3 Sidewalks and Walkways

3.1 General

The campus is serviced by numerous streets that are the property of and maintained by the City of Kingston. Service issues and standards relating to accessibility should be coordinated by Queen's University with the appropriate municipal staff. The road and municipal right of way have an important impact on the quality of access for campus users. Crosswalks, sidewalk design, illumination and snow removal are key elements.

Not all streets have sidewalks. Prohibiting parking on one side of a street to facilitate pedestrian movement on streets without sidewalks should be considered where necessary.

A safe accessible site which links important buildings, parking lots, city streets and open spaces will benefit all campus users. People who have a visual impairment require a walkway / pathway that is safe, easy to locate, continuous and free of hazards. A person with a mobility impairment requires a continuous walkway / pathway that is not too steep and complete with curbed ramps at grade changes.

A pedestrian circulation system of accessible sidewalks and walkways shall be provided connecting all key facilities throughout the campus.

3.2 Orientation and Wayfinding

The use of wayfinding devices on sidewalks and walkways to assist people with visual impairments shall be provided to improve safety and orientation. These may include coloured markings or texture changes at critical locations such as parking lots, grade changes and rest areas.

Providing a difference in colour and texture between a walkway and adjacent surfaces serves as a guide to people with visual impairments, defining the accessible corridor where it passes through large open areas such as courtyards and plazas.

A colour contrast, textural change or edge treatment along sidewalks and walkways should be used consistently to delineate routes throughout the entire campus. The wayfinding and orientation system should be integrated with accessible signage at critical locations such as building entrances and intersections.

3.2.1 Crosswalks at intersections should be consistently marked with colour and textural changes. Pedestrian routes that traverse parking lots should be similarly marked.

3.3 Definitions

Sidewalks - A sidewalk is defined as an improved pedestrian surface existing within a municipal

road allowance or adjacent a vehicular area. Sidewalks should be planned and constructed to provide a safe and efficient means of travel along road allowances. If a parking lot or vehicle route is adjacent to a sidewalk, protection should be provided to separate pedestrians from vehicles. Sidewalks should connect with the pedestrian circulation system of the campus.

Walkways - A walkway is defined as an improved surface on campus property facilitating pedestrian circulation to buildings, courtyards, pedestrian ways, passages or open spaces to which the public have or are permitted access. Walkways should be planned, constructed and maintained to provide a comfortable, safe and efficient means of travel from sidewalks, parking lots, roads, public transit and drop-off zones to the main building entrance, between buildings and to all facilities throughout the campus. ***Where possible, exterior walkways should be protected from the elements.***

3.4 Minimum Width of Sidewalks

Sidewalks constructed within the campus shall have a minimum clear width of 1500 mm and be free of obstructions caused by utility poles, seating, light standards, etc.

3.5 Minimum Width of Walkways

The minimum width for accessible walkways should not be less than 1800 mm. **The preferred width is 2000 mm.** *This width allows enough room for wheelchairs to pass and also for the storage of snow without obstructing pedestrian traffic during the winter months.*

3.6 Surfaces for Sidewalks and Walkways

Sidewalk and accessible walkway surfaces shall be constructed of a continuous, hard, smooth, stable, non-slip material. Acceptable materials for walkways and sidewalks shall conform to Table 2.1, Section 2 - General Requirements. **Brushed concrete is the preferred surface.**

Materials which are not suitable include exposed earth, coarse gravel, sand and bark chips. These materials often cannot support the weight of a wheelchair. If ceramic or quarry tile is used, it shall have a slip-resistant finish.

3.6.1 Where paving materials such as brick pavers, concrete slabs or tiles are used, all joints shall be as flush as possible, with a tolerance of 6 mm being the maximum limit.

3.7 Slope of Sidewalks

3.7.1 Sidewalk slopes should be easily traversed without causing manoeuvrability problems or fatigue.

3.7.2 Sidewalk slopes and grading shall be constructed so that:
a) the maximum cross slope does not exceed 2-1/2% (1:40);

b) the minimum cross slope is not less than 2% (1:50);
c) the grade is maintained consistently where the sidewalk crosses laneways and private entrances; and
d) the longitudinal slope does not exceed 5% (1:20).
Cross slopes of less than 2% (1:50) induce surface icing while slopes of greater than 3%, (1:50) are difficult for wheelchair users to maintain a straight direction of travel.

3.8 **Slope of Walkways**

Walkway slopes and grading shall be constructed so that:
a) the maximum cross slope does not exceed 2-1/2% (1:40).
b) the minimum cross slope is not less than 2% (1:50).

A walkway with a slope gentler than 1:20 is not considered a ramp and may be any length. Where walkways exist with longitudinal slopes of 3% to 5%, (1:33 to 1:20), level resting areas shall be placed at 30 metre intervals. Walkways having a slope greater than 5% (1:20%) should be discouraged. Where no alternative access route exists, slopes between 1:12 and 1:20 are acceptable and should be designed as ramps and, as such, shall conform to Section 8, Ramps.

3.9 **Walkways through Parking Lots and Access Roads**

Parking lots and access roads are commonly used as walkways throughout the campus. This can create unsafe and intimidating conditions for people with hearing, visual or mobility impairments.

3.9.1 Separate, accessible corridors of travel shall be established where possible.

3.9.2 The accessible route should not oblige persons with disabilities to pass behind vehicles that may be backing out (OBC A-3.7.1.2.(1)). Circulation routes adjacent to parking spaces shall be part of the barrier-free path of travel to buildings or facility entrances and shall be obstacle-free.

3.9.3 Parking lots and access roads shall not exceed 5% (1:20) in slope. Accessible curb ramps conforming to Section 3.13 shall be installed wherever there is pedestrian access.

3.9.4 Walkways shall be located so as not to lead to dangerous drop-offs, changes in grade or loading zones. Walkways should not lead into loading zones. Where this occurs, a barrier or guard shall be installed to provide a warning.

3.10 **Edges along Sidewalks and Walkways**

For people with visual or ambulatory disabilities, a sudden change in grade along the edge of a walkway can be an unexpected hazard. Grade changes along sidewalks or walkways should

be avoided.

Protection from grade changes exceeding 75 mm along the edge of a sidewalk or walkway shall be provided by:
a) a curb not less than 75 mm high; or
b) a cane detectable railing or a barrier (refer to clause 8.8 or 18.5); or
c) a median not less than 400 mm wide, constructed of a textured surface that contrasts from the walkway. *Grass or rough textured concrete pavers are acceptable.*

3.11 **Drainage Structures and Gratings**

It is recommended that drainage structures and gratings be placed away from the accessible portion of sidewalks and walkways. Where they do occur they should not present a hazard to persons using wheelchairs or other mobility aids. Elongated openings can trap the front wheels of wheelchairs and the small wheels of other mobility aids and openings larger than 13mm can trap crutch and cane tips. Storm water run-off can impede accessibility if sidewalks and walkways are not drained appropriately. It is particularly important to prevent water accumulation where it can freeze and become a slip hazard.

Drainage structures at grade within a barrier-free path of travel shall:
a) not have gratings with openings that will permit the passage of a sphere more than 13 mm in diameter. (OBC 3.7.1.3.(2))
b) be designed so that all elongated openings are oriented at right angles to the direction of travel.

3.11.1 Surface run-off shall not be channelled to cross or follow walkway or sidewalk surfaces due to potential ice formation during freeze / thaw in winter months.

3.12 **Protruding Objects**

Persons who have mobility and visual impairments should be protected from objects protruding into and over sidewalks and walkways. Cane users have no means of detecting objects that are outside their range. The following objects should be positioned adjacent to sidewalks and walkways so as to not impede pedestrians: benches, trees, signs, parking meters, fire hydrants, planters, litter receptacles, sculptures, drinking fountains, sandwich boards, newspaper vending boxes, utility poles, guy wires and postal boxes,etc.

3.12.1 Refer to Section 2.5 for requirements.

3.12.2 Vegetation will be placed and maintained in conformance with Clause 18.7.

3.13 **Curb Ramps**

Most municipal and campus streets are constructed with barrier curbs edging the vehicular

portion of the right of way. Typically these curbs are 150 mm in height. Curb ramps allow persons in wheelchairs to make these grade changes at appropriately located pedestrian crossings. In most situations, curb ramps do not require handrails.

Curb ramps should be as gradual as possible and should not project onto a road surface.

Curb ramps shall be located:

a) along all pedestrian routes where there is a curb.
b) where they will not be blocked by parking vehicles.

Corner curb ramps or curb ramps constructed by building up the roadway surface are not recommended.

3.13.1 Curb ramps located at pedestrian crosswalks shall:
a) be wholly contained within the area designated for pedestrian use.
b) be unobstructed by utility poles, trees, signs or any other obstruction.
c) lead directly across the road to the opposite curb ramp. See Figure 3.1.

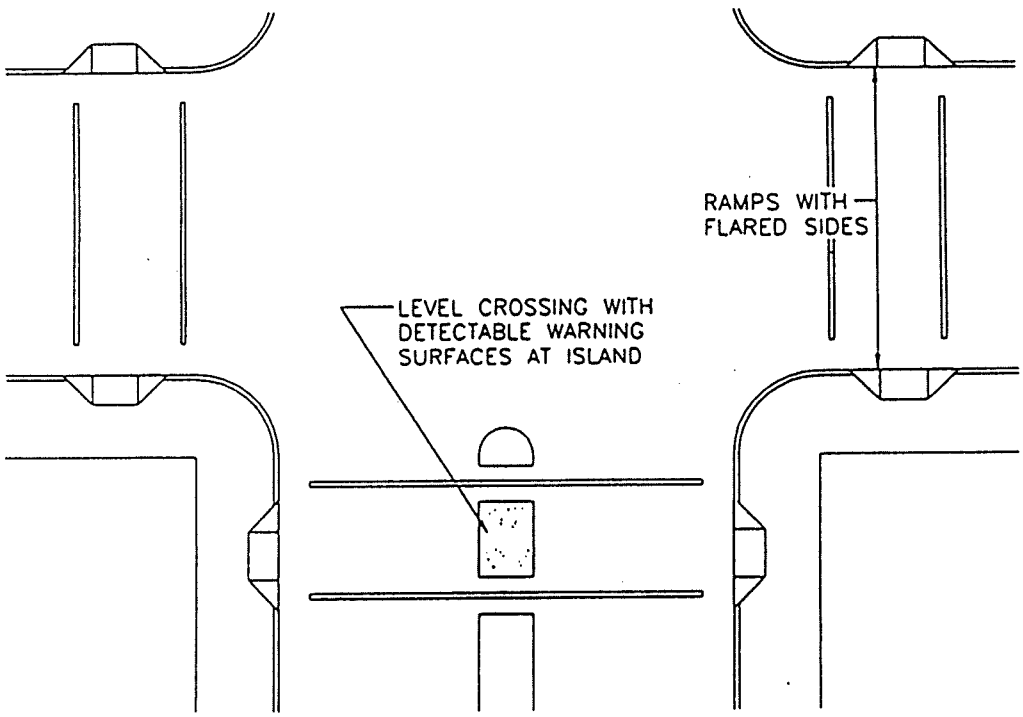
3.13.2 Curb Ramps shall be constructed to have:
a) a maximum running slope conforming to the requirements in Section 8, Ramps;
b) a maximum counter slope of gutters and road surfaces immediately adjacent to curb ramps not exceeding 5% (1:20);
c) a minimum width of 920 mm or 1200 mm where exposed to snow;

d) a level walking space 920 mm wide at the top of the ramp so pedestrians who are not crossing can avoid the ramp (Figure 3.2). *Curb ramps with returned curbs can be used where pedestrians would not be expected to walk across the ramp (Figure 3.3).*;
e) the bottom lip of the ramp flush with the adjacent roadway surface (a tolerance of 6 mm is the maximum limit); and
f) surfaces that are slip-resistant and include a detectable warning surface that is colour and texture contrasted with the adjacent surfaces. Any paint used for colour contrast shall be slip-resistant. *A textured surface will provide a secure foothold. A detectable surface with a change in plane and a surface texture different from the adjacent sidewalk will assist persons with visual impairments.*

3.14 Drainage Structures

Drainage structures located near curb ramps shall:
a) conform to Section 3.9;
b) be placed outside the pedestrian crossing lane at crosswalks; and
c) be installed flush with the surrounding surface or be of the drain inlet type mounted in the curb.

Run-off shall be prevented from pooling at the base of the curb ramp.



Location of Curb Ramps
at Pedestrian Crosswalks

FIGURE 3.1

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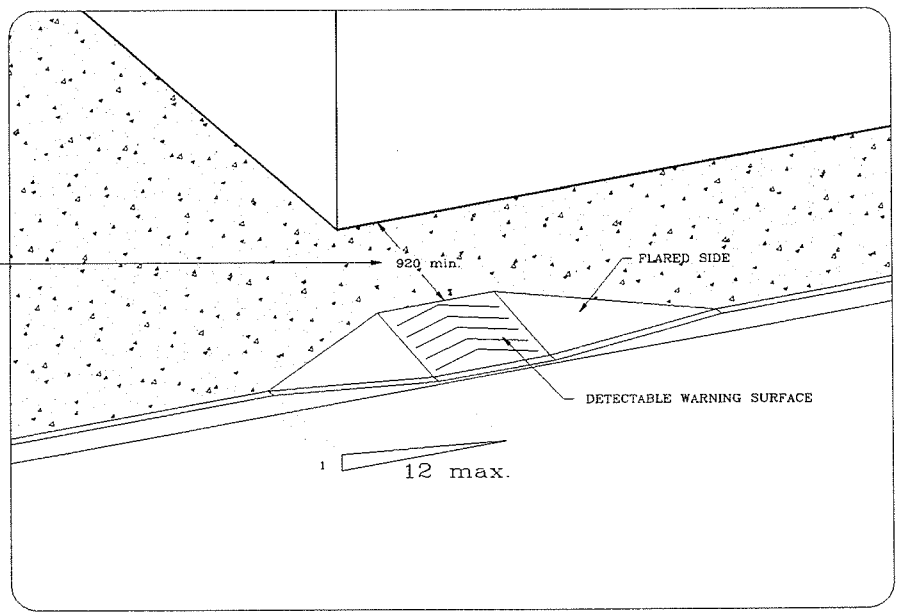
NOTE: IF THIS DIMENSION IS 1220mm OR GREATER, THE SLOPE FOR THE FLARED SIDES MAY BE INCREASED TO 1:10.



Curb Ramp with Flared Sides

FIGURE 3.2

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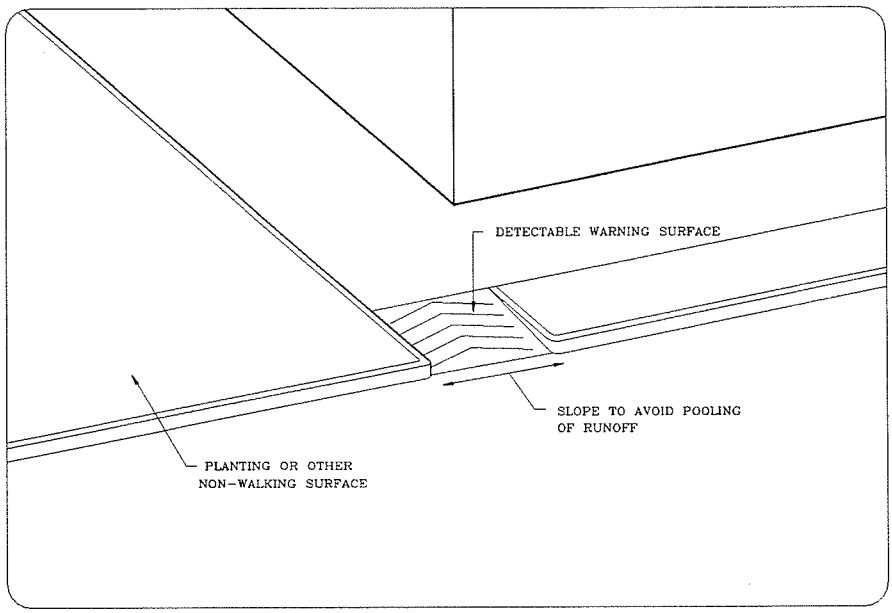

Curb Ramp with Returned Curb

FIGURE 3.3

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CRUSHED ROCK/
PEA GRAVEL

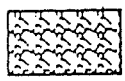
Soft Surface Characteristics

EARTH

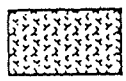
Irregular and soft surfaces make walking extremely difficult for people with handicaps.
Poor surfaces for wheelchairs and other small wheeled vehicles.
The visually impaired may have difficulty with orientation.
Surfaces are susceptible to erosion.
Surfaces will withstand only light traffic.
Surfaces are useful for areas where light pedestrian traffic will need a moderately firm surface, ie. trails, nature areas, etc.
Low to moderate installation costs.
High maintenance costs.
Provides some resiliancy

TURF

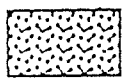
RIVER ROCK



STONE DUST

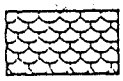


BARK CHIP



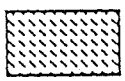
Variable Surface Characteristics

COBBLE STONES

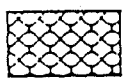


Irregular surfaces and wide joints make walking extremely difficult for people with mobility problems.
Joints easily trap crutch and cane tips, heels, narrow wheels; joints hould be filled and no wider than 1/2".
Irregular surfaces make movement difficult for wheelchairs and other small wheeled vehicles.
Ice and snow can be a problem by damaging the surface or being difficult to remove.
Moderate maintenance requirements, moderate to high installation costs.
Low resiliancy.

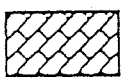
EXPOSED AGGREGATE



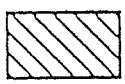
FLAGSTONES



CONCRETE PAVERS
ON GRAVEL

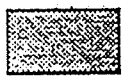


WOOD DECKING



Hard Surface Characteristcs

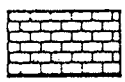
ASPHALT



Firm and consistant surfaces for walking and moving wheeled vehicles.
Joints kept to a minimum, less than 1/2" wide and filled.
Ice and snow removal possible without damage.
High installation costs, lowest manintenance costs.
Not resiliant.

CONCRETE

BRICK ON CONCRETE



Pathway Surfacing

TABLE 3.1

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3.15 **Raised Islands**

Raised islands within crosswalks shall:
a) have curb ramps at all sides where pedestrian traffic crosses; and
b) have detectable (textured) warning surfaces.
A level rest area not less than 1200 mm long in the middle of the island is preferred. See Figure 3.1.
c) an accessible route may be provided by cutting through level with the street or have curb ramps at both sides and a level area not less than 1200 mm long in the middle (Figure 3.1).

Islands level with the street shall have within the area designed for pedestrian use detectable warning surfaces that are (a) at least 900 mm long; and (b) of a texture and colour that contrasts with the surrounding walking surfaces.

3.16 **Crosswalk Controls**

As most marked and signalized crosswalks are on Municipal rights of way, technical issues should be coordinated by Queen's University with the appropriate municipal staff.

Where light signal controls are used, they shall:
a) be equipped with tactile direction arrows;
b) be located beside the crosswalk; and
c) be located consistently throughout the campus for all crosswalks.

3.16.1 Push Buttons

Push buttons for traffic lights should be free of obstacles such as guardrails and should be mounted at a height of between 650 - 800 mm. The signal button shall be colour / brightness contrasted to its immediate surroundings.

3.16.2 Auditory Cues

The auditory sound cue shall be clearly audible above the ambient noise of the crosswalk area. The sound source shall be emitted from both sides of the crosswalk. Where auditory traffic light signals are utilized, they must be closely monitored for mechanical malfunction.

3.17 **Walkways and Sidewalks Adjacent to Construction Sites**

A clear path of travel, at least 920 mm wide, shall be provided around construction sites to ensure a safe route of travel for pedestrians. Barricades shall be provided to protect pedestrians from cars and construction activity. If a raised walkway is necessary, curb ramps conforming to Section 3.13 shall be provided.

Construction barricades shall:
a) include a cane detectable barrier;
b) include both visual and auditory signals to warn pedestrians; and

ALL c) conform to the specifications in Figure 3.4.

3.18 **Bus Stops**

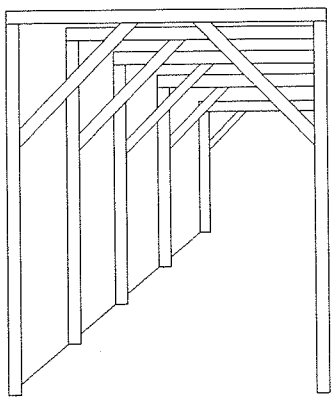
A continuous hard, smooth, stable, non-slip surface shall be provided at all bus stops.

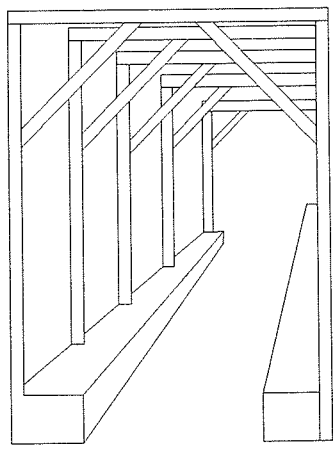
3.18.1 The waiting area shall connect to the adjacent sidewalk on the same side of the street. **A sheltered waiting area setback from the sidewalk is preferred. A bench or sitting area conforming to sections 18.3 and 18.4 is preferred. (See Figure 3.5).**

3.19 **Winter Maintenance**

ALL *Snow banks can significantly reduce the quality of access to campus for people with disabilities for a significant part of the year. Responsibility for snow removal operations on campus is shared between the City of Kingston (municipal road rights of way) and Queen's University. It is recommended that the timing of operations be coordinated so that ploughing of roads and sidewalks does not create an obstacle for people with mobility or visual disabilities.*

The accessible pedestrian route on all sidewalks and walkways shall be maintained clear of snow.



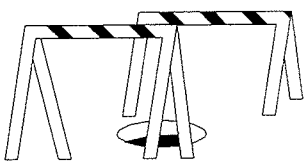


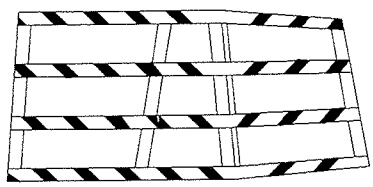
(a)

A Poorly designed construcion barrier wich is not cane detectable

(b)

Illustrates a modification to the barrier wich allows it to be detected by the long cane and thus prevent possible contact at head height by the visually impaired person





(c)

The common saw horse is not normally detected by the long cane. This barrier serves the same purpose as the saw horse but is cane detectable for visually impaired travellers

Construction Considerations

FIGURE 3.4

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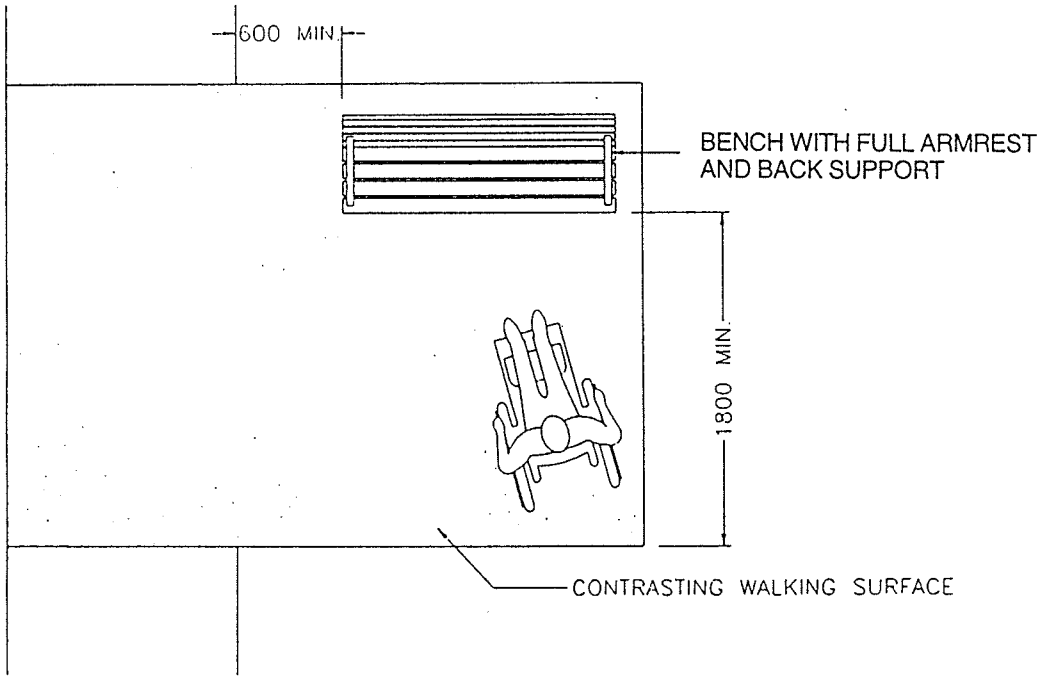

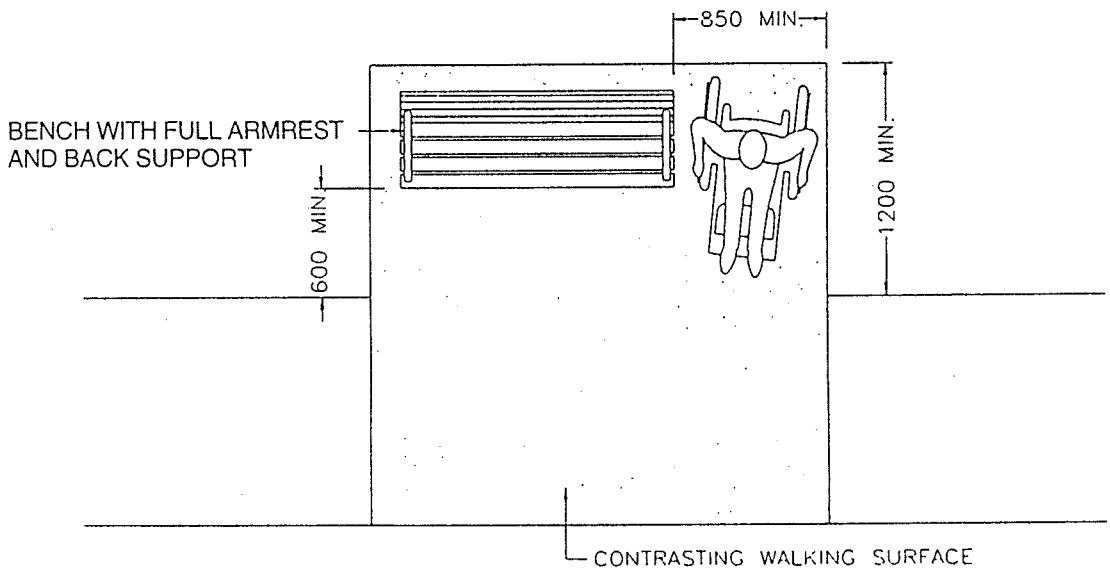

Benches

FIGURE 3.5

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