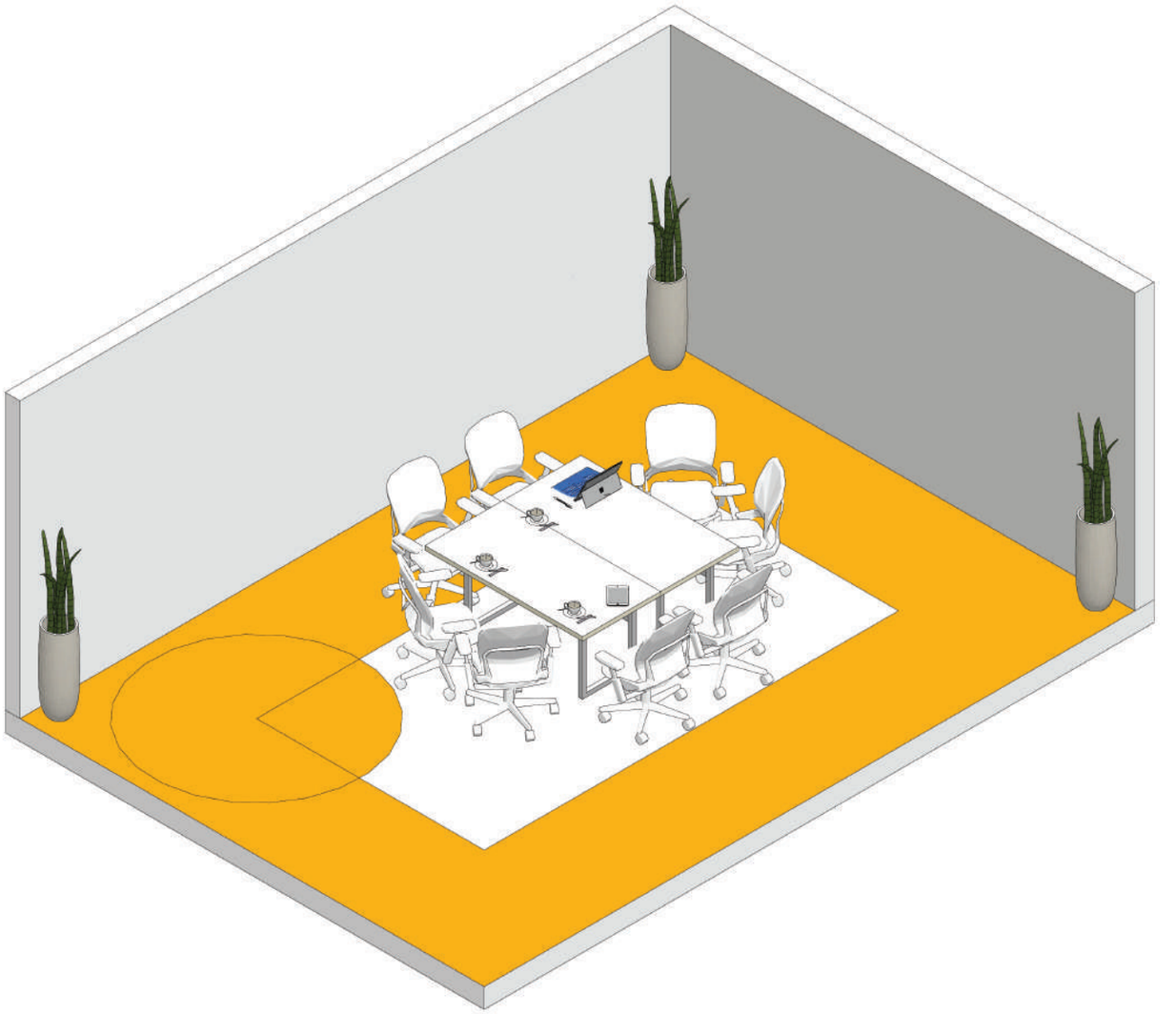
Figure 1: There are a variety of products on the market that allow for different methods of assisting people, of varying mobility, into a swimming pool

C 6 OFFICE OPEN PLAN FLOOR

- Offices should allow people of all ability to join the workforce and should not exclude disabled people by poor building design.
- Consideration of the base building design is critical to ensure changing tenants always have accessible office units and entrances.
- Open plan office design should still follow the guidance relating to internal circulation contained within this document. Visually contrasting floor surfaces should be used to mark internal circulation routes and ensure they are not obstructed when desks are moved.

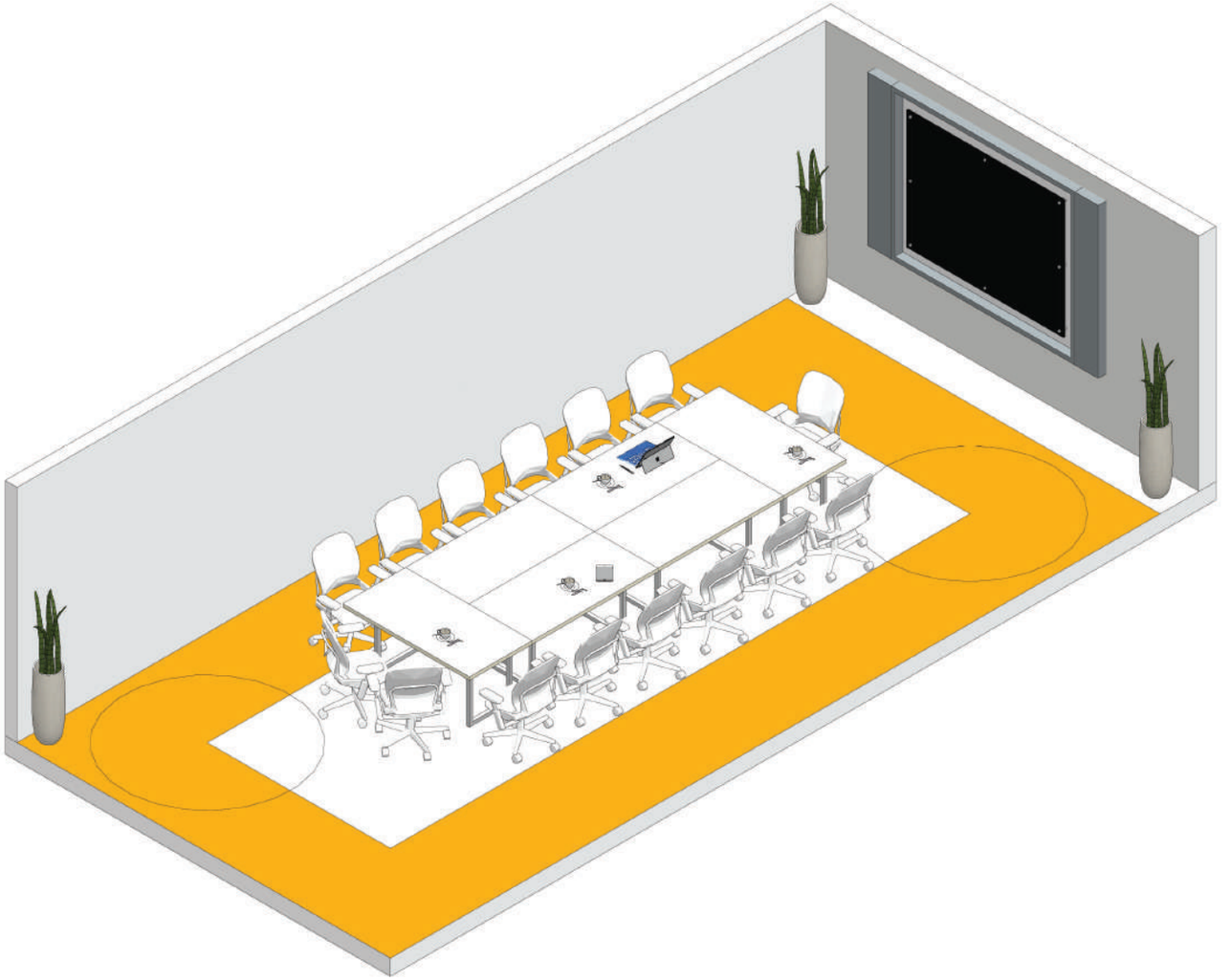
C 7 SMALL MEETING ROOM

- Clear circulation path of at least 900mm to be achieved around perimeter of room
- Hearing enhancements and technology for hearing impairments provided



C 7 CONFERENCE ROOM

- Clear circulation path of at least 900mm to be achieved around perimeter of room
- Hearing enhancements and technology for hearing impairments provided



C 7 INDIVIDUAL OFFICE

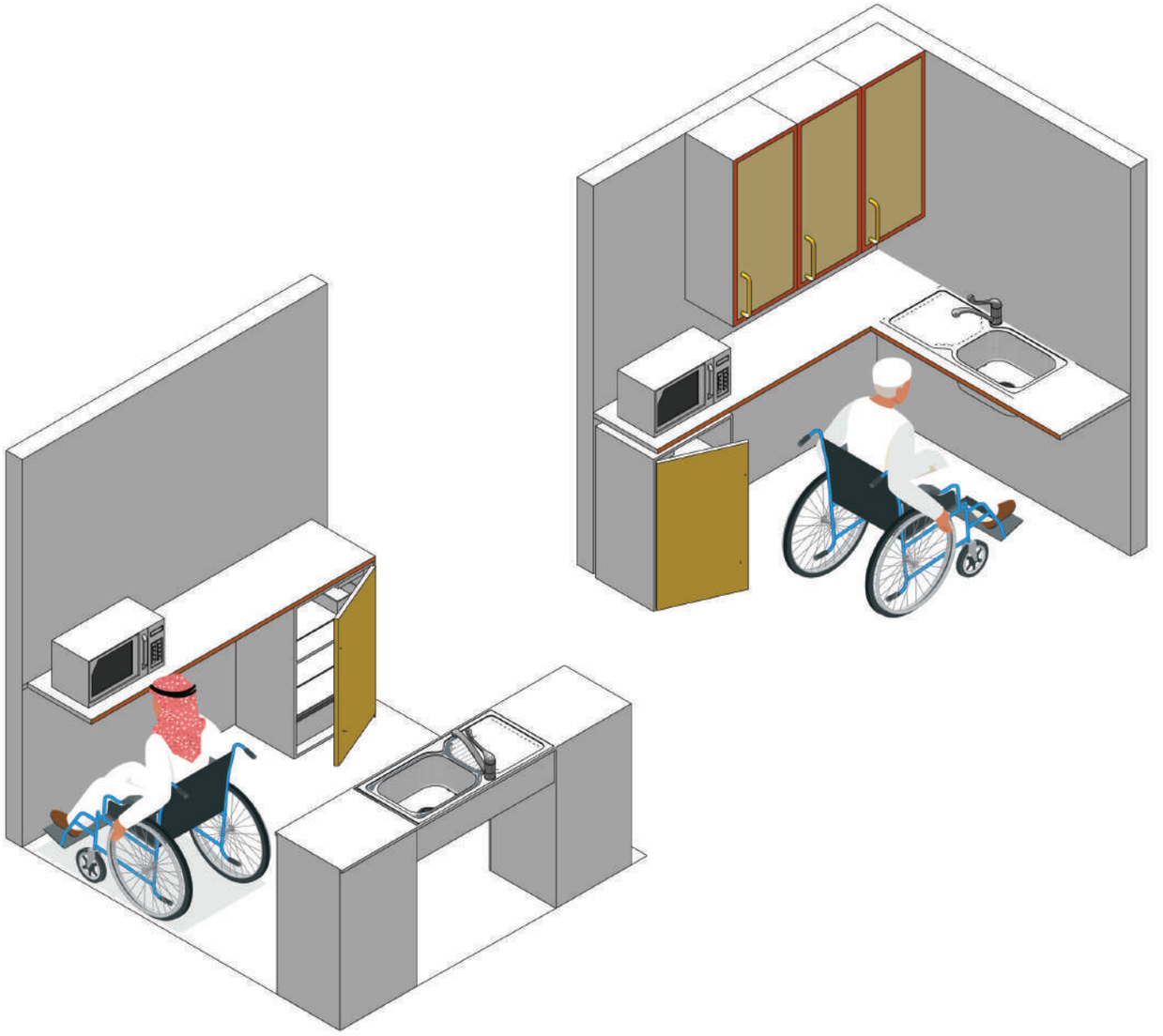
- Clear circulation path of at least 900mm to be achieved to provide access to front and rear of desk

C 8 OFFICE DESK

- All office furniture, seating and desks should follow guidance in this document
- Access to fixed storage in workplaces should be made accessible for people of all heights and wheelchair users. At least one unit should be fully accessible at low height
- Access to storage areas should be as direct as possible and unobstructed. The location should be readily apparent or clearly signed.
- Some storage with knee recesses and an aisle width of 1200mm should be provided where possible to enable frontal approach. Where there is no knee recess, the aisle width should be at least 1400mm.

C 9 REFRESHMENT AREAS

- Recessed areas for knees to be provided under sinks and worktop counters.
- Storage and fridges to be provided under counter.
- Microwave to be at reach for wheelchair users.



C 10 OFFICE KITCHENS

- Clear maneuvering space of 2100mm diameter
- Recessed areas for knees to be provided under sinks and worktop counters.
- Storage and fridges to be provided under counter.
- Microwave to be at reach for wheelchair users.

C 11 CAR PARKING BUILDINGS

- Wayfinding is important in large car parking buildings. Direction signs that clearly show way towards disabled spaces must be used on each floor.
- Signs should be provided at any directional change option inside the parking building. Different symbols and colours on each floor should be used to help people find cars, toilets, elevators, exits, etc.
- Accessible parking spaces should be closely located by exits and elevator shafts in the building. Each exit point should have a small cluster of accessible spaces to ensure they are well distributed throughout whole building and travel distances are minimised.
- An accessible path should connect all disabled parking spaces to exit points of building.
- Pedestrian paths, ideally to front of parked cars should be provided using floor painting with a contrasted 30 points of LRV to the vehicle surface.

Figure 1 & 2: Use of clear delineation of car and pedestrian areas with strong wayfinding elements make navigating car park buildings safer for all users
Source: Nova Polymers; B4 Car Park, Birmingham

C 12 RETAIL SHOP FLOORS

- Retail shopfloors should follow the guidance for internal circulation and corridors to ensure wheelchair users can navigate around clothes racks and other merchandise on shopfloor.
- Permanent or temporary circulation routes should be defined using visually contrasting floor finishes and textures.
- Artificial lighting can be used to further emphasise the circulation routes within stores.
- Movable artificial lighting can be useful way of allowing shopfloors to change their layout and internal circulation.

Figure 1: In the extreme weather conditions of Saudi Arabia, it is critical that both natural and artificial lighting is used in positive manner to illuminate all spaces well but not overly glare or distract certain users
Source: Takhassussi Patchi Shop in Saudi Arabia by Lautrefabrique Architectes

WAYFINDING

D

D 1 EXTERNAL WAYFINDING

- How to get to and interpret external spaces should be easily and independently understandable and useable by all users.
- Visual, tactile and audible information can be provided (as appropriate to the location, function and use of the space) to convey information to all users.
- For some complex buildings and external areas more detailed information should be provided in a variety of formats to assist all users to independently orientate themselves and identify routes to facilities and services. The following are some examples of information provision:

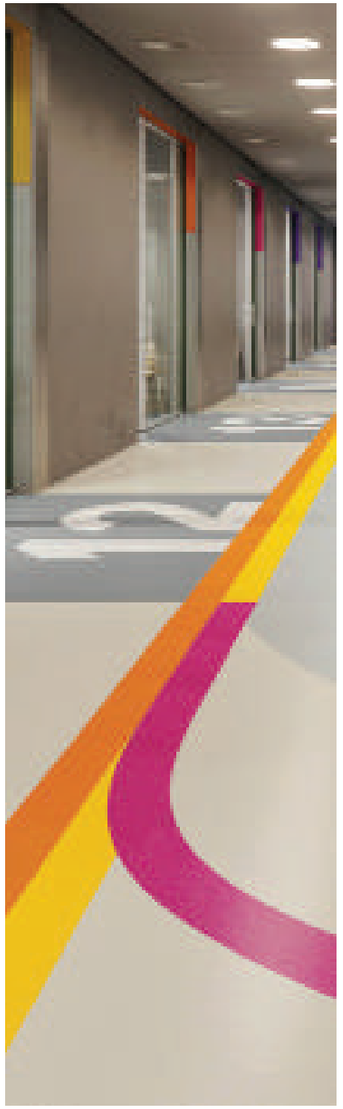
  - Plans and maps including tactile information
  - Models
  - Assistive technology including interactive displays, audible information and electronic navigation systems.

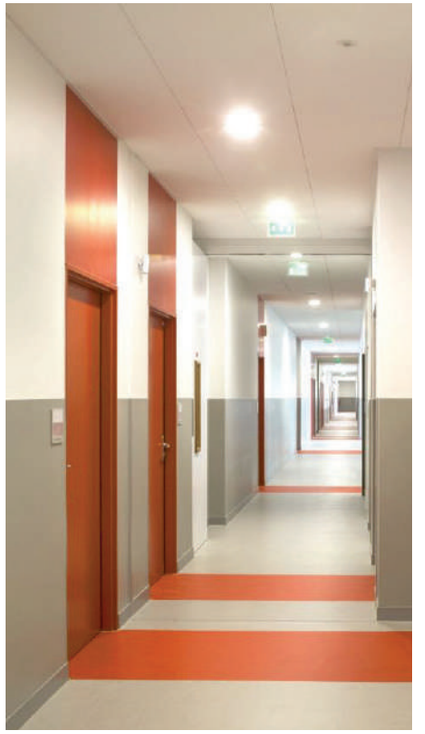
Figure 1: London has invested heavily in a widespread legibility strategy that includes a variety of different maps, signs and information points across its streets
Source: Applied Wayfinding London

D 2 EXTERNAL SIGNS

- Signage should form part of an integrated communication strategy that provides information about the use of a space as well as directional information. The use of the latest innovations in technology should be considered in order to provide the best user experience e.g. GPS systems on smart phones providing mapping information and information about the location of facilities and services.
- Signage should be positioned at key decision-making points (nodes) on the path of movement. It should be positioned over the path of travel at a height well above head level in high pedestrian traffic areas, but in a manner that a person in a wheelchair or a child can see it easily. Signage should be positioned to avoid shaded areas and glare. Where heads-up signage is used this should be positioned outside the accessible path but accessible from it.
- Printed characters should be placed on top, centred (where there is only one word) and aligned to the left (when there is more than one word).
- When both Arabic and English languages are used, Arabic being the primary language texts shall be aligned to the right.
- Braille characters will be located at the bottom left, at a minimum distance of 10 mm and a maximum of 30 mm from the left side and bottom of the sign. Accessibility pictograms shall follow the ISO 7000: 2004 standard.
- Public address systems are clearly audible and supplemented by visual information where practicable.

D 3 INTERNAL WAYFINDING





D 4 INTERNAL SIGNS

- In general, signs with a clearly balanced layout of text, symbols and pictograms should be used.
- Signs should have tactile information like high-embossed characters or braille text.
- Signs should not be visually cluttered
- Consider a strong branded theme for all wayfinding signage, using a consistent font, font colour, background colour and symbol/ pictogram style.
- Information content should be kept to minimum on sign, clearly getting to the point with minimum fuss. No duplication should occur on a sign.
- It is recommended that signs contain a mix of both Arabic and English for a wider audience, with Arabic being the primary language.
- The information shown should follow a clear hierarchy of importance.
- Complex information should be broken down into simpler parts, with general information moving towards more specific information.
- Colour coding should be used to differentiate zones or hierarchies of text messages.
- Consideration for how people with colour blindness views signs is important.
- Letters, numbers, symbols and pictograms should be glare-free and presented in high reflectance contrast
- Illuminated signs where text is light on a dark background are difficult to view and should be avoided.

Figure 1:
Signage at the reception desk of the house of disabled people organization is clear and explains exactly where everything in building can be found.
Source:
House of Disabled Peoples Organization by Cubo Architects

D 5 BRAILLE

Braille signage should follow the following design specifications:

- Braille dots should have a domed or rounded shape – make sure they are not pointy or flat.
- The spherical radius of each dot should be 0.75-0.80mm. The base diameter of each dot should be 1.5-1.6mm.
- Each dot should have a height of 0.6-0.9mm.
- Horizontal and vertical distance between two dots in the same cell should be 2.3-2.5mm.
- Distance between corresponding dots in adjacent cells should be 6.1-7.6mm.
- Distance between corresponding dots from one cell to the cell below should be 10-10.2mm.
- Unified English Braille should be used in absence of any Arabic alternative.
- For braille signs of 10 words or fewer, use uncontracted braille.
- For floor directories, use uncontracted braille.
- For signs of greater than 10 words, use contracted braille only if the sign consists of sentences such as emergency evacuation instructions. Ensure contracted braille follows Unified English Braille rules.
- Generally, do not use capital letters in braille signs, except for emergency instructions which comprise sentences.
- If text is multi-lined, place all the braille a minimum of 9.5 mm below the entire raised print text.
- For multi-lined braille text, a semi-circular braille indicator may be horizontally aligned with and placed directly before the first braille character. This indicator is not essential.

Figure 1:
Braille control panel
Source:
www.changingplaces.org.au

Figure 2:
Vertical road sign that marks Clarence Street in Sydney Australia. It conforms to local building designations from 20 to 6L, and is accompanied by Braille alphabets.

D 6 FONT TYPE

Text of signs should be legible and clear. It should meet the followings design specifications:

- The size, type and layout of lettering on signs must be clearly legible.
- Use a clear, simple sans serif typeface with uniform stroke width, wide horizontal proportions and distinct letter forms, including prominent ascenders and descenders and open counterforms. Some examples of suitable typefaces are Arial, Futura, Gill Sans, Helvetica, Lucinda Sans, and Trebuchet.
- Avoid using italics, stylized print, underlining and block capitals.
- Lettering should be in initial upper case. This helps with letter and word recognition.
- Always ensure the sign background contrasts with the print. Clear colour combinations include black text on a white background, white on black, yellow on black or black on yellow.
- Do not print information over pictures or patterns.
- Characters and their background should be non-reflective.
- For non-tactile print, the size of the text should be related to the distance at which the information is to be viewed. Letters should have a minimum height of 15mm. If signs will be viewed from more than 3m away, the text should have a height of 5mm for each metre of viewing distance. For example, if a sign is designed to be viewed from a 5m distance, text should have a height of 25mm.

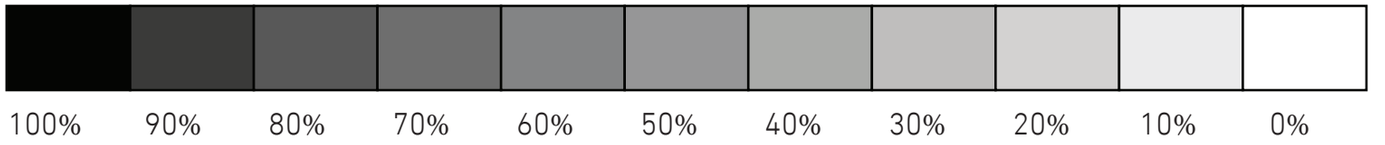
FONT SIZE

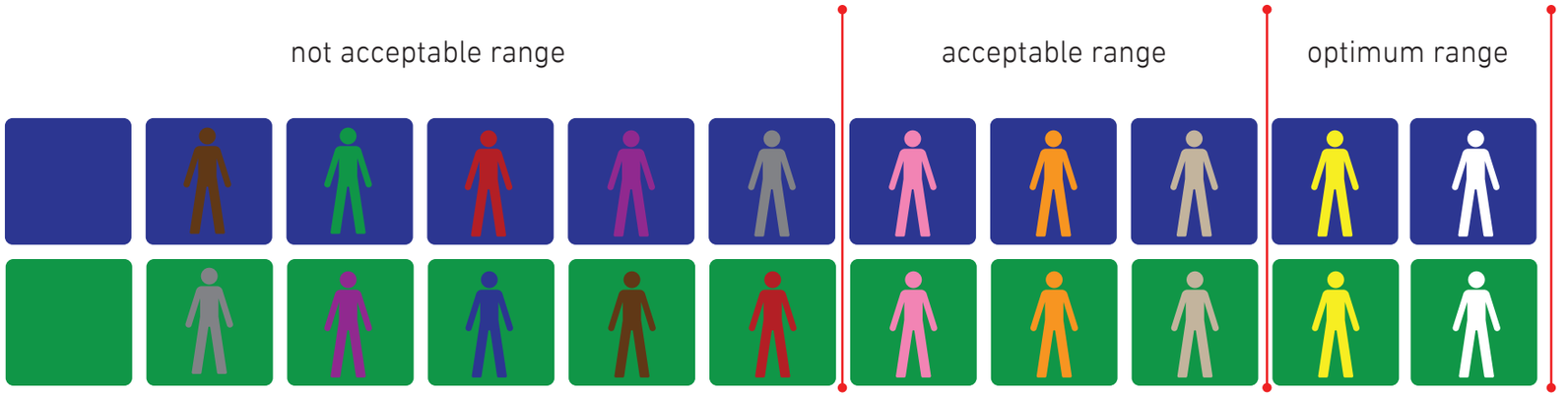
Where signs are designed to be read by touch by non-braille users the following design specifications are recommended:

- For non-tactile print, the size of the text should be related to the distance at which the information is to be viewed. Letters should have a minimum height of 15mm. If signs will be viewed from more than 3m away, the text should have a height of 5mm for each metre of viewing distance. For example, if a sign is designed to be viewed from a 5m distance, text should have a height of 25mm.
- Raised letters should have softshouldered edges.
- Letters should be raised from the surface of the sign plate by at least 1mm.
- Letter height should be 15-50mm, that is approximately 48-144pt.
- Minimum spacing between letters should be 2mm.
- Minimum spacing between words should be 10mm.
- Letter stroke thickness should be 2-7mm.
- Do not use engraved print letters. These can be very difficult to read by touch.
- Raised borders and elements should be 10mm minimum from tactile characters.

D 7 COLOUR CONTRASTING

- Sign fonts and there backgrounds need to contrast 70 LRV





D 8 WAYFINDING SYMBOLS

- These are a selection of internationally recognized symbols for disability.
- They are often referred to as the International Symbol for Accessibility (ISA)

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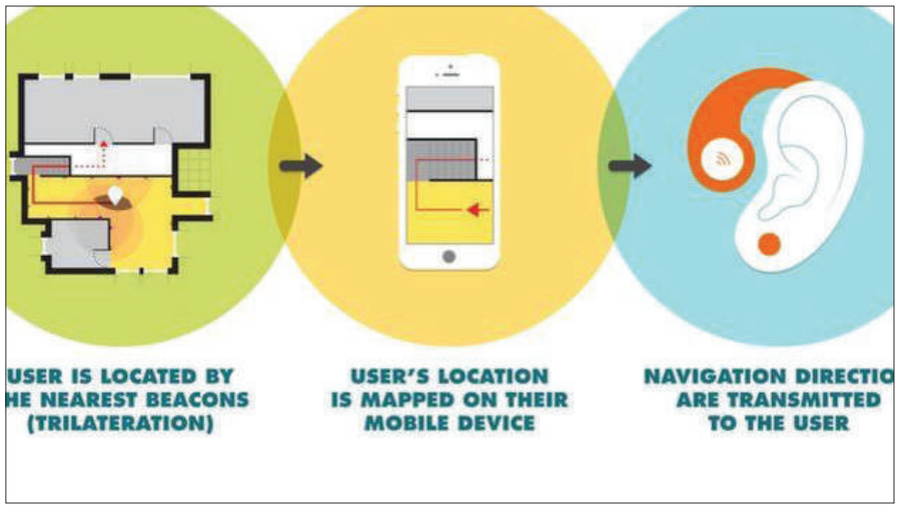
FUTURE TRENDS

E

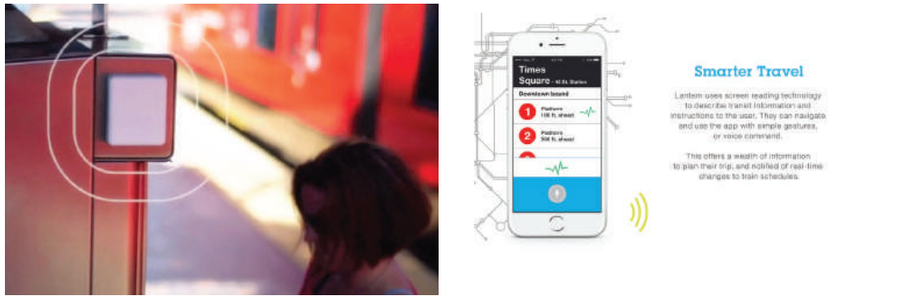
E 1 PUBLIC TRANSPORT NAVIGATION

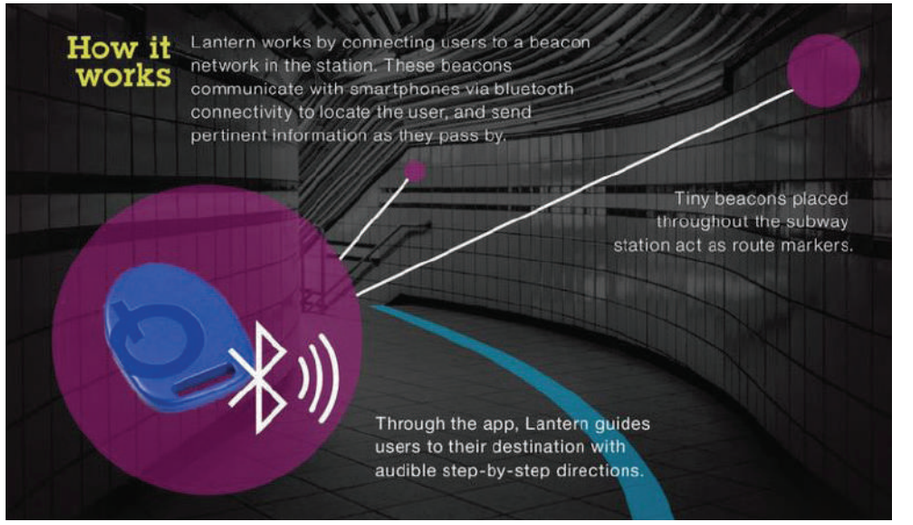


Designer: TFL

Location: London Underground

Description: Aiming to improve public accessibility, Transport for London (TFL) installed a network of Bluetooth beacons throughout the London underground



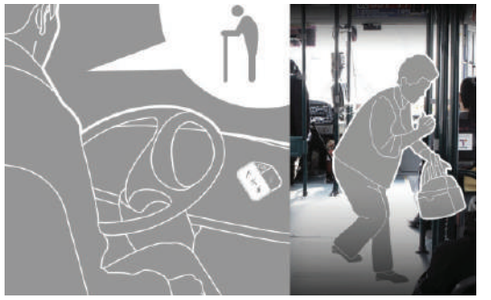


Designer: Eugene Gao

Location: New York Subway

Description: A new subway navigation system that would rely on Bluetooth beacons to guide blind passengers between stations.

E 2 PUBLIC TRANSIT DESIGN



Designer: Adam Molner

Location: concept

Description: The design uses bold, universally recognizable visual cues like red/green lighting around the doors to indicate times to enter and exit and large wheelchair/bicycle graphics to indicate dedicated areas.

Designer: Jade Jinwon Heo

Location: concept

Description: The bell contains two buttons. A larger one for special passengers, and a smaller regular button. On pressing the bell, the driver is made aware of the nature of the passenger disembarking. If it happens to be a special passenger, the bu driver can make certain arrangements to ensure a smooth de-boarding experience.

E 3 SMART STREET FURNITURE

Designer: Marshalls Street Furniture

Location: concept

Description: Crosswalks, street lamps and other smart street fixtures could be enhanced with IoT technology. A person would be able to create a unique account through a web portal and plug in specific preferences that have to do with accessibility.

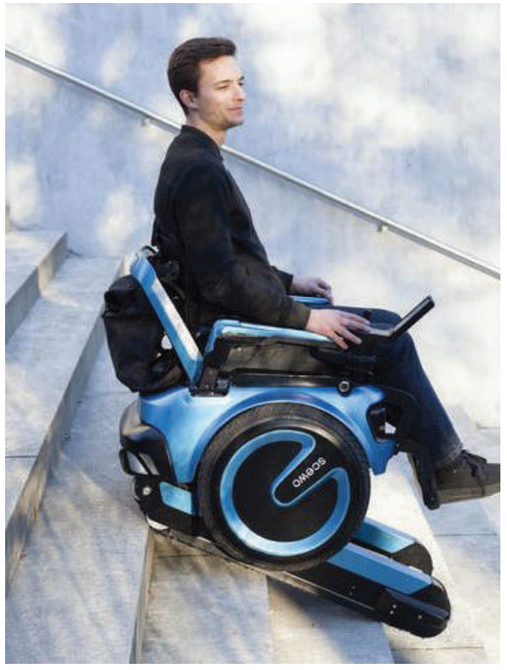
E 4 BRAILLE SIGNS

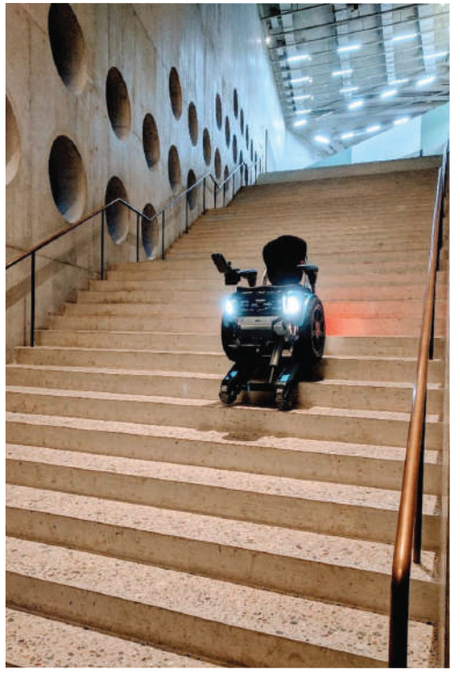
Designer: Maltesers

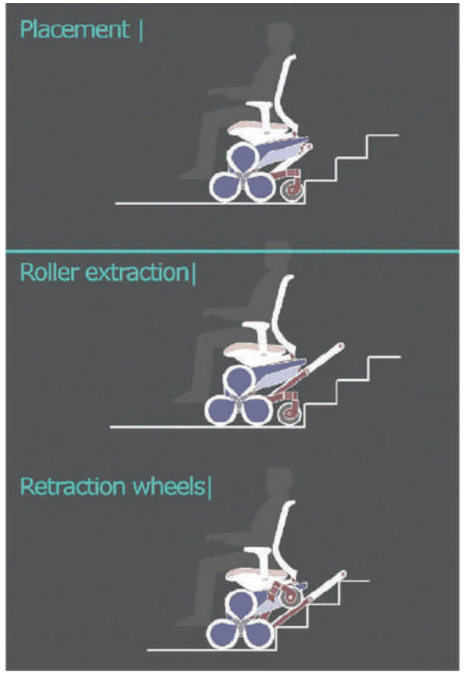
Location: London

Description: In order to make the billboard accessible for all to experience, Maltesers is offering audio descriptions and translations on its official UK Facebook page. For those who are curious, the braille billboard of model Maltesers reads: “Caught a really fast bus once, turns out it was a fire engine.

E 5 STAIR CLIMBING WHEELCHAIRS







Designer: Scewo

Product: in production

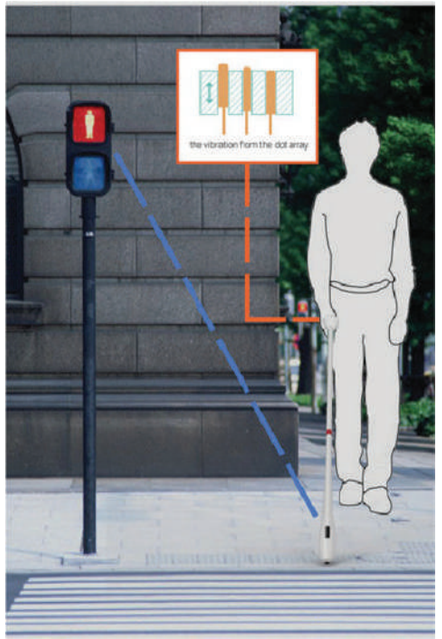
Description: The wheelchair offers a more balanced and secur experience for users, and is capable of climbing stairs and offering more stability on uneven terrain. This enables those who rely on their wheelchair as their primary means of getting around to feel less restricted when they leave their home in the morning.

Designer: Massimiliano Englaro

Product: concept

Description: The wheelchair works by incorporating a series of different modes that can enable it to climb stairs, uneven or rugged terrain and traditional routes. This completely frees a person who relies on a wheelchair for mobility to go virtually anywhere they wish without having to rely on elevators or others for help.

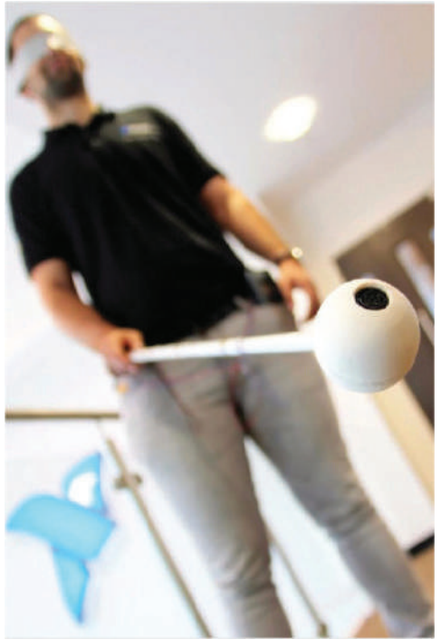
E 6 SMART WALKING CANES

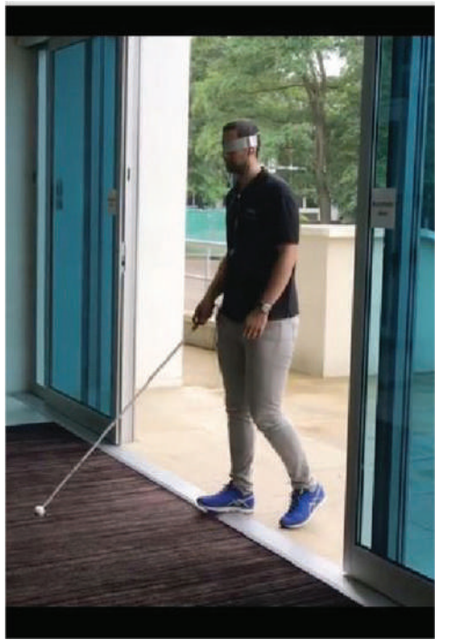


Designer: Magpie

Product: concept

Description: The Hanger Blind Concept Cane has been designed for those with visual impairments to feel safer when they are making their way through the city. The cane works by wirelessly receiving data from traffic lights to let users know when to stop or when it's safe to cross. This is communicated to the user via the handle to provide a stimulation that is non-auditory and non-visual for a streamlined experience.





Designer: Vasileios Tsormpatzoudis

Product: concept

Description: The 'mySmartCane' works like parking sensors that are incorporated into vehicles in order to detect the proximity of obstacles and help users to avoid them. The 'mySmartCane' consists of a 3D-printed ball that is affixed onto the end of the cane in order to house the sensors. It can be retrofitted onto virtually any cane and is capable of providing auditory feedback to the user to play a series of beeps relating to how close the object is.

E 6 SMART WALKING CANES

Designer: Zhejiang University

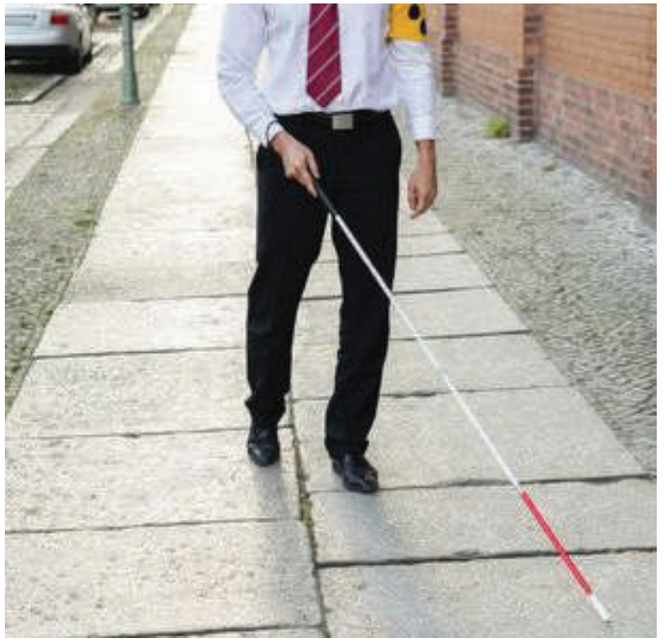
Product: concept

Description: The product would be a long pole-like navigating crutch that can be held comfortably in one hand. Extended on an angle before the blind user, this wheeled walking stick would rarely have to be lifted to overcome small obstacles

Designer: Soonjae Kwon

Product: concept

Description: The Sonicane 2.0 gives feedback to the user in either braille or through sound. The cane's built-in GPS helps lead its user around the city and its vibrating nub helps direct the person which direction to head in next.



Designer: Birmingham City University, UK

Product: concept

Description: Smart cane uses high-tech onboard electronics to help blind people locate people that they know. The system uses a database of facial photographs of people known to the user.

E 7 AUTONOMOUS VEHICLES

Designer: May Mobility

Product: prototype

Description: May Mobility's design includes accommodations for entry and exit, as well as for securing the passenger's wheelchair once it's on board during the course of the trip

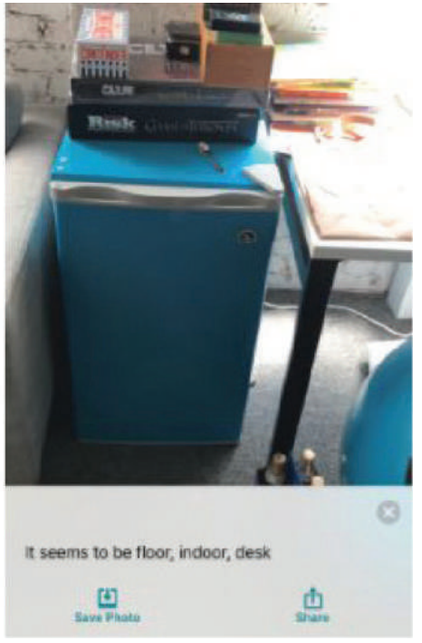
E 8 ACCESSIBLE ELECTRIC VEHICLES

Designer: Istvan Kissaroslaki for Kenguru

Product: available

Description: The first ever electrically powered vehicle designed especially for wheelchair users

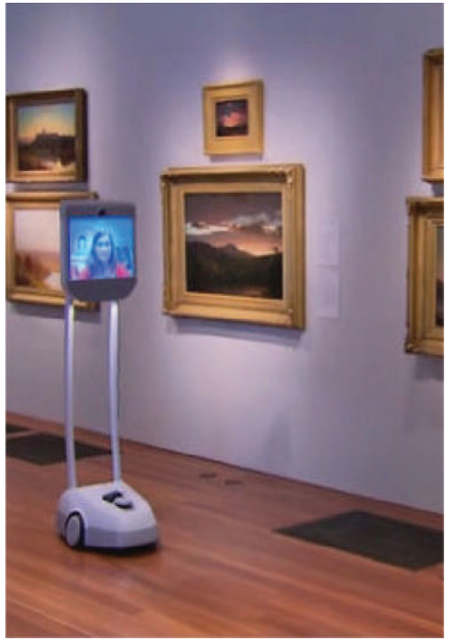
E 9 APP ASSISTED VISION



Designer: Microsoft

Product: available

Description: Microsoft's 'Seeing AI' is a smartphone connected tool that aims to help those with visual impairments navigate their surroundings with a little more ease. The update features "talking camera" technology, which can read and interpret surroundings translating them in real-time for the user.

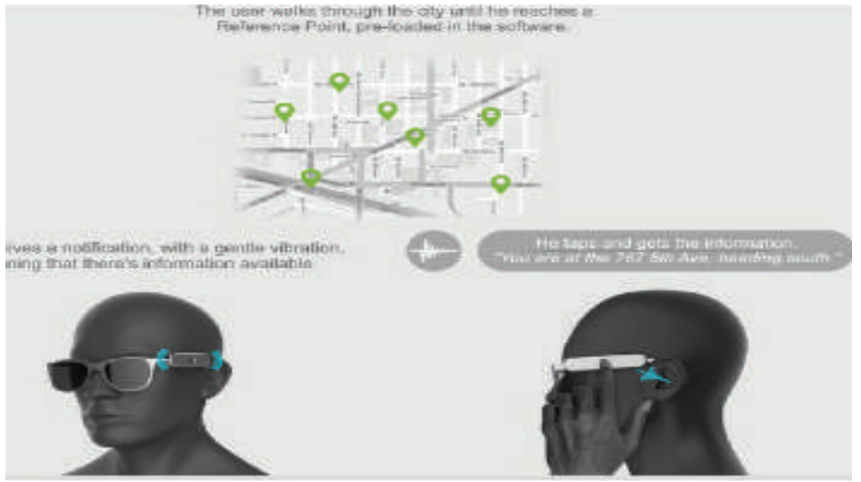


Designer: Henry Evans

Location: De Young Museum in San Francisco

Description: The De Young Museum's new robot guided tours will make their collections accessible to those who are paralyzed bedridden or otherwise unable to visit, even allowing them to interact with other museum-goers.

E 10 GPS WAYFINDING DEVICES FOR BLIND



Designer: Tomas Moyano and Nicolas Aichino

Product: concept

Description: The glasses are capable of providing auditory prompts to let a user know of their present location; this can be of valuable use to help ensure they don't stray from their projected course. When the user of the glasses reaches a reference point that has been preloaded, the GPS function will vibrate and allow the user to press the button on the side to hear their location.

E 11 DISABLED PARKING PROTECTION

Designer: Morelia City Transit Department

Location: Mexico

Description: Handy Park has a builtin camera that's capable of reading a car's license plate and identifying the disability symbol. Used to ensure disabled parking spots are used by those who they are reserved for.

E 12 PRE-FABRICATED ACCESSIBLE HOMES



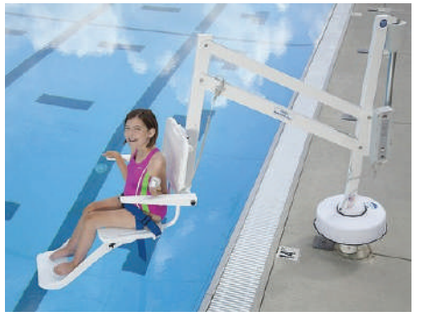
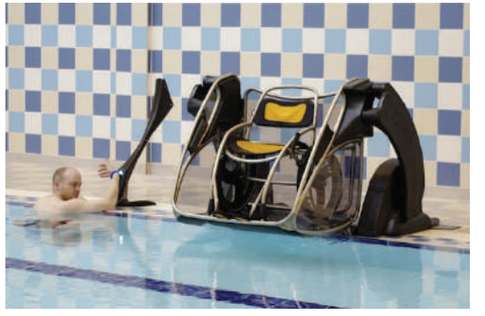


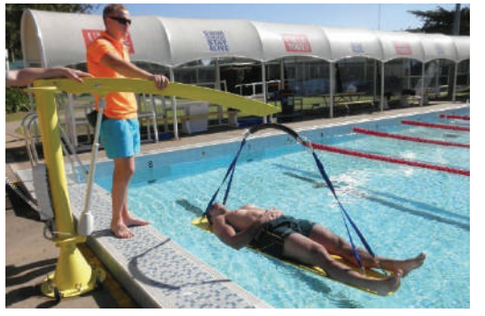
Designer: FABCAB

Location: Washington

Description: FabCab's house design keeps accessibility at the fore without sacrificing a sleek and interesting appearance.

E 13 SWIMMING POOL ASSISTANT



Designer: various

Description: There are a variety of products on the market that allow for different methods of assisting people, of varying mobility, into a swimming pool

E 14 MOBILITY SCOOTERS

Designer: PriestmanGoode

Product: available

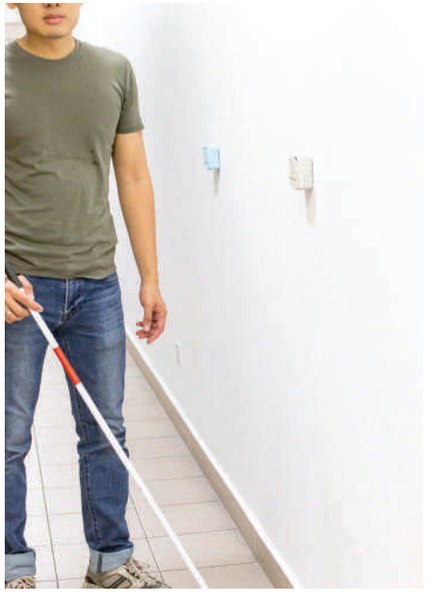
Description: This scooter was designed to ensure that the elderly and others with mobility issues are able to remain active for longer, without tiring themselves out too much.

Designer: Transboard

Product: concept

Description: scooter vehicle is a new kind of transportation option that enables riders of all kinds to feel comfortable and secure when riding the unit around town.

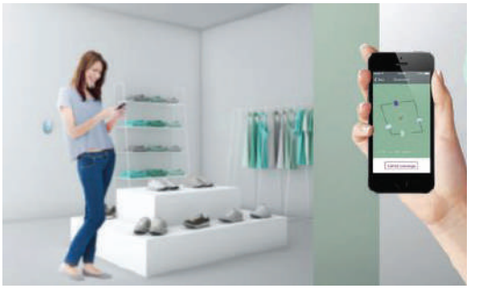
E 15 INTERNAL WAYFINDING



Designer: Yee Jek Khaw

Product: concept

Description: This sound navigation device is connected to an app and users can load familiar sounds onto it so that the Echo can play them. The device is then used in therapy as a way to teach people to learn how to navigate with their visual impairments



Designer: Estimote

Product: available

Description: Mobile application uses beacon technology that is meant to be placed around a room to map a space using a quick orientation process using the app.

E 16 INTERACTIVE MAPS FOR BLIND

Designer: University of Buffalo's Center for Inclusive Design and Environmental Access

Location: University of Buffalo

Description: Both seeing and non-seeing visitors can use the multi-sensory maps for the blind. In addition to a touch-sensitive 3D surface and audio feedback, the Blind Talking Campus model also features an overhead video projector that floods the monochromatic surface with light to bring the map to life visually.

E 17 CROSSWALK APPLICATIONS

Designer: Seelight

Product: available

Description: SeeLight is an app that helps blind users better navigate city streets by letting them know when it is safe to cross the road.

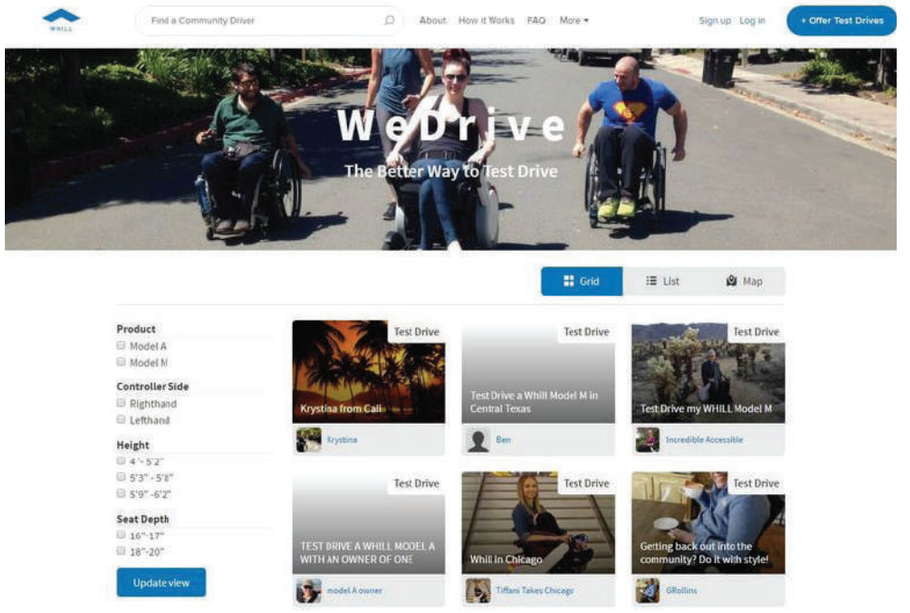
E 18 INTERACTIVE MAPS FOR BLIND

Designer: Brain Power

Product: in production

Description: The Brain Power Autism System is leveraging aspects of augmented reality and artificial intelligence to encourage those with autism to make eye contact and better recognize the emotions of others

E 19 CROSSWALK APPLICATIONS

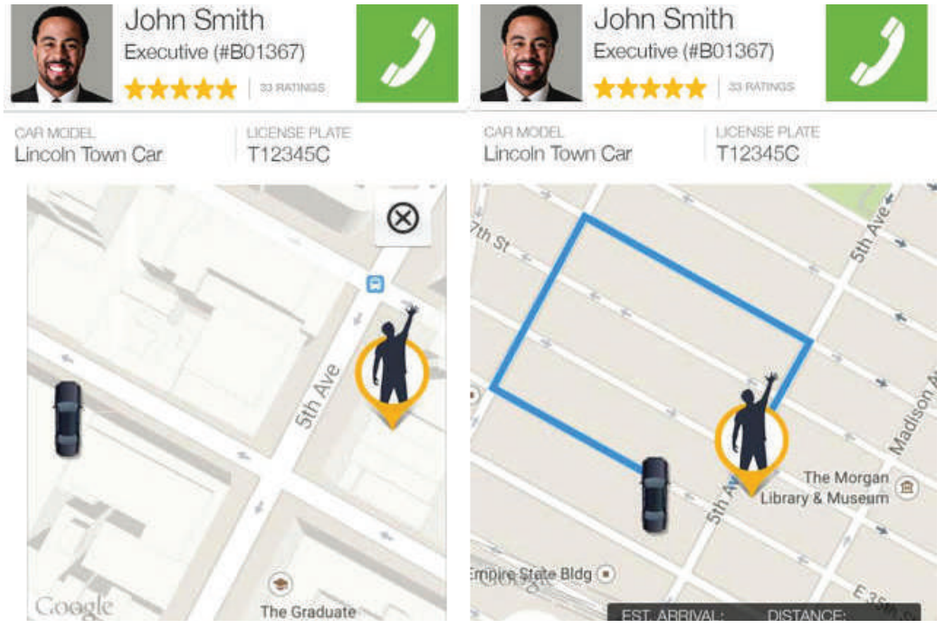


Designer: WHILL

Location: USA

Description: WeDrive, a new sharing economy website created by WHILL, takes that modern, internet-based system into a more niche area. WHILL makes high-tech wheelchairs, and the company is using WeDrive to connect potential consumers with current WHILL users and give them the opportunity to try out mobility devices in the real world.

E 20 RIDE SHARING



Location: concept

Description: Ride-hailing app that makes it easier for visually impaired users to access rideshare services.

Designer: Uber Assist

Product: Thailand

Description: New service allows people with disabilities to order specially equipped vehicles that can handle the needs of people with mobility problems or wheelchairs.

E 21 OBSTACLE AWARENESS

Designer: VTT Technical Research Centre, Finland

Product: in production

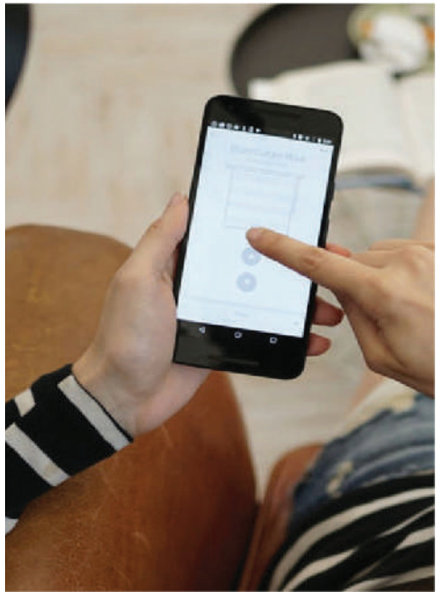
Description: Guidesense is designed to aid visually impaired people with mobility in day-to-day life, can sense objects and obstacles in the surrounding environment and relay those obstacles to its user through the use of both haptic and audio feedback.

Designer: Eye and Ear at Schepens Research Institute

Location: Massachusetts

Description: A pocket-sized collision warning device that is being targeted towards the blind, who are often at risk of colliding with objects when out and about.

E 22 SMART HOME DEVICES



Designer: Brunt

Product: available

Description: 'Brunt Blind Engine' -- a simple device that transforms nearly any window covering into a smart and voice responsive device and can be commanded by Amazon Alexa.

E 23 SANITARY FACILITIES

Designer: Jan S. van Ackeren

Location: concept

Description: Getting on an off of the toilet can be difficult for seniors who have mobility issues, so the 'Uppie' toilet seat is intended to provide users with a functional way to always be able to get up without fuss

الهيئة الملكية لمدينة الرياض

ROYAL COMMISSION FOR RIYADH CITY