



Queensland Health

Capital Infrastructure Requirements

Volume 3 Architecture & Health Facility Design

Section 3.2 Manual & Specifications



Capital Infrastructure Requirements - Volume 3 Architecture and health facility design – Section 2: Manual and specifications

Published by the State of Queensland (Queensland Health), August 2020

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Version	Author	Version Description	Released Date	Approved for Release by
1.0	Health Planning and Infrastructure Division, Queensland Health	First public release	28 May 2012	DDG, Health Planning & Infrastructure Division
1.1	Health Infrastructure Branch	Name changed from Capital Infrastructure Minimum Requirements to CIR Approved	5 April 2013	DDG, System Support Services
2.0	Health Infrastructure Branch	Second public release. Updated information regarding Legionella, infection control and other minor edits.	3 September 2014	DDG, Office of the Director-General
3.0	Capital and Asset Services Branch	Updated to align with the new water risk management provisions under the Public Health Act 2005 (February 2017)	7 August 2017	DDG, Corporate Services Division
4.0	Capital and Asset Services Branch	Incorporation of BIM, updated references, refreshed layout, compliance statement and checklist process reviewed.	22 October 2020	DDG, Corporate Services Division

Contents

1	Planning considerations	1
1.1	Climate	1
1.1.1	Temperature and solar access	1
1.1.2	Humidity	2
1.1.3	Rainfall	3
1.1.4	Prevailing winds/breezes	4
1.1.5	Orientation	5
1.2	Site context	6
1.2.1	Region and scale	6
1.2.2	Morphology and elevation	10
1.2.3	Site selection and development	11
1.2.4	Transport corridors	12
1.2.5	Parklands	12
1.2.6	Character and density	13
1.2.7	Historic/heritage	14
1.2.8	Cultural	14
1.2.9	Open space and green space	15
1.2.10	Future development	16
1.3	Wider context	19
1.3.1	Relation to town/city centre	19
1.3.2	Relation to public transport	20
1.3.3	Relation to other community facilities	20
1.4	Relationship to other major projects in area	21
1.5	Connections	22
1.5.1	Availability of transportation	22
1.5.2	Bicycle and pedestrian connectivity	23
1.5.3	Utilities infrastructure capacities (current and future)	24
1.6	Access	25
1.6.1	Ambulance and emergency access	26
1.6.2	Crossovers with ambulance	27
1.6.3	Bicycle and pedestrian access	27
1.6.4	Patients drop off/pickup	28
1.6.5	Patients transfer	29
1.6.6	Accessibility requirements	30
1.6.7	After-hours access	32
1.6.8	Access for on-site accommodation	32
1.6.9	Staff	33
1.6.10	Logistics	33
1.6.11	Large vehicles	34
1.6.12	Taxi	34
1.6.13	Fire/police/emergency services	35
1.7	Urban design	35
1.7.1	Public realm	35
1.7.2	Edges	36
1.7.3	Permeability	37
1.7.4	Activation	37
1.7.5	Significant views	38
1.7.6	Landmarks	38
1.7.7	Visual quality and amenity	39
1.7.8	Heritage/local character	39

1.8	Landscape/vegetation	40
1.8.1	Significant flora and fauna	41
1.8.2	Species	41
1.9	Strategic planning issues	42
1.9.1	Local plan	42
1.9.2	Building height	42
1.9.3	Plot ratio/density	43
1.9.4	Land Use	43
1.9.5	Designation	44
1.9.6	Restrictions	44
1.9.7	Residential context	45
1.9.8	Shadow studies	46
1.9.9	Future expansion identification	46
1.9.10	Other issues	47
1.10	Disaster plan	54
1.10.1	Post-disaster function	55
1.10.2	Earthquakes	56
1.10.3	Cyclones	56
1.10.4	Bushfires	56
1.10.5	Provisions for disasters	57
1.10.6	Wind and earthquake-resistant design	57
1.10.7	Roof considerations	58
1.10.8	Flood protection	58
1.11	Site planning	59
1.11.1	Site planning constraints	59
1.11.2	Position of engineering services, including plant	62
1.11.3	Neighbour visual, acoustic, considerations	63
1.11.4	Staging and decanting	64
1.12	Master planning	64
1.12.1	Master plan documents	65
1.12.2	Position of infrastructure services	68
1.13	Whole-of-hospital departmental relationships	69
1.14	Departmental functional relationship diagrams	70
1.15	Functional relationships/adjacencies	70
1.15.1	Internal circulation and spatial organisation	71
1.15.2	Horizontal	73
1.15.3	Vertical	76
1.16	Spatial parameters	77
1.16.1	Building grid	77
1.16.2	Floor to floor height	77
1.16.3	Travel times and sightlines	78
1.17	Wayfinding	78
1.18	Bariatric design requirements	80
1.19	Infection Isolation	81
1.20	Safety in design—risk issues	82
1.20.1	Work health and safety	83
1.20.2	Obligations	83
1.20.3	Objectives	83
1.20.4	Meetings	84
1.20.5	Safety in design hazard and risk register	84
1.20.6	Workshop	84

1.21 Standard rooms	84
1.22 Schedule of accommodation	85
1.23 Room data sheets	88
2 Architectural design	89
2.1 Design parameters	89
2.1.1 Design life expectancy	89
2.1.2 Construction technology and expertise	90
2.1.3 Local support	90
2.1.4 Survey and existing condition drawings	91
2.1.5 Base drawing requirements	92
2.1.6 Whole-of-life	94
2.1.7 Asset and facilities management	95
2.1.8 General requirements	96
2.1.9 Physical environment	98
2.1.10 Environmental sustainability	102
2.1.11 Climate change	107
2.1.12 Design process plan	108
2.1.13 Design program	108
2.1.14 Building information modelling	110
2.1.15 As-built standard for facility management usage	111
2.1.16 Project budget	112
2.1.17 Fire resistance	112
2.1.18 Security CPTED	113
2.1.19 Information communications technology	115
2.2 Façade	118
2.2.1 Walls	118
2.2.2 Windows	119
2.2.3 Spandrels	122
2.2.4 External doors	122
2.2.5 Louvers	123
2.2.6 Shading	123
2.2.7 Glare control	124
2.2.8 Curtain wall	124
2.2.9 Plant	125
2.2.10 Verandas/balconies	125
2.2.11 Soffit	125
2.2.12 Tanking and waterproofing	126
2.2.13 Materials	127
2.2.14 Acoustic	128
2.3 Roof	130
2.3.1 Waterproofing	130
2.3.2 Gutters	130
2.3.3 Slope	131
2.3.4 Undercover areas	132
2.3.5 Canopies	132
2.3.6 Porte-Cochere	132
2.3.7 Covered walkways	132
2.3.8 Flashings	133
2.3.9 Expansion joints	134
2.3.10 Box gutters	134
2.3.11 Access for maintenance (including work health and safety)	135
2.4 Partitions	136
2.4.1 General	136
2.4.2 Glazed	137
2.4.3 Acoustic separation	139

2.4.4	Wall protection	139
2.4.5	Handrails	140
2.4.6	Clinical fixtures	141
2.4.7	Pneumatic tube stations	142
2.4.8	Splash protection	145
2.5	Doors	147
2.5.1	Types	147
2.5.2	Hardware	155
2.6	Ceilings	162
2.6.1	Ceiling heights	162
2.6.2	Ceiling systems and finishes	164
2.6.3	Fixtures and fittings	168
2.6.4	Wet areas	168
2.6.5	Patient areas	170
2.6.6	Public areas	170
2.6.7	Clinical areas	171
2.6.8	Accessibility for maintenance	172
2.6.9	Security	172
2.7	Set downs	174
2.7.1	General	174
2.7.2	Wet areas	175
2.7.3	Penetrations	176
2.7.4	Falls	176
2.8	Disability Discrimination Act compliance	176
2.8.1	Disability Discrimination Act 1992	176
2.8.2	Disability Discrimination Act 1992 requirement	177
2.8.3	Visual impairment	178
2.8.4	Hearing impairment	180
2.8.5	Ramps	180
2.9	Under crofts	183
2.9.1	Accessible	183
2.9.2	Non-accessible	183
2.10	Plant rooms	184
2.10.1	General	184
2.10.2	Plant accommodation	184
2.10.3	Indoor	187
2.10.4	Roof space	187
2.10.5	Risers	188
2.10.6	Ducts	188
2.10.7	Plenums	189
2.10.8	Raised floors	189
2.10.9	Plant in ceilings	189
2.11	Vertical transport	190
2.11.1	Lifts and escalators	190
2.11.2	Alternative vertical transport	193
2.11.3	Visitor/staff	193
2.11.4	Bed lifts	194
2.11.5	Goods and service lifts	194
2.11.6	Hot lift	195
2.11.7	Stairs	195
3	External and Landscape	198
3.1	General	198

3.2	Car parking	199
3.2.1	Car park numbers	200
3.2.2	Car park layout	200
3.2.3	Daytime	201
3.2.4	After-hours	201
3.2.5	Drop off area	201
3.2.6	Emergency drop off	201
3.2.7	Ambulance road	202
3.3	Gardens and courtyards	203
3.3.1	Public gardens and courtyards	204
3.3.2	Patient gardens and courtyards	204
3.3.3	Rehabilitation/treatment gardens and courtyard	204
3.3.4	Mental health gardens and courtyards	205
3.3.5	Mental high dependency gardens and courtyards	205
3.3.6	Mortuary gardens and courtyards	205
3.3.7	Aged care gardens and courtyards	205
3.3.8	Indigenous gardens and courtyards	206
3.3.9	Dementia gardens and courtyards	206
3.4	Fences and walls	206
3.5	Outdoor furniture	207
3.6	Breezeways/covered outdoor space	207
3.7	Landscaping/planting schedule	207
3.8	Safety	208
3.9	Loading bay	209
3.10	Supply zone	209
3.11	Helipad	210
3.12	Walkways	211
3.13	External wayfinding and signage	211
3.14	Ramps	212
4	Interior design	213
4.1	Design parameters	213
4.1.1	Design concepts	213
4.1.2	Indoor environmental quality	214
4.1.3	Volume and spaces	215
4.1.4	Flexibility of use	215
4.1.5	Ambience	215
4.1.6	Public space	216
4.1.7	Shared space	216
4.1.8	Private space	217
4.1.9	Non-clinical workplace, offices	217
4.1.10	Teaching and research	219
4.1.11	Corridors	221
4.1.12	Infection control	222
4.1.13	Surface materials	222
4.1.14	Work health and safety	223
4.1.15	Whole-of-life	224
4.1.16	Maintenance	224
4.1.17	Colour scheme	224
4.1.18	Acoustics	225
4.2	Walls	228
4.2.1	Finishes	228
4.2.2	Materials	229
4.2.3	Colours	229

4.2.4 Graphics	230
4.3 Floors	231
4.3.1 Slip resistance	232
4.3.2 Finishes	233
4.3.3 Materials	233
4.3.4 Colours	234
4.4 Ceiling	235
4.4.1 Semi-restricted areas	235
4.4.2 Restricted areas	236
4.4.3 Dietary and laundry areas	236
4.4.4 Penetrations	237
4.4.5 Mental Health patient locations	237
4.5 Joinery	237
4.5.1 High Counters	237
4.5.2 Wheelchair access	239
4.5.3 Low counter	239
4.5.4 Security barriers	239
4.5.5 Finishes	240
4.5.6 Materials	240
4.5.7 Colours	241
4.6 Loose furnishings	242
4.6.1 Indoor plants	242
4.6.2 Furniture and equipment	243
4.6.3 Finishes	244
4.6.4 Materials	244
4.6.5 Colours	244
5 Access mobility and workplace health and safety	245
5.1 Space standards and dimensions	245
5.1.1 Corridors	245
5.1.2 Ceiling heights	246
5.1.3 Department sizes	247
5.1.4 Corridors (travel)	249
5.1.5 Engineering	250
5.2 Ergonomics	252
5.2.1 Disabled access	253
5.2.2 Staff station	254
5.2.3 Computers	258
5.3 Human engineering	264
5.3.1 Performance requirements	264
5.3.2 General	264
5.3.3 Dependent patients	266
5.3.4 Handrails and grabrails	266
5.3.5 Fixtures and Fittings	267
5.3.6 Principle	267
5.4 Signage	268
5.4.1 General	269
5.4.2 Bed numbers	269
5.4.3 Room signs	270
5.4.4 Egress signs	271
5.4.5 External directional signs	271
5.4.6 External illuminated signs	272
5.4.7 Fire services signs	272

5.4.8 Door numbers	272
5.4.9 Miscellaneous signs	273
5.5 Doors	274
5.5.1 Door swing	274
5.5.2 Doors used by patients	274
5.5.3 Door width	275
5.5.4 Door handles general	277
5.5.5 Door grilles and undercuts	278
5.5.6 Hold Open Device	279
5.5.7 Glazed panels	281
5.5.8 Automatic and sliding doors	282
5.5.9 Insect control	283
5.6 Grab rails and handrails	284
5.6.1 Continuity	284
5.6.2 Prevention of self-harm	285
5.6.3 Outside corners	285
5.7 Windows and glazing	286
5.7.1 General	286
5.7.2 Window types	287
5.7.3 Cleaning	288
5.7.4 Size	288
5.7.5 Glazing	289
5.8 Floors	290
5.8.1 Floor finishes	290
5.9 Acoustics	295
5.10 Security	297
5.10.1 General	297
5.10.2 Windows and doors	297
5.10.3 Entry/exit	299
5.10.4 Parking	300
5.10.5 Reception/waiting	300
5.10.6 Screens and Grilles	301
5.10.7 Treatment/interview	301
5.10.8 Alarms	302
5.10.9 Video	306
6 Art	307
6.1 General	307
6.2 Integrated art	308
6.3 Loose art	308

Figures

Figure 1: Brisbane surrounds climate zones.....	7
Figure 2: Queensland climate zones	8
Figure 3: Australian wind regions.....	9
Figure 4: Indicative design stage program detail.....	110

1 Planning considerations

Ecological sustainable development (ESD) targets must be considered in relation to all of the following planning considerations (see 2.1.10).

1.1 Climate

Climate conditions shall be considered in the planning of a health facility. The following climatic aspects are to be included:

- temperature and solar access
- humidity
- rainfall
- prevailing wind
- orientation.

1.1.1 Temperature and solar access

Requirements

The building design must suit local climatic conditions by responding directly to the impact of the temperature and solar access.

The exposure to daylight penetrations shall consider the appetite for exposure by patients, staff and visitors to direct sunlight within and outside the building during the cooler winter months and the requirement to block the direct sunlight exposure in the warmer summer months.

Temperature control shall be achieved as much as possible via a combination of passive shading and the building orientation in the first instance.

Rationale /example

Daylight is required in regard to the usability of a space. Daylight should be provided throughout the building and in particular is required in:

- patient care and treatment areas, such as, but not limited to inpatient units, recovery areas, consultations spaces in response to evidence based design principles
- staff areas where staff are located for long durations at a time, such as offices, nursing stations, receptions and patient treatment areas, in response to staff wellbeing and productivity
- public areas, such as corridors, waiting areas and cafeterias
- at all times, patients undergoing care must not be exposed to excessive temperature direct sunlight and glare. This should be achieved as much as possible through passive control. Examples are application of insulation, use of low E and tinted or reflective glazing etc.

Temperature control is extremely important in the reduction of:

- plant sizes for air conditioning
- on-going energy consumption and carbon footprint
- maintenance costs.

Checkpoint

The design team is responsible for implementing the temperature and solar access principles in its departmental planning and will demonstrate the outcome in:

- daylight access to patients
- daylight access to staff
- daylight access to public areas
- temperature control achieved through building orientation
- temperature control achieved through passive building shading.

1.1.2 Humidity

Requirements

Humidity can bring discomfort to patients and staff and to external or non-air-conditioned areas for patients, staff and visitors. These spaces shall be substituted with alternative solutions during periods of high humidity. In areas of high humidity, internal spaces shall be protected from humidity to avoid condensation by control and treatment of entry points and openings.

Rationale/example

The regional context of the facility must guide the project towards the application of semi-open/enclosed spaces for patient, staff and visitors. When the users in these areas are exposed to great amounts and lengths of humidity during the year, alternative indoor spaces should be considered to provide the required level of comfort. This applies in particular for meeting and waiting areas.

Entry points to the enclosed parts of a facility must consider the frequency of opening and the regional context of the facility to determine the impact of the humidity to the internal areas and the risk to condensation. If the risk is significant, a control mechanism to the entry point to reduce the humidity exposure is required, such as airlock or revolving doors.

Checkpoint

The design team is responsible for implementing the humidity principles in its departmental planning and will demonstrate the outcome in the provision of:

- design solution to control the entry of humidity at entry points and openings
- suitable areas for staff and patients during periods of high humidity.

1.1.3 Rainfall

Requirements

The regional context of the facility must guide the project towards the amount of rainfall and the associated impact towards the master planning (MP) of a site to ensure that:

- design must reflect regional context of amount of rainfall and impact on siting of buildings, position of ground floor levels
- design must reflect regional context of amount of rainfall and impact on design approach towards gutter, overflows and slope of roofs
- the internal space of the health facility must not be subject to flooding
- overland flood impacts are considered and allow patients, visitors and staff to access the facility without hindrance
- provision of covered circulation must be provided where possible for circulation of patients, staff and goods
- external areas shall rely on natural draining only.

Rationale/example

The regional context of the facility, the frequency and the amount of rainfall are to inform the planning and the design of the facility. If the site is subject to significant rainfall then the following design aspects must be considered:

- sufficient space for retention basins needs to be provided
- the internal road system, including pathways, cycle ways and parking's need to consider overland flow scenarios and be designed to allow the continuous circulation of traffic and access to the buildings
- provision of undercover walkways or awnings must be present to allow staff and visitors to access the building
- entrances to the buildings must be provided with at least a porte cochere to allow undercover drop-off at main entrance and entrance used for ambulatory care
- enclosed outdoor areas of a small size, such as courtyards, air voids and light voids should be provided with a dual field sump to avoid flooding as result of drain blockage or excessive rainfall
- flat roofs should be avoided unless overflows are installed to allow the roof to drain along the outside of the building rather than relying on the overflow capacity
- gutters should be designed to allow overflowing along the outside of the building rather than relying on the overflow capacity
- landscape surfaces, hard and soft need to consider appropriate materials to allow appropriate drainage and stability of the surfaces
- coverage and sizing of walkways needs to consider horizontal driven rain and should exceed the width of the walkway accordingly.

(See also relevant section in *CIR Volume 4 Engineering and Infrastructure*.)

Checkpoint

The design team is responsible for implementing the rainfall principles in its departmental planning and will demonstrate the outcome in the design approach to:

- siting of buildings and positioning of ground floor levels
- suit climate region to roofs, gutter and overflows
- overland flows
- flood mitigation caused by excessive rainfall
- undercover circulation, access and drop-off areas, sufficient space for retention basins needs to be provided.

1.1.4 Prevailing winds/breezes

Requirements

The direction of prevailing breezes must be considered during the MP of the site.

The siting of the building/s and the positioning of courtyards and negative space created must assist in providing courtyards that open up to the prevailing winds, allowing the healing environment to extend beyond the interior of the facility towards the exterior through visual and physical access with more sheltered areas being provided.

Rationale/example

Obtain wind direction data from the Bureau of Meteorology. Depending upon the climate zone of the site, especially humidity and ambient temperatures, it may be possible to have natural ventilation in some parts of the building for all or some parts of the year. When designing the building, the following effects of wind direction must be considered:

- entrances and exits, including emergency exits should be protected from the effects of strong wind when being used
- where the climate is suitable for natural ventilation to be used, windows should be positioned to take advantage of the wind direction
- the direction of wind in relation to the effect of win-blown rain
- the effect of natural ventilation, especially humidity and corrosive effects of maritime environments on the selection of interior materials
- whether dust may be a problem when designing for natural ventilation
- location and direction of operable windows for power outages.

If natural ventilation of interior spaces is to occur, all open able windows and doors must be insect and security screened.

Checkpoint

The design team is responsible for implementing the wind direction principles in its departmental planning and will demonstrate the outcome in:

- the direction of prevailing breezes has been considered during the MP of the site
- siting of the building/s and the positioning of courtyards has resulted in courtyards that open up to the prevailing winds

- when the healing environment extends beyond the interior of the facility towards the exterior through physical access, sheltered areas from prevailing winds shall be provided
- entrances and exits, including emergency exits should be protected from the effects of strong wind.

1.1.5 Orientation

Requirements

It is important to consider the orientation of the building/s in relation to the sun, wind and views. This achieves both EBD and ESD benefits. Making maximum use of controlled sun and lighting as well as views achieves ESD benefits and enhances staff and patient comfort through natural light penetration and the provision of views.

Rationale/example

The following are to be considered when designing in regard to orientation:

- a north aspect allows for better control of the sun, south largely avoids sun penetration problems, while eastern and particularly western aspect is more difficult for sun control
- areas with deep footprint on northern aspect are very comfortable in winter
- deep footprint on the eastern and western aspect are useful in controlling the amount of sun penetrating the building
- consider the use of vertical shading systems on eastern and western elevations
- maximise windows, including highlights to allow maximum light from south.

Checkpoint

The design team is responsible for implementing the orientation principles in its departmental planning and will demonstrate the outcome in:

- buildings have been orientated in relation to the sun, wind and views
- maximum use has been made of controlled sun and lighting as well as views
- staff and patient comfort has been promoted through natural light penetration and the provision of views.

Specifications

Climate—bushfires

Refer:

- *Planning Act 2016 (Qld)*
- *Planning Regulation 2017 (Qld)* and all subsidiary acts and regulations
- National Construction Code (NCC)
- Local planning legislation and requirements, including regarding development in bushfire hazard overlays

1.2 Site context

1.2.1 Region and scale

Requirements

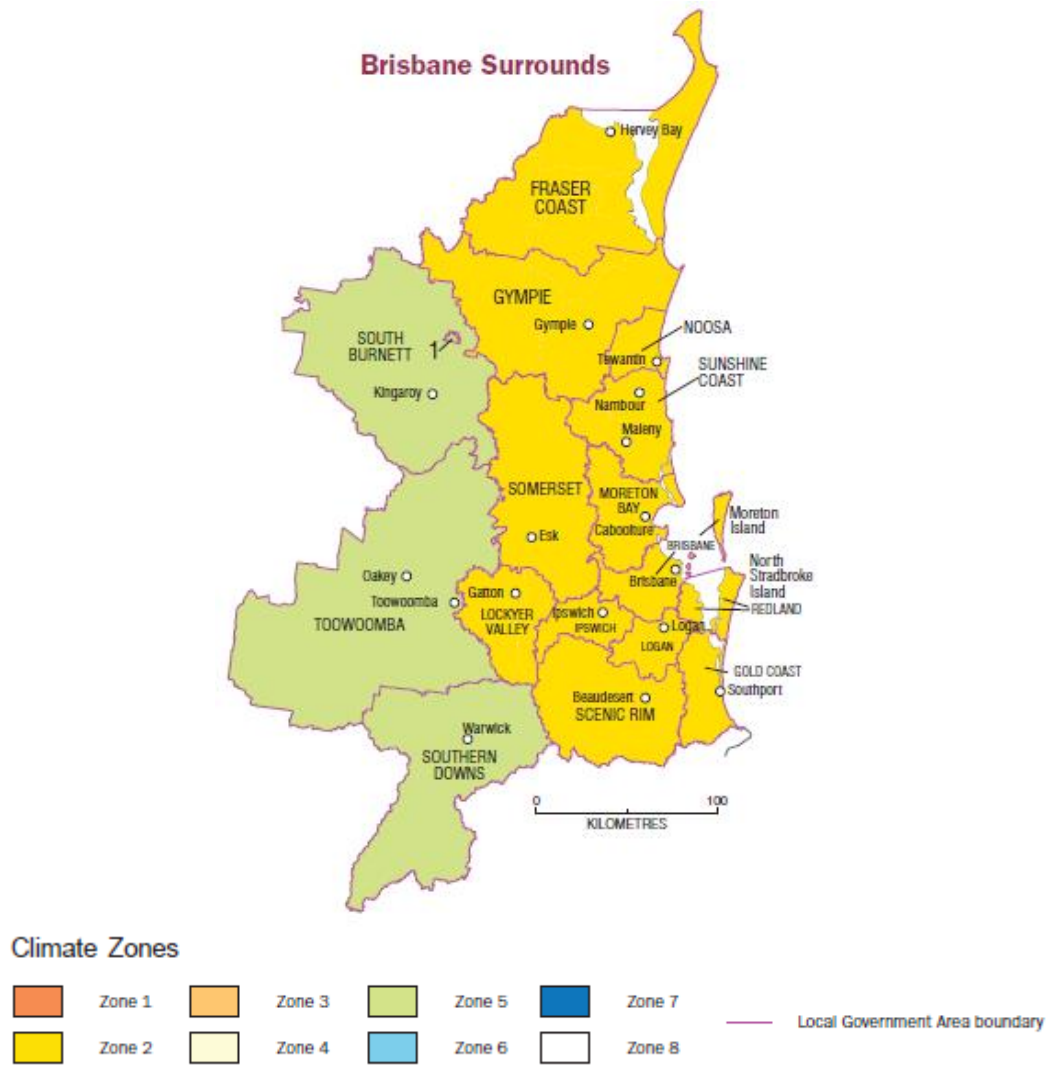
The health facility must be designed in response to additional criteria as a result of its regional context and aspect. This includes its position towards climatic regions, Australian wind regions, maritime and its urban context.

Throughout the CIR, an urban, climate and an environmental coding are used in reference to the criteria.

Table 1: Regional, climate and environmental coding

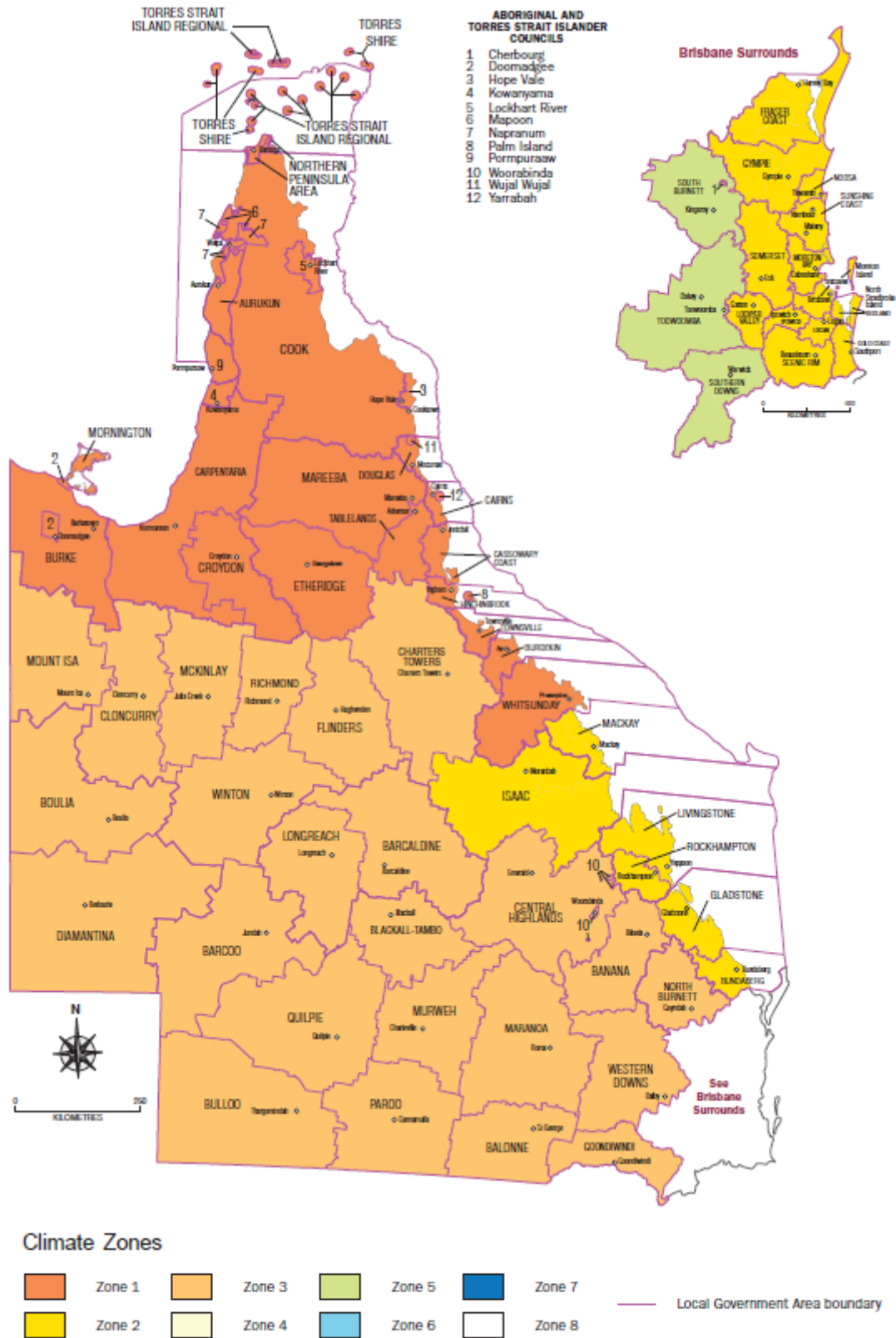
Name	Coding
Urban context	
Remote facility	Remote
Regional facility	Regional
Metropolitan facility	Metro
Climate zone (as per NCC)	
Zone 1	CLZ 1
Zone 2	CLZ 2
Zone 3	CLZ 3
Zone 4	CLZ 4
Zone 5	CLZ 5
Environmental	
Marine environment	Marine

Figure 1: Brisbane surrounds climate zones



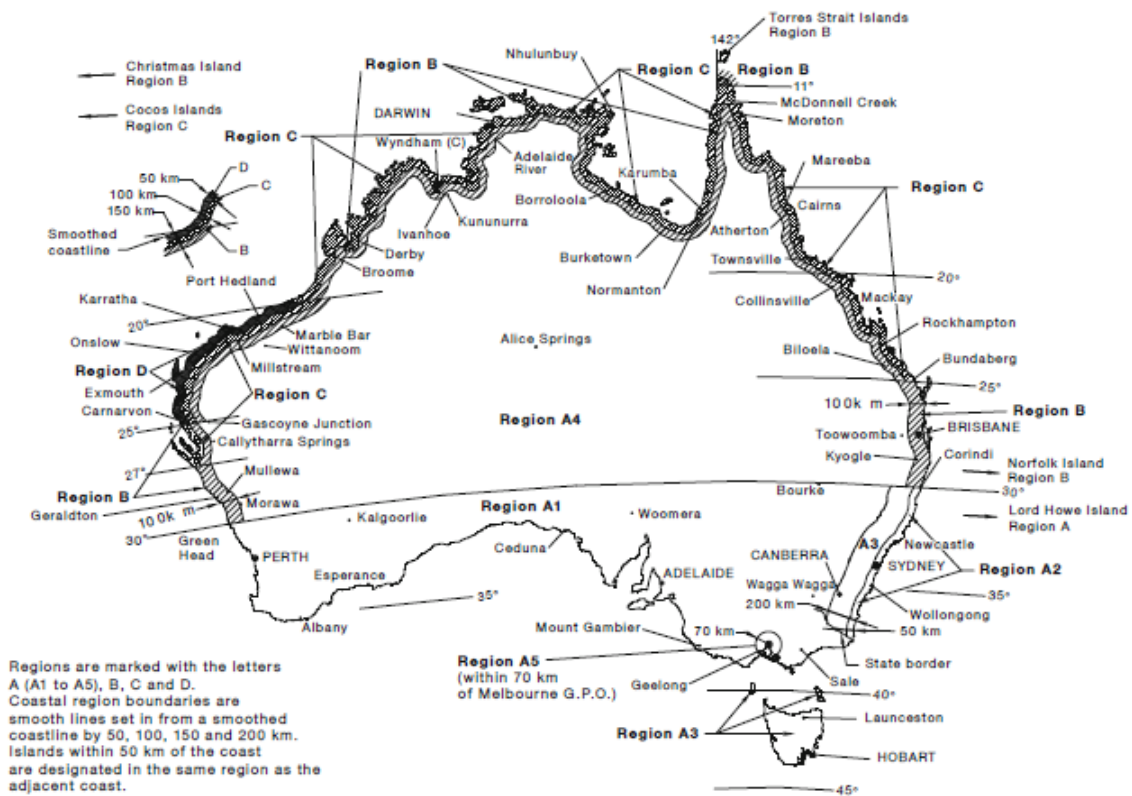
Source: National Construction Code (Australian Building Codes Board)

Figure 2: Queensland climate zones



Source: National Construction Code (Australian Building Codes Board)

Figure 3: Australian wind regions



Source: AS/NZS 1170.2

Rationale/example

- In Queensland the three wind regions are non-cyclonic A4, and B, and cyclonic C.
- There are numerous site and design specific factors affecting the design wind speed of a facility and these are determined by the structural engineer for the health facility project.
- The scale of a facility and its urban context will determine the level of self-sufficiency and reliance on external or internal support of the facility in regard to, but not limited to:
 - maintenance
 - non-clinical operations, such as waste management, cleaning
 - security surveillance
 - disaster backup requirements
 - airport and heliport access
 - building and plant materials choice, based on replacement and service provisions.
- Marine exposure has a significant impact on the performance, longevity and maintenance requirements of the building materials and plant.

The climatic location of a facility will impact significantly the humidity, solar exposure, temperature, rainfall, drought, dust, insects, wind and comfort levels of a facility.

Checkpoint

The design team is responsible for implementing the regional and scale principles in its departmental planning and will demonstrate the outcome in:

- the establishment and provision of a regional context overlay report on the CIR Architectural and engineering volumes, sections 1 and 2, and the effect the regional context will have on each of the clauses by providing the required design strategy for each of the requirements (these can be provided as a standalone report or as an integrated overlay as part of the standard reporting requirement an utilising the coding as outlined above).

1.2.2 Morphology and elevation

Requirements

If the proposed site of a health facility is elevated, exposed or amongst buildings which may cause wind tunnel effects these must be considered when siting buildings and deciding circulating routes, position of entry and courtyards.

The sitting and massing of a building on an elevated site must avoid the health facility becoming too visually dominant towards the surrounding urban environment.

Rationale/example

A health facility site where there are very significant factors associated with elevation or exposure (such as being on a promontory), or when positioned amongst tall buildings which may cause wind tunnel effects, investigations towards comfort and wind effect might have to be undertaken. To incorporate structural effects a wind tunnel test might have to be considered.

The siting, massing and treatment of the building forms will be very important to achieve a positive urban design and integration result.

One must not however compromise the models of care of the facility, such as designing single storey with very long travel distances as an attempt to try to blend in with low rise neighbourhood. Properly addressing the urban edge is a way of minimising local impact.

Checkpoint

The design team is responsible for implementing the morphology and elevation principles in its departmental planning when:

- the proposed site of a health facility is elevated, exposed or amongst buildings which may cause wind tunnel effects, the siting of the buildings, access and entry points shall be designed to avoid or to mitigate wind tunnel effects and maintain comfort levels at street levels
- the siting, massing and treatment of building forms shall avoid the health facility being too visually dominant and not integrating or being responsive into the surrounding urban fabric.

1.2.3 Site selection and development

Requirements

Site selection must ensure the site has no unforeseen fundamental problems and considerations must include but are not limited to:

- environmental and statutory requirements/ environmental impact study
- native title study
- contamination study
- acoustic study
- traffic management and impact
- cultural and heritage study
- flooding study
- earthquake, natural faults
- utilities infrastructure analysis
- land use, easements and covenants
- geotechnical study.

Rationale/example

Prior to selection of a site or considering the development of an existing site, development considerations, such as land use, storm water management, habitat preservation, landscape design and irrigation systems, shading, shall be investigated to establish development risks and to identify unforeseen development delays or additional development costs.

Checkpoint

The design team is responsible for implementing the site selection and development principles in its departmental planning and will undertake studies and identify potential unforeseen issues in relation to the following:

- environmental and statutory requirements and environmental impact study
- native title
- contamination
- acoustic
- traffic management and impact
- cultural and heritage
- flooding
- earthquake and natural faults
- utilities infrastructure
- land use, easements and covenants.

1.2.4 Transport corridors

Requirements

Transport access via the surrounding grid of transport corridors for both private and public modes is vital for a health facility to offer equitable and uncompromised access to its patients, visitors and staff.

Rationale/example

It is important that access to the site from different modes of transport is considered during early planning stages and that the required discussions with the local government and other state government departments are being held as early in the process as possible to allow for strategic solutions in support of the project. A regional signage and wayfinding strategy will have to indicate the requirements within the vicinity of the facility and along access routes from transport corridors.

Checkpoint

The design team is responsible for implementing the transport corridor principles in its planning and shall ensure:

- an investigation is undertaken of transport access via the corridors for ambulances, other emergency services, general visitors, staff and patient access
- public transport connections via transport corridors will be investigated and its capacity in volume and timetable will be examined
- during early planning stages, consultation with local government and state departments has occurred to investigate a transport strategy.

1.2.5 Parklands

Requirements

Physical access to public parklands for the use of visitors and other groups associated with the health facility is beneficial to the wellbeing and the care setting as a whole by allowing moments of recreation and positive distraction.

Rationale/example

Family, visitors and staff benefit from access to green space and parklands near the health facility. Some members of the family, such as young children will have a need for open space to allow activity and distraction. Adults and the elderly enjoy the green space for recreation. It is critical that when this space is available, it must also be able to be accessed in a safe and equitable manner for people of all ages and ability. Improvements may include, but are not limited to:

- safety
- improved lighting
- provision of pedestrian crossings, pedestrian bridges, additional pathways
- improved signage
- disability compliance.

Checkpoint

The design team is responsible for implementing the parkland principles in its planning and will demonstrate the outcome through:

- mapping accessible parklands for use of visitors and other groups associated with health facility
- safe and equitable access to the parklands and any necessary improvements are investigated, through discussions with appropriate authorities.

1.2.6 Character and density

Requirements

The character and density of the proposed facility must be integrated with both health services and health operations planning to create a set of parameters which inform the massing and urban design response.

Rationale/example

A health campus is a civic building and is an important part of its community. It makes a significant contribution to the wider community in physical and social presence. Due to their size and impact on the site it can become a challenge to deal with the impact of their scale. Many times, the massing has resulted in trying to integrate their scale with the surroundings. These campuses have a low rise built form and are very ineffective in support of today's models of care and service.

The early involvement of health planning professionals in the MP process will help to inform the operational requirements and shall avoid long clinical radiuses.

The scale of a facility, its massing and form is also informed by the level of service delivery that is considered and the amount of future growth that needs to be considered.

There must be a careful balancing between future proofing and future models of care on the one hand and local density and scale on the other hand.

Checkpoint

The design team is responsible for implementing the character and density principles in its planning and shall ensure the:

- massing and density of the proposed facility shall be integrated in the wider surrounding morphology of the site and it respects and enhances the urban fabric
- facility design shall avoid long clinical radiuses design shall balance future proofing and future models of care on the one hand and local density and scale on the other
- MP process and urban design response will have taken operational models into account and will not affect efficiency outcomes
- design shall be informed by the level of service the facility will provide and consider future growth.

1.2.7 Historic/heritage

Requirements

When historic or heritage contents is present on the site or in close proximity of the site, it shall be the intention to encourage the retention of significant heritage elements to provide benefit to the community through cultural enrichment and the enhancement of urban character and amenity.

Rationale/example

If the site/building is on a national, Queensland or local government heritage register it will require a conservation management plan.

If the site/building is not on a government register but is mentioned in the Queensland Health register of heritage sites/buildings or planners believe it should be registered, an investigation in the suitability of adaptive reuse and the associated cost plan will be considered in a value for money proposition.

The retention or creation of vistas through to heritage elements will culturally enrich and enhance the urban character of the area.

Where an existing building, element and/or place has been included in a national, Queensland or local government heritage register, on or near to the site of the proposed project a conservation management plan that broadly follows the approach and guidelines advocated by the Australia ICOMOS Burra Charter is mandatory.

A proposed facility development shall aim to minimise any adverse impacts on places or elements of Aboriginal and Torres Strait Islander heritage.

Checkpoint

The design team is responsible for implementing the historic and heritage principles in its planning and shall:

- where applicable, prepare a conservation management plan
- where applicable, conduct value for money studies relevant to the suggested adaptive reuse
- respond with appropriate care into the facility design by incorporating existing vistas to heritage or historic buildings where possible.

1.2.8 Cultural

Requirements

The facility shall be culturally responsive. The cultural and the cultural background of patients, staff and visitors shall be considered in the overall planning of the facility.

Rationale/example

The culture and the cultural background of various ethnic groups need to be recognised in the design of a care facility. Various cultures respond differently to healthcare environments, the delivery and receipt of care, the headlining process and patient support.

The healthcare environment should consider the cultural needs of patients, families, visitors and staff. They should accommodate a variety of cultural behaviours that are present in the population that the facility serves.

When designing for Aboriginal and Torres Strait Islanders, special consultation shall be undertaken with representatives of those cultural groups to test the proposed design with the cultural requirements.

Checkpoint

The design team is responsible for implementing the cultural principles in its planning. This means that:

- proposed design shall incorporate a cultural overlay to respond to the requirements of the various cultural backgrounds present in the population that the facility serves
- a population and patient profile identifying percentages of cultural backgrounds shall inform the specific allowances in the design response.

1.2.9 Open space and green space

Requirements

Permeability enabling a connection between users and outdoor open and green space must be provided to create a quality indoor and outdoor healing environment.

Rationale/example

Permeability between major facility elements provides the users with a greater connection with outdoors green space and transparency allowing views to buildings and green space along major circulation routes.

The open and green space shall:

- fuse landscape and indoor spaces
- connect with the circulation patterns
- be used to draw light, sunlight and natural ventilation into the buildings.

The development must minimise adverse impacts on the local natural habitat.

The proposed development must satisfy agency-specific design guidelines that are consistent with the intent of these in the Queensland *Design Guidelines for Government Buildings* (2010)¹.

The flora and fauna of the subject site and any adjoining habitat corridors linking to the site must be identified and analysed in a detailed habitat assessment report prepared by a suitably experienced and qualified person. The proposed design solution must effectively address and resolve the content of the habitat assessment report and wherever possible, to contribute to the enhanced biodiversity of the site.

Checkpoint

The design team is responsible for implementing the open space and green space principles in its planning and will demonstrate the outcome in:

¹ <https://www.hpw.qld.gov.au/SiteCollectionDocuments/DesignGuidelinesGovernmentBuildings2010.pdf>

- the design shall demonstrate that permeability, enabling a connection between users and outdoors green space has been provided
- when the facility is sited or positioned adjacent to a large open or green space, the design shall take advantage of this by incorporating these spaces into the design solution
- when applicable, a detailed habitat assessment report has been undertaken
- facility design is consistent with Queensland *Design Guidelines for Government Buildings* (2010).

1.2.10 Future development

Requirements

A health facility must be as far as practical be designed so it can be modified or expanded to meet changing requirements over time. This should include but not limited to:

- changes in service demand leading to future growth or contraction
- changes in medical technology
- changes in case mix
- short and long-term regional, statutory and urban planning considerations.

These measures may be outside of the project scope but the capability of implementing these measures in the future must be retained.

Rationale/example

The master plan will indicate a development framework where the external circulation for vehicle, bicycle and pedestrian will facilitate operational and logistical requirements during future developments.

The primary circulation hierarchy should enable a framework which allows future building or expansion of individual departments without compromising the circulation system and wayfinding.

Provision of core infrastructure in locations which will not obstruct change or expansion, and will continue to provide ‘back bone’ services and access throughout the life of the building.

The master plan must allow for changes to occur such as:

- car parking options to enable expansion, including options for future multi-level car parking of varying densities
- future expansion provision may be gained from adjacent roof slabs that can become additional storeys and associated structural allowances
- additional buildings, such as education and allied health or other potential partners
- critical zones, including but not limited to the emergency department, medical imaging, operating suite, ambulatory care and cancer care services can expand in the future while minimising disruption ongoing operational activity
- additional inpatient bed provisions
- future rooftop helipads
- ensuring that the building structure, construction and provision of building services can be easily modified to respond to change and expansion
- appropriate building grid and floor to floor heights to facilitate easier future connections

- infrastructure ring mains which are sited to maintain space for growth of property, and avoidance of services next to buildings which will be expensive to relocate.

Checkpoint

The design team is responsible for implementing the future development principles in its planning and shall ensure the:

- master plan demonstrates the future development framework
- master plan shall respond to the short and long-term planning considerations
- master plan shall allow for growth and respond to the requirements of the health services plan and the forecasted population projections
- master plan design shall allow for integration with the wider urban context as the area around the facility expands
- existing and future clinical areas shall be located within an efficient clinical radius
- health facility design shall be able to meet the various requirements of changes in medical technology and equipment
- health facility design shall be based on building services
- Other site specific issues.

Requirements

Depending on the regional context the following items could be applicable and shall be addressed:

- bird, insect and pest control
- dust intrusion control
- external odour sources
- legibility and ease of wayfinding
- vitality and diversity in public spaces
- the health facility must provide a healthy environment for all users.

1.2.10.1 Bird/insect/pest control

To minimise issues with birds, possible solutions include:

- bird control wires or bird spikes
- audio bird deterrent
- bird proofing repellent (however needs to be reapplied yearly)
- bird nets.

Each site shall require different considerations depending upon local species.

For insect and pest control problems external doors that open directly into food preparation areas and that are used for service deliveries or regular access shall be fitted with air curtains, flexible doors or an equal control system to restrict the ingress of insects. Flyscreen doors which can be propped open, and electronic insect traps within the kitchen, shall not be used as the only means of insect control.

Doors and fly-screens are generally required for all opening windows used for access and/or ventilation.

In the construction of health facilities, gaps and penetrations which allow ingress of insects and other pests are not allowed and must be properly sealed. In particular, gaps in the following area are not permitted:

- around windows, doors, grills and louvres
- between floors, walls, soffits and ceilings.

Floor and wall penetrations by pipes, ducts and conduits shall be tightly sealed to minimise entry by rodents and insects. Joints of structural elements shall be similarly sealed.

1.2.10.2 Dust

Dust can be a major problem and will affect the way a facility may be used. The orientation in respect to wind direction must mitigate the effects of wind on open able windows, and doors. Design and positioning of courtyards and landscape of the immediate surrounding must be designed to minimize dust through hard and soft landscape. Vegetation including grasses must be chosen accordingly.

1.2.10.3 External odour sources

External odour sources outside the site are very site specific but must be considered at the MP stage of a project. The facility should be positioned and designed to mitigate the effect of outdoor odours.

There are also external odour sources which are created by the health facility. The design must consider and position these sources to mitigate the impact of odours to the facility and its neighbours. These can include:

- pathology air outlets
- mortuary air outlets
- general waste mulchers
- bin storage
- helicopter fumes
- kitchen exhaust
- diesel vehicles fumes.

Waste mulchers are not advisable in tropical environments, due to the unavoidable odours.

In addition to the position of industrial bins storage, the path of waste vehicles circulation shall be considered.

Air conditioner intakes shall not be positioned in vicinity of odour sources and shall take into consideration the prevailing wind direction. Helicopter landing sites can produce strong fuel smells and the downdraft can affect any nearby air intakes. Carbon filters on air intakes are generally to be avoided, since their performance is questionable with aviation fumes and are expensive to maintain.

1.2.10.4 Clarity and legibility

The facility shall achieve easy wayfinding with clarity and legibility through easily followed public primary and secondary routes throughout the facility. These routes shall extend beyond the facility

linking the greater urban network. An overlay of wayfinding and landscaping must be made to test visibility and sight lines and the overlay should consider the growth of vegetation and trees.

Refer to *Queensland Health Wayfinding Guidelines 2010* (QH-GDL-343-6-1) for further details.

1.2.10.5 Diversity and vitality in public areas

Where possible the facility's public and circulation routes shall offer different environments with integration of landscape, seating opportunities, information services, hospital retail and café or other social meeting spaces. These spaces shall be designed to create a vibrant atmosphere and will aid in the de-institutionalising of the hospital environment.

Checkpoint

The design team is responsible for implementing the other site-specific principles in its planning and will demonstrate the outcome in the design:

- with relevant bird, insect and pest control
- to minimise the intrusion of dust
- to avoid the impact of external odour sources
- with ease of wayfinding through clarity and legibility
- with diversity and vitality in public areas.

1.3 Wider context

1.3.1 Relation to town/city centre

Requirements

Health facilities are major an employment source in communities and as such are major activity centres. This applies even more to regional facilities than to major metropolitan facilities. Regional facilities employ a significant amount of people relative to size of the local community. As such, the health facilities need to be designed with consideration to the wider impact of such a facility to its surrounding environment and to is local centre.

Health facilities must be designed to assist in becoming part of a knowledge precinct in accordance with *TransformingSEQ The SEQ City Deal Proposition 2019* and associated smart precinct studies.

Rationale/example

As an important activity centre, the facility precinct shall consider its position in the civic environment. The impact of required support infrastructure and amenity, such as retail, cafes and food outlets need to be considered in the master plan. Partnering and private developments should be encouraged in the surrounding precincts through the urban design vision. This will not only benefit the service provisions to the workforce and visitors of the health facility, it will create a more active and potentially safer neighbourhood.

A health facility often becomes part of an informal or formal network, with research, education and other activities that are related to health. The most obvious are universities and colleges associated with hospitals and their associated training and research.

Checkpoint

The design team is responsible for implementing the wider context principles in its planning and will demonstrate the outcome in:

- MP, associated development framework and urban design vision by addressing the activity and land use opportunities for the wider precinct to encourage integration and partnering
- consultation on the master plan with local government and other major stakeholders to encourage precinct wide integration.

1.3.2 Relation to public transport

Requirements

Health facilities shall promote the use of public transport for staff, visitors and patients through maximising the accessibility of public transport. The ease of access and proximity of the transport provision shall be an important enabler and shall be considered for all greenfield and brownfield projects.

Checkpoint

The design team is responsible for implementing the relation to public transport principles in its planning and will demonstrate the outcome in:

- a transport management plan for the facility that identifies a public transport and alternative transport strategy and quantifies the patronage, uptake over time and change management requirements.

1.3.3 Relation to other community facilities

Requirements

The design shall ascertain the range of services and amenities available within the wider precinct and shall consider the impact of the health facility towards these amenities.

In the case of a facility being a redevelopment/renovation or extension of existing facility, surrounding services, amenities and businesses shall be minimally impacted and opportunities shall be maximised to attract new and relevant services to the precinct.

In the case of new facilities the master plan must promote and encourage the wider precinct to attract a suite of services, amenities or businesses that service the facility including patients, staff and visitors as well as the wider neighbourhood.

Rationale/example

In both urban and remote and regional areas, arrangements can be in place for the provision of services required by the facility or the health facility has the potential to be the catalyst for social, community and amenity renewal. Examples are:

- private pharmacy
- medical centre, general practice clinic
- specialist consulting suites
- dental surgery

- allied health, such as podiatrist; dietician
- physiotherapist
- hairdresser
- dry cleaner, launderette
- supermarket
- food outlets
- cafés
- child care, kindergarten
- hotel, motel
- supplies and consumables
- linen services
- food services
- waste disposal services
- cleaning and maintenance services
- landscaping services
- other retail services.

Checkpoint

The design team is responsible for implementing the relation to other community services principles in its planning and will demonstrate the outcome by:

- identifying and quantifying the potential for service, amenity and business opportunities in the master plan (MP) and project definition plan (PDP)
- identifying the required partners or arrangement that will be required to enable the service delivery as required in the health services plan and the functional design brief.

1.4 Relationship to other major projects in area

Requirements

A health facility is often a major project in the local context. The project timelines for other major projects in the region must be considered in relation to the timeline of the health facility. The implications of limited local resources, trades or materials, must be anticipated in the early design.

Rationale/example

When other major projects are possibly running concurrent the following could apply:

- increased impact on project location
- inflated trade costs
- limitation of trade capacity
- absence of appetite for tendering on government projects
- lack of supply in base materials, such as concrete, steel reinforcements and aggregates

- the design can anticipate such situations by designing in accordance with alternative construction methodology and material usage, such as offsite fabrication and prefabrication.

Checkpoint

The design team is responsible for implementing the relation to other major project principles in its planning. The:

- design program shall indicate possible concurrent projects and delivery times
- project budget shall consider the impact of concurrent projects on the location and trade costs
- design shall consider the limitations of trade availability and shall consider alternative construction methodology and material usage to minimise the impact.

1.5 Connections

1.5.1 Availability of transportation

Requirements

As part of the transport management plan of a health facility, convenient, equitable and safe connections to public transport network must be provided between the health facility and the transport facilities.

In addition easy and appropriate access must be considered for:

- emergency vehicles (ambulances, fire trucks and police vehicles)
- patient transport
- taxis and private transport
- private vehicles
- large logistic vehicles (garbage trucks and large delivery trucks).

The provision of such connections can involve close consultation and collaborations with third party land holders, local governments and other state governments.

Rationale/example

The design shall integrate building and parking locations, access routes and access points. Public realm shall be designed in support of accessibility of public transport. Dialogue needs to occur with local and other government departments at early stage to define the strategy and the responsibilities in providing the transport connectivity.

The design of the transport connectivity shall be integrated with the site circulation of the health facility and the surrounding urban development.

The transportation plan should support alternatives to fossil-fuelled single-occupancy vehicles and shall consider bicycles and pedestrians.

Checkpoint

The design team is responsible for implementing the connectivity to transport principles in its planning. The:

- transportation management plan shall identify the connections between the health facility and public and private transport modes
- design shall identify the strategy for all users of the facility to provide convenient and safe connections to local public and private transport network
- design of the transportation connections shall:
 - integrate the internal public circulation pattern into the surrounding urban development
 - provide arterial access into local access roads for private vehicles, public and emergency access.

1.5.2 Bicycle and pedestrian connectivity

Requirements

Pedestrians and bicycle users must have safe and equitable connectivity to walkways and bicycle ways off site.

The provision of such connections can involve close consultation and collaborations with third party land holders, local governments and other state governments. It is necessary to consult with local authorities at the early stages of the project to reach an integrated solution.

Rationale/example

Opportunity for pedestrian and bicycle use can be diminished when lack of or unsafe connectivity is present between the health facility and the wider urban network. To optimise the outcome, an integrated approach with local governments and other state departments is required.

Checkpoint

The design team is responsible for implementing the connectivity for bicycle and pedestrian principles in its planning. The design:

- shall identify the strategy for pedestrian and bicycle users of the facility to provide them with convenient and safe connections walkways and bicycle ways
- of pedestrian and bicycle connections shall integrate the internal public circulation pattern into the surrounding urban development.

1.5.3 Utilities infrastructure capacities (current and future)**Requirements**

Infrastructure requirements for a health facility are significant in quantity and can impact on the total capacity within a precinct. Base infrastructure and redundant infrastructure availability will need to be investigated very early in the process to identify suitability of the site versus the planned health facility and its infrastructure demands.

Facilities will require utilities as follows:

- storm water
- town water
- town (bottled) gas
- sewer
- electricity
- data
- communications
- dark fibre/NBN
- mobile phone coverage.

Rationale/example

A survey and gap analysis of required infrastructure versus available services must be undertaken identifying:

- expected demand
- current capacity
- infrastructure deficiency
- future capacity and ability to expand
- spare capacity after facility and any other expected local projects are built.

The impact of a health facility on existing local service networks will be substantial. In establishing a hospital facility on any site, the requirements and regulations of authorities regulating water, electricity, gas, telephones, sewerage, telecommunications and any other responsible statutory or local authority must be complied with.

The water supply shall have the capacity to provide for normal usage and to meet fire-fighting requirements.

The electricity shall be of stable voltage and frequency.

The local authority utility companies and network providers shall be consulted during the MP stages for all building services connections. Sewerage, stormwater, water supply, electricity, gas, information, communications & technology (ICT)/dark fibre, mobile phone, satellite must be considered.

Checkpoint

The design team is responsible for implementing the utilities infrastructure principles in its planning and will demonstrate the outcome in:

- an infrastructure utility study that identifies spare capacity or deficiencies in utility network
- consultation with the local authority, utility companies and network providers during the infrastructure assessment and MP stages for all connections required by the facility in regard to infrastructure services
- ensuring required services infrastructure is available and has or will have the capacity to be upgraded to cope with future expansion, including redundancy allowances.

1.6 Access

Requirements

The siting of the healthcare facility shall provide convenient and safe access both to the community and to its users, such as patients, staff and visitors and suppliers.

Separation of access for visitors, ambulance emergency, staff and service vehicles is required for safety and efficiency purposes.

It is preferred to provide visitor access for public car parking and emergency department car parking off a separate entrance.

Rationale/example

Design of access shall investigate separate flows for:

- ambulance and police access to emergency department
- visitor access to emergency department
- visitor drop off to main entry
- visitor access and drop off to ambulatory care
- staff access to car park and after hour's car park
- visitor access to car park
- access for logistics to logistics department
- access for service vehicles to engineering and maintenance department.

In a health facility, it is not sufficient to separate pedestrians, bicycles and vehicles. For example a patient could be dropped off by car to emergency, main entrance or could be driving themselves for ambulatory services and walk from the car park. Separate journey assessment is required for all forms of travel described above.

Checkpoint

The design team is responsible for implementing the access principles in its planning and will demonstrate the outcome by ensuring:

- the siting of the healthcare facility provides convenient and safe access both to the community and to patients, staff, visitors, including emergency, fire, police, service and logistics, and other users
- maximum separation of the visitors, ambulance emergency, staff and service vehicle access shall be provided to increase safety and avoid congestion.

1.6.1 Ambulance and emergency access

Requirements

Emergency vehicles:

- Ambulance access links between the public road network and the ambulance entry must be dedicated to emergency vehicles only and clearly marked as 'ambulance only'. If a separate access road cannot be provided, a dedicated lane shall be provided
- The provision of alternative access routes for ambulance/emergency access shall be considered in case the dedicated emergency access route is obstructed
- Access to emergency vehicles shall be designed and planned to incur minimal effect from floods or other natural disasters.

Public arrival to the emergency department shall be either via:

- the main facility vehicle entry and separate from emergency ambulance routes. Provision for a number of drop-off spaces and short-term parking (15 minutes) will be provided
- direct pedestrian routes to and from public car parking facilities provided to the emergency department.

An additional direct pedestrian access via an internal entry connected to the main circulation or main entry of the facility will be provided to the emergency department.

Rationale/example

Vehicular routes to the emergency department must be clear and well sign-posted, including illumination for night time. They shall be direct and unobstructed.

Dedicated ambulance parking to the emergency department will be large enough to accommodate a dedicated number of ambulances unloading patients under cover with sufficient room for access around the vehicles. Refer to relevant guidelines relating to Queensland ambulances for spatial requirements. Provision of additional parking for doctors and police vehicles shall be made.

The ambulance arrival area shall be provided with a roof canopy covering the entire extends of the ambulances. This cover should be designed preferably as a cantilever roof to avoid collision between ambulances and supporting structure. If support structure is still required it should be designed to limit visual hindrance as much as possible, for example circular columns rather than blade columns.

The ambulance entry to the emergency department will be separate from the pedestrian entry. It shall be designed to accommodate use in a post-disaster situation, which will potentially require

large numbers of patients to be triaged and treated under cover. The required building services provisions shall be provided to the undercover area, but will be housed in a secure environment.

The ambulance entry to the mental health unit shall, where possible, be separated from the ambulance entry to other hospital departments.

It is important to consider alternative access routes for ambulance access in case the main emergency access is obstructed and thus in such a rare event this would allow emergency traffic and ambulances to use an alternative route. This would be used on rare occasions and overall design should discourage daily usage.

Checkpoint

The design team is responsible for implementing the ambulance and emergency principles in its planning and shall demonstrate the outcome in the design through:

- compliance with the ambulance access requirements including accessibility, parking, entry and egress
- minimising effects of floods and disaster
- alternative access routes for ambulance/emergency access.

1.6.2 Crossovers with ambulance

Requirements

Pedestrian crossing of dedicated ambulance access routes shall be restricted. This must be well considered during the design phase through the provision of dedicated pedestrian crossings.

Vehicle crossings of dedicated ambulance access routes shall be avoided as much as possible. If this can't be avoided a detailed traffic safety assessment shall be undertaken.

Rationale/example

Dedicated ambulance access routes shall be designed to enhance the safety of the pedestrians. To ensure pedestrians cross only at dedicated crossings, the design could incorporate raised pedestrian crossings and barriers either side of the ambulance access.

Checkpoint

The design team is responsible for implementing the ambulance crossover principles in their planning and shall demonstrate compliance with ambulance crossover requirements.

1.6.3 Bicycle and pedestrian access

Requirements

The design shall recognise and respond to opportunities for improved pedestrian and cycle circulation by providing safe, convenient, user-friendly and equitable walkways, seating, resting and bicycle ways through the site and the provision of 'end of destination facilities' and, to enhance the pedestrian and cycle access and amenity of the local area.

Rationale/example

The site's opportunities and constraints for improved pedestrian and cycle connections and access should be identified and analysed in a pedestrian and cycle connectivity, access and safety assessment report.

As far as practical, pedestrians should be able to move from the facility's main entrance to public transport stops and parking facilities without crossing roadways. Where road crossing are required, appropriate pedestrian crossings and urban design concepts shall be applied. The crime prevention through environmental design (CPTED) principles will be applied with special consideration to staff and public access after-hours.

The main access route to the main entry shall be provided as a shaded or rainproof walkway dependent upon the regional location. The efficient movement of people from car parks to buildings is essential in the delivery of a user-friendly, welcoming and safe facility.

Resting and seating points spaced at 45 metres maximum shall be provided along main pedestrian circulation routes in consideration of pedestrians of limited mobility.

Pedestrian access should generally be flat and level across the site. Where changes in level cannot be avoided, ramps shall be provided in accordance with Australian Standards.

Having appropriate regard to the building's function and the privacy, safety and security of its occupants, the building's external walls should include adequate doors and/or windows to activate adjoining pedestrian spaces by providing physical and/or visual connections between the building's interior and the adjoining external pedestrian spaces without compromising the facility's security controls.

Building service access requirements for waste, deliveries and maintenance should be located so as to not adversely impact on the amenity and functioning of adjoining pedestrian spaces.

Building utility requirements for electricity, telecommunications, gas, water and sewage should be located so as to not adversely impact on the amenity, safety and functioning of adjoining pedestrian spaces.

The provision of 'end of destination facilities' including change rooms, lockers, dry rooms, showering and ironing facilities should be provide in accordance with the ESD strategy or a green star rating if applicable and the number of users in accordance with traffic management study.

Checkpoint

The design team is responsible for implementing the bicycle and pedestrian access principles in its planning and will demonstrate the outcome through:

- compliance with the bicycle and pedestrian access requirements
- compliance with end of destination recommendations of the traffic management study.

The proposed design solution effectively addresses and resolves the content of the pedestrian and cycle connectivity, access and safety assessment report, including pedestrian, cycle, vehicle, public, private, service access and security issues.

1.6.4 Patients drop off/pickup

Requirements

Access for private vehicles and taxi pick-up or drop-off points shall be provided at the main entrance and ambulatory care entrance. These access points shall have short-term parking associated to allow ease of use.

Rationale/example

All patient drop-offs or set down parking areas shall be positioned under a canopy providing protection from sun and deluge.

The entry must be easily identifiable through design and signage from the main access road, the patient or taxi drop off and patient and visitor entrances. All patient and visitor entrances, including emergency and ambulatory care shall:

- have entrance canopies
- be provided with air locks
- have wheelchair access
- be in reasonably close proximity to parking designated for the following vehicles in the following priority order:
 - cars of people with disability
 - taxis and private cars to set down passengers
 - ambulance taxis
 - private cars parked in short-term parking bays.

Checkpoint

The design team is responsible for implementing the patient drop off/pickup principles in its planning and will demonstrate the outcome through:

- access for private vehicle or taxi drop-off or pick-up has been provided for the main entrance and ambulatory care entrance
- short-term parking shall be associated with the drop-off points
- provision of a canopy for protection from sun and deluge located at drop-off/pick-up areas.

1.6.5 Patients transfer

Requirements

Patient transfers shall be conducted via:

- the main entrance/or emergency department for regional to small facilities
- a separate discharge lounge/exit and associated ambulance pick-up zone for large facilities.

Rationale/example

Patient discharge/transfer lounges/bays require associated ambulance parking. Great privacy consideration should be given to the design of these parking bays when they are located near the main entrance.

Checkpoint

The design team is responsible for implementing the patient transfer principles in its planning and shall:

- provide a patient transfer area located at the main entrance/or emergency department for regional to small facilities
- provide a separate pickup zone for large facilities
- allow for the provision of associated parking for transfer and ambulance vehicles
- ensure the design shall provide appropriate privacy considerations for the access to the transfer points.

1.6.6 Accessibility requirements

Access for people with disability must be addressed as part of the ongoing development of a health facility. Access must be provided in a way that does not discriminate against individuals regardless of their ability.

The building and environments of a proposed facility must satisfy the requirements of the Commonwealth *Disability Discrimination Act 1992* (DDA) and Queensland *Anti-Discrimination Act 1991*.

The design and construction of proposed facility must be in accordance with the NCC, the provisions of which require that all facilities be designed to comply with AS 1428.1- *Design for access and mobility*.

However, it is recommended that most parts of a building be designed to comply with the more demanding requirements of AS 1428.2 as well as relevant sections of AS 1428.3 and AS 1428.4. Exceptions to these ‘access’ provisions include parts of the building that would not normally be accessible to a person with disability, such as mechanical plant rooms and cleaners rooms and may include areas where access is restricted for safety or security reasons.

Rationale/example

Since the advent of the Commonwealth Human Rights and Equal Opportunity Commission, both the Australian and Queensland Governments have enacted legislation to prevent discrimination against persons with disabilities.

Disability discrimination law places a legal obligation on the designers, owners and operators of all public, work and human spaces to ensure that access is not conditional on a person’s ability. Under these laws, the definition of premises extends from the property boundary and includes all built features contained therein and their use. Egress is also regarded as a function of the built environment under these laws.

The proposed facility shall result in a high quality healthcare facility with connections to related urban infrastructure and transport with best practice accessibility outcomes for people with a range

of disabilities and provide an opportunity for all risk relating to disability discrimination to be minimised to a level which will be easily managed by the facility operator.

Good access design has significant benefits for a health facility. By creating an accessible built environment for people with disability, research has demonstrated that all people who use that environment benefit through improved safety, clearer direction, easier negotiation of pedestrian surfaces and level changes. These benefits will have a direct impact on the facilities' operating costs.

The access design must aggressively approach innovation and the design must engage all people regardless of their language, ability or culture, in the built solution. The final access design must be socially justified and as non-institutionalised as possible. It must reduce the risk of complaint to a manageable level under *Disability Discrimination Act 1992*, providing an enduring built outcome for Queensland Health.

The BCA deemed-to-satisfy provisions require that access for persons with disabilities must be provided to and within all areas of a healthcare building normally used by the public and staff, except where it is inappropriate that access be provided. It includes the provision of:

- suitable and appropriately located 'accessible' car parking facilities
- passenger set down areas
- 'accessible' building entry and continuous 'accessible' paths of travel to most parts of the building
- 'accessible' sanitary facilities for disabled persons.

The NCC performance requirements are less prescriptive, but at times may direct better access facilities than those produced by adherence to AS 1428.1. Compliance with the NCC does not necessarily mean compliance with disability discrimination law.

The recommendations of the advisory notes on access to premises published by the human rights and equal opportunities commission may be used to provide guidance on how to develop an accessible design framed around the DDA. These advisory notes build on the minimum benchmark established by the NCC and make extensive reference to other parts of Australian Standards not required by the NCC.

A building that is designed to the level suggested by the advisory notes is most likely to satisfy the outcomes intended by these disability discrimination laws.

Consequently and in order to comply with the more stringent requirements of the advisory notes, most parts of a building shall be designed to comply with the more demanding requirements of AS 1428.2 as well as relevant sections of AS 1428.3 and AS1428.4. Exceptions to these 'access' provisions include parts of the building that would not normally be accessible to a person with disability, such as mechanical plant rooms and cleaners rooms. This could include areas where access is restricted for safety or security reasons.

Due to the ageing population the use of wheelchairs and walking devices will increase in hospital environments. It is therefore important that the design recognises this increase through additional provisions in the design of but not limited to:

- corridor widths suitable for wheelchairs and walking devices
- counter heights for wheelchairs
- location of grab bars and hand rails
- door widths

- parking space for wheelchairs and walking devices in waiting rooms and clinical areas.

Checkpoint

The design team is responsible for implementing the Accessibility principles in its planning and will demonstrate the outcome through:

- provision of a DDA compliance review at the various design stages SD, PDP, detailed design (DD) and for construction issues
- recognition of the requirements of wheelchair and walking devices in the design and shall demonstrate additional provisions in the DDA report.

1.6.7 After-hours access

Requirements

All after-hour access should be provided through a security-controlled access.

The only main after hour entry should be through a defined central entry access. The signage and wayfinding should be designed so that at night, illuminated signs guide the traffic.

This access may also function as the after-hour access to the emergency department.

Other after-hours access, such as the maternity department should be security controlled with an 'access upon invitation only' protocol.

Rationale/example

See Australasian Health Facility Guidelines (AusHFG) Part C.

Checkpoint

The design team is responsible for implementing the after-hours access principles in its planning and shall ensure:

- after-hour access is provided through security controlled access
- the main after-hours access point shall be clearly identified and appropriate wayfinding shall be provided to support this night and day
- when a security controlled access point relies on un-escorted travel within the facility, then the travel path to the point of destination shall be designed according to the security protocols of that facility and prohibit unsecure access to other areas.

1.6.8 Access for on-site accommodation

Requirements

Connection between the on-site accommodation and the health facility shall be safe, easy and well-lit at night-time.

Rationale/example

The access to on-site accommodation from the public space, if applicable, must be separated to allow a feeling of domestic living rather than institutional living.

The access between the on-site accommodation and the facility must be as direct as possible, well-lit at night and designed in accordance with CPTED principles.

Connections between on-site accommodation and the health facility should avoid travel routes through car parks.

Checkpoint

- The design team is responsible for implementing the access for on-site accommodation principles in its planning in accordance with CPTED principles. The design shall include access to on-site accommodation that is direct, easy and well-lit at night-time.

1.6.9 Staff

Requirements

Staff access shall consider the peak demand caused by shift change on access routes, parking, change facilities and public transport timetables as well as meeting the safety requirements at night-time.

Rationale/example

Shift changes cause a major influx and outflux of staff. This can temporarily cause a peak demand in parking and change facilities.

Staff parking occurs in an identified parking area designed with consideration of after-hours safety. Staff parking should not take prime parking positions close to the entrance, which should remain reserved for patients.

Consideration for the staff after-hours safety, especially when entering and leaving the site and also using the staff car park should be achieved via CCTV monitoring, well-lit access between the hospital and the staff parking location, duress systems and by using the principles of CPTED (refer to 2.1.18).

Checkpoint

The design team is responsible for implementing the staff principles in its planning and will demonstrate the outcome through:

- a staff parking and access strategy identified in the transport management plan that shall identify the access, parking and change facility requirements versus the shift change demands and the provided solution or managed condition
- demonstrated compliance with the staff access requirements.

1.6.10 Logistics

Requirements

A separate access shall be provided for logistics and service vehicles.

The service zone is effectively a 'back of house' function. Support services will utilise this access route to supply to the kitchen, the central store, the central equipment store, the maintenance department, dangerous goods and medical gasses and the mortuary.

Rationale/example

This access should also be used for access to the mortuary by funeral service vehicles. The design shall accommodate the additional parking and privacy requirements associated with this.

Checkpoint

The design team is responsible for implementing the logistics principles in its planning and will demonstrate the outcome through:

- a separate access is provided for logistics and service vehicles
- a traffic management study to define maximum size of vehicles to be catered for
- separate parking provisions for service and maintenance vehicles.

1.6.11 Large vehicles

Requirements

Access requirements for large vehicles shall be provided when required.

Rationale/example

The access requirements include the accommodation of large vehicles that will access service and supply zones. The size of vehicles will vary dependent upon the scale and nature of the facility and the types of vehicles that service the facility.

Large vehicles have large turning requirements. In addition, their turning behaviour creates high wear on the surfaces and the application of concrete for those areas is recommended.

In metropolitan areas, a transfer handling facility should be considered to create efficiency in logistics by reducing the size of delivery trucks and implementing a just in time delivery principle.

Checkpoint

The design team is responsible for implementing the large vehicle principles in its planning and will demonstrate the outcome through:

- providing adequate access for large vehicles to meet logistic requirements of the facility
- a traffic management study to define the maximum size of vehicles to cater for requirements of the facility
- the surface of the large vehicle manoeuvring areas, designed to avoid excessive wear.

1.6.12 Taxi

Requirements

Access for taxis to patient and visitor entrances, including emergency, mental health and ambulatory care shall be provided and be adequately signed and clearly visible to users.

Rationale/example

The access for taxis shall be designed to allow safe drop off and pick up and as close as possible to the entrance.

Taxi ranks do not need to be located near to the entrances since this can impact on the entrance drop-off point and parking space provisions. When taxi ranks are separated from the drop off, a taxi call system or a clear line of vision between the two points should be provided.

Checkpoint

The design team is responsible for implementing the taxi principles in its planning and shall ensure:

- design provides for taxi access to patient and visitor entrances

- taxi drop off areas must be designed to DAA requirements
- taxi ranks meet the taxi principle requirements.

1.6.13 Fire/police/emergency services

Requirements

The design shall provide access and an emergency services route with back up access. This must also be appropriately marked and signed.

Rationale/example

Transportation considerations shall have informed the conceptual planning with vehicle and emergency access for fire and rescue vehicles. Parking space for emergency vehicles shall be provided.

This should be designed in consultation with Queensland Fire and Emergency Services (QFES).

The location of emergency facilities such as fire boosters needs to be considered with a view to accessibility in peak flood events.

Checkpoint

The design team is responsible for implementing the emergency vehicles principles in its planning and will demonstrate the outcome through provision of:

- an emergency services route to accommodate access to the building
- appropriate markings and signs
- an emergency services route as required by the QFES
- a dedicated emergency services back-up access
- emergency facilities, such as fire boosters considered in relation to peak flood events.

Specification

Disabled access

Refer:

- AS 1428.1 to .4: Design for Access and Mobility
- *Disability Discrimination Act 1992.*

1.7 Urban design

1.7.1 Public realm

Requirements

The proposed development shall respond to the local context and contribute to the quality of the public space while reinforcing local identity, provide orientation and aid navigation.

Rationale/example

The proposed facility shall be designed to reinforce its visual presence and provide a landmark within the urban context while still complementing and enhancing local character and amenity especially when it is located:

- in a place of significance or in a place with a particular civic importance or function
- at a key intersection, node or transition between urban areas.

Checkpoint

The design team is responsible for implementing the public realm principles in its planning and will demonstrate the outcome through:

- the use of urban design principles to activate the public realm as much as possible
- design to aid to the wayfinding and navigation
- design to improve the safety.

1.7.2 Edges

Requirements

The edges of the facility building/s and site shall provide a conducive environment for pedestrians through shading and rest stops. Edges abutting public spaces must resolve issues of human scale, access and safety.

Rationale/example

Active edges are shown along primary public pedestrian routes and shall:

- promote spines and edges as key wayfinding devices
- promote spines and edges that are activated by users
- promote a hierarchy of appropriate edge conditions
- create a robust urban structure for the facility through a defined street system, built active edges, varied form and significant densities
- optimise pedestrian amenity by establishing strong active street edges
- provide high quality external edges to ensure the built form defines boundaries of the facility
- reinforce street structure through built form to ensure consistent street edge supporting building to the frontage and boundaries.

The design shall deliver a streetscape which actively engages with the health facility and the local community. Strong levels of activation and amenity shall foster a strong sense of civic arrival, pride of place, and local identity.

Checkpoint

The design team is responsible for implementing the edges principles in its planning and the design shall:

- provide a conducive environment for pedestrians through shading and rest stops

- resolve issues of human scale, access and safety
- position active edges along primary public pedestrian routes.

1.7.3 Permeability

Requirements

The design shall encourage physical and visual permeability through the site.

Ensure that building forms are articulated to allow for visual and physical connections through to the landscape.

Rationale/example

Permeability is achieved through the use of landscape elements that are integrated into the building fabric, and landscape spaces that penetrate into the footprint of the building.

Checkpoint

The design team is responsible for implementing the permeability principles in its planning and will ensure:

- the design provides physical permeability and allows for circulation through the site
- the design provides visual permeability and allows for visual connectivity and wayfinding through the site
- building forms are articulated to allow for visual and physical connections through to the landscape.

1.7.4 Activation

Requirements

Activation of the public space, the edges and landscaped spaces shall assist in creating a safer and more inviting environment.

Rationale/example

Health facility sites are historically seldom activated along the edges, however activation shall be considered. This can be achieved through, but not limited to the provision of:

- allied health services that don't require access to the hospital
- related services that don't require access to the hospital
- play areas for children
- rest and relaxation areas
- related retail and food outlets.

Site activation does not only benefit the urban environment, it assists in creating a safer environment and can potentially offer some positive revenue benefits by partner involvement.

Checkpoint

The design team is responsible for implementing the activation principles in its planning and will demonstrate the outcome by:

- providing activated areas in public, landscaped areas
- identifying future activation opportunities in the design including potential related lease and retail activities.

1.7.5 Significant views

Requirements

Siting and organisation of the building shall respond to and prioritize unique natural views and other natural site features.

Rationale/example

Views from the health facility shall be maximised, taking in a variety of character and landscape areas.

Outdoor spaces and courtyards shall be especially cognisant of views. Attention shall be paid to any significant vistas and be a key driver of landscape and building design and where possible building orientation.

Vistas shall be 'framed' through building and landscape arrangements accentuating and focusing on the long view whilst maintaining the privacy and amenity of the adjacent health functions.

Checkpoint

The design team is responsible for implementing the significant views principles in its planning and shall ensure

- siting of the building responds to and prioritises natural views
- design identifies the main vistas from the health facility
- design maintains privacy requirements of areas in the facility and the neighbouring properties.

1.7.6 Landmarks

Requirements

A health facility because of its nature and importance to the community will become a landmark which assists legibility and way finding.

Rationale/example

A health facility offers a considerable opportunity to contribute in a meaningful and positive way to the skyline and the visual condition, simultaneously benefiting legibility and way finding.

On a flat terrain site positioned in a low level development this means that almost any object of any height offers potential as a landmark and the associated benefits to its local legibility and way finding.

Checkpoint

The design team is responsible for implementing the landmark principles in its planning and shall ensure design:

- contributes in a meaningful and positive way to the skyline
- identifies and demonstrates the various perception angles and positions towards the landmark.

1.7.7 Visual quality and amenity

Requirements

The health facility shall contribute positively in terms of visual quality to its neighbourhood in keeping with its significance it serves. The design shall respond to and integrate with, the surrounding urban context, including resolving issues of neighbouring heritage values, visual sight lines, building proportions, height and bulk.

Rationale/example

The resolution and integration of key visual elements of a health facility, including architectural features, external cladding materials, colours, illumination and signage shall achieve an outcome that improves or complements and acknowledges the local character, provides visual interest and variety and minimises any adverse urban impacts.

Checkpoint

The design team is responsible for implementing the visual quality and amenity principles in its planning and will comply with the visual quality and amenity principles.

1.7.8 Heritage/local character

Requirements

The design of a health facility shall be respectful of potential heritage significance on the site including buildings, landscape surrounding buildings and the neighbourhood.

Checkpoint

The design team is responsible for implementing the heritage and local character principles in its planning and will ensure the master plan and PDP report shall address the heritage impact and the response to the local character of the site.

1.8 Landscape/vegetation

Requirements

The landscaping and vegetation shall be designed in a manner which is highly contextually, socially and functionally appropriate to benefit patients, visitors, staff and the precinct as a whole. The landscape and vegetation shall foster a sense of place and a strong ‘health’ identity.

Rationale/example

A common design language is preferred and this may be achieved through an appropriate palette of hard-scape and soft-scape finishes.

Pavement finishes, colours, textures, furniture, mass, theme and specimen planting must be carefully considered and arranged to express the local character and reinforce the ‘fit’ of the buildings and the community within their constructed and natural landscape.

Functionally, car parks and residential interface boundaries shall incorporate shade or screen planting to deflect or reduce refracted heat from the hardstand and protect and soften boundary fencing and service equipment. Within this microclimate and amenity amelioration strategy, care shall be taken to ensure that functional lighting, sight lines and pedestrian sight windows are maintained.

The use vegetation for shade and insulation along walkways, and courtyards should be considered.

Special attention shall be given to avoid the overshadowing of neighbouring properties.

Checkpoint

The design team is responsible for implementing the landscape / vegetation principles in its planning and shall ensure the landscape design:

- creates a unique sense of place and a strong ‘health’ identity
- positively contributes to the streetscape and urban address and the adjacent streets
- preserves as much as possible and not disturb any significant landscape or vegetation aspects
- capitalises on the natural landscape, existing trees and views where possible
- improves and separates the buffer between the site and adjacent residences
- provides therapeutic settings and healing courtyards
- considers the requirements of indigenous groups and their use of landscape areas
- creates functionality driven landscape environments, such as grieving adjacent to any morgue and any secure mental health courtyards
- uses the landscape to promote and enhance intuitive way finding
- provides internal landscapes where possible especially along main access ways.

1.8.1 Significant flora and fauna

Requirements

An environmental review including an ecological assessment shall be undertaken to establish the ecological values of the site.

Checkpoint

The design team is responsible for implementing the significant flora and fauna principles in its planning and will demonstrate the outcome through:

- an environmental review, including an ecological assessment to inform the design and identify:
 - presence of protected flora and fauna species
 - potential impacts of the project on the ecological values, statutory or other approvals required for the proposed project works
 - mitigation measures which may be required to off-set impacts of the project.
- the design shall consider the following:
 - enhance ecological value of site
 - maintain/restore biodiversity
 - existing vegetation and topsoil protected during construction.

1.8.2 Species

Requirements

Species shall be selected with regard to the local environment and native species of the area and there should be no negative aspects of them being used in the context of a health facility.

Rationale/example

Some species may have particular local, heritage or cultural significance.

Low maintenance, robustness, appropriate scale and efficient water usage are obvious factors to consider.

It is important to avoid any species with thorns or barbs, are known skin irritants, that may be poisonous if touched or ingested or are known to have an effect upon allergies, such as hay fever.

Particular care is to be taken in mental health and dementia courtyards towards the appropriateness of the species.

Checkpoint

The design team is responsible for implementing the species principles in its planning and shall ensure selected species:

- are relevant to the local environment and native species of the area
- have no negative aspects to them being used in a health facility context
- require low maintenance
- are robust, appropriate in scale and have efficient water usage
- will not cause allergies, be poisonous or have thorns.

1.9 Strategic planning issues

1.9.1 Local plan

Requirements

When the site is not covered by a community infrastructure designation (CID), the development of the site shall be in accordance with the requirements of the local authority town planning scheme, or in the absence of such a scheme be approved by the local council or authority or will have successfully undergone self-assessment and impact assessment processes.

Rationale/example

When the local plan is applicable, certain requirements from Queensland Health (some described in these guidelines) will be more stringent and be applied over and above the local plan requirements. For example:

- parking
- access
- shading.

Checkpoint

The design team is responsible for implementing the local plan principles by ensuring:

- consultation occurs with the local council at appropriate intervals during the MP and PDP for the development of the site irrespective of the existence of a CID
- when applicable, the development of the site is in accordance with the requirements of the local authority town planning scheme, or in the absence of such a scheme been approved by the local council or authority or shall successfully have undergone self-assessment and impact assessment processes.

1.9.2 Building height

Requirements

When the site is not covered by a CID, the building height will be determined by the functional requirements of the facility within the parameters of the local planning scheme.

Rationale/example

The maximum height will also be dependent upon setbacks from alignment and boundaries according to local planning scheme.

The building height should consider the requirements as described under site context and urban design in these guidelines.

Single storey buildings should be avoided as much as possible since they often result in very inflexible solutions and high site coverage ratios.

Checkpoint

The design team is responsible for implementing the building height principles in its planning and when applicable, the building height shall be in accordance with the requirements of the local planning scheme.

1.9.3 Plot ratio/density

Requirements

When the site is not covered by a CID, the functional requirements of the facility shall drive the plot ratio/density which must be in accordance with the local planning scheme.

Rationale/example

The allowable plot ratio/density of the site will be defined in the local planning scheme and is generally dependent upon height of building structure with plot ratio decreasing as height increases.

Multi-level structures allow for greater open space on site, cut down travel distances for people, reduce lengths for services and provide greater flexibility for future expansion.

Checkpoint

The design team is responsible for implementing the plot ratio principles in its planning and when applicable, the plot ratio shall be in accordance with the requirements of the local planning scheme.

1.9.4 Land Use

Requirements

When the site is not covered by a CID, the land use dedication shall be as described in the local plan.

Rationale/example

For other actual permitted functions on the site refer to the restrictions section.

For suitability of the site, compliance of the land use is not sufficient. The site would have to comply with other requirements as indicated in these guidelines.

Checkpoint

The design team is responsible for implementing the land use principles in its planning and when applicable, the land use shall be in accordance with the requirements of the local planning scheme.

1.9.5 Designation

Requirements

When the site is not covered by a CID, it is advisable to undertake a CID process for medium to large size health facilities, to facilitate the development or redevelopment of a health facility.

Rationale/example

Designation of sites for the use of hospital and health related functions are allowed under the *Sustainable Planning Act 2009*. A site designation process in accordance with the CID guidelines must be followed if designation is required for the site. Queensland Health is the responsible party for obtaining and managing the site designation process.

There are six steps to the site designation process which must be followed:

- Preparation of the initial assessment report for release.
- Invite submissions from state and local government agencies.
- Consolidate step 2—request for information and amend initial assessment report for release.
- Invite submissions—public consultation.
- Consolidate step 4—request for information and prepare final assessment report for the minister.
- Forward final assessment report to Queensland Health for ministerial consideration and approval.

The designation process should be planned as early as possible to avoid complications during the design and delivery process. Note that when a designation is not in place, a formal DA application in accordance with local government requirements is necessary. As a guide only, the designation process should commence with the master plan stage.

Checkpoint

The design team is responsible for implementing the designation principles in its planning and when applicable, an application for CID shall be processed.

1.9.6 Restrictions

1.9.6.1 Easements and covenants

Requirements

Searches shall be undertaken to establish if there any easements, encumbrances or leases affecting the site. These will affect planning and site use.

Checkpoint

The design team is responsible for implementing the restriction principles in its planning and will demonstrate the outcome through:

- all easements or leases affecting the site have been identified and their restrictive effects have been taken into account in the design
- all covenants affecting the site have been identified and their restrictive effects have been taken into account in the design.

1.9.6.2 State & Commonwealth Legislation

Requirements

If the site has CID or if CID is being sought for the site, this exempts the state from any development approval requirements triggered under the local planning scheme, but this does not exempt the state from obtaining approvals/licenses and meeting statutory obligations under other pieces of federal and state legislation and or/meet planning policies.

Rationale/example

Any development on a site shall have regard to Australian and Queensland legislation and/or planning policies which may be applicable, including the following and any sub-ordinate regulations or policies:

- *Aboriginal Cultural Heritage Act 2003*
- *Environmental Protection Act 1994*
- *Coastal Protection and Management Act 1995*
- *Transport Infrastructure Act 1994*
- *Planning Act 2016*
- State Planning Policy 2/02 Planning and Managing Development Involving Acid Sulphate Soils
- State Planning Policy 1/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide.

Checkpoint

The design team is responsible for implementing the state and government legislation principles in its planning and will ensure the project has obtained all approvals/licenses, met statutory obligations under other pieces of federal and state legislation and has meet planning policy requirements that are applicable to the site.

1.9.7 Residential context

Requirements

The aesthetics and form of a hospital facility shall be sympathetic with its immediate environment, especially where built in a residential area.

Design consideration shall be given to ensure that it is accepted as an asset by the community, and not thought of as an imposition and inconvenience on the neighbourhood with consideration given to issues pertinent to local residents.

Rationale/example

Issues for residents located in close proximity to a health facility include:

- lighting and overspill as issues to immediate neighbours
- car parking noise throughout the day and into the evening—lack of visual or sound buffering and the predominant hard surfaces of car parks (timber fences, asphalt, concrete) exacerbate the problem
- traffic noise along access roads
- helicopter noise, if applicable

- reduced visual amenity
- increase shadows and reduced light levels
- perceived reduction of privacy due to high visitation levels at a health facility
- height variation between building heights.

Checkpoint

The design team is responsible for implementing the residential context principles in its planning and they shall ensure the design shall comply with the residential context principles.

1.9.8 Shadow studies

Requirements

Shadow study must be undertaken to identify:

- the impact of the development towards its neighbouring buildings and properties.
- where there are excessive internal sun penetrations.

Rationale /example

Sun studies shall incorporate buildings and large vegetation and the effect of large ground level variations.

Checkpoint

The design team is responsible for implementing the shadow studies principles in its planning and shall undertake shadow studies to:

- identify the impact on neighbouring sites
- identify excessive internal sun penetrations
- verify the effect of the proposed shading strategy/treatment.

1.9.9 Future expansion identification

Requirements

The facility shall have a design philosophy that considers flexibility of internal layout, effective expansion strategy and functional replacement strategy. Planner shall ensure that the building structure, façade systems and provision of building services can be modified to respond to change and expansion.

Rationale/example

The design principles for flexibility and expansion are to:

- ensure that clinical treatment zone can expand in the future without disrupting ongoing operational activity, such as but not limited to:
 - the emergency department
 - medical imaging
 - operating suite
 - ambulatory care
 - cancer care services

- renal dialysis.
- provide footprints, which will inherently allow expandability
- provide core infrastructure in locations, which will not obstruct change or expansion, and will continue to provide ‘back bone’ services and access throughout the life of the building
- provide convenient access and circulation through the building that could require change or expansion in the future.

Checkpoint

The design team is responsible for implementing the future expansion principles in its planning and shall ensure the:

- project identifies appropriate future flexibility principles relevant to the facility in MP and PDP
- design demonstrates a design philosophy that considers flexibility of internal layout, effective expansion strategy and replacement strategy in MP, PDP and schematic design (SD)
- design philosophy is tested for compliance with the future expansion principles in DD and construction documentation (CD).

1.9.10 Other issues

Other planning matters relevant to the local community or other stakeholders affected by the projects shall be identified and appropriate consultation shall occur to assist in the development of appropriate design solutions.

Rationale/example

Matters likely to be of interest to adjoining landowners and other parties include, but are not limited to:

- built form, height and bulk
- design, including architectural and landscape treatments
- intended site population
- vehicular and pedestrian access and circulation
- hours of operation
- management of stormwater discharge
- potential future implications for the ongoing and viable development of adjacent lands
- impacts during construction
- noise
- interruption and effects during construction.

Parties likely to be interested in the development or redevelopment of a health facility include, but are not limited to:

- local regional council
- state and federal government agencies
- elected representatives—federal, state and local.

1.9.10.1 Light spillage

Requirements

Exterior lighting must minimise glare and light pollution and shall not impact the neighbouring properties.

Rationale/example

Exterior lighting shall be designed to minimise night sky pollution. Lighting controls shall permit zoned operation, allowing facilities to provide multiple lighting levels or to designate night parking nearer the building. Lighting design for the site, roadway, and parking lots shall control glare and light pollution.

Screening must be provided where required to prevent light from vehicle headlights affecting neighbouring properties.

Checkpoint

The design team is responsible for implementing the light spillage principles in its planning and shall ensure exterior lighting has been designed in accordance with the light spillage principles.

1.9.10.2 Helipad positioning

Requirements

Helicopter landing pads and flight approach paths shall in the first instance be designed and located to accommodate fast, comfortable and secure transport of patients and will comply with applicable regulations governing provision and placement of safety features, lighting, fencing, and other specific items. Noise mitigation towards neighbouring properties and internal areas in the facility shall be investigated.

Rationale/example

Helipads on hospital sites are in first instance a critical lifesaving strategy and their positioning towards emergency departments, ICU and other relevant departments shall not compromise clinical efficiency nor increase clinical risks during patient transfer.

Roof top helipads should be considered on congested or highly built up sites, since they reduce the impact to the open space requirements and provide less impact on the surrounding area during landing and take-off.

Roof top helipads can create more acoustic impact to the facility. Acoustic mapping of the impact of the helicopter to the various departments, but in particular where acoustic disturbance severely impacts on the usage of the space, such as inpatient units and operating theatres shall be conducted and should assist in determining the positioning of the helipad.

Ground level helipads are permitted and can be applied where the site is not congested. Note that it is not only the helipad but also the flight corridor that will impact on the ground level.

The design shall be based on the operational requirements during landing and take-off and shall consider safety and emergency conditions.

Checkpoint

The design team is responsible for implementing the *Helipad principles* in its planning and will demonstrate the outcome through:

- ground level of roof top level helipad choice shall consider the site condition and the amount of site congestion and built up form
- acoustic mapping shall inform the positioning of the helipad
- the positioning shall allow a fast, comfortable and secure transfer of patients and this shall be demonstrated by helipad travel route study between the helipad and the emergency department.

1.9.10.3 Noise emissions

Requirements

Noise emissions shall be identified and the design shall provide solutions found to mitigate them relevant to the receivers they are impacting.

Rationale/example

The following noise emissions have been identified as the most likely to have having the potential to impact upon receivers located both within the facility and the immediately adjacent community:

- mechanical plant noise (includes kitchens and laundries)
- medical equipment/paging noise
- vehicle noise
- helicopter noise
- user activities
- construction noise.

A relevant design solution shall be developed for each noise generator versus the receivers.

For example, the helicopter noise can be mitigated by the use of a better performing acoustic façade for inpatients, allowing them not be interrupted in their sleep, however the noise will have limited impact on the activity of a kitchen facility and therefore the kitchen would most likely not require the better performing façade.

Checkpoint

The design team is responsible for implementing the *Noise emission principles* in its planning and will demonstrate the outcome through:

- the design shall identify the likely noise emissions categories
- the design shall provide mitigation strategies relevant to each receiver of each noise category.

1.9.10.4 Noise emission limits

Requirements

Limits for noise emissions from the site shall be derived in accordance with the *Environmental Protection (Noise) Policy 2019* and the Environmental Protection Regulation 2019, local authority and Queensland Health policy for environmental noise emission.

Rationale/example

Acceptable noise limits in each specific situation shall be dependent on the ambient noise climate at the noise sensitive receptor premises or alternatively consideration shall be given to the use of the receptor in determining appropriate limits.

Checkpoint

The design team is responsible for implementing the *Noise emission limit principles*, including the mechanical *plant noise principles*, *limits for vehicle noise principles* and other associated criteria in its planning and will demonstrate the outcome through:

- when noise emissions and the acceptable noise limits are impacting the design solution, a professional sound reading shall be undertaken to inform the design and the mitigation strategy
- the design shall for continuous noise, such as that from mechanical plant and equipment not exceed the limits of the criteria defined by the environmental protection regulation
- the design shall demonstrate that it has controlled the sources of vehicle noise at various locations.

1.9.10.5 Existing exterior noise sources

Requirements

Planning and design of new facilities and retrofitting of existing facilities shall include due consideration of all existing exterior noise sources that may be transmitted from outside a building to its interior through the exterior shell (exterior walls, windows, doors, roofs, ventilation openings, and other shell penetrations).

Checkpoint

The design team is responsible for implementing the *Exterior noise sources principles* in its planning and will demonstrate the outcome through:

- the design shall demonstrate it has considered all existing exterior noise sources that can be transmitted to the inside of the building.

1.9.10.6 Exterior noise classifications

Requirements

Exterior noise classifications identify exterior noise exposure that is not produced by the facility. For preliminary planning site noise exposure shall be classified into one of four categories of noise exposure: A (minimal), B (moderate), C (significant), or D (extreme) to understand potential impacts on building envelope design. More detailed assessment is required as design develops.

Rationale/example

Building façade sound isolation performance shall depend on the site classification and shall be as required to provide acceptable interior sound levels.

Healthcare facility design shall consider future noise source development, such as the construction of highways, airports, or rail lines in the vicinity of the project.

Checkpoint

The design team is responsible for implementing the *Exterior noise classification principles* in its planning and will demonstrate the outcome through:

- the design of the building façade shall be designed in accordance to the noise exposure category classification that is applicable to the site.

1.9.10.7 Management of construction noise

Requirements

The typical approach for management of construction noise in Queensland is based around limits on hours of operation (typically 6.30am to 6.30pm Monday to Saturday). Outside of this period construction noise shall not be audible. There are not typically noise limits applied to construction works occurring within the prescribed hours. However, it is recommended that noise and vibration impacts are carefully managed to assist in mitigating the potential for complaint.

For works or refurbishments occurring near an existing healthcare facility, construction during the approved hours can still result in significant impacts on operation. Uses and equipment (such as medical imaging) within a healthcare facility can be sensitive to vibration and therefore structure-borne vibration can be a key issue.

There are some impacts that are difficult to mitigate such as structure-borne noise. In those instances where it is not practicable to entirely mitigate the impact, communication with stakeholders and users working in areas proximate to works is critical. A similar approach should be applied for offsite receptors such as neighbouring residences.

Where construction is proposed in close proximity to neighbouring residences, sensitive uses such as wards, laboratories, medical imaging and operating theatres there is potential for significant construction noise and vibration impacts. A construction noise and vibration management plan shall be prepared as a minimum to assist in managing this risk. For areas where risk is considered high, further assessment may be warranted to better quantify impacts and understand opportunities for mitigation.

Rationale/example

The regulation identifies two types of noise infringement:

- unlawful environmental nuisance
- noise offences.

In general terms, a noise nuisance is the lesser of the two in terms of severity and is punishable by a noise nuisance abatement notice. The definition of noise nuisance is totally within the eye of the beholder. Any audible noise emission can sustain a complaint of noise nuisance. The only absolute safeguard against complaint is inaudibility.

A noise offence is of greater severity and is punishable by a fine.

In the case of noise offences, construction work is not an offence, provided it is carried out between the hours of 6.30 am to 6.30 pm, Monday to Saturday.

The design shall consider build ability and the related sound generation of the construction, to aid in the reduction of the noise emissions.

Checkpoint

The design team is responsible for implementing the *Noise emission criteria for construction principles* in its planning and will demonstrate the outcome through:

- the design shall consider build ability issues and the impact towards the sound generations and shall aid in the avoidance of the so-called noise nuisance.

1.9.10.8 Internal noise levels**Requirements**

The facility shall comply with the recommended indoor noise criteria for health buildings as identified in AS/NZS 2107.

Rationale/example

Achieving appropriate levels of background noise will be important for the successful operation of the facility. It is important that the background noise shall be neither too loud nor too quiet.

Background noise levels inside the facility result from a number of different noise sources such as mechanical services, helicopter noise and traffic noise. Generally, it is expected that air-conditioning systems will be the main influence on the background noise levels within the facility.

The mechanical services will be designed to ensure that the required noise limits are achieved. These limits will be coordinated with mechanical engineer's design.

Checkpoint

The design team is responsible for implementing the internal noise level principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate its compliance with the recommended indoor noise criteria for health buildings as presented AS/NZS 2107:2016 Acoustics—recommended design sound levels and reverberation times for building interiors.

1.9.10.9 Privacy Requirements for rooms

Requirements

The facilities privacy requirements shall be based on the requirements of each individual space.

Rationale/example

The acoustical requirements of partitions depend on the acoustical functionality of the two spaces which the partition separates. It is not possible to assign a unique partition performance to a space, such as a meeting room. It also depends on adjacent uses. It is possible for a room to have different partition ratings on each of its four walls and these would all change if the layout was to change, thereby varying the adjoining uses.

Checkpoint

The design team is responsible for implementing the privacy requirement principles in its planning and will demonstrate the outcome through:

- the design shall adopt the requirements for acoustic separation outlined in the Association of Australasian Acoustical Consultants (AAAC) Guideline for Health Care Facilities.

1.9.10.10 Reverberation Control

Requirements

The facility shall identify the requirements for reverberation control for each space and this shall be satisfied accordingly.

Rationale/example

Excessive reverberation can adversely affect the ability of people to communicate as well as privacy and the general overall noisiness of the facility.

Advice regarding the selection and placement of absorptive treatments will be required during the design of the facility, which will be included on the individual room data sheets (RDS).

Checkpoint

The design team is responsible for implementing the reverberation principles in its planning and will demonstrate the outcome through:

- the design shall consult with acoustic consultants to establish reverberation time criteria.
- the design shall address the placement of absorptive treatments to counteract reverberation and this shall be recorded in the RDS.

1.9.10.11 Fire Breaks

Requirements

The site shall be selected and planned to conform with *AS 3959 - Construction of buildings in bushfire prone areas*.

Rationale/example

Health facility sites shall be designed to conform to AS 3959. Protection against bushfires shall be addressed in site selection, creation of firebreaks, fire resistant construction, sufficient water supply and building sprinkler systems (external).

Checkpoint

The design team is responsible for implementing the fire break principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate the site planning is compliant with AS 3959—Construction of buildings in bushfire prone areas.

1.10 Disaster plan

Requirements

All nominated healthcare facilities shall be capable of continued operation during and after a natural disaster, except in instances where a facility sustains primary impact. This means that special design consideration is needed to protect the occupants and the essential services, such as emergency power generation, heating systems and water (if applicable).

Rationale/example

Queensland's state counter disaster plan provides a blueprint for the prevention, preparedness, response and recovery arrangement for disasters in Queensland.

In a cyclone prone area, critical emergency services buildings are robust enough to survive a cyclone and other government buildings are designed to be quickly 'converted' for use as shelters, aid distribution centres and secure storage for supplies (refer to the *Design Guidelines for Queensland Public Cyclone Shelters [Sept 2006]*²).

In planning a health facility, area and function allocations must be incorporated in the event of a disaster requiring a response by the facility. This may include, but is not limited to, triage facilities, emergency departments, local command centre size and placement, location of temporary facilities for government and commonwealth departments and agencies responding.

The health facility must be designed in accordance with the building level classifications as per the NCC.

Subject to the level classification, the main services back up will be enabled by allowance for the required number of days redundancy with additional back-up power generation.

Services design will comply with AS 1170.4 to accommodate post disaster function of the facility.

The design of the proposed development must include appropriate consideration of the expected longevity (and continued operation) of the building before, during and after a disaster, including

² <https://www.hpw.qld.gov.au/construction/Projects/CycloneShelters/Pages/default.aspx>

natural events, such as a cyclone, flood or storm and/or a man-made event such as a fire, bombing or chemical attack.

The building design recognises the acceptable and non-acceptable consequences for the building due to a risk event (eg. heatwave, storm surge) occurring and the consequences are minimised or avoided through an appropriate design response.

The building design recognises the desired service delivery role of the building in and/or after the event of a disaster may be quite different to its normal day-to-day service delivery role. In threat-prone areas, the building solution is ‘multi-purpose’ and able to quickly respond to changing needs if required.

Typical problems, such as disruption to public utilities, including water supply, sewer mains or energy supplies, may affect the operation of on-site services, however the responsibility for maintaining these public utilities lies with others.

Appropriate construction detailing and structural provision shall be made to protect occupants and to ensure continuity of essential services in areas where there is a history of earthquakes, cyclones, flooding, bushfires or other natural disasters.

In addition, consideration of disease pandemics may need to be addressed and the threat of terrorism has led to a growing need to consider this type of emergency at MP stage.

Checkpoint

The design team is responsible for implementing the disaster plan principles in its planning and will demonstrate the outcome through:

- the design shall comply with the expected longevity need (in days) of the building before during and after a disaster function and shall outline the requirements this places on the facility and its operation
- the design shall comply with the service delivery profile of the facility and the BCA level applicable to each of the individual buildings and shall outline the requirements this places on the facility and its operation
- the design shall comply with the pandemic response profile of the facility and to each of the individual buildings and shall outline the requirements this places on the facility and its operation
- the design shall comply with the terrorist response plan of the facility and to each of the individual buildings and shall outline the requirements this places on the facility and its operation.

1.10.1 Post-disaster function

Requirements

At times of natural disaster, pandemic or major act of terrorism, health facilities may be called upon to admit patients and deliver health services that differ from their normal operations which may affect facility design.

The level of post disaster function is to be determined by Queensland Health. Consult local jurisdiction health disaster preparedness bodies to ascertain any particular requirements.

Checkpoint

The design team is responsible for implementing the *Post-disaster principles* in its planning and will demonstrate the outcome through:

- the design shall identify the requirements of the local facility to respond to post disaster functions and shall comply with these requirements
- provide detail of how essential services including water quality will be maintained in the event of a disaster.

1.10.2 Earthquakes

Requirements

In earthquake-prone areas, facilities shall be designed and constructed to withstand the force assumptions of AS 1170.4.

Checkpoint

The design team is responsible for implementing the earthquake principles in its planning and will demonstrate the outcome through:

- in earthquake-prone areas, the design shall demonstrate its compliance with AS 1170.4.

1.10.3 Cyclones

Requirements

In cyclonic areas special attention must be given to protection against the effects of the direct force of wind (structural detailing, cladding and roof fixings and glazing design) wind generated projectiles (trees, cladding and fencing) and wind driven water entry and localised flooding.

Rationale/example

A risk analysis towards the level of cyclone protection shall determine the cyclone protection of the building.

Checkpoint

The design team is responsible for implementing the cyclone principles in its planning and will demonstrate the outcome through:

- the design shall respond to the cyclone protection risk analysis and shall identify the departments or building areas that need to have special cyclone protection against:
 - direct force of wind
 - wind generated projectiles
 - localised flooding and wind driven water entry
 - the design shall identify the required cyclone protection for each effected department or building area.

1.10.4 Bushfires

Requirements

Facilities must be designed and constructed to conform to AS 3959—Construction of buildings in bushfire-prone areas and shall conform with *Queensland state planning policy 1/03 guideline; mitigating the adverse impacts of flood, bushfire and landslide.*

Rationale/example

Protection against bush fires has been addressed in:

- site selection
- creation of firebreaks
- fire resistant construction
- sufficient water supply
- building sprinkler systems (external).

Checkpoint

The design team is responsible for implementing the *Bushfire principles* in its planning and will demonstrate the outcome through:

- the design shall demonstrate it is conform to AS 3959—Construction of buildings in bushfire-prone areas
- the design shall demonstrate it is conform to Queensland state planning policy 1/03 guideline; mitigating the adverse impacts of flood, bushfire and landslide.

1.10.5 Provisions for disasters

Requirements

Those facilities that must remain operational in the aftermath of a disaster require special design to protect systems and essential building services, such as power, water, medical gas systems and in certain areas, air conditioning and shall be designed for continued operation.

Rationale/example

Special consideration must be given to the likelihood of temporary loss of externally supplied power, gas, water, and communications.

Checkpoint

The design team is responsible for implementing the Provision for disaster principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate it is designed to remain operational in the aftermath of a disaster and that it protects systems and essential building services.

1.10.6 Wind and earthquake-resistant design

Requirements

Facilities shall be designed to meet the requirements of AS/NZS 1170.2 and AS 1170.4.

Checkpoint

The design team is responsible for implementing the wind and earthquake resistance principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate it is designed to meet the requirements for wind of AS/NZS 1170.2.
- the design shall demonstrate it is designed to meet the requirements for earthquake design AS 1170.4.

1.10.7 Roof considerations

Requirements

Roof coverings and mechanical equipment shall be securely fastened or ballasted to the supporting roof construction and shall provide weather protection for the building at the roof. If ballast is used, it shall be designed so as not to become a projectile.

Rationale/example

The impact of the additional uplift generated by a helicopter landing on a rooftop helipad shall be considered if applicable.

In addition to the wind force design and construction requirements specified, particular attention shall be given to roofing, entryways, glazing and flashing design to minimize uplift, impact damage and other damage that could seriously impair functioning of the building.

Checkpoint

The design team is responsible for implementing the roof consideration principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate the roof coverings and mechanical equipment is designed securely during the event of a natural disaster and that ballast will not become a projectile
- when applicable, the design shall demonstrate the roof coverings and mechanical equipment is designed to withstand the impact of the additional uplift generated by a helicopter.

1.10.8 Flood protection

Requirements

The state planning policy guideline-mitigating the adverse impacts of flood, bushfire and landslide, calls for health related facilities to be at a level of Q500 or above. This does not take into effect the requirements caused by storm surges, freeboard and climate change and these shall be added over and above.

Rationale/example

Consultation with the state emergency service is recommended to ensure arrangements are in place for emergency long range communications assistance in the event of emergency situations or a major disaster.

- all hospital facilities shall be capable of continued operation during and after a natural disaster, except in instances where a facility sustains primary impact
- special design consideration is needed to protect essential services, such as emergency power generation, heating systems and water (if applicable)
- typical problems such as disruption to public utilities, such as water or sewer mains and energy supplies, shall not affect the operation of onsite services

- effective long range communications systems, which do not rely on ground lines to function, are essential.

Refer to *Queensland state planning policy 1/03 guideline; mitigating the adverse impacts of flood, bushfire and landslide*.

Refer to relevant section in Volume 4.

Checkpoint

The design team is responsible for implementing the flood protection principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate the building is positioned to meet the requirements of Q500, storm surge, freeboard and climate change
- the design shall demonstrate the building services and in ground services, pipes cabling and drainage is positioned to meet the of Q500, storm surge, freeboard and climate change.

Specifications

Disaster plan

Refer:

- AusHFG Part B Section 80.

1.11 Site planning

1.11.1 Site planning constraints

Requirements

The planning can be affected by major constraints. An early site-suitability review prior as part of the infrastructure assessment or as part of the strategic MP should be undertaken to identify these and assess the site versus the preliminary functional design brief to determine the adequacy of the site versus the program or to amend the program and the functional brief to suit the site.

Rationale/example

Identify constraints from adjacent infrastructure or for example transport corridors, energy, historical infrastructure.

Checkpoint

The design team is responsible for implementing the site constraints principles in its planning and will demonstrate the outcome through:

- the design team shall identify the site planning constraints as early as possible to determine the suitability of the site versus the preliminary functional brief.

1.11.1.1 Acid sulphate soils**Requirements**

The extent of existing acid sulphate soils must be sourced from the local regional council's official public record. The presence of acid sulphate soils within the site area of the proposed facility needs to be established and a site management plan to manage the issue of acid sulphate soil must be established by the consultants for the project.

Rationale/example

If there is a known presence of acid sulphate soils or is any question as to the presence of acid sulphate, borehole tests must be conducted to establish the extent of acid sulphate.

Checkpoint

The design team is responsible for implementing the acid sulphate principles in its planning and will demonstrate the outcome through:

- when applicable, the design team shall establish the extent of existing acid sulphate soils via:
 - information sourced from the local regional council's official public record
 - borehole tests.
- when applicable, the design team shall prepare a site management plan to manage the treatment of acid sulphate soil.

1.11.1.2 Geotechnical**Requirements**

A geotechnical investigation shall identify the nature of the soil conditions and inform the types of footings required and areas not suitable or not cost effective for construction.

Checkpoint

The design team is responsible for implementing the geotechnical principles in its planning and will demonstrate the outcome through:

- the design team shall conduct a geotechnical identify the nature of the soil conditions
- the design team shall determine the types of footings required
- the design team shall determine the areas not suitable or not cost effective for construction.

1.11.1.3 Indigenous cultural and heritage

Requirements

Indigenous, heritage or cultural heritage issues that are officially registered for the site shall be identified to determine the extent they can affect the planning and the use of the site.

Checkpoint

The design team is responsible for implementing the Indigenous principles in its planning and will demonstrate the outcome through:

- when applicable, consultation with the relevant local specialists and authorities and indigenous, heritage or cultural heritage issues that are officially registered for the site shall be identified by the design team
- when applicable, the design team shall use the identified indigenous, heritage or cultural heritage issues to inform the planning of the site.

1.11.1.4 Ecological

Requirements

Ecological matters pertaining to the site shall be identified and it must be established whether there are any Environmental Protection Agency (EPA) requirements or restrictions.

Checkpoint

The design team is responsible for implementing the ecological principles in its planning and will demonstrate the outcome through:

- the design team shall identify ecological matters pertaining to the site and shall consult with the EPA to determine the extent of the requirements or restrictions
- when applicable, the design team shall use the ecological restrictions and requirements matters to inform the planning of the site.

1.11.1.5 Site contamination

Requirements

When the site is on the contaminated land register (CLR), and/or the environmental management register (EMR), a site management plan will be needed to be implemented and approved by the EPA prior to any works approvals.

Rationale/example

An asbestos report for the site must be conducted which will identify the presence of any asbestos.

It will be a requirement of the contractor to conduct site investigations prior to any site works commencing. The contractor will need to safely remove all asbestos materials which are affected by any proposed demolition, refurbishment or new build works, all in accordance with agreed method statements and specialist asbestos procedures.

Should any below ground contaminants be identified, as mentioned above, a site management plan will need to be implemented and approved by the EPA.

Checkpoint

The design team is responsible for implementing the site contamination principles in its planning and will demonstrate the outcome through:

- the design team shall investigate whether the site is on the CLR, and/or the EMR
- when applicable, any below ground contaminants shall be identified during investigations and a site management plan will be implemented and approved by the EPA
- when applicable, the below ground contaminants shall inform the planning of the site
- when applicable, an asbestos report shall be produced and this shall inform the extent of refurbishment or demolition of existing buildings/structures.

1.11.1.6 Flooding

Requirements

New health facilities shall not be located in flood plains. Where the effects of flooding are unavoidable, appropriate civil, structural and construction methodology and protective measures shall be incorporated into the design.

Rationale/example

The *Queensland state planning policy guideline: mitigating the adverse impacts of flood, bushfire and landslide*, calls for health related facilities to be at a level of Q500 or above.

For new work on an existing site it is necessary to consider whether the alignment of new and existing is possible, especially if there is to be interconnection with existing. This will be looked at on a case-by-case basis depending upon the height of the existing floor levels.

Checkpoint

The design team is responsible for implementing the Flooding principles in its planning and will demonstrate the outcome through:

- when in doubt in regard to the compliance of a site with the Q500 level and the additional storm surge, freeboard and climate change requirements, the design team shall undertake flood modelling to determine the position of the required lowest floor level for the health facility on the site
- the extent of the flooding as a result of a Q500 increased with storm surge, freeboard and climate change requirements shall inform a precinct wide access or isolation position and shall inform the design requirements outlined in the natural disaster section of this document
- for all new facilities, the design team shall not located buildings or structures or services in flood plains.

Where the location of buildings, structures and services below the flood level is unavoidable, appropriate civil, structural and construction methodology shall be adopted and protective measures shall be incorporated into the design.

1.11.2 Position of engineering services, including plant

Requirements

The positioning of plant and engineering services shall take noise, accessibility, future requirements, operational efficiency, redundancy and disaster readiness into account.

Rationale/example

The positioning of plant and engineering services shall have taken a number of issues into consideration, but not limited to:

- noise generated and the effects upon users of site
- noise generated and the effects on neighbours
- accessibility for replenishing, servicing, maintenance and replacement
- accessibility in regard to future upgrading
- operational effect of plant on vibration and acoustic performance of buildings
- operational efficiency and operational cost considerations related to running distances and reticulation across the site and between buildings
- redundancy requirements and future expansion requirements
- location in regard to flood levels and accessibility in case of natural disasters.

Checkpoint

The design team is responsible for implementing the positioning of engineering services principles in its planning and will demonstrate the outcome through:

- the design team shall demonstrate it has taken noise, accessibility, future requirements, operational efficiency, redundancy and disaster readiness into account in the positioning of the engineering services and the plant
- the design team shall prepare an option report to inform the preferred solution.

1.11.3 Neighbour visual, acoustic, considerations

Requirements

The positioning shall consider the impact that the operation of the facility will have on neighbours and shall aim to reduce or mitigate potential issues.

Rationale/example

Concerns of residents in close proximity to a facility that have been considered in the design of the facility include:

- lighting and overspill
- carparking noise throughout the day and into the evening. This should be reduced with visual and/or sound buffering. The predominant hard surfaces of car parking (timber paling fences, asphalt, concrete) often exacerbate the problem
- traffic noise along streets leading to the facility
- helicopter noise, (where the facility includes a helipad)
- perceived reduced visual amenity due to the construction of a facility and loss of previous site features
- perceived reduction of privacy due to high visitation levels at the facility
- construction noise during construction period.

Checkpoint

The design team is responsible for implementing the Neighbour considerations principles in its planning and will demonstrate the outcome through:

- the design team shall undertake consultation with community reference groups to establish potential areas of concern
- the design team shall undertake consultation with neighbour groups to establish potential areas of concern
- the design team shall aim to reduce or avoid the items of concern and shall provide evidence of the mitigation or the reasons why no alternative solution is viable.

1.11.4 Staging and decanting

Requirements

When the project involves work on an existing health facility, the design shall incorporate a staging and decanting strategy which shall minimise multiple relocation and allow business continuity as much as possible.

Rationale/example

The staging and decanting strategy should address the following items:

- maintaining the operation of the facility at all times, having regard to the disaster management requirements and minimum hospital services requirements of the facility and Queensland Health
- in general, build new areas for department decanting rather than temporary buildings
- move departments only once where possible, with the intent of minimising disruption
- where possible, clear a large enough site area in order to build the new facility without significantly affecting the operation of the existing facility
- maintain access to all retained plant, services storage and operational facilities.

Checkpoint

The design team is responsible for implementing the staging and decanting considerations principles in its planning and will demonstrate the outcome through:

- the design team shall test its design in MP, PDP and SD in regard to the staging and decanting strategy and shall optimise its design to reduce the need for multiple relocations and shall allow business continuity as much as possible
- the design team shall budget for the staging and decanting works and shall aim to minimise these costs.

1.12 Master planning

Requirements

The health facility MP shall translate the long-term vision and have a design philosophy that includes an effective expansion strategy, and a replacement strategy. The future expansion shall be planned to occur with minimal impedance to access to the facility by the public, patient, visitors, staff or those supplying the facility with the goods and services during the operation of the facility.

Rationale/example

In the healthcare industry a MP has different meanings in different contexts. The most common use of the term MP refers to words, diagrams and drawings describing the ‘global arrangement of activities’ in a health facility with particular emphasis on land use, indicating growth and change over time.

Under the above definition, a MP is a fundamental planning tool to identify options for the current needs as well as projected future needs. Its purpose is to guide decision making for clients and designers, health facility owners and designers are encouraged to prepare a MP before any DD. Ideally, a successful MP will avoid wrong long-term strategic decisions, minimise abortive work, prevent future bottlenecks and minimise expectations that cannot be met in the given circumstances.

The facility will be modified or expanded to meet the requirements of changes in medical technology, case mix and demand that will occur over the life of the facility.

A MP diagram or drawings is typically a simplified plan showing the following:

- the overall site or section of site relating to the development
- departmental boundaries for each level related to the development
- major entry and exit points to the site and the relevant departments
- vertical transport including stairs and lifts
- main inter-departmental corridors (arterial corridors)
- location of critical activity zones within departments but without full detail
- future developments, expansions, renewals
- areas (if any) set aside for future growth, partnering and change
- arrows and notes indicating major paths of travel for various types of vehicles, visitors, patients, staff, logistics and emergency traffic
- services MP showing the engineering impact, plant locations, availability of services and future demand
- staged renewal diagrams indicating the medium to long-term staged progress and implementation of the works. This would include all of the criteria above for each stage.

Checkpoint

The design team is responsible for implementing the MP considerations principles in its planning and will demonstrate the outcome through:

- the design team shall comply with the MP requirements of this guideline and shall demonstrate it has complied with the required input and items to consider as described in the planning sections above
- the design team shall provide a staged MP scenario that meets the projections identified in the health services plan and functional brief and shall demonstrate a medium plan for 10 years and anticipate a long-term plan up to 30 years.

1.12.1 Master plan documents

Requirements

MP diagrams and drawings shall be prepared for all logical options (typically three) to an equal level of resolution and presentation so that each option reaches its maximum potential.

Rationale/example

Depending on the nature of the project, the exact deliverables for a MP can be fine-tuned. Additional requirements are outline below in this section.

The MP shall allow each option to be compared on equal terms. The diagrams and drawings are typically accompanied by a report covering the following headings as a minimum:

- project description
- outline brief
- opportunities and constraints
- options considered
- evaluation criteria
- evaluation of the options including cost impact (if any)
- recommended option
- executive summary and recommendation.

Checkpoint

The design team is responsible for implementing the MP documents principles in its planning and will demonstrate the outcome through:

- the design team shall prepare a minimum of three master logical options, including plan diagrams and drawings for all to an equal level of resolution and presentation so that each option reaches its maximum potential
- the diagrams and drawings are presented in a report identifying the option evaluation, including opportunities and constraints, individual costing, individual program and a detailed outline presented as a master concept plan on the preferred option and its reasons for recommendation
- the production of a building information model as per the Project Information Requirements Building Information Modelling (BIM) document.

1.12.1.1 Stacking plans**Requirements**

This shall be used for locating departments in multistorey developments to illustrate the departmental relations and the operational intent.

Checkpoint

The design team is responsible for implementing the staking plan principles in its planning and will demonstrate the outcome through:

- use of stacking plans to establish vertical and horizontal connections.

1.12.1.2 Master concept plan**Requirements**

This shall be used as a further development of the preferred MP option.

Checkpoint

The design team is responsible for implementing the master concept plan principles in its planning and will demonstrate the outcome through:

- the development of a master concept plan shall highlight the reasons for its recommendation and shall provide more DD resolution to be further tested and costed
- the master concept plan shall be associated with a schedule of accommodation for area allowance purposes and budget testing only.

1.12.1.3 Staging plan

Requirements

A staging plan shall show a complete MP defined for each stage of the development rather than simply a zone allocation for future works.

Checkpoint

The design team is responsible for implementing the staging plan principles in its planning and will demonstrate the outcome through:

- the staging plan shows a complete MP defined for each stage of the development and shall consider operational, construction, services provision and maintenance of health services delivery.
- staging plans shall indicate the required decanting areas and the affected areas of the site/building.

1.12.1.4 Strategic plan

Requirements

A strategic plan shall be a higher level ‘what if’ studies. It shall provide a range of development scenarios. These may include the use of alternate sites, private-public collocation, purchase vs. lease or alternate operational policies. A strategic plan can be used to test a certain service delivery demand versus the site infrastructure and site constraints and inform the client on a strategic direction.

Checkpoint

The design team is responsible for implementing the strategic plan principles in its planning and will demonstrate the outcome through:

The strategic plan provides a range of development scenarios.

- Option A—Minimal impact. (high risk mitigation only)
- Option B—Medium-term (high risk mitigation + staged implementation of long-term strategy)
- Option C—Long-term (high risk mitigation + immediate realisation of long-term strategy).

1.12.1.5 Future proofing

Requirements

A MP shall be future proofed in line with the projection in the health services plan, the relevant population date for the catchment and with trends in the care delivery in Queensland health that are likely to occur in the next 30 years.

Rationale/example

The MP shall demonstrate how the facility can renew itself on the site, or if the renewal is impossible to achieve it shall identify future renewal obstacles and possible alternative solutions in either clinical service delivery program or site expansion.

The MP shall identify other development opportunities without impacting on the renewal strategy.

Life cycle assessment guidelines and applicable sustainability principles to be considered.

Checkpoint

The design team is responsible for implementing the future proofing principles in its planning and will demonstrate the outcome through:

- the design team shall provide evidence that the MP is future proofed in line with the projection in the health services plan, the relevant population data for the catchment and with trends in the care delivery in Queensland Health that are likely to occur in the next 30 years
- the design team shall provide evidence how the MP facilitates the facility to renew itself on the site or shall provide an alternative strategy.

1.12.1.6 Adaptability/flexibility

Requirements

The facility will serve the current and future generations and therefore must accommodate ongoing changes.

Checkpoint

The design team is responsible for implementing the adaptability and flexibility principles in its planning and will demonstrate the outcome through:

- the design team shall provide evidence how the MP facilitates the facility to adapt for future changes in relation to:
 - the facility population
 - healthcare disease patterns
 - treatment modalities and care models
 - work practices
 - medical, information and communication technology advances
 - research and education
 - building design and construction innovation.

1.12.2 Position of infrastructure services

Requirements

Services reticulation shall be determined with the MP and future developments in mind to maintain a high degree of flexibility.

Rationale/example

This avoids unnecessary interruptions and expansive alterations to base infrastructure.

In the case a centralised energy principle will be considered, this will have to be located and staged to suit the development of the MP.

Especially the main trunks, such as water, fire and power are located well outside the areas where future expansion is expected to occur.

Checkpoint

The design team is responsible for implementing the positioning of infrastructure principles in its planning and will demonstrate the outcome through:

- the design team shall demonstrate that the services reticulation is to maintain a high degree of flexibility and will not be impacted by medium-term future expansion.

1.13 Whole-of-hospital departmental relationships

Requirements

Departmental relationships shall evolve through innovative health planning which maximises flexibility and the optimal use of resources. Departmental adjacencies shall be informed by an understanding of the broader clinical and operational requirements of healthcare facilities and by the individual functional briefs.

Rationale/example

Planning shall ensure the collocation of appropriate services with consideration to their clinical and/or 12/24-hour functions. Collocation shall be considered with both horizontal and vertical connectivity. Patient, staff and visitor flows within the facility also inform departmental adjacencies.

The importance of maintaining patient safety and security in the movement of both high and low acuity patients shall be reconfirmed and identified in the user group consultation.

Checkpoint

The design team is responsible for implementing the whole of hospital relationship principles in its planning and will demonstrate the outcome through:

- The design team shall demonstrate its whole of hospital departmental planning principles and shall provide whole of hospital concept diagrams identifying and proving the key design objectives as indicated in *CIR Volume 3 Architecture and health facility design Section 1 Principles*:
 - increase the efficiency of the operation
 - deliver a patient focused environment
 - integrate evidence based design
 - safe environment
 - future proofing
 - adaptability and flexibility
 - increase retention of staff and support staff attraction
 - connectivity space
 - a focus on whole-of-life (WOL)
 - the provision of a modern digital facility

- innovative design concepts
- business continuity strategies
- stakeholder relationship management
- campus amenity
- partnerships
- scalability for regional context.

1.14 Departmental functional relationship diagrams

Requirements

Departmental functional relationships diagrams shall form the basis for design and indicate the direct relationships between areas.

Rationale/example

- Refer *CIR Volume 2 Functional design brief Section 2 Manual* for examples and format requirements of functional relationship diagrams.

Checkpoint

The design team is responsible for implementing the departmental relationship principles in its planning and will demonstrate the outcome through:

- mapping of departmental functional relationships has been conducted in response to the functional design brief and user consultation
- diagrams have formed the basis for design and indicate the direct relationships between clusters has been established.

1.15 Functional relationships/adjacencies

Requirements

The designer must take great care to understand and implement the critical adjacencies between the departments in his design and planning of the health facility.

Rationale/example

The functional physical adjacencies of each specialist department within a hospital are paramount and determine the planned footprint of a healthcare facility. This footprint determines the facility's circulation flow, ease of communication and shapes how people use the subsequent spaces.

Checkpoint

The design team is responsible for implementing the functional relationships principles in its planning and will demonstrate the outcome through the design team shall:

- demonstrate that the design complies with the requested critical adjacencies between the departments and shall demonstrate this compliance by mapping the various patient journeys and access points
- demonstrate that the design achieves:

- patient access points as close as possible to their destination
- short routes for staff and patients
- maximisation of single lift journeys
- avoids bottlenecks.

1.15.1 Internal circulation and spatial organisation

Requirements

The internal organisation of the facility must be based on a legible plan that is easy to understand with intuitive way finding. The circulation pattern will be clear and transparent to create an order to the complex organisation of the various departments and shall be planned around a main organisational element that will become the ‘centre’ or ‘spine’ of the facility. Areas of common usage will be treated as focal points within the facility.

Rationale/example

The main entrance of the facility shall be clearly visible from the access road. Access at ground surface level(s) is required for the main entrance and the emergency department.

The lobby reception, central circulation and waiting areas shall be light, bright, easily identifiable, spacious and centrally located in relation to all functional units.

The facility layout will attempt to separate inpatient and staff flows from outpatient and visitor flows.

Circulation must be sufficiently generous to allow full accessibility and ‘barrier-free’ design for all users. Public traffic routes must not be through operational areas. Within each department, the internal spatial organisation shall be planned around a clear circulation system and allow maximum access to daylight, external views and outdoor spaces to staff and patients in waiting and treatment areas.

Allocations of attending the ambulatory care department will have access without having to traverse clinical and inpatient areas.

Safe and easy access shall be provided to and from car parking areas for visitors and staff. Service, delivery and waste management routes shall be clearly established from the loading dock to all areas of the building.

Checkpoint

The design team is responsible for implementing the Internal circulation principles in its planning and will demonstrate the outcome through:

- the design team shall demonstrate that the design uses a legible plan and clear circulation and wayfinding and shall demonstrate this compliance through:
 - the presence of a main organisational element in the form of a ‘centre’ or ‘spine’
 - the main entrance of the facility shall be clearly visible.
- The ambulatory care department will have direct access:
 - a generous ‘barrier-free’ circulation, with public routes that are clear and direct
 - safe and easy access shall be provided to and from car parking areas
 - travel routes provide views, easy orientation, and appropriate lighting

- during transport, patients are able to maintain dignity during transfers, including transfers into lifts
- separate pathways are provided for materials movement, public circulation and the transportation of patients
- areas of inpatient accommodation and clinical treatment have direct access from the central circulation.

1.15.1.1 Movement of visitors, staff and patients

Requirements

The facility shall reflect design techniques for moving visitors, staff and patients through the facility with the least effort. Spaces shall be designed to create privacy where required and direct visitors through defined areas. ‘Back-of-house’ movement shall cause minimal disruption to the mainstream work environment and not be readily accessible to visitors or patients.

Wayfinding shall enable all facility users to reach their destination without getting lost or traversing areas that are private or contentious.

Checkpoint

The design team is responsible for implementing the *Movement of people principles* in its planning and will demonstrate the outcome through the design team shall demonstrate that the design uses:

- techniques to moving visitors, staff and patients through the facility with the least effort by mapping the various patient, staff and visitor routes and access points
- integrated wayfinding techniques to minimise getting lost.

1.15.2 Horizontal

Requirements

Long travel distances are an access barrier for many facility users, even when the path of travel is flat. A low-rise deep plan layout (rather than a short-distance multistorey one) carries with it that challenge. A useful principle is to keep the travel distances to a minimum. The longer ones should be avoided or when not possible should be limited to logistics and supply only and the use of AGV or alternative mechanical solutions should be used.

Checkpoint

The design team is responsible for implementing the horizontal relationship principles in its planning and will demonstrate the outcome through the design team shall demonstrate that the design:

- has kept horizontal travel distances to a minimum for patients and staff
- only allows longer travel distances for supply and logistics and utilised a mechanical or AGV solution
- minimises horizontal travel distances by mapping the various patient, staff and visitor routes and access points.

1.15.2.1 Gradient restraints

Requirements

The design of gradients within the site shall comply with statutory regulations.

Checkpoint

The design team is responsible for implementing the gradient principles in its planning and will demonstrate the outcome through compliance with AS1428.

1.15.2.2 Resting places

Requirements

The design of resting places within the site shall comply with statutory regulations.

Rationale/example

The term is used to distinguish the facility from landings, which are incorporated in the line of the path of travel of ramps and walkway.

Checkpoint

The design team is responsible for implementing the resting places principles in its planning and will demonstrate the outcome through:

- locate resting places adjacent to the path of travel
- where there are landings, locate resting places so that they are accessible from them
- at each resting place, provide space for seating and for people in wheelchairs
- arrange the relationship between the seating and the wheelchair spaces so that people may sit side-by-side.

1.15.2.3 Footpaths and circulation areas**Requirements**

All principal footpaths and circulation paths shall be design compliant with statutory requirements.

Checkpoint

The design team is responsible for implementing the footpaths principles in its planning and will demonstrate the outcome through:

- provide all principal footpaths and circulation paths, and those that are expected to cater for a large number of people, with a minimum width of 1800 millimetres to allow two wheelchairs to pass. Include ramps in this criterion
- in other areas, make provision for passing points to meet the AS 1428.1 criteria, at intervals not exceeding 20 metres and, where the whole path of travel is not visible from both its ends, at positions which are visible:
 - from one end and another passing point or
 - from the two nearest adjacent passing points.
- ensure that footpaths and circulation areas have a maximum of 1 in 20 gradient with a maximum 1 in 40 cross fall
- ensure that any elements in footpaths and circulation areas, such as waste bins and telephones, have a maximum ground clearance of 300 millimetres at the front edge, to allow them to be detected by a person using a long cane, and a luminance contrast with the paving of 30 per cent minimum. Where this is not possible, provide warning TGSIs to allow detection
- ensure that the projecting ends of handrails at ramps and stairs at right angles to the path of travel do not protrude into it. Observe AS 1428.1 figures 16 and 17.

1.15.2.4 Walkways**Requirements**

Walkways may include pedestrian crossings. The design of the pedestrian crossings will involve pedestrian way design. The safety and amenity of people who may be in danger, or who may become disoriented, must be recognised. Major crossings shall be signalised.

Checkpoint

The design team is responsible for implementing the walkways principles in its planning and will demonstrate the outcome through the design team shall demonstrate that:

- pedestrian crossings are designed in a safe manner and provide sufficient amenity for people of all ages and ability
- travel distances to a minimum for patients and staff.

1.15.2.5 External ramps**Requirements**

Where external ramps are provided, ensure adjacent stairs or a lift is also provided for those who have difficulty walking up or down ramps.

Checkpoint

The design team is responsible for implementing the external ramp principles in its planning and will demonstrate the outcome through:

- where ramps are provided, provide adjacent stairs or a lift. The head and foot of an adjacent stair or ramp, or the lift door, is visible from the head and foot of the other. The alternative paths of travel are visible and obvious to a potential user
- step ramps or kerb ramps are not used in series. Where kerb ramps are used at pedestrian crossings, their gradient is between 1:8 and 1:8.5 and their axis is aligned with the direction of the pedestrian crossing.

1.15.2.6 External stairways and steps**Requirements**

All external stairways and steps shall be design compliant with statutory requirements.

Checkpoint

The design team is responsible for implementing the external stairways and steps principles in its planning and will demonstrate the outcome through:

- where there are two or more steps, a handrail on both sides and continue handrails around the mid-landings has been provided, to AS 1428.1
- note 1: DSAPT have particular requirements for height to AS AS1428.2
- tread/riser proportions are designed to requirements of the NCC
- note 1: DSAPT particular requirements for going/riser configuration to AS 1428.2
- 30 per cent luminance contrast strip 50–75 millimetres wide provided on the treads to AS 1428.1.
- note 1: the detail is fundamentally different from that in AS 1428.2
- handrails designed to meet AS 1428.1
- note 1: the standard now offers a wider choice of details where the handrail terminates
- the head and foot of an adjacent stair or ramp is visible from the head and foot of the other. The alternative paths of travel are visible and obvious to a potential user.

1.15.3 Vertical

1.15.3.1 Vertical connectivity

Requirements

The utilisation and location of vertical transportation cores can minimise internal travel distances. The positioning shall be informed by accessibility to departments, patient/visitor and logistical separation considerations, operational efficiency and wayfinding considerations.

Checkpoint

The design team is responsible for implementing the vertical relationship principles in its planning and will demonstrate the outcome through:

- the design team shall demonstrate that the location and utilisation of vertical transportation optimises travel distances by mapping the various patient, staff and visitor routes and access points.

1.15.3.2 Lifts

Requirements

Lifts provide good connectivity between vertical floors to create adjacencies between departments. Vertical travel times can often be much shorter than long horizontal travel in the larger facilities.

Checkpoint

The design team is responsible for implementing the Lifts principles in its planning and will demonstrate the outcome through the design team shall:

- demonstrate that the lifts provide good connectivity between vertical floors to create adjacencies between departments
- make effort in the design to reduce lift traffic, and provide a healthy alternative, such as stairs and by masking them behind stairs.

1.15.3.3 Stairs and visual connectivity

Requirements

The provision of open stairs shall be encouraged as much as possible. Not only does it provide a healthy alternative to lifts, it provides visual connectivity between floors and promotes connectivity between departments. Open stairs may lead to the requirement for fire engineering and shall be carefully considered in detail.

Checkpoint

The design team is responsible for implementing the Stairs and visual connectivity principles in its planning and will demonstrate the outcome through:

- open stairs are provided where possible
- since open stairs may lead to the requirement for fire engineering, decisions to use are carefully considered in detail and shall not impact any future flexibility in relation to fire department boundaries.

1.16 Spatial parameters

1.16.1 Building grid

Requirements

An efficient building grid shall be considered from a build ability point of view and building economics, but also from a spatial waste point of view. Grids of 8.4, 9.6 and 10.2 provide great flexibility and little wastage caused by planning when utilising the rooms from the AusHFG a guide. These grids are interchangeable for ambulatory care, non-clinical workplaces and medical areas.

A customised grid for the inpatient units will provide better economy, however an alternative inpatient room design in relation to the AusHFG could be considered to achieve a standardised grid across the entire building.

Checkpoint

The design team is responsible for implementing the building grid principles in its planning and will demonstrate the outcome through:

- the design team shall demonstrate that it has investigated value for money versus planning efficiency in the determination of the suitable grid.

1.16.2 Floor to floor height

Requirements

Floor to floor heights shall be considered for modern clinical usage. Existing buildings with floor to floor below 4 meter shall not be considered for clinical re-use. An adaptive reuse shall be determined informed by a holistic review of the condition and suitability, including the building services and structural condition.

Rationale/example

Adaptive re-use to be considered can include, but not limited to offices, retail, allied health functions and ambulatory care.

In new facilities a minimum floor-to-floor of 4.5 meters shall be considered throughout the facility.

Checkpoint

The design team is responsible for implementing the floor-to-floor ceiling height principles in its planning and will demonstrate the outcome through the design team shall demonstrate:

- that it has investigated value for money versus planning efficiency in the determination of the floor-to-floor heights and that considerations for modern clinical usage are incorporated
- that a holistic review of existing buildings with floor-to-floor below four meters has occurred to determine the adaptive re-use
- solid reasons when not conforming to a minimum floor-to-floor height of 4.5 metres throughout a new facility.

1.16.3 Travel times and sightlines

Requirements

Efficient layouts shall reduce travel time for staff and clear sightlines between staff stations and patients to allow observation minimises the required travel and increases patient safety.

Rationale/example

Circulation routes shall be clear and uncluttered to provide overall safety and allow efficient exit out of the building in case of an emergency.

Checkpoint

The design team is responsible for implementing the travel time principles in its planning and will demonstrate the outcome through the design team shall demonstrate that:

- it has investigated staff travel distances and times in the planning of the departments
- it has investigated the sightlines between staff in the planning of the departments
- it has designed clear and uncluttered circulation routes to provide overall safety.

1.17 Wayfinding

Requirements

Appropriate wayfinding design and signage for designated areas shall be included to assist patients, visitors and staff to navigate around, preventing confusion and disorientation. The wayfinding shall be part of a permanent wayfinding strategy and shall be applied to the entire project, which can also be applied to change management and future stages of the development.

Rationale/example

Good wayfinding design has significant benefits for a healthcare service, both in human and monetary. In a hospital environment good wayfinding design can directly reduce stress for patients, staff and visitors. Disorientation, caused by poor wayfinding design, contributes directly to a facility's operating costs as a result of people becoming lost, missing or being late for appointments, as well as contributing to increased stress which in turn can drive staff absenteeism and reduce healing outcomes.

Wayfinding designs shall be an integral solution to the healing implications of stress applied to users through the wayfinding experience. The wayfinding shall aid in understanding the building design and the graphic design shall not be complicated or introduces difficult and misunderstood medical terms.

The wayfinding design must simplify the wayfinding experience, reduce stress associated with disorientation, and engage all people regardless of their language, ability or culture. The wayfinding design must be welcoming and non-institutionalised.

The wayfinding design must make a strong connection with all available environmental and sensory cues and markers, whether built or part of the natural environment.

The graphic design component of the wayfinding strategy must include:

- colour—visual identifiers
- shape—visual and interpretive identifiers

- permanent identifiers in a raised tactile and braille format
- adaptable visual identifiers for change management.

The wayfinding system and signage within the facility must:

- be effective and comprehensive
- be innovative and address the needs of all user groups, including patients, visitors, staff, facility management and people with disability
- consider all aspects of the built environment, including any intuitive wayfinding elements that may assist the visitor's ability to read and understand the facility
- be integrated with the architectural planning, landscape design and public art
- feature appropriate graphics to assist wayfinding and be coordinated with the approach to public art
- provide for temporary and future connections to other buildings on the site
- comprise appropriate street signage (arranged in conjunction with the relevant authorities) indicating the location of the facility and any parking or street-side signage necessary on public roads.

The wayfinding system and signage must include the following sign types:

- signs for the external site and to identify each of the different buildings
- signs to identify the car parks and to direct facility users to the car park
- signs to direct pedestrian facility users to and around the facility
- directories and maps for each of the lifts and foyers within the facility
- electronic interactive directories at each main entrance and the emergency entrance
- signs which identify each of the discrete departments and clinical areas within the facility and to the extent that the discrete clinical services and clinical support services have dedicated areas within the facility, signs which direct facility users to those service
- signs for the discrete reception areas within the facility
- signs which identify the name or number of each of the discrete bedrooms, bed and treatment bays within the facility
- signs for each door which identify each room within the facility
- information signs
- an appropriate number of illuminated large scale campus signs
- an illuminated logo and facility name signage on the building's façade.

References to be applied to the design must include:

- Queensland Health *wayfinding guidelines (QH-GDL-343-6-1)*
- *Disability Discrimination Act 1992*
- *Anti-Discrimination Act 1991*
- NCC
- AS 1428, Part 1–4.

Checkpoint

The design team is responsible for implementing the wayfinding principles in its planning and will demonstrate the outcome through:

- the design team shall develop and implement a permanent wayfinding strategy and shall apply this to the entire project
- the design shall comply with the wayfinding strategy, principles and sign requirements outlined in this guideline
- the design shall comply with the *Queensland Health wayfinding guidelines*.

1.18 Bariatric design requirements

Requirements

Provision for bariatric patients is a growing requirement for Queensland Health and the industry in general. The design has to consider the weight and the size of patients as heavy as 250kg or more.

Rationale/example

The provision of ceiling tracks or other lifting devices in patient rooms is not required to be 100 per cent compliance, as in being available in each room, however considerations shall be given to the DD and location of support and services to allow future upgrades and introduction of bariatric support aids while minimising the disruption and cost impact on the existing environment for the installation of:

- ceiling tracks in the patient rooms and bathrooms
- widening of doors in consultation suites and treatment areas
- strengthening and replacement of grab rails.

A number of specific bariatric rooms shall be provided as specified in the functional design brief.

Checkpoint

The design team is responsible for implementing the bariatric design principles in its planning and will demonstrate the outcome through the design shall:

- provide specific bariatric rooms as specified in the functional design brief
- provide a suitable amount of other spaces that are compatible with bariatric requirements, such as:
 - treatment rooms
 - consultation rooms
 - resuscitation bays
 - morgue
 - lifts
 - toilets.
- consider the bariatric requirements as a result of weight and size of patients as heavy as 250 kilograms or more, in the provision of:
 - grab rails

- sanitary fixtures
- beds and chairs
- wheelchairs and mobile hoists
- door widths.
- the provision of suitable lifting devices in a considered amount of patient rooms, patient bathrooms and treatment areas
- consider the future installation of suitable lifting devices in the remaining amount of patient rooms, patient bathrooms and treatment areas.

Relevant specifications—bariatric design requirements

Refer

- AusHFG Part C: Design for Access, Mobility, Safety and Security

1.19 Infection Isolation

Requirements

All areas of the facility shall be designed, constructed, furnished and equipped in keeping with the principles of infection control. Infection control involves the prevention of possible spread of infection by minimising the transfer of micro-organisms from person-to-person.

The application of infection isolation shall be undertaken by close consultation with the relevant infection control representatives starting in the early stages of the MP and throughout the project design and delivery stages.

All Queensland Health kitchens and other food related infrastructure shall meet the *Food Act 2006* and the Australia New Zealand Food Standards Code.

Rationale/example

Infection control requirements are critical to the planning of a health facility and need to be incorporated into plans and specifications.

A number of strategies contribute to the control of infection, such as hand washing, careful aseptic technique and the observance of 'standard precautions'.

Facets of construction and fit-out that contribute to effective infection control include:

- ventilation
- floor coverings
- waste management
- provision for ease of cleaning
- provision for sterilisation and disinfection of equipment and instruments
- provision for the isolation of infectious patients as required.

The following items must be considered:

- the materials used in the facility shall be generally easy to clean, non-porous, and avoid gaps and cracks which are difficult to clean and maintain
- all services must be designed and maintained mindful of infection control.

Consider sufficient space to allow enough room for storage of personal protective equipment i.e. gowns and gloves for protective isolation.

Refer to the AusHFG and *CIR Volume 4 Engineering and infrastructure* for further details.

Checkpoint

The design team is responsible for implementing the *Infection Isolation principles* in its planning and will demonstrate the outcome through the design team shall:

- demonstrate its close consultation with infection control team from the early stages in the MP
- demonstrate the infection control measures that are undertaken in the design in each of the design stages: MP, PDP, SD, DD and CD.

Relevant specification—infection isolation

Refer

- HB260: Hospital acquired infections—Engineering down the risk.

1.20 Safety in design—risk issues

Requirements

In respect of legislative requirements the *Work Health and Safety Act 2011* states that designers of structures can influence the safety of these products before they are used in the workplace. These people have a responsibility, so far as is reasonably practicable, to ensure these products are without risks to the health and safety of people who are at or near the workplace. Queensland Health as a client and other members of the project team, such as people influencing the design, engineers, interior designers, project manager and contractors have similar duties.

Refer to the *Work Health and Safety Act 2011* for further details.

Rationale/example

Safe design is a strategy aimed at preventing injuries and disease by considering hazards as early as possible in the planning and design process. A safe design approach considers the safety of those who construct, maintain, clean, repair and demolish a building or structure as well as those who work in it. Safety can be enhanced through choices in the design process. These decisions are made in consideration of other design objectives such as aesthetics, practicality and cost.

Checkpoint

The design team is responsible for implementing the safety in design principles in its planning and will demonstrate the outcome through the design team shall:

- establish and implementation of a safety in design risk registers
- provide a link between the registers and the building information model
- undertake safety in design workshops and consultants shall be appointed for review throughout all design and delivery stages of the project
- shall demonstrate the risks identified and control measures proposed for each of the three key phases:
 - design for safe construction
 - design for safe maintenance
 - design for use.

1.20.1 Work health and safety

Requirements

Compliance with the *Work Health and Safety Act 2011* by all member of the project team:

- designers
- engineers
- interior designers
- project managers
- client
- brief providers.

1.20.2 Obligations

Requirements

The undertaking of this risk management process is mandatory by act of parliament and cannot be ignored or avoided by the project team as a whole or by any member of the project team. The collective safe design obligations requires the team to identify potential workplace health and safety hazards, assess the risks the hazards may have on the persons constructing the structure and working in or on the structure when completed, and then, where practical to do so, provide an appropriate solution to eliminate or minimise the hazard.

To meet this onerous obligation, it is necessary for the design team to collectively undertake and document a hazard identification and risk assessment procedure throughout all stages of the project design and documentation. This procedure will necessarily involve the client and project manager and the contractor to fulfil their obligations under the Act.

1.20.3 Objectives

Requirements

The primary objective of this risk management procedure is to:

- minimise the risk of design-related accidents, ill health and health and safety losses on projects

- collectively provide all with specific arrangements to comply with the Act, codes of practice and guidelines
- promote and emphasise the efficient management of safe design through project management protocols.

1.20.4 Meetings

Requirements

It is expected that each member of the project team has established risk management procedures in place and these shall be reviewed in order to collectively agree on a format and methodology for review and recording. The contractor quality assurance manager shall schedule an initial meeting to review established procedures, consider the respective expertise and inputs by each member, and agree on the methodology and format for identifying and recording the assessment process. A series of meetings shall be convened to a pre-agreed programme to address each key stage of the DD and documentation process. This process shall commence in the design phase of each stage.

1.20.5 Safety in design hazard and risk register

Requirements

The safety in design management procedure shall include an assessment form to be reviewed and recorded at each meeting. All project team members, including Queensland Health and the HHS must actively assist in implementing this procedure.

1.20.6 Workshop

Requirements

A summary and attached appendix shall list out the risks identified, and control measures proposed for each of the three key phases:

- design for safe construction
- design for safe maintenance
- design for use.

1.21 Standard rooms

Requirements

The design team shall conduct the development of a standard room process for the facility in close consultation with the facility users and Queensland Health and demonstrate a minimum of 80 per cent of the room types to be based on standard rooms.

Rationale/example

Early in the concept design phase, a consultation process on standard rooms shall be implemented to ensure that rooms that are repeated throughout the facility will contain the same items of equipment and envelope design requirements. The initial requirements for these rooms can be based initially on the AusHFG as well as standard rooms from other recent health projects.

These shall be developed with amendments as required for the models of care to be implemented specifically for the project, as well for the specific environmental and services requirements that are relevant.

Overseas projects have successfully proven to apply ratios of 80 per cent standard rooms without any adverse effects on the functionality. This allows a great flexibility in use due to the generic approach, but brings very significant cost saving due to the repetition factors.

Checkpoint

The design team is responsible for implementing the standard room principles in its planning and will demonstrate the outcome through:

- the design team shall conduct the development of a standard room process for the facility in close consultation with the facility users and Queensland Health
- the design shall comply with the minimum of 80 per cent standard rooms and these shall be identified and included in the RDS
- The use of a space planning tool linked to the building information model is required.

1.22 Schedule of accommodation

Requirements

The schedules of accommodation shall provide as a minimum the information identified below. The schedule will gain more detail during the design stages from MP to DD.

The schedules shall be built upon the accommodation brief, provided as part of the functional design brief. Note that areas and rooms identified in the accommodation brief is indicative for clinical and operational requirements and that the accommodation brief will not represent the total build area requirements. It shall be design teams responsibility to establish a complete SOA identifying all build area (FECA).

Table 2 : Indicative master plan—schedule of accommodation

Areas Description	Unit / Bed No. Existing	Unit / Bed No. Proposed at opening	Unit / Bed No. Proposed till end of service plan	Current Hospital			Strategic Plan			Master Plan			Existing vs. new			
				Depart Area	Travel & Eng.	GFA	Depart Area	Travel & Eng. (28%)	GFA	Depart Area	Travel & Eng. (30%)	GFA	Area	%		
CLUSTER 1 - SUPPORT						2,496			3,470	937	4,407	3,470	308	3,778	1,282	51.4%
Kitchen						483			700	189	889	700	210	910	427	88.6%
Mortuary						184			175	47	222	175	53	228	43	23.5%
Maintenance Engineering						559			600	162	762	600	0	600	41	7.4%
Linen Handling / Laundry						432			500	135	635	500	0	500	68	15.8%
Biomed. Technical Services						102			120	32	152	120	0	120	18	18.1%
Environmental Sciences						0			75	20	95	75	0	75	75	
Waste Management						0			100	27	127	100	0	100	100	
Contaminated Waste						64			75	20	95	75	0	75	12	18.1%
Staff Amenities						0			150	41	191	150	45	195	195	
Archive						0			250	68	318	250	0	250	250	
Supply						597			650	176	826	650	0	650	53	8.9%
Chemical Store						76			75	20	95	75	0	75	-1	-1.6%
CLUSTER 2 - AMBULATORY CARE						2,140			3,350	905	4,255	3,350	1,005	4,355	2,215	103.5%
Renal	8	9	19			318			600	162	762	600	180	780	463	145.7%
Clinical Measurement	2	2	4			178			225	61	286	225	68	293	115	64.5%
Dental	8	10	14			483			500	135	635	500	150	650	167	34.7%
Ambulatory Care (Outpatients)	14	20	30			762			1,500	405	1,905	1,500	450	1,950	1,188	155.9%
Child & Adolescent Outpatients	2	4	6			318			300	81	381	300	90	390	73	22.8%
Day Oncology (8B) / Haematology	3	5	8			83			225	61	286	225	68	293	210	254.3%
CLUSTER 3 - AMBULATORY INTERFACE						4,686			8,360	2,257	10,617	8,390	2,517	10,907	6,221	132.7%
Main Entry						102			230	62	292	230	69	299	197	194.3%
Commercial						0			120	32	152	150	45	195	195	
Pathology						267			300	81	381	300	90	390	123	46.2%
Emergency	16	28	36			972			1,750	473	2,223	1,750	525	2,275	1,303	134.2%
Emergency Short Stay (16B)	0	10	16			0			450	122	572	450	135	585	585	
MAPU (12B)	0	8	12			0			325	88	413	325	98	423	423	
CCU (8B)	3	6	8			381			375	101	476	375	113	488	107	28.0%
Security						0			40	11	51	40	12	52	52	
Medical Records						457			550	149	699	550	165	715	258	56.4%
Medical Imaging	8	10	13			1,048			1,500	405	1,905	1,500	450	1,950	902	86.1%
Pharmacy						216			250	68	318	250	75	325	109	50.5%
Allied Health						1,010			1,300	351	1,651	1,300	390	1,690	680	67.4%
Transport Services / Transit Lounge						25			120	32	152	120	36	156	131	514.2%
Pre-Admission Centre						210			250	68	318	250	75	325	115	55.1%
Rehabilitation Services Community						0			800	216	1,016	800	240	1,040	1,040	
CLUSTER 4 - INPATIENT						5,455			5,725	1,546	7,271	5,725	1,718	7,443	1,988	36.4%
Inpatient Medical / Palliative (1x30B)	37	26	30			3,556			892	241	1,133	892	268	1,160	-2,396	-67.4%
Inpatient Surgical / Orthopaedic (2x30B)	29	45	60			0			1,783	481	2,264	1,783	535	2,318	2,318	
Inpatient Obstetric (20B)	17	21	20			0			650	176	826	650	195	845	845	
Inpatient Child & Adolescent (18B)	10	12	18			533			550	149	699	550	165	715	182	34.0%
Inpatient Sub Acute Rehab / GEM (29B)	12	12	29			699			1,200	324	1,524	1,200	360	1,560	862	123.3%
Inpatient Aged Care (15B)	0	7	15			0			650	176	826	650	195	845	845	
CLUSTER 5 - MENTAL HEALTH						1,708			2,200	594	2,794	2,200	660	2,860	1,152	67.4%
Inpatient Acute Psych (30B)	18	21	30			1,270			1,600	432	2,032	1,600	480	2,080	810	63.8%
Community Mental Health (Adult & Child)						438			600	162	762	600	180	780	342	78.0%
CLUSTER 6 - HOT FLOOR & INTERFACE						3,931			4,825	1,303	6,128	4,825	1,448	6,273	2,342	59.6%
Special Care Nursery (9 cots)	4	7	9			191			200	54	254	200	60	260	70	36.5%
Birthing / Delivery	4	4	5			318			375	101	476	375	113	488	170	53.5%
Birthing Centre	2	3	4			311			300	81	381	300	90	390	79	25.3%
Operating Suite	3	4	5			1,410			1,500	405	1,905	1,500	450	1,950	540	38.3%
Endoscopy	1	1	2			0			350	95	445	350	105	455	455	
Day Surgery	8	20	28			762			600	162	762	600	180	780	18	2.4%
CSSD						400			600	162	762	600	180	780	380	95.0%
HDU (6B)	3	4	6			0			300	81	381	300	90	390	390	
ICU (10B)	2	6	10			540			600	162	762	600	180	780	240	44.5%
7. ADMIN / EDUCATION						574			2,300	621	2,921	2,300	690	2,990	2,416	420.9%
Administration						464			1,400	378	1,778	1,400	420	1,820	1,356	292.6%
Training & Edu. Rooms						110			900	243	1,143	900	270	1,170	1,060	958.9%
8. DISCRETIONARY UNITS						2,407			3,700	999	4,699	850	165	1,015	-1,392	-57.8%
Education partner						356			0	0	0	0	0	0	-356	-100.0%
Information Technology						730			800	216	1,016	550	165	715	-15	-2.1%
Tropical Public Health						235			250	68	318	0	0	0	-235	-100.0%
Accommodation Refurb						610			800	216	1,016	0	0	0	-610	-100.0%
Emergency Housing						0			300	0	300	300	0	300	300	
Child Care Centre (75 Places)						0			850	230	1,080	0	0	0	0	
Community Health						0			1,000	270	1,270	0	0	0	0	
Gross Department Area									33930			31110				
Travel & Engineering										9,161			8,510			
FECA						23,396					43,091			39,620	16,224	69.3%

Table 3 : Indicative SOA PDP

Area Schedule Measured - PDP							
DEPARTMENT ZONE	DEPARTMENT AREA	Departmental Zone	Nos of beds	Current FDP Area Schedule - Jan 2009	AHFG Guideline Area	Masterplan Review Report Nov 2008	AHFG areas - Benchmark-SOA
1		Main Entry					
	1.1	Main Entry		185	240	230	Benchmark
	1.2	Bookings		40			
	1.3	Travel Agency		38	0		schedule
	1.4	Transit Area		60	120	120	
	1.5	Retail and Cafe (Shell only)		150	150	150	MP Figure
	1.6	Pastoral Care		64	64	incl	Benchmark
	1.7	Emergency / Control Room		15	15	incl	Benchmark
		Mail Room		12	12	incl	Benchmark
		Security		-	25	40	schedule
		Sw itch		10	10	incl	Benchmark
				574	636	540	
2		Emergency Department					
	2.1	Emergency	36	1,460	1,412	1,750	Schedule
	2.2	Short Stay Unit	12	238	247	450	Schedule
	2.3	Emergency Admin	-	352	322	0	Schedule
				2050	1981	2200	
3		Critical Care					
	3.1	ICU	10	1,563	1,365	600	Schedule
	3.2	HDU	6	incl	incl	300	
	3.3	CCU	8	incl	incl	375	
				1563	1365	1275	
4		Inpatient Units					
	4.1	IPU Medical	30	1,024	1,104	892	Schedule
	4.2	Shared space betw een ICU + Ward	-	139	0		Schedule
	4.3	MAPU see below	-	-	0	325	schedule
	4.4	IPU Surgical Orthopaedic	60	2,014	2,101	1,783	Schedule
	4.5	IPU Shared space betw een 2 wards	-	225	137		Schedule
				3403	3342	3000	
5		Sub-acute IPU					
	5.1	IPU-Rehab	29	954	1,247	1,200	schedule
	5.2	IPU-Acute Aged care 15 beds	15	959	645	650	schedule
	5.3	MAPU -12	12	inc above	360		schedule
	5.4	Shared space betw een wards	-	445	137	0	Schedule
				2358	2389	1850	
6		Womens and Childrens					
	6.1	IPU-Maternity	20	638	805	650	Schedule
	6.2	Birthing Suite	5	433	672	375	Schedule
	6.3	Birthing Centre	4	200	0	300	
	6.4	SCN	9	495	710	200	Schedule
	6.5	Shared space betw een above	-	243	0		schedule
	6.6	IPU-Child & Adolescent	18	839	630	550	schedule
	6.7	Outpatients Womens	7	184	0		Schedule
	6.8	Outpatients Child andAdolescent	6	176	330	300	schedule
	6.9	Outpatients Shared Areas	-	130	0		schedule
				3337	3147	2375	
7		Mental Health					
	7.1	IPU - Mental Health	30	1,521	1,740	1,600	schedule
	7.2	Community Mental Health	-	436	600	600	Benchmark
				1957	2340	2200	
8		Interventional Suite					
	8.1	Peri-operative unit (Day of Surgery)		211	222	250	Schedule
	8.2	Operating Suite	5	1,063	1,065	1,500	Schedule
	8.3	Endoscopy	2	256	251	350	Schedule
	8.4	Recovery Stage 1	11	207	210	incl	Schedule
	8.5	Day Surgery Unit	28	611	605	600	Schedule
	8.6	Operating Theatres - Support		490			
	8.7	CSSD	-	420	500	600	Benchmark
				3258	2853	3300	

9	Ambulatory Care Centre					
9.1	Preadmission		110	0		
9.2	Renal	19	668	570	600	Schedule
9.3	Clinical Measurement Unit	4	288	331	225	Schedule
9.4	Dental	14	470	449	500	Schedule
9.5	Outpatients Department	31	1,021	1,323	1,500	Schedule
9.6	Day Oncology	8	392	359	225	Schedule
9.7	Allied Health Therapy		885	1,010	1,300	Schedule
9.8	CBRT - Community Based Rehab	-	500	800	800	MP Area
			4334	4842	5150	
10	Clinical Support					
10.1	Medical Imaging	13	1,370	1,337	1,500	Schedule
10.2	MI admin	-	155	169	Incl	Schedule
10.3	Pathology Services	-	586	546	300	Schedule
10.4	Mortuary	-	222	183	175	Schedule
10.5	Pharmacy	-	336	330	250	Schedule
			2669	2565	2225	
11	Administration					
11.1	Administration Offices		750	750	1,400	MP Area
11.2	Patient Information -Medical Records		375	500	550	
			1125	1250	1950	
12	Clinical Depts.					
12.1	Clinical Departments		500	500	0	Assumption
			500	500	0	
13	Education & Research					
13.1	Mackay Hospital Education Centre		991	811	900	Schedule
13.2	JCSM		0	0	0	
13.3	Tropical Public Health		0	0	0	
13.4	Clinical Research		0	0	0	
			991	811	900	
14	Staff Amenities					
14.1	Accommodation - on call		0	200	0	Assumed
14.2	Staff - Central Dining /Breakout		100	0		
14.3	Doctor Lounge + Oncall					
14.4	Staff Amenities		204	160	150	Benchmark
			304	360	150	
15	General Support					
15.1	Biomedical Engineering		160	100	120	Benchmark
15.2	Engineering & Maintenance		300	300	600	Assumed
15.3	IT		300	103	550	Benchmark
15.4	Server			100	0	Assumed
15.5	Environmental Services		64	64	75	Benchmark
15.6	Kitchen Production		700	800	700	Benchmark
15.7	Linen Handling / Laundry		430	550	500	Assumed
15.8	Supply/Materials Management		400	320	650	Benchmark
15.9	Waste Management		102	102	100	Benchmark
15.10	Chemical Store		50	50	75	Assumed
15.11	Contaminated Waste		0	0	75	Benchmark
15.12	Archive			240	250	Benchmark
15.13	CELS (Central Equipment Loans Store)		100	-	0	
	<i>Existing Areas included under New areas</i>		-	-	-	
			-	-	300	
			2606	2729	3995	
	GDA all departments		31029	31110	31110	
	Travel (15%)		4,654	4,667	8,510	
	Plant (15%)		4,654	4,667		
	FECA		40338	40443	39620	

1.23 Room data sheets

Requirements

RDS must be prepared for the PDP, SD and DD phase. The format of all RDS is that a room data sheet is provided for each type of room, rather than one per room, thus reducing the total number of RDS.

Rationale/example

RDS will be prepared with an increased level of detail in specifics with the building services accurately recorded during the design phases. One RDS will exist for each identical room. Non-identical will require a separate data sheet in DD

RDS will require user sign off at the completion of each design stage. The RDS will have be read in conjunction with detailed room layout sheets or alternative approved media.

These RDS are to assist in the understanding of the scope and direction of services and equipment that may be required for these types of rooms.

Detailed information in the form of door/window schedules, finishes schedules will be documented in the CD stage. Typically, final scheduling of finishes occurs during the documentation stage after the overall interior design is detailed and materials are selected, costed and approved.

Checkpoint

The design team is responsible for implementing the room data sheet principles in its planning and will demonstrate the outcome through:

- a RDS per standard room, being a 100 per cent identical repetitive room layout associated room layout or alternative approved media
- information listed in RDS will include but not limited to:
 - furniture, fittings and equipment which will be later finalised by specialist consultants (for example equipment consultants or food services consultants)
 - fixtures and fittings which will be incorporated into trade package specifications during contract documentation phase (for example metalwork)
 - room fabric such as wall finish and flooring finish which is generically described
 - preliminary door/window information highlighting special requirements of the areas
 - engineering services provisions such as power, water, data, air, gasses
 - other information that is generally included in RDS as per the AusHFG RDS
 - acoustic requirements specifically highlighting spaces with very high noise generation from equipment or activity as well as spaces with vibration sensitive uses and equipment.

2 Architectural design

2.1 Design parameters

2.1.1 Design life expectancy

Requirements

Design life expectancy of Queensland Health department buildings is 30 to 50 years. This is the default life expectancy unless noted otherwise. The design must take into account that the life expectancy of the building must allow for expected longevity (and continued operation) of the building before, during and after a disaster, including natural events, such as a cyclone, flood or storm and/or a man-made event, such as a fire, bombing or chemical attack.

Rationale/example

Design and detailing of buildings and external works, including selection of durable materials and components shall be developed to provide Queensland Health with an asset capable of achieving this design life requirement. Ongoing consultation with users will continue to assist Queensland Health in the development of appropriate maintenance and replacement strategies to support this lifespan.

Checkpoint

The design team is responsible for implementing the life expectancy principles in its planning and will demonstrate the outcome through:

- its strategy to achieve the required lifespan in the PDP report and shall further demonstrate this in detail as part of the WOL report
- its selection of low maintenance, long-life materials with known performance where possible or new technology but with back up research
- its consideration and avoidance of potential problems, such as corrosion, flooding, water penetration or termites.

2.1.2 Construction technology and expertise

Requirements

The development of the facility should as far as possible incorporate up-to-date construction technology, develop expertise and advance the body of knowledge of the local construction industry. The development should introduce, adopt and develop innovative and/or best practice design systems and expertise within the local industry and wherever possible, facilitate local economic development while:

- introducing new technology after back-up research
- taking advantage of local skills and expertise wherever possible
- recognising and allowing for unavailability of local skills and expertise
- assisting with the implementation of BIM through project delivery.

Checkpoint

The design team is responsible for implementing the construction technology principles in its planning and will demonstrate the outcome through the design team shall demonstrate:

- its incorporation of up to date construction technology
- its developed expertise and advancement of the body of knowledge of the local construction industry
- it has introduced, adopted and developed innovative and/or best practice design systems and expertise within local industry and facilitated local economic development
- it has introduced new technology after back up research
- it has taken advantage of local skills and expertise wherever possible
- it has recognized and allowed for unavailability or absence of local skills and local expertise in regard to certain technology/trades.

2.1.3 Local support

Requirements

The intention of the Queensland Government is to create, grow and support sustainable employment opportunities in the local area. The proposed development should make maximum use of, and avoid

exclusion of local expertise, construction and engineering systems, elements, materials and fixtures and furnishings.

Rationale/example

As part of the design process, consultation shall be undertaken to identify local skills and opportunities are maximized for local involvement as much as possible in the design, construction, supply, installation and maintenance.

Checkpoint

The design team is responsible for implementing the local support principles in its architectural design and will demonstrate the outcome in through the design team shall demonstrate:

- it has developed understanding of the economic environment in the location of the facility
- it has involved local firms to inform the design solution
- that the proposed development shall make maximum use of, and avoid exclusion of local:
 - expertise
 - construction systems
 - engineering systems
 - elements
 - materials
 - fixtures and furnishings.

2.1.4 Survey and existing condition drawings

Requirements

Base information shall be prepared to enable the design team to undertake their design process and prepare documentation. The information shall be provided in the form of surveys, existing reports, building information models, CAD drawings and hardcopy drawings maintained by the facility or Queensland Health.

Rationale/example

It is the responsibility of the project team to identify the requirements that may include:

- strategic capital Infrastructure condition assessment—a high level assessment of the capital infrastructure identifying status of the condition, compliance gaps, repair requirements, high risks, medium and long-term maintenance requirements, infrastructure gaps and demand comparisons, functional analysis and fit for purpose review
 - detailed infrastructure condition survey—this includes all of item one above, supplemented with:
 - dilapidation survey, an architectural and interior condition survey and identification of repairs
 - metering of all utilities services, such as power, water or gas plus a detailed report on plant condition and expected remaining service life and maintenance required
 - detailed water quality survey of both the water supplied by the water utility and the quality of water maintained within the existing facility.

- a detailed review of structural condition and compliance: BCA, DDA and all relevant code compliances.
- a detailed set of drawing and schedules identifying and locating the non-compliances, faults.
- recommendations on corrective actions.
- detailed ground survey—this includes all features at ground level. Including datum's and contours at .25 m intervals. On larger campuses, it may be required to use aerial survey techniques to increase site wide accuracy.
- detailed in-ground survey, including survey of in-ground services, including:
 - communications
 - water mains
 - sewer
 - stormwater
 - electrical
 - gas
 - any other applicable services.
- 3D survey (e.g. point cloud) - similar to above, however it includes an external three dimensional survey of all buildings, which includes all features in the X, Y and Z axis, including features, such as window ledges, sills, downpipes and fascias.
- interior survey 3D (e.g. point cloud) - this is a three dimensional survey of the interiors includes all walls, partitions, stairs, bathrooms, built in fixtures, lights, internal glazing and doors. It needs to identify finishes and fittings. Internal 3D survey displays only what is visible to the naked eye, not hidden items such as services in ceiling spaces.

Checkpoint

The design team is responsible for implementing the survey principles in its architectural design and will demonstrate the outcome through the design team shall:

- identify the usable extend and missing information regarding the site condition
- identify the usable extend and missing information regarding the building and structure condition
- identify the gaps in existing information and request additional survey information to inform the design process.

2.1.5 Base drawing requirements

Requirements

The design team is to consolidate drawings and provide discipline BIM files, compiled into an overall federated model at the completion of a Queensland Health facility project. These drawings and models shall be integrated into a master set of information in accordance with the facilities document control policy. If a local policy is absent, the Queensland Health facilities document control policy shall be used.

Rationale/example

It is important that any when work occurs on the facility, the updating process occurs so that the base drawings always represent a current representation of the facility.

The project must incorporate receipt of the base drawings as described above that are affected by the works. If these drawings are not in existence then:

- the provision shall be included as part of the scope of works, or
- the provision of base drawings must be procured separately
- any new works, renovations, extensions or demolitions shall be integrated into the base drawings and shall be part of the scope of works.

Checkpoint

The design team is responsible for implementing the base drawing principles in its architectural design and will demonstrate the outcome through:

- the design team is to consolidate drawings at the completion of the Queensland Health facility project. These drawings shall be integrated into a master set of drawings in accordance with the facilities document control policy. The format and contents should include:
 - location plan
 - site plans which including layered information on:
 - architectural
 - mechanical
 - electrical
 - structural
 - civil
 - hydraulics
 - fire services (wet and dry)
 - communications
 - ICT
 - security
 - landscaping.
 - architectural site sections in two directions
 - building plans for each level in a layered format displaying all information listed in item two above plus:
 - interior design
 - joinery
 - FFE
 - floor datum
 - roof and eaves height.
 - architectural sections through each building in two directions.

Note: All of the above can be replaced by using BIM in industry foundation classes (IFC) format, if the BIM can generate all the information outlined in the list of items above.

2.1.6 Whole-of-life

Requirements

Queensland Health is committed to the principles and practices of strategic asset management which focuses on WOL management of assets and recommends the building information model is leveraged to assist.

WOL requirements are underpinned by the fact that the cost of building assets over their life cycle is many times greater than the capital cost of construction.

Rationale/example

WOL places an emphasis on efficiency, long-life, low maintenance, easy access, easy replacement and low running costs, resistance to environmental factors, such as sun, rain, temperature, humidity, salt air and pollution.

The input from facility managers should be sought where possible.

Checkpoint

The design team is responsible for implementing the WOL principles in its architectural design and will demonstrate the outcome through:

- the design team shall demonstrate its compliance with the WOL objectives and shall outline a strategy that includes WOL costing in relation to:
 - material selections
 - furniture and fittings
 - equipment
 - plant and services selection
 - structural system selection
 - façade and roof system selection
 - the design team shall submit a WOL strategy PDP, SD, DD and CD stages identifying building components, anticipated product or materials choice, replacement terms and costs.

2.1.7 Asset and facilities management

Requirements

The health facility will be an asset of Queensland Health and as such will require a strategic approach to the management of the facility and its associated assets. The asset management is a process that needs to be driven by service needs and supported by appropriate policies, frameworks, processes, systems, information and competencies. The design shall support the strategic approach to the management of the assets. The design team shall provide support to the HHS executive management in the development of asset and facility management objective.

Rationale/example

In brief, strategic asset management is the effective alignment of assets with service requirements and consists of the following key components:

- business planning to determine health service demand
- strategic asset planning to evaluate the alignment of assets with service demand
- asset planning to determine asset and non-asset solutions to meet service demand as determined through business planning
- implementation of asset and non-asset solutions through acquisition, construction, leasing and other means
- maintenance of assets in appropriate condition to meet service requirements and manage risks
- renewal and replacements of assets to meet changing service needs and technology
- disposal or recycling of surplus assets
- measuring and monitoring asset performance.

An asset management plan is required in line with Queensland Health corporate guidelines. The HHS asset manager is responsible for all asset purchases and the upkeep and maintenance of the data records (including BIM) for all building, plant and equipment held within the HHS.

The asset strategic plan provides a five year outlook for all major capital works and infrastructure repairs and replacements across the HHS. The information is gathered from a number of sources but predominately through condition assessments undertaken three yearly and recorded within the computerised maintenance management system (CMMS).

Checkpoint

The design team is responsible for implementing the asset and facilities management principles in its architectural design and will demonstrate the outcome through the design team shall:

- demonstrate its compliance with the facility management objectives and shall assist the executive management of the facility in outlining a strategy that includes the maintenance, renewal, replacement and associated costing in relation to:
 - material selections
 - furniture and fittings
 - equipment
 - plant and services selection
 - structural system selection

- façade and roof system selection.
- include the strategy in the PDP, SD, DD and CD stages and shall cross reference the outcomes with the WOL report
- if a BIM enabled project, collaboration with the asset and facilities management team will ensure information is structured in BIM to support long-term asset management.

2.1.8 General requirements

2.1.8.1 Building materials

Requirements

Materials shall be selected for longevity and maintainability, with consideration of vandal resistance and sustainability objectives consistency with the regional parameters and particular regard to WOL costs.

Checkpoint

The design team is responsible for implementing the building material principles in its architectural design and will demonstrate the outcome through:

- materials selected for longevity and maintainability, vandal resistance and sustainability objectives consistency with regional parameters with regard to WOL costs
- project team shall develop a holistic material choice matrix in SD for external and internal finishes, identifying the performance towards various disciplines and parameters and effect that material and highlighting the preferred material. This matrix shall be updated in DD and CD. The holistic approach shall be conceived through the input of:
 - architects
 - interior designers
 - quantity surveyors
 - structural engineers
 - building services engineers
 - ESD consultant
 - building maintenance management
 - facility staff
 - operational support staff.

2.1.8.2 Building structure

Requirements

The structure of a health facility building shall have good flexibility and thus requires inherent future proofing. It shall be designed to allow a certain level of alterations and penetrations in the structure without the requirement to provide additional strengthening or significant structural alterations.

Rationale/example

These may be realised by:

- a structural grid that allows good functionality, flexibility by using larger structural grids (such as 8.4 metres, 9.6 metres, 10.8 metres or other approx. grid size)
- structural elements with a regular geometric relation to the planning grid, and the location of structural elements allows the planning and flexibility of the spaces within the facility to minimize impairment of future expansion
- use of topping slabs to provide greater flexibility for areas exposed to potential high levels of change within the building
- concrete tensioning to allow maximum capacity for future floor penetrations
- reviewing the floor capacities by increasing the KPA's of various areas to allow greater flexibility for heavier loading and activities
- providing the footings and foundations for additional stories in appropriate locations, such as car parking facilities for car parking and alternative usages, such as offices or medical consulting rooms.

Checkpoint

The design team is responsible for implementing the building structure principles in its architectural design and will demonstrate the outcome through:

- the design team shall demonstrate it has undertaken an analysis of the structural concept and DD to allow a level of flexibility in the structural design, suitable for the future requirements and alterations.

2.1.8.3 Engineering services

Requirements

The engineering services design of a health facility building shall have good flexibility and thus contain inherent future proofing. They shall be designed to allow a certain level of alterations and expansion without the requirement to make significant alterations and cause significant service interruptions.

Rationale/example

- The capacity of all incoming and outgoing services to the site should include an allowance for future expansion.
- All vertical and horizontal distribution, including piping racks, trays, culverts and service corridors should have allowance for future expansion.

- All motor control centres, switchboards and panels should incorporate capacity and spatial allowance for expansion within the same.
- All services risers should be accessible for their full height and have space for future services.
- All services cupboards for switchboards and panels should have space for future services.
- All central plant, including chillers, boilers and transformers should have a spare capacity for future growth built into their sizing calculations.
- Provide redundancy and back-up on systems serving critical areas of the facility.
- Configure system zoning in clinical and other areas such that failure of an air handling unit or the carrying out of maintenance on an air handling unit, for instance, will not leave the remainder of the department without services.

For more detail on engineering services requirements, refer to *CIR Volume 4 Engineering and Infrastructure*.

Checkpoint

The design team is responsible for implementing the engineering services principles in its architectural design and will demonstrate the outcome through the design team shall demonstrate that the building services:

- shall have good flexibility and thus contains inherent future proofing
- have been developed in compliance with volume 4 of this document.

2.1.9 Physical environment

2.1.9.1 Building in a marine environment

Requirements

When building in a marine environment there are a number of aspects required by the NCC to be considered. The design shall use appropriate products to avoid premature failure with undesirable results for the client.

Rationale/example

In general, the NCC uses the terms ‘distance from breaking surf’ and ‘distance from saltwater’ not subject to breaking surf’ to determine the necessary level and type of protective coating required on various metal building products to be used in a marine environment. However, depending on the building product being used, there are specific definitions that apply.

Checkpoint

The design team is responsible for implementing the physical environment principles in its architectural design and will demonstrate the outcome through:

- specification must detail the standards for metal components (for facilities within one kilometre of the coastline)
- all nuts, bolts and associated brackets for the structural steel work as well as nails and screws for use with wall ties and any other associated fixings have high levels of corrosion resistance and be compatible so they maintain the integrity of the system.

2.1.9.2 Privacy

Requirements

The facility should be designed to support patient privacy and dignity through the provision of private spaces, acoustic treatments, and discrete planning of patient flows.

Rationale/example

In multi-bed facilities, the design should incorporate a privacy space for discrete communication. These rooms (family consultation rooms, grieving rooms, and/or private alcoves) should be non-bookable and should not be used for office or write-up purposes. A privacy room could be designed as a focus or quiet room in an office environment.

Checkpoint

The design team is responsible for implementing the privacy principles in its architectural design and will demonstrate the outcome through:

- in facilities with multi-bed rooms provision should be provided for private communication
- public circulation and staff/patient circulation should be separated wherever possible
- areas for patients in gowns should be located in a private zone, out of the view of the public circulation system.

2.1.9.3 Temperature and solar access

Requirements

The building design must suit local climatic conditions by responding directly to the impact of the temperature and solar access. The exposure to daylight penetration shall consider the appetite for exposure by patients, staff and visitors to direct sunlight within and outside the building during the cooler winter months and the requirement to block the direct sunlight exposure in the warmer summer months.

Planning of internal spaces shall ensure that no patient undergoing care and no staff is exposed to direct sunlight or in direct line of air conditioning outlets to avoid the negative temperature impact of these cold/hot spots.

Rationale/example

The quality of light needs to be considered since it governs the usability of one space over another. The facility design should control internal temperature via a combination of passive shading, such as fixed external shade systems and the building orientation to achieve a northern aspect alignment in first instance.

Daylight, but not solar penetration should be provided throughout the building and in particular is required to:

- patient care and treatment areas, such as but not limited to inpatient units, recovery areas, consultations spaces
- staff areas where staff is located for long durations at a time, such as offices, nursing stations, receptions and patient treatment areas
- public areas, such as corridors, waiting areas, cafeterias.

In some areas of the building, natural ventilation may suffice if solar access principles are followed. It should be remembered that on a southern elevation, sunlight has little penetration into buildings and none during the hottest part of the day.

Glare shall be avoided due to negative stress effect on people and interference with computer screens. Tinting of glass is a secondary design solution, avoiding sunlight penetration is the primary design solution for example use of external shading systems on exposed sides of the facility.

Large vegetation to provide shading should be considered as an additional measure only as this can be easily removed.

Checkpoint

The design team is responsible for implementing the solar access principles in its architectural design and will demonstrate the outcome through:

- the provision of daylight, but not solar penetration throughout the building and in particular is required to:

patient care and treatment areas, such as but not limited to inpatient units, recovery areas, consultations spaces

staff areas where staff is located for long durations at a time, such as offices, nursing stations, receptions and patient treatment areas

public areas, such as corridors, waiting areas, cafeterias

- reduction of glare
- no patient undergoing care, or staff is exposed to direct sunlight or in direct line of air conditioning outlets.

2.1.9.4 Humidity

Requirements

Humidity can lead to condensation and mould problems and must be considered at all times. Non air-conditioned and external spaces need to apply material choices and fixings suitable to withstand the long-term effects of exposure to humidity. In humid environments the design solutions must be systematically applied to every part of the system, including items not be visible in the final product, such as ceiling cavities fixings, bolt and reinforcement.

Rationale/example

Humid environments are very corrosive and greatly affect the choice of materials and finishes to be used in a facility. A failure to consider humid environments and to systematically apply design solutions to every part of the system, including items which will not be visible in the final product, such as fixings, bolts or reinforcement will cause major problems and can greatly reduce the expected life of a building.

The humidity of the environment also needs to be considered when choosing external materials. The regional context of the facility should guide the project towards the appropriate choice of materials and fixings techniques.

High humidity can bring discomfort to patients and staff. External or non-air-conditioned areas for patients, staff and visitors need to have alternative solutions during periods of high humidity.

Checkpoint

The design team is responsible for implementing the humidity principles in its architectural design and will demonstrate the outcome through:

- non-air conditioned and external spaces need to apply material choices and fixings suitable to withstand the long-term effects of exposure to humidity
- external or non-air-conditioned areas for patients, staff and visitors need to have alternative solutions during periods of high humidity.

2.1.9.5 Rainfall**Requirements**

The regional context of the facility must guide the project with regard to the amount of rainfall and especially the maximum intensity of rainfall and the associated impact on the design of buildings and external areas. The roofs, covered walkways, canopies, awnings, waiting areas and all external areas to be designed with maximum rain intensity in mind.

Small enclosed outdoor areas, such as courtyards, air voids and light voids shall have a dual field sump to avoid flooding as result of drain blockage or excessive rainfall.

Flat roofs to with overflows are to be designed to allow the roof to drain along the outside of the building rather than relying on the overflow capacity.

Landscape surfaces, hard and soft have suitable materials shall allow drainage and stability of the surfaces.

The coverage of walkways is designed to accommodate the effects of wind driven rain.

Checkpoint

The design team is responsible for implementing the rainfall principles in its architectural design and will demonstrate the outcome through:

- the regional context of the facility must guide the project regarding amount of rainfall, especially the maximum intensity of rainfall and associated impact on the design of buildings and external areas
- roofs, covered walkways, canopies, awnings, waiting areas and all external areas to be designed with maximum rain intensity in mind
- small enclosed outdoor areas, such as courtyards, air voids and light voids to have a dual field sump to avoid flooding as result of drain blockage or excessive rainfall
- flat roofs with overflows also to be designed to allow the roof to drain along the outside of the building rather than relying on overflow capacity
- landscape surfaces, hard and soft to use materials that allow drainage and stability of the surfaces
- the coverage of walkways is designed to accommodate the effects of wind driven rain.

2.1.9.6 Prevailing winds/breezes**Requirements**

Entrances and exits, including emergency exits shall be protected from the effects of strong wind. Emergency exits and the effect of wind on the ability to open the exit doors have been considered and verified.

Checkpoint

The design team is responsible for implementing the prevailing winds principles in its architectural design and will demonstrate the outcome through:

- entrances and exits, including emergency exits to be protected from the effects of strong wind when being used consider airlocks
- emergency exits and the effect of wind on the ability to open the exit doors have been considered and verified.

2.1.10 Environmental sustainability

Requirements

Queensland Health supports a policy for Environmentally Sustainable Development (ESD) for its health services buildings.

The following principles will guide the implementation of this policy:

- **Integration**—the application of ESD will integrate with and support the delivery of health services and enhance the safety and quality of healthcare.
- **Diversity**—there should be recognition of the geographical diversity of the state and the diversity in the type and complexity of health facilities and associated support infrastructure and services.
- **Balance**—consideration of ESD initiatives will be based on ecological, social and economic benefits, including the desire for innovation and not purely on financial criteria.
- **Inclusion**—the planning and implementation of ESD must be inclusive, sensitive and involve the participation and contribution of staff, the community, service providers and partners.
- **Performance**—evaluation of ESD implementation will be focused on performance and achievement of clearly articulated targets and outcomes that are consistent with Queensland Health strategic and operational directions.

Rationale/example

The purpose of this policy is to articulate the commitment and approach of Queensland Health in undertaking all necessary measures towards ensuring that the impact of its physical facilities, clinical and business operations, on the environment is minimised and the delivery of health services is environmentally, socially and economically sustainable.

Queensland Health supports the use of the green star process as a design tool to inform design decisions relating to major projects. The Green Star—Healthcare rating tool will be referenced as a design tool however it is important to note that formal Green Star accreditation is not generally a requirement of health facilities projects. The project team and Queensland Health may choose a Green Star rating against which to reference the project.

The aim of environmental sustainability in design should be:

- integration—ESD to integrate with and support delivery of health services and enhance safety and quality of healthcare
- diversity—recognition of geographical diversity of Queensland and the diversity in the type and complexity of health facilities and associated support infrastructure and services
- balance—ESD initiatives to be based on ecological, social and economic benefits, including the desire for innovation and not purely on financial criteria
- inclusion—planning and implementation of ESD to be inclusive, sensitive and involve the participation and contribution of staff, community, service providers and partners
- performance—evaluation of ESD to be focused on performance and achievement of clearly articulated targets and outcomes consistent with Queensland Health strategic and operational directions
- whole-of-government policy, such as recycling of buildings and infrastructure to be considered
- consider addressing sustainability throughout the documents using triple bottom line reporting of economic, social, and environmental considerations.

Checkpoint

The design team is responsible for implementing the environmental principles in its architectural design and will demonstrate the outcome through:

- ESD to be workshopped with client to establish the appropriate rating and targets
- ESD to be workshopped with client to establish ESD drivers and objectives
- an ESD report shall be submitted during all design stages from MP to CD. This report will gain more detail during the stages
- the PDP version and onwards versions of this report shall demonstrate a return over investment consideration. The return can be non-financial but patient or staff benefits, which ultimately result in financial returns to the Queensland Health
- proof of efficiency in relation to region of facility.

2.1.10.1 Resource use and management**Requirements**

It is the intention of Queensland Health to minimise the facilities energy requirements for the life of its operation and to minimise any adverse environmental impacts resulting from the facilities use and management of energy.

Checkpoint

The design team is responsible for implementing the resource use principles in its architectural design and will demonstrate the outcome through:

- as a minimum, the facility must satisfy applicable current Queensland Government regulations, policy, and/or standards for energy management and use.
- the proposed development shall incorporate international best practice in regard to energy conservation and management
- the design shall comply with the Queensland Government carbon footprint and carbon targets and requirements of Queensland Government.

2.1.10.2 Water use and management

Requirements

It is the intention of Queensland Health to minimise the facilities water use requirements for the life of its operation and to minimise any adverse environmental impacts resulting from the facilities use and management of water.

Rationale/example

The proposed development must satisfy agency-specific design guidelines that are consistent with the intent of the Queensland Design Guidelines for Government Buildings.

Where the objectives of minimizing energy or water use impact adversely on maintaining water quality, the objective of maintaining water quality shall override.

Checkpoint

The design team is responsible for implementing the water use principles in its architectural design and will demonstrate the outcome through:

- as a minimum, the building must satisfy applicable current Queensland Government regulations, policy, programs and/or standards for water use and management
- the proposed development is to incorporate international best practice in regard to storm water management, water conservation and water recycling
- depending on the regional context, the design shall to consider complying with local government requirements, especially when located in a drought prone area and when it is exempt of DA due to a CID over the site
- depending on the regional context, the design shall comply with local government requirements when it is to submit for a DA to the local government.

2.1.10.3 Material choice

Requirements

It is the intention of Queensland Health to optimise the selection and incorporation of appropriate non-polluting, recycled, recyclable and renewable materials in the construction of the building.

Checkpoint

The design team is responsible for implementing the *Material choice principles* in its architectural design and will demonstrate the outcome through:

- sustainable material selection which includes:
 - low embodied energy
 - high recycled/recyclable content
 - material production with low ecological impact
 - low (quantify) volatile organic compound (VOC) to reduce off-gassing
 - materials that make a minimal impact on habitat and land from which resources are sourced from, materials produced, and site on which used
 - ensure product uses less virgin resources and more recycled content—closed loop materials are optimal
 - mode of production, if possible low waste and with waste fed back into production cycle
 - products harmful to human health to be avoided (check listings and make reference)
 - materials toxicity, VOC'S and harbouring of allergens, insects and bacteria
 - products should be selected to minimise the amount of transport
 - review the amount of harmful by-products made during production and/or manage the containment and treatment of harmful by-products.

2.1.10.4 Rain water

Requirements

Rainwater conservation (through harvesting, treatment and reuse) shall be undertaken and shall be reused for non-clinical purposes.

Checkpoint

The design team is responsible for implementing the *Rainwater principles* in its architectural design and will demonstrate the outcome through:

- rainwater conservation (through harvesting, treatment and reuse) shall be conducted.

2.1.10.5 Building components

Requirements

The selection of building components should be influenced by sustainability considerations.

Rationale/example

For example, pre-cast or prefabricated elements may offer opportunities for enhanced speed of construction and quality control whilst providing ESD benefits relative to in situ construction, as they are more energy efficient and produce less waste.

The use of concrete manufactured with fly ash (to reduce the amount of cement and therefore the embodied energy) should be considered.

Checkpoint

The design team is responsible for implementing the building components principles in its architectural design and will demonstrate the outcome through:

- selection of building components influenced by sustainability considerations.

2.1.10.6 Life cycle

Requirements

The durability and life cycle environmental impacts of products and materials are important factors to take into account in the selection of construction and fit-out materials.

Checkpoint

The design team is responsible for implementing the *Life cycle principles* in its architectural design and will demonstrate the outcome through:

- durability and life cycle environmental impacts of products and materials factors taken into account in selection of construction and fit-out materials.

2.1.10.7 Daylight

Requirements

Maximising natural daylight is a major ESD opportunity to improve patient outcomes and staff productivity.

Checkpoint

The design team is responsible for implementing the daylight principles in its architectural design and will demonstrate the outcome through:

- design maximises natural daylight penetration to all patient, staff and treatment areas.

2.1.10.8 Sun shading

Requirements

In Queensland sun shading is an important ESD consideration. Shading of exterior (for example with overhangs) minimises energy consumption through reduced air-conditioning requirements.

Checkpoint

The design team is responsible for implementing the *Sun shading principles* in its architectural design and will demonstrate the outcome through:

- shading of exterior (for example with overhangs) minimises energy consumption through reduced air-conditioning requirements.

2.1.10.9 Air quality

Requirements

The location and control equipment associated with exhaust from ventilation, medical laboratories, incinerators and similar outlets should be carefully designed to ensure that patients, staff, visitors and nearby residents are not negatively impacted by air quality contaminants.

The location and control equipment associated with exhaust from ventilation, medical laboratories, co/trigeneration systems, incinerators and similar outlets should be carefully designed to ensure that patients, staff, visitors and nearby residents are not negatively impacted by air quality contaminants.

Rationale/example

Air pollutants, such as formaldehyde (for example from building materials) and volatile organic compounds (for example from paints and solvents) can have impacts on patient and staff health and must be minimised.

Formaldehyde can be minimised by careful selection or avoidance of composite wood products. Volatile organic compound emissions can be reduced by selecting low or no-VOC paints and with solvents. Carbon dioxide levels can be controlled through the use of CO₂ sensors linked to the ventilation system.

A by-product of the combustion process from a cogeneration or trigeneration system includes nitrogen oxides (NO_x) which can further react with oxygen in the exhaust stack and beyond to form nitrogen dioxide (NO₂). Nitrogen dioxide is a toxic air pollutant and can be particularly harmful to immune-compromised individuals. Consideration should be given to both the indoor and outdoor air quality implications from a co/trigeneration system, risk assessment, wind modelling and controls to minimise any associated risks.

Checkpoint

The design team is responsible for implementing the air quality principles in its architectural design and will demonstrate the outcome through:

- the location and control equipment associated with these outlets designed to ensure that patients, staff, visitors and nearby residents not negatively impacted.

2.1.11 Climate change

Requirements

The design of the proposed development should account for and be adaptable to the impacts of climate change. The preparation of a climate change impact statement and strategy must be prepared that identifies what measures the proposed development has employed to mitigate and adapt to the impacts of climate change.

Rationale/example

The building design must address such factors as increased sea-levels and increased likelihood and frequency of extreme climatic risk events, such as changes to anticipated local flood levels, increases in temperature and possible greater wind loads.

Checkpoint

The design team is responsible for implementing the climate change principles in its architectural design and will demonstrate the outcome through:

- a climate change impact statement and strategy to be prepared identifying measures employed to mitigate and adapt to the impacts of climate change
- design to account for and be adaptable to impacts of climate change.

2.1.12 Design process plan

Requirements

A design process plan shall be established by the project team at the start of each project. This shall be reviewed at the commencement of each design phase. Associated consultants and their involvement shall to be integrated in detail.

Checkpoint

The design team is responsible for implementing the design process plan principles in its architectural design and will demonstrate the outcome through:

- the establishment of a design process plan by the project team which includes:
 - project governance
 - design governance
 - project program
 - design program with milestones:
 - approvals
 - issue date of all documents
 - review periods
 - sign off dates
 - design stages.

2.1.13 Design program

Requirements

The design program needs to identify various design stages, to allow the project director and project manager to monitor the progress and to manage the input, output, approvals and overall governance of the project. The principal consultant will prepare the design proposal

The stages shall include:

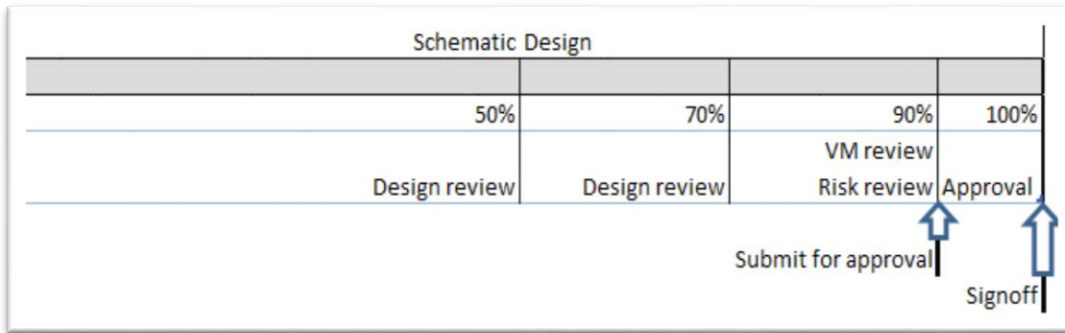
- concept and concept review
- MP

- PDP
- SD
- DD
- tender documents
- contract documentation
- construction
- handover
- post construction
- defects liability.

The program shall reflect the following details (see Figure 4 for example)

- design period
- 50 per cent status of each stage—first design review
- 70 per cent status of each stage—second design review
- 90 per cent status of each stage, final draft—submittal for approval
- approvals
- risk review
- design project control group meetings
- steering committee meetings for alignment of approvals and sign offs
- shareholder engagement which includes:
 - user group meetings
 - user group sign offs
 - executive meetings
 - executive sign offs
- approval process for local government or other authorities for example development approval. or,
- CID
- cabinet sign off (if applicable)
- community reference group meetings
- other government department user group meetings
- neighbour level groups and
- community forums.

Figure 4: Indicative design stage program detail



Checkpoint

The design team is responsible for implementing the design process principles in its architectural design and will demonstrate the outcome through:

- the design team shall comply with the design program principles as outlined in this clause.

2.1.14 Building information modelling

Requirements

As per the *Digital Enablement for Queensland infrastructure – Principles for BIM Implementation*, Queensland Health projects (tier 1, 2, and 3) as instructed by the Queensland Health Project Director, must be undertaken in a BIM environment. BIM process will be managed by a dedicated BIM manager, through the use of a BIM Management Plan ensuring integration amongst disciplines. For further details refer to the Queensland Health *Project Information Requirements BIM* document.

Rationale/example

BIM suits healthcare facilities, in which the coordination of the building structure and all mechanical, electrical plumbing, IT and other systems is a challenging effort for all parties.

BIM provides detailed information for decision-making and facilitates information exchanges between different parties in design and construction phases. Project commissioning is essentially a communication and validation process that begins early in the building acquisition process and continues through owner occupancy.

BIM integrates design information with the drawings themselves to provide all appointed parties, user groups, asset managers and the client with a greater understanding of all aspects of a project. BIM is an integral process to support design, construction and ongoing operational management.

BIM processes will create not only discipline centric models, but also a federated model of the project.

Integrated, coordinated building information models help all contributing parties and stakeholders better visualise the future infrastructure. If managed appropriately this will lead to fewer clashes of services and changes during the design and construction process.

BIM projects are required to have the capability to schedule objects and materials, associated 2D documentation derived directly from the coordinated models. This information will be linked to cost planning tools to inform the cost plan (5D). The ability to associate time to the model objects to enable graphical staging must also be applied (4D).

Checkpoint

The design and construction team is responsible for implementing the BIM principles on the project and will demonstrate the outcome through:

- Queensland Health projects shall be undertaken in a BIM environment and managed by a dedicated BIM manager, conforming to the Queensland Health Project Information Requirements to ensure integration.

2.1.14.1 Building information model requirements**Requirements**

The design and construction activities, including all documentation for individual buildings, the site and if applicable the overall precinct for the health facility will be developed in using collaborative BIM processes. Discipline centric models and a federated model of the project in IFC format shall be required to comply with the Open BIM requirements of the digital enablement for Queensland infrastructure principles.

Rationale/example

It is anticipated and expected that individual buildings will be developed by compatible consultant teams able to share graphics and information between disciplines and with documents capable of being incorporated into a common model. Individual discipline models shall be created using software capable of incorporating geometry, spatial relationships, geographic information, quantities, properties of building components and other information as defined in the Queensland health project information requirements.

It is intended that the construction stage for a facility will include a construction staging and/or sequenced model (4D) and consultant teams will be required to contribute the amendment of their models to reflect the project(s) 'as-built'. This as-built IFC model will facilitate the requirements of "managed" in the digital enablement for Queensland infrastructure principles.

Objects included in the model, and the properties and information associated with them need to be prepared in a way able to allow the addition of properties and information defined by the building owner. The designated BIM manager must collaborate early with the facility/asset managers to ensure data is structured appropriately to meet this need.

Checkpoint

The design and construction teams (appointed parties) are responsible for implementing the Queensland health BIM project information requirements for BIM in design and construction, demonstrating improved project outcomes.

2.1.15 As-built standard for facility management usage**Requirements**

As built information shall comply with the Project Services 'as-built information' requirements and the 'E-plan' upload requirements and shall be provided in digital form to Project Services, Queensland Health facility management and the local facility management director.

Checkpoint

The design team is responsible for implementing the as built principles in its architectural design and will demonstrate the outcome through:

- as built standards for facility management should comply with the project services requirements
- as built documents for facility management shall include the base drawing requirements as described above and any of the undertaken survey data as described above
- as built documents for facility management should comply with the Queensland governments asbestos management and control policy for government buildings

2.1.16 Project budget

Rationale/example

A full explanation of cost planning for each project stage may be found in AIQS Australian Cost Management Manual, Volume 1. The confidence level required on cost estimation for each project stage is determined by the Queensland Government Capital Works Management Framework (CWMF) estimate categories and confidence levels³.

Cost estimating in the early stages of MP and PDP is primarily based on the use of square metre rates, benchmarking and taking location factors into account and applied to a clustered SOA. The clusters normally represent grouping of individual department areas of a similar type or collocation or can represent stand-alone buildings that contain a single department.

In the PDP the clusters can be more detailed, and the SOA should list each individual department and all external covered areas.

In SD the cost estimating is based on elemental estimates prepared by measuring detailed quantities priced at unit rates.

From DD onwards all areas should be detailed enough for accurate measure and elemental costing based on defined rates.

Cost estimation for all stages will include client costs, information communications and technology, and furniture fit-out and equipment.

Checkpoint

The design team is responsible for implementing the *Project budget principles* in its architectural design and will demonstrate the outcome through:

- describe and illustrate standard Queensland Health template for various stages and rational.

2.1.17 Fire resistance

Requirements

³ <https://www.hpw.qld.gov.au/construction/BuildingPolicyAdvice/CWMF/Pages/Default.aspx>

It is Queensland health policy to design the building in accordance with the NCC as a ‘deemed to satisfy’ position. Fire engineering should only be undertaken and is only allowed when the result of the engineered solution will not impact on future expansion and future flexibility.

Checkpoint

The design team is responsible for implementing the *Fire resistance principles* in its architectural design and will demonstrate the outcome through:

- building design is in accordance with the NCC as a ‘deemed to satisfy’ position
- the building has adopted a fire engineered solution after the design team successfully demonstrated that the future expansion and flexibility is not impacted by the fire engineered strategy.

2.1.18 Security CPTED

Requirements

The design of the facility will incorporate the principles of the Queensland Government’s *CPTED Guidelines for Queensland*. A regular auditing system of CPTED issues in the built environment must be implemented.

Attention should be focussed on:

- Part A Essential features of Safer Places
- Part B Implementation Guide.

Rationale/example

An independent review by Queensland Health will review the local context and the suitable response with the desired approach of the local users to inform a suitable and locally accepted security solution. It is evident that not one solution is suitable to all facilities. For example, a glass security screen at a counter can be seen very unapproachable in on facility and can be very much a necessity in another facility dependant on the local security treats.

The design team shall present a series of option during security workshops and establish a facility wide security strategy.

Checkpoint

The design team is responsible for implementing the *Security CPTED principles* in its architectural design and will demonstrate the outcome through:

- the design shall incorporate the *CPTED Guidelines for Queensland*
- the design team shall conduct security workshops with the users to establish a locally suitable security strategy.
- the design shall be reviewed independently by Queensland Health and an assessment of security and safety requirements shall provide improvements and amendments to be incorporated in the security approach for the facility.

2.1.18.1 Surveillance

Requirements

The public realm and buildings must be designed and managed to maximise, consistent with other legitimate goals, the potential for passive surveillance.

Checkpoint

The design team is responsible for implementing the surveillance principles in its architectural design and will demonstrate the outcome through:

- public realm and buildings designed and managed to maximise the potential for passive surveillance.

2.1.18.2 Legibility

Requirements

The facility and site shall be designed, detailed and managed to make it legible for users, especially pedestrians and cyclists, without losing the capacity for variety and interest.

Legibility must be promoted in both the overall structure and form of the environments and in appropriate detail within them.

Checkpoint

The design team is responsible for implementing the legibility principles in its architectural design and will demonstrate the outcome through:

- the facility and site designed, detailed and managed to be legible for users, especially pedestrians and cyclists, without losing the capacity for variety and interest
- legibility promoted in overall structure and form of environments and in detail within them.

2.1.18.3 Territoriality

Requirements

Security must be supported by designing and managing spaces and buildings to define clearly legitimate boundaries between private, semi-private, community group and public space.

Territoriality must be delivered without significant loss of surveillance.

Checkpoint

The design team is responsible for implementing the *Territoriality principles* in its architectural design and will demonstrate the outcome through:

- security supported by designing and managing spaces and buildings to define clearly boundaries between private, semiprivate, community group and public space
- territoriality delivered without significant loss of surveillance.

2.1.18.4 Ownership

Requirements

A feeling of individual and community ownership of the public realm and associated built environments must be promoted to encourage a level of shared responsibility for their security.

Checkpoint

The design team is responsible for implementing the ownership principles in its architectural design and will demonstrate the outcome through:

- feeling of individual and community ownership of public realm and associated built environments promoted to encourage a level of shared responsibility for their security.

2.1.18.5 Management

Requirements

Places must be designed and detailed to minimise damage and the need for undue maintenance, without undermining the aesthetic and functional qualities that make the places attractive to the community.

Systems of both regular and reactive maintenance and repair must be implemented to maintain the quality of the places.

Checkpoint

The design team is responsible for implementing the management principles in its architectural design and will demonstrate the outcome through:

- places designed and detailed to minimise damage and need for undue maintenance, without undermining the aesthetic and functional qualities
- systems of regular and reactive maintenance and repair implemented to maintain quality of places.

2.1.18.6 Vulnerability

Requirements

The built environment must be designed and managed to reduce or limit risk from assault by providing well-lit, active and overlooked places and pedestrian and cyclist systems and routes to important places.

Checkpoint

The design team is responsible for implementing the *Vulnerability principles* in its architectural design and will demonstrate the outcome through:

- built environment designed and managed to reduce or limit risk from assault by providing well-lit, active and overlooked places and pedestrian and cyclist systems and routes to important places
- design and management of places avoids creating or maintaining hidden spaces close to pedestrian/cyclist travel routes in the public realm
- design and management of places provides a variety of routes and other ways to avoid potential or actual problems
- safety delivered in ways consistent with purpose of the place.

2.1.19 Information communications technology

Requirements

The ICT strategy and its detailed requirements are determined by the Queensland Health Services Information Agency (HSIA). This department will assist in formulating project specific strategies and requirements. Please refer to their website for detailed procedures and design processes. The local ICT representatives should be consulted on local specifics, such as limitations and local requirements. Health information developments and investments included in capital works projects must support current clinical practices.

Rationale/example

All health facility projects will have an information and communications technology component. This could include the provision or upgrade of the infrastructure, new or upgrade of equipment and installation of new health information management systems.

It is recommended that all proposals for funding be discussed with Queensland Health prior to formal submission. The processes applicable will depend upon the type and scale of the proposal.

Proposals must be consistent with each current Queensland Health ICT strategies and are expected to comply with the relevant technical standards as appropriate to the project.

Refer to *CIR Volume 4 Engineering and infrastructure* more technical specifications on ICT.

Checkpoint

The design team is responsible for implementing the *ICT principles* in its architectural design and will demonstrate the outcome through:

- ICT strategy and detailed requirements determined by the HSIA which has assisted in formulating project specific strategies and requirements
- the local ICT department has been consulted on local specifics
- health information developments and investments included in project supports current clinical practices.

Relevant specifications—design parameters

Infection control

Refer:

- AusHFG Part D—Infection Control
- HB260, Hospital acquired infections—Engineering down the risk
- Australian Guidelines for the Prevention and Control of Infection in Healthcare, NHMRC, <https://www.nhmrc.gov.au/about-us/publications/australian-guidelines-prevention-and-control-infection-healthcare-2019>
- Infection Control Guidelines, <https://www.health.qld.gov.au/clinical-practice/guidelines-procedures/diseases-infection/infection-prevention>
- Kitchen and other food service areas—compliance in all Queensland Health facilities with *Food Act 2006 (Qld)* and the Australia New Zealand Food Standards Code
- Queensland Government—Water risk management plan provisions under the *Public Health Act 2005* (<https://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/water/risk-management>).

Environmental sustainability

Refer:

- Strategic Asset Management Framework—Environmental Sustainability Management.

Cyclonic protection

Refer:

- BCA
- AS 1170.2 Structural Design Action Part 2 Wind Action Code.

Fire resistance

Refer:

- BCA Section C.

Security

Refer:

- Queensland Government - *CPTED Guidelines for Queensland, 2007*
- AusHFG Part C: Design for Access, Mobility, Safety and Security
- AS 4485: Security for health care facilities.

Surveillance

- AS 4806: Closed circuit television (CCTV).

ICT - Refer: Queensland Government Enterprise Architecture ICT Policies, Standards and Guidelines.

2.2 Façade

Requirements

The design of the façade on a health facility shall focus on providing a quality weather proof product with longevity characteristics and limited maintenance requirements. The building façade must meet the structural, thermal and acoustic requirements imposed to various parts of the building. The façade shall respond to the planning and location principles described earlier in this section in regard to the role of the building in the precinct.

Rationale/example

It is advised that façade engineering is undertaken for structural, thermal and acoustic properties.

Preference shall be given to integrated solutions that allow a single point of warranty for the façade.

Thermal modelling shall be undertaken on all new health facilities and all major redevelopments or major additions. A value for money judgement shall inform the size and value of the capital works projects for which this shall apply.

Checkpoint

The design team is responsible for implementing the facade principles in its architectural design and will demonstrate the outcome through:

- the design team shall demonstrate that the façade meets its functional requirements in terms of quality weather proof product with longevity characteristics and limited maintenance requirements
- the design team shall demonstrate that the façade meets the structural, thermal and acoustic requirements imposed to various parts of the building
- the design team shall demonstrate that the façade responds to the planning and location principles.

2.2.1 Walls

Requirements

Walls in the facility must satisfy a range of criteria specifically relating to durability, acoustics and thermal performance. Walls need to be long-life and low maintenance, impermeable, non-porous, non-inflammable and have good thermal performance which is especially important in hot climatic areas. The materials and colour must not be visually jarring or foreboding, and where possible avoid an ‘institutional’ feel.

Checkpoint

The design team is responsible for implementing the Walls principles in its architectural design and will demonstrate the outcome through:

- walls long-life, low maintenance, impermeable, non-porous, non-inflammable and have good thermal performance especially in hot climatic areas. Materials and colour not visually jarring or foreboding, avoiding an ‘institutional’ feel
- sustainability issues considered

- gaps or penetrations in walls sealed to prevent ingress of air, moisture and any insects or other pests
- the walls have a good STC rating so excessive noise not transferred to interior spaces.

2.2.2 Windows

Requirements

Windows in the facility must satisfy a range of criteria specifically relating to durability, acoustics and sun protection.

Checkpoint

The design team is responsible for implementing the windows principles in its architectural design and will demonstrate the outcome through:

- windows in facility satisfy a range of criteria specifically relating to durability, acoustics and sun protection.

2.2.2.1 Performance requirements

Requirements

All rooms occupied by patients or staff on a regular basis shall have glazed windows or doors to achieve external views and/or make use of direct or borrowed natural light where practical.

The external windows of all patient bedrooms shall overlook external areas defined as:

the perimeter space around a building as well as naturally ventilated and lit atriums and courtyards.

To allow a view of the outside environment, the height of window sills shall be level or lower than the sight line of patients in their beds or in a chair.

Rationale/example

- Note 1: NCC requires the provision of natural light to all rooms used for sleeping purposes in a class 9a building. This does not apply to the operating unit, emergency unit and similar areas.
- Note 2: Where possible, the provision of external windows to ICU and CCU bed areas is required by these guidelines.
- Note 3: For the purpose of this clause an internal atrium with artificial ventilation will be accepted if it complies with NCC requirements.

Refer also NCC requirements for natural light and ventilation as applicable to class 9a buildings.

Checkpoint

The design team is responsible for implementing the performance requirement principles in its architectural design and will demonstrate the outcome through:

- all rooms regularly occupied by patients or staff have glazed windows or doors for external views and/or make use of direct or borrowed natural light where practical
- external windows of patient bedrooms overlook external areas defined as perimeter space around a building as well as naturally ventilated and lit atriums and courtyards

- the height of window sills level or lower than the sight line of patients in their beds or in a chair.

2.2.2.2 External Views

Requirements

Windows shall be designed to maximise external views for both patients and staff.

Rationale/example

This is in support of the evidence-based design principles. Refer to *CIR Volume 3 Architecture and health facility design Section 1 Principles, Section 3.2.3*.

Requirements covering natural and artificial light, and natural and mechanical ventilation, including air-conditioning, are dealt with separately under the NCC.

Checkpoint

The design team is responsible for implementing the external view principles in its architectural design and will demonstrate the outcome through:

- windows designed to maximise external views for patients and staff, see *evidence-based design principles, CIR Volume 3 Architecture and health facility design Section 1 Principles, Section 3.2.3*
- requirements covering natural and artificial light, and natural and mechanical ventilation, including air-conditioning, are dealt with separately under the NCC.

2.2.2.3 Window types

Requirements

Provide operable windows as necessary to allow for ventilation in case of breakdown of mechanical ventilation systems, for example air-conditioning. The use of operable windows for this purpose should be regulated by the use of key operated sashes managed by staff. The operable windows shall be selected with hardware to control/restrict the degree of opening.

Rationale/example

Where possible, operable windows are to be incorporated into the facility design, see *Evidence based design principles*.

In multi-level facilities with ducted air-conditioning systems and buildings in cyclone prone areas, it is not always possible or desirable to use operable (opening) windows, fixed windows are acceptable with access for external window cleaning where required that complies with WHS regulations.

Top hung awning windows may act as smoke/heat scoops from fires in storeys below and shall not be used in multi-storey buildings.

Refer to AS 2047, Windows in buildings—selection and installation.

- Note 1: fly screens should be fitted to the opening sections of a window or door as described above.
- Note 2: the provision of operable windows also facilitates energy efficiency as artificial lighting and air-conditioning systems may not be necessary at certain times of the day and year. However, infection control requirements may override this.

- Note 3: to prevent unauthorised access through windows a restriction device should be used. This applies particularly to areas that may accommodate children or persons with dementia or confusion or mental illness.

Checkpoint

The design team is responsible for implementing the *Window type principles* in its architectural design and will demonstrate the outcome through:

- the design team shall demonstrate it has evaluated the use of operable windows and when applicable introduced them in accordance with the NCC and infection control requirements.

2.2.2.4 Window size

Requirements

Window design to incorporate ESD principles and comply with applicable ESD guidelines and regulations.

Rationale/example

Privacy or shading where required should be provided without affecting the requirements of the NCC.

A thermal modelling procedure based on glazing ratio in façade at PDP shall inform the thermal performance and hence the appropriate window sizing.

Refer to NCC requirements for natural light and natural ventilation.

Checkpoint

The design team is responsible for implementing the *Window size principles* in its architectural design and will demonstrate the outcome through:

- window design to incorporate *ESD principles* and comply with applicable *ESD guidelines* and NCC Volume 1, Section J requirements.

2.2.2.5 Windows—security

Requirements

The design team shall conduct a security risk assessment and provide security risk mitigation treatments such as bars, security screens, security glazing, electronic security, locks or restrictors to external perimeter windows as appropriate to minimise unauthorised entry.

Where physical barriers are provided to windows in the form of non-removable bars or security screens ensure that fire safety, including emergency evacuation is not compromised.

Rationale/example

For the purpose of the CIR all fixtures and fittings that are installed, that is fixed to the building, are part of the building and subject to the requirements of these guidelines. As such the relevant requirements of all parts of the AusHFG apply, in particular:

- ergonomics
- human engineering
- safety precautions

- fire safety
- security
- infection control.

Note: Consult with employees and identify, assess and control risks when selecting, purchasing and installing FFE. Refer to WHS legislation and regulations applicable.

Refer to:

- AS 4145.3, Mechanical locksets for windows in buildings
- AS 5039, Security screen doors and security window grilles
- AS 5040, Installation of security screen doors and window grilles.

Security screening in marine environments must have suitable low maintenance, corrosion resistant materials and fixings, such as stainless steel.

Note: that screens in marine environment, even stainless steel fixtures require regular maintenance to prevent surface corrosion.

Checkpoint

The design team is responsible for implementing the window security principles in its architectural design and will demonstrate the outcome through:

- security risk assessment undertaken and security risk mitigation treatments, such as bars, security screens, security glazing, electronic security, locks or restrictors to external perimeter windows provided as appropriate to minimise unauthorised entry.

2.2.3 Spandrels

Requirements

It is preferred that if spandrels are used, these are included in conjunction with the windows contract and provided by the same contractor, to avoid problems with responsibility for water tightness of finished facade.

Checkpoint

The design team is responsible for implementing the *Spandrel principles* in its architectural design and will demonstrate the outcome through:

- spandrels used in conjunction with the windows contract and provided by the same contractor to avoid problems with responsibility for water tightness of finished facade.

2.2.4 External doors

Requirements

All external doors to be made of long-life, low maintenance materials with appropriate security, fire resistance and wind load performance. They shall have seals to keep out wind, rain, insects and other debris. If the doors are frequently opening, the provision of an airlock or windscreen shall be considered to avoid internal drafts, excessive temperature loss, internal condensation and the intrusion of insects.

Rationale/example

The use of revolving doors in a health facility for public entries shall be avoided due to the complicated use with wheelchairs and walking aids.

Checkpoint

The design team is responsible for implementing the *External door principles* in its architectural design and will demonstrate the outcome through:

- external doors made of long-life, low maintenance materials with appropriate security, fire resistance and wind load performance
- external doors frequently opening shall be provided with an airlock or windscreen.

2.2.5 Louvers

Requirements

Louvers and architectural blades can be used as passive shading device, a rain proof device or a passive privacy device. Louvre types shall be chosen with maintenance and cleaning strategies in mind for both the louvers and the surfaces they are covering.

Rationale/example

This refers to metal and other non-glass louvers. Glass louvers are included in the window section.

Louvers can cover a surface, such as a façade and when positioned in a certain position, as in too close, they can obstruct maintenance and cleaning activities between the two surfaces.

Checkpoint

The design team is responsible for implementing the louvers principles in its architectural design and will demonstrate the outcome through:

- the choice and type of louvers shall be relevant to the particular function they are serving, such as:
 - shading
 - rain protection
 - privacy protection
 - the choice and type of louvers shall be mindful of cleaning and maintenance requirements of the louvers and the surface they cover.

2.2.6 Shading

Requirements

Shading devices and their performance shall be tested in detail. The effectiveness of shading from the façade shall be modelled using sun path information to ensure correct functionality. Solar shading devices should incorporate *ESD principles* and comply with applicable *ESD guidelines* and regulations.

Rationale/example

Shading is very important in the Queensland climate.

The aim is generally to allow light but not direct sunlight into internal spaces. The exception to this will be some winter sun where appropriate to provide warmth to some internal spaces. Sun shading in the form of awnings, canopies or roof overhangs is required to help achieve this.

Shading should be designed to help to break down the scale of facades and help make the building look less ‘institutional’. It should, where possible use long-life, low maintenance materials. Access for maintenance and replacement should be considered.

Good orientation of the buildings will greatly assist with the effective use of shading.

Checkpoint

The design team is responsible for implementing the shading principles in its architectural design and will demonstrate the outcome through:

- sun path has been modelled to ensure effectiveness
- solar shading devices incorporate *ESD principles* and comply with applicable *ESD guidelines* and regulations.

2.2.7 Glare control

Requirements

The design shall reduce glare wherever possible.

Rationale/example

Glare is to be minimised or avoided where possible as it has a negative effect upon users of a facility.

Glare control can take the form of tinting of glass used or positioning windows and shading so that direct sun is not admitted. It must be remembered that a balance of light from several directions helps to reduce glare.

Checkpoint

The design team is responsible for implementing the *Glare control principles* in its architectural design and will demonstrate the outcome through:

- glare generally minimised or avoided where possible.

2.2.8 Curtain wall

Requirements

Curtain walling shall be designed and installed as a complete system.

Rationale/example

Curtain walling is commonly used in health facilities partly because it simplifies the façade responsibilities. With curtain walling, one contractor usually takes full responsibility for the total façade and avoids disputes regarding performance.

Checkpoint

The design team is responsible for implementing the *Curtain wall principles* in its architectural design and will demonstrate the outcome through:

- curtain wall has been designed as a single system for installation by a single contractor.

2.2.9 Plant

Requirements

Plant rooms need to be well ventilated and placed where they will cause minimal disruption to users on the site or neighbours. The acoustic and vibration implications of plant must be considered and resolved.

It is important that the ease of maintenance and replacement of equipment be considered and allowed for.

Plant rooms need to be positioned where they will not interfere with future changes or expansion of the facility.

Plant rooms for transformers and main switchboards must be above flood level non electrical services, such as water pipes sanitary waste pipes and medical gas pipes must not pass through electrical equipment rooms.

Checkpoint

The design team is responsible for implementing the plant principles in its architectural design and will demonstrate the outcome through:

- acoustic and vibration implications of plant considered and resolved
- ease of maintenance and replacement of equipment considered and allowed for
- plant rooms positioned where they will not interfere with future changes or expansion of the facility.

2.2.10 Verandas/balconies

Requirements

Verandas and balconies shall be covered to provide protected areas of respite.

Rationale/example

Verandas and balconies can provide sun shading of internal spaces and provide opportunities for staff and patients to relax outdoors but still under cover.

When verandas and balconies are to be used by patients, it is important that visual surveillance and security is maintained. Verandas and balconies help to break down the scale of facility buildings and facades and may be used to make a facility look less 'institutional'.

Checkpoint

The design team is responsible for implementing the *Verandas principles* in its architectural design and will demonstrate the outcome through:

- verandas and balconies shall be covered
- verandas and balconies used by patients have visual surveillance and security maintained.

2.2.11 Soffit

Requirements

Soffits shall be designed to be durable and easily maintained.

Exterior soffit linings and support systems in adverse environments, such as coastal locations and indoor hydrotherapy pools require special consideration to avoid corrosion problems. It is important that soffits are able to be easily accessed for maintenance. In high humidity environments the lining material needs to be such that it does not absorb water over time, to avoid sagging and deformation problems.

Acoustically absorbent materials shall be considered for soffits over noisy areas, such as covered loading docks.

Checkpoint

The design team is responsible for implementing the soffit principles in its architectural design and will demonstrate the outcome through:

- exterior soffit linings and support systems in adverse environments, such as coastal locations and indoor hydrotherapy pools designed to avoid corrosion problems. Soffits able to be easily accessed for maintenance. In high humidity environments the lining materials used do not absorb water over time, avoiding sagging and deformation problems
- acoustically absorbent materials considered for soffits over noisy areas, such as covered loading docks.

2.2.12 Tanking and waterproofing

Requirements

Basement and retaining wall waterproofing systems shall be provided and installed in accordance with the manufacturer's instructions and the specifications. As with all waterproofing matters, the consequences of problems with tanking are usually very great and difficult to rectify, as tanking occurs on the outside face of walls under ground level, so excavation and subsequent re-instatement will be required.

Rationale/example

Waterproofing will occur on the external façade and includes sarking, waterproofing of balconies, capping and flashings around windows, doors, penetrations.

Often tanking failures are difficult to locate as the actual place where water penetrates the building structure is not where water becomes visible.

Tanking is usually part of a system which includes tanking, aggregate and a variety of drainage systems to protect below ground structure from leaks.

Many tanking methods require a lot of room for access. Where access or excavation is an issue one may consider the use prefabricated butyl rubber panels which can be lowered into the excavation from above. When using butyl rubbers a polyester geotextile protective layer is often required between the structure and the rubber for protection.

Checkpoint

The design team is responsible for implementing the *Tanking principles* in its architectural design and will demonstrate the outcome through:

- basement and retaining wall waterproofing systems provided and installed in accordance with the manufacturer's instructions and the specifications.

2.2.13 Materials

Requirements

Material selection will reflect an emphasis on WOL costs not just capital costs. Since health facilities have an expected life of approximately 50 years, material selection is vital in ensuring recurrent costs are minimised.

The main issues to consider are:

- durability
- low maintenance
- ease of maintenance and in some cases replacement
- ease of the actual cleaning and maintenance of the surfaces themselves
- ease of access to the surfaces to enable cleaning and maintenance to occur
- longevity
- ambience (non-institutional).

Checkpoint

The design team is responsible for implementing the *Materials principles* in its architectural design and will demonstrate the outcome through:

- material selection reflects WOL costs not just capital costs.

2.2.14 Acoustic

Requirements

The following noise emissions most commonly have the potential to impact upon persons located both within the facility and the immediately adjacent community:

- intruding noise
- mechanical plant noise (includes kitchens and laundries)
- vehicle noise
- user activities
- construction noise
- helicopter (aviation) noise.

This noise has to be considered when designing the facility itself, and as well as when considering the positioning of the heliport and its associated flight paths because of the effect upon users of the facility and also upon any neighbours.

Checkpoint

The design team is responsible for implementing the *Acoustic principles* in its architectural design and will demonstrate the outcome through:

- the following conduction and operational noise emissions have been considered in the design:
 - mechanical plant noise (includes kitchens and laundries)
 - vehicle noise
 - user activities
 - construction noise
 - helicopter (aviation) noise.

Specifications

Façade—walls

Refer:

- BCA

Windows—Performance requirements

Refer:

- Note 1: BCA clause F4.1 requires the provision of natural light to all rooms used for sleeping purposes in a class 9a building. This does not apply to the Operating Unit, Emergency Unit and similar areas.
- Note 2: Where possible, the provision of external windows to ICU and CCU bed areas is required by these guidelines.
- Note 3: For the purpose of this clause an internal atrium with artificial ventilation will be accepted if it complies with BCA requirements.
- Refer also BCA Part F4 Natural light and ventilation as applicable to class 9a buildings.

External views

Refer:

- BCA Part F4 Natural light and ventilation as applicable to class 9a buildings.

Window types

Refer:

- AS 2047 Windows in Buildings—selection and installation.

Window size

Refer:

- BCA Part F4 covering natural light and natural ventilation.

Window security

Refer:

- AS 4145.3 Mechanical locksets for windows in buildings
- AS 5039 Security screen doors and security window grilles
- AS 5040 Installation of security screen doors and window grilles.

2.3 Roof

Requirements

Complex roof designs, internal box guttering and high maintenance features shall be avoided. The roof design shall be appropriate to the intended use. Open vented roof types, such as sheet metal decking on purlins with suspended ceilings shall not be used over critical care areas.

Checkpoint

The design team is responsible for implementing the *Roof principles* in its architectural design and will demonstrate the outcome through:

- complex roof designs, internal box guttering and high maintenance features avoided. Open vented roof types, such as sheet metal decking on purlins with suspended ceilings not to be used over critical care areas.

2.3.1 Waterproofing

Requirements

Provide roof and deck waterproofing systems to substrates, which are:

- waterproof under five minutes duration rainfall of an intensity, which has an average recurrence interval of 100 years
- graded to falls to dispose of storm water without ponding above the depth of lapped seams
- able to accommodate anticipated building movements
- able to accommodate its own shrinkage over the warranty life of the roofing system.

Checkpoint

The design team is responsible for implementing the *Roof waterproofing principles* in its architectural design and will demonstrate the outcome through:

- roof and deck waterproofing systems to substrates are:
 - waterproof under five minutes duration rainfall of an intensity, which has an average recurrence interval of 100 years
 - graded to falls to dispose of storm water without ponding above the depth of lapped seams
 - able to accommodate anticipated building movements
 - able to accommodate its own shrinkage over the warranty life of the roofing system.

2.3.2 Gutters

Requirements

The capacity of gutters to be in excess of the one in a 100-year rainfall event. Downpipes also to be sized to handle a 100-year rainfall event, and where possible all gutters to be on the building perimeter.

In the event of sustained rainfall at intensity greater than the one in 100-year rainfall event, water will flow over the perimeter gutters to the building exterior and fall to ground below. It will then follow the site overland flow. Avoid parapet gutters where possible.

Down pipes can become blocked for a number of reasons, including hail and the accumulation of leaves and windblown debris, such as plastic bags.

To prevent down pipe blockage:

- all gutters to be covered with an aluminium mesh leaf guard to exclude leaves, plastic bags and windblown debris, large hail stones
- all gutters to be accessible from the roof or accessible by scissor hoist to permit regular maintenance inspection and cleaning if required
- overflow pipes to perimeter gutters to have flow capacity equal to downpipes.

Checkpoint

The design team is responsible for implementing the roof gutter principles in its architectural design and will demonstrate the outcome through:

- capacity of gutters in excess of the one in a 100-year rainfall event. downpipes sized to handle a 100-year rainfall event, and where possible all gutters on the building perimeter
- in the event of sustained rainfall at an intensity greater than the one in 100-year rainfall event, water to flow over the perimeter gutters to the building exterior and fall to ground below. it then follows the site overland flow
- all gutters covered with an aluminium mesh leaf guard to exclude leaves, plastic bags and windblown debris, large hail stones
- all gutters accessible from the roof or accessible by scissor hoist to permit regular maintenance inspection and cleaning if required
- overflow pipes to perimeter gutters have flow capacity equal to downpipes
- all perimeter gutters, in the event of downpipe failure, overflow to the building exterior.

2.3.3 Slope

Requirements

Low pitch metal decking should be avoided if possible. Where low pitch metal decking is necessary and unavoidable, the minimum recommended pitch is 3°, but 5° is preferred.

Checkpoint

The design team is responsible for implementing the *Roof slope principles* in its architectural design and will demonstrate the outcome through:

- low pitch metal decking avoided where possible. Where low pitch metal decking necessary and unavoidable, the minimum recommended pitch is 3°, but 5° is preferred.

2.3.4 Undercover areas

Requirements

The same criteria that apply to roofs apply to undercover areas, the use of materials with a short service life or deteriorate aesthetically shall be avoided.

Checkpoint

The design team is responsible for implementing the undercover areas principles in its architectural design and will demonstrate the outcome through:

- the same criteria that apply to roofs apply to undercover areas, i.e. the use of materials with a short service life or deteriorate aesthetically avoided.

2.3.5 Canopies

Requirements

The same criteria that apply to roofs apply to canopies, the use of materials with a short service life or deteriorate aesthetically shall be avoided.

Checkpoint

The design team is responsible for implementing the *Canopies principles* in its architectural design and will demonstrate the outcome through:

- the same criteria that apply to roofs apply to canopies i.e. the use of materials with a short service life or deteriorate aesthetically avoided.

2.3.6 Porte-Cochere

Requirements

The Porte-Cochere usually visually defines the entry of the facility and provides a sense of arrival and assists wayfinding. As such it shall be inviting and clearly seen as one enters the site. Rainwater must be captured and taken to ground. Any gutters must be easily accessed for maintenance.

Checkpoint

The design team is responsible for implementing the *Porte-Cochere principles* in its architectural design and will demonstrate the outcome through:

- it is inviting and clearly seen as one enters the site
- rainwater captured and taken to ground
- any gutters easily accessed for maintenance.

2.3.7 Covered walkways

Requirements

Covered walkways shall be designed to provide protection even when used in moderate wind-driven rain. All rainwater shall be captured and taken to ground and not allowed to spill off the walkways. All gutters shall be easily accessed for maintenance. Lighting to be adequate for out of hours use. Covered walkways used for patients or services delivery shall to be weather protected.

Checkpoint

The design team is responsible for implementing the *Covered walkway principles* in its architectural design and will demonstrate the outcome through:

- covered walkways designed to provide protection even when used in moderate wind-driven rain
- all rainwater captured and taken to ground
- all gutters easily accessed for maintenance
- lighting adequate for out of hours use
- covered walkways used for patients or services delivery weather protected.

2.3.8 Flashings

Requirements

All flashings shall be provided in accordance with manufacturers recommendations. It is recommended that flashing on the high side of the major roof penetrations (mechanical) extends back to the ridgeline.

Rationale/example

- Installation—flash roof junctions, upstands, abutments and projections through the roof. Preform to required shapes where possible. Notch, scribe, flute or dress down as necessary to follow the profile of adjacent surfaces. Mitre angles and lap joints 150 millimetres in running lengths. Provide matching expansion joints at 6 m maximum intervals.
- Upstands—flash projections above or through the roof with two-part flashings, consisting of a base flashing and a cover flashing, with at least 100 millimetres vertical overlap. Provide for independent movement between the roof and the projection.
- Wall abutments—provide over flashings where roofs abut walls, stepped to the roof slope in masonry and planked cladding, otherwise raking.

Refer to AS/NZS 2904 - Damp-proof courses and flashings.

Checkpoint

The design team is responsible for implementing the *Flashings principles* in its architectural design and will demonstrate the outcome through:

- all flashings provided in accordance with manufacturers recommendations
- flashing on the high side of the major roof penetrations (mechanical) extend back to the ridgeline.

2.3.9 Expansion joints

Requirements

Expansion joint covers shall be flush with the floor surface to facilitate the use of wheelchairs and trolleys. Expansion and seismic joints shall be constructed to resist passage of smoke.

Consideration to be given to box gutter expansion joints, where box gutters are unavoidable are as follows, the maximum spacing recommended are:

- P.G.I./Zincalume 18 metres
- S.S./Aluminium 12 metres
- Copper/Zinc 7 metres
- investigate reusable expansion/seismic joints especially for areas that expect regular movement.

Checkpoint

The design team is responsible for implementing the *Expansion joint principles* in its architectural design and will demonstrate the outcome through:

- expansion joint covers flush with the floor surface. Expansion and seismic joints constructed to resist passage of smoke
- consideration given to box gutter expansion joints where box gutters are unavoidable
- maximum spacing is:
 - P.G.I./Zincalume 18 metres
 - S.S./Aluminium 12 metres
 - Copper/Zinc 7 metres.
- reusable expansion/movement joints used for areas that expect regular movement investigated.

2.3.10 Box gutters

Requirements

Box gutters are best avoided. The design of box gutters, if absolutely necessary, shall be capable of handling the most extreme downpour. Overflow pops of substantial capacity are essential. Vortex breakers at the head of downpipes are also recommended.

Box gutters shall not pass over internal spaces, but where there is no option, special arrangements to be made for water leakage protection. Box gutters to never pass over areas such as main electrical switchboards, operating rooms, critical care areas, lift machine rooms and shafts. Box gutters, where wide enough, shall also be made trafficable.

Note: in this context, wide means equal or more than 450 millimetres.

Checkpoint

The design team is responsible for implementing the *Window type principles* in its architectural design and will demonstrate the outcome through:

- overflow pops of substantial capacity essential. Vortex breakers at the head of downpipes recommended. Box gutters generally do not pass over internal spaces, but where no option, special arrangements made for water leakage protection

- box gutters never pass over areas, such as main electrical switchboards, operating rooms, critical care areas, lift machine rooms and shafts
- box gutters, more than 450 millimetres wide made trafficable
- where access is required of trafficable box gutter, consideration given to appropriate methods of preventing falls, i.e. the provision of handrails or permanent anchorage points for individual fall arrest systems and safety harnesses.

2.3.11 Access for maintenance (including work health and safety)

Requirements

Adequate access to all plant must be provided in accordance with relevant occupational health and safety regulations and standards. Where access is required to a roof, consideration must be given to appropriate methods of preventing falls, i.e. the provision of handrails or permanent anchorage points for individual fall arrest systems and safety harnesses. This requirement also applies to trafficable box gutters.

Checkpoint

The design team is responsible for implementing the *Roof access principles* in its architectural design and will demonstrate the outcome through:

- adequate access to all plant provided in accordance with relevant work health and safety regulations and standards
- where access is required to a roof, consideration given to appropriate methods of preventing falls, i.e. the provision of handrails or permanent anchorage points for individual fall arrest systems and safety harnesses
- fixed platforms, walkways, stairways and ladders to comply with AS 1657.

Specification

Roof—lashings

Refer:

- AS/NZS 2904 Damp-proof courses and flashings.

Access for maintenance (including WHS)

Refer:

- AS 1657 for compliance requirements for fixed platforms, walkways, stairways and ladders
- Includes anchorages complying with AS 2626.

2.4 Partitions

2.4.1 General

Requirements

Partitions to be standardised across the project with variations required only in locations requiring radiation protection or fire rating.

Rationale/example

Key issues for selection of partitions are:

- maintenance and durability
- acoustic performance
- resistance to damage
- fire resistance
- aesthetics (particularly non institutional feel).

The minimum standard partition to be a 92 mm steel stud sheeted either side with one layer of 13 mm mineral fibre reinforced gypsum board. Nogging, trimmers and insulation to be provided within the partition as required.

A minimum of 92 mm stud provides required partition stiffness and is deep enough to house all in-wall services including medical services panels (MSP), central vacuum system distribution, basin and sink waste, hot and cold-water supply, medical gases and electrical and IT cables.

Mineral fibre reinforced gypsum board lining has high impact resistance, excellent acoustic and fire properties, is mould resistant, is suitable for use in wet areas and is considered better than traditional plasterboard in a healthcare setting because of its superior impact resistance and greater versatility.

Checkpoint

The design team is responsible for implementing the general partition principles in its architectural design and will demonstrate the outcome through:

- partitions standardised across project with variations only in locations requiring radiation protection or fire rating
- the minimum standard partition is 92 mm steel stud sheeted either side with one layer of 13 mm mineral fibre reinforced gypsum board. Nogging, trimmers and insulation provided within the partition as required.

2.4.2 Glazed

Requirements

Apart from aesthetic considerations interior glazing is used for a number of purposes, which include:

- WHS (employee safety)
- safety of patients, public and others
- clinical observation of patients
- security, for example checking room occupation in emergency departments
- work practices
- visual communication.

Rationale/example

Glazed panels for both doors and partitions shall be sized, positioned vertically and located to enable use by the majority of occupants i.e. 90 per cent of the population when seated (eye height 685–845 millimetres*), and standing (eye height 1405–1745 millimetres*) and for persons in wheelchairs assume a seated eye height.

*From Table 1 in AS HB59, Ergonomics, the human factor, a practical approach to work systems design.

Note: a variety of terms are used for interior glazing that include ‘viewing panels’, ‘observation panels’, and ‘glazed doors’.

The use of glazing in doors is similar to partition glazing in that it provides for all of the functional categories above, however the use and operation of doors present a separate WHS risk to staff and safety risk to occupants.

Glazing is typically used in the following areas and situations:

- entry/exit to operating rooms or procedure rooms
- scrub room to operating room
- airlocks
- clean and dirty utility
- work rooms frequently used by staff
- kitchens and pantries

- entry doors and doors across corridors.

The instances where these occur are numerous, however the following should be noted:

- rooms used to interview mental health or disturbed patients, including mental health secure rooms
- waiting rooms and other public areas—not in a direct line of sight.

Where adjustable venetian blinds are provided these shall be incorporated between glazing as an integral assembly, for protection against damage and dust collection. Controls should be located to avoid misuse.

In cases where partition glazing is required as above, but cannot be included due to room layout, furniture or fittings, glazed door panels can be used provided that any required obscuration can be achieved.

Interior glazing is not recommended in the following areas:

- rooms requiring acoustic isolation unless the panel can be designed to achieve the required rating where patient or staff privacy is required although safety requirements may need to be balanced against this in some situations.

Glazed panels to have a mechanism, device or material to obscure the glazing in the following areas:

- patient bedrooms to facilitate privacy
- staff areas when privacy is required.

Glazed panels to have the means (mechanism, device, material) to maintain the integrity of the level of protection or security required in the following and other similar areas:

- operating rooms and procedure rooms where a laser may be in use
- rooms requiring X-ray or other radiation shielding
- rooms requiring electromagnetic shielding, for example a faraday cage.

Door observation panels may be obscured glazing (varying grades) in areas where a clear vision of the room is not required. This type of glass or applied film may suit rooms where the primary concern is WHS, patient, staff or functional privacy. Obscured glass is usually adequate and is recommended in doors to the following rooms:

- clean utility
- dirty utility
- operating and procedure rooms
- examination/treatment rooms.

The type and grade of safety glazing to be fit for purpose, for example avoiding potential risks for security, violence or self-harm in addition to complying with any the NCC requirements.

Checkpoint

The design team is responsible for implementing the *Glazed partition principles* in its architectural design and will demonstrate the outcome through:

- the design team shall demonstrate compliance with the principles in this section.

2.4.3 Acoustic separation

Requirements

Separation is particularly important in areas where treatment must have a high level of acoustic privacy, for example interview rooms or mental health.

Rationale/example

Refer section 4.15 Acoustics for more information.

Checkpoint

The design team is responsible for implementing the *Acoustic separation principles* in its architectural design and will demonstrate the outcome through:

- acoustic separation has been applied to those areas identified as high privacy.

2.4.4 Wall protection

Requirements

Wall protection will be required wherever there is potential for damage from trolleys or other traffic.

Rationale/example

Timber grab and crash rails shall be considered as an alternative to the moulded polyvinyl products as they are cheaper, easier to clean and refurbish and maintain a quality appearance for a longer period.

Checkpoint

The design team is responsible for implementing the Wall protection principles in its architectural design and will demonstrate the outcome through:

- wall protection used where potential for damage from trolleys or other traffic
- timber grab and crash rails have been used an alternative to moulded polyvinyl.

2.4.4.1 Corner guards and crashrails

Requirements

Provide corner guards and crashrails to protect wall linings and finishes against damage from impact in:

- inpatient, outpatient and public circulation corridors
- support services corridors, storage bays, equipment rooms
- any areas with trolley, mobile equipment or bed traffic.

Crashrail design shall to be appropriate for differing functional requirements, such as inpatient units, back of house, loading docks.

Crashrail function is frequently incorporated in a dual-purpose handrail/crashrail design. Ensure that the handrail and crashrail functions comply with AS 1428 and meet specific user requirements, such as aged care.

Additional lower crashrail or wall protection may be required for a particular damage pattern.

Checkpoint

The design team is responsible for implementing the *Guards and rails principles* in its architectural design and will demonstrate the outcome through:

- corner guards and crashrails to protect wall linings and finishes from damage and consider location of rails appropriate to usage of area and anticipated cause of damage.

2.4.4.2 Strips and allied items**Requirements**

Note: additional lower crashrail or wall protection to items described above may be required for a particular damage patterns dependent upon what equipment is to be used or likely to be used at a future date in the health facility.

Rationale/example

It should be remembered that the cost of providing protection strips is much less than the cost of repairing damage and then installing strips at a later date. This should be discussed with appropriate user groups.

Checkpoint

The design team is responsible for implementing the strips and allied items principles in its architectural design and will demonstrate the outcome through:

- additional lower crashrail or wall protection required for particular damage patterns dependent upon equipment used or likely to be used in future in health facility
- additional rails/allied items discussed with appropriate user groups.

2.4.5 Handrails**Requirements**

Provide handrails as required to provide assistance and support for patients and visitors, as required by the NCC and as a result of risk assessment.

Each department shall also be assessed individually for the requirements of staff and visitors with disabilities Free ends shall be returned as these constitute a potentially serious head injury risk to children. Design to ensure no pinch points or grip obstructions from fixing brackets.

Grab bars to have a finish that contrasts with the adjacent wall surface.

Grab bars in bathrooms shall allow patients to be as safe and independent as possible. This includes using dropdown grab bars when needed, with or without integral toilet paper holder.

Grab bars in bathrooms to allow staff to complete a double transfer as required for patient care. This includes evaluation of the toilet in relation to the wall and the grab bars provided. Clearance is required on both sides of the toilet for a double transfer to occur. Towel rail shall meet grabrail compliance from a loading and fixing requirement.

When bathroom entrances are located on the same wall as the headwall, fewer steps are needed for the patient and the room is more visible to the patient, facilitating independence. If this arrangement is provided, continuous handrails shall also be installed to assist with mobility and safety.

Consideration to be given to deinstitutionalised look of handrails and grab rails such wood.

Checkpoint

The design team is responsible for implementing the *Handrails principles* in its architectural design and will demonstrate the outcome through:

- handrails as required by the NCC and as a result of risk assessment
- each department assessed individually for requirements of staff and visitors with disabilities
- free ends returned. No pinch points or grip obstructions from fixing brackets
- grab bars have finish that contrasts with wall surface
- dropdown grab bars used when needed, with or without integral toilet paper holder
- clearance on both sides of toilet for double transfer to occur
- towel rail meets grab rail compliance from a loading and fixing requirement
- when bathroom entrances on the same wall as the headwall, continuous handrails installed to assist mobility and safety
- ‘deinstitutionalised’ look of handrails, grab rails, in wood considered.

2.4.6 Clinical fixtures

Requirements

Heavy clinical fixtures that need to be attached to partitions shall be identified early in the design process.

Rationale/example

There are several ways to strengthen the supporting partitions.

1. One can allow for an equipment specific mounting position to be set into the walls.
2. Alternatively, a strip or band of reinforcement set behind the wall sheeting at a pre-determined height which will allow some variability in equipment to be fixed to the partition at a later date.
3. In some areas where there is likely to be a large number of fixtures to be fixed to partition walls a reinforcement sheeting can be positioned under the normal sheeting over a whole wall surface. This gives the greatest flexibility.

Both 2 and 3 above allow for greater flexibility and future proofing on the space.

One above should only be used when there is certainty that there is not going to be any change to the type and position of the particular equipment.

Checkpoint

The design team is responsible for implementing the clinical fixtures principles in its architectural design and will demonstrate the outcome through:

- a facility wide fixture and lines of height strategy shall be developed in detail
- early in the design process heavy clinical fixtures that need to be attached to partitions identified.

2.4.7 Pneumatic tube stations

2.4.7.1 System overview

Requirements

A pneumatic air tube transport system—which may be either a point-to-point or a multi-point system—is a distribution network of tubes through which carriers of various sizes containing small items are driven by air flow. The prime mover is a blower which can alter the direction of the air flow in the tube as required to move the carrier through the system.

Checkpoint

The design team is responsible for implementing the *Pneumatic tube system principles* in its architectural design and will demonstrate the outcome through:

- pneumatic tube system may be a point to point or multi-point system, and shall comply with the checkpoints listed below in item 2.4.7.2 or 2.4.7.3.

2.4.7.2 Point-to-point system

Requirements

Point-to-point pneumatic tube systems provide two-way transfer via a single continuous tube linking stations.

Rationale/example

This system is suitable for use in an application that requires simple operation and a dedicated link between departments, for example between an operating theatre and the pathology department.

Checkpoint

The design team is responsible for implementing the *Point-to-point pneumatic tube principles* in its architectural design and will demonstrate the outcome through:

- point-to-point systems used in applications which require simple operation and a dedicated link between departments only.

2.4.7.3 Multi-point system

Requirements

Multi-point pneumatic air tube transport systems provide full intercommunication between all points in the system.

Rationale/example

Where systems are large and traffic is heavy, the network may be split into zones. This allows local transport of carriers in each zone, as well as transfer to another zone when required. This type of system is commonly used in large facilities with, for example the pharmacy and pathology departments being in separate zones.

Checkpoint

The design team is responsible for implementing the *Multi-point pneumatic tube principles* in its architectural design and will demonstrate the outcome through:

- where systems large and traffic is heavy, network split into zones, allowing local transport of carriers in each zone, and transfer to another zone when required.

2.4.7.4 Diverters

Requirements

Diverters are used to route carriers through the network and sometimes across zones. The number and location of diverters to be agreed at local level between the designer and hospital staff, but generally they must be used economically and be positioned to minimise the system tube length.

Checkpoint

The design team is responsible for implementing the *Diverters principles* in its architectural design and will demonstrate the outcome through:

- number and location of diverters agreed between the designer and hospital staff but used economically and positioned to minimise system tube length.

2.4.7.5 System control

Requirements

Multi point systems are controlled centrally by a dedicated microprocessor or computer. The controller receives transfer instructions, carries out continuous monitoring of the system and provides system status information. If required, cleaning cycles may be carried out at pre-determined intervals to keep the pipework free of dust. The control system should allow reconfiguration of the network as required. Stations can be operational on a 9 am to 5 pm basis, with override facilities as required, or 24 hours a day, according to the requirements of a particular department.

Checkpoint

The design team is responsible for implementing the *System control principles* in its architectural design and will demonstrate the outcome through:

- multi point systems controlled centrally by a dedicated microprocessor or computer

- cleaning cycles carried out at pre-determined intervals to keep the pipework free of dust control system allows reconfiguration of the network

stations operational 9 am to 5 pm with override facilities as required, or 24 hours a day, according to requirements of particular department.

2.4.7.6 Stations

Requirements

A station may be an end unit (one at the end of a branch), or a through station (carriers may pass straight through it), although the stations operate in slightly different ways, send and receive operations may be carried out at each one.

Each station shall include a user interface, which is normally in the form of a keypad and display unit.

Rationale/example

A station may be an end unit (one at the end of a branch), or a through station (carriers may pass straight through it) send and receive operations carried out at each one.

Each station has user interface, normally in the form of keypad and display unit.

Features include:

- network tubing: 160 mm diameter and normally upvc, but where required for protection, steel tube used for some sections
- automatic send and receive stations
- full intercommunication between all stations
- prioritisation of carrier delivery
- multi-zone with communication between zones
- security measures for transfer of certain products, such as drugs
- leak proof carriers and sealed insert bags for samples (spillage contained within carrier).

Checkpoint

The design team is responsible for implementing the *Stations principles* in its architectural design and will demonstrate the outcome through:

- tube stations and network providing appropriate connectivity and response time between departments per briefing.

2.4.7.7 Medical service panels

Requirements

The development of the medical services panels to be based on AusHFG and through consultation with user groups to determine the final arrangement of services on the panels.

Medical services panel is provided with separate front plates to differentiate between the different services trade and enable modification of the panel to be completed by a single services trade.

The power outlets are colour coded to differentiate between connected essential and non-essential equipment.

Checkpoint

The design team is responsible for implementing the *Medical services panels principles* in its architectural design and will demonstrate the outcome through:

- medical services panels based on AusHFG and consultation with user groups to determine final arrangement of services on the panels
- medical services panel provided with separate front plates to differentiate between the different services trade and enable modification of the panel by single services trade
- power outlets colour coded to differentiate between connected essential and non-essential equipment.

2.4.8 Splash protection

Requirements

Apply splash protection to walls in areas, such as laboratories, formula rooms, beverage bays, kitchens, bathrooms, showers, and dirty utility rooms in addition to hand basins, scrub troughs, cleaners' and laundry sinks.

Checkpoint

The design team is responsible for implementing the *Splash protection principles* in its architectural design and will demonstrate the outcome through:

- splash protection to walls in areas, such as laboratories, formula rooms, beverage bays, kitchens, bathrooms, showers, and dirty utility rooms and to hand basins, scrub troughs, cleaners' and laundry sinks.

Specification

Partitions—general

Refer:

- AusHFG 480.19.05 Construction relating to PET scanner.
- The wall for PET/CT with radiation shielding weighs approximately 9 tonnes.
- The standard partition will be use a 92mm steel stud and be sheeted either side with one layer of 13 mineral fibre reinforced gypsum board. Nogging, trimmers and insulation will provided within the partition as required. A 92mm stud was chosen as it provides the required partition stiffness and is deep enough to house all in-wall services including medical services panels (MSP), central vacuum system distribution, basin and sink waste, hot and cold water supply, medical gases and electrical and IT cables.
- Mineral fibre reinforced gypsum board lining was selected as it has high impact resistance, excellent acoustic and fire properties, is mould resistant and suitable for use in wet areas. It is also manufactured from 95 per cent recycled materials and is itself post-construction recyclable. This product is considered better than traditional plasterboard in a healthcare setting because of its superior impact resistance and greater versatility.

Glazed

- Glazed panels for both doors and partitions should be sized, positioned vertically and located to enable use by the majority of occupants i.e. 90 per cent of the population when seated (eye height 685 - 845mm*), and standing (eye height 1405 - 1745mm*) and for persons in wheelchairs assume a seated eye height.
- *From Table 1 in HB59—Ergonomics—The human factor—A practical approach to work systems design.
- Note: A variety of terms are used for interior glazing that include ‘viewing panels’, ‘observation panels’ and ‘glazed doors’.
- The type and grade of safety glazing should be fit for purpose such as avoiding potential risks for security, violence or self-harm in addition to complying with any the BCA requirements.

Refer:

- AusHFG Section 790 Safety—Glazing, Security—Building Elements.

Wall protection - Corner guards and crashrails

Refer:

- AS 1428.

Bumpers

Refer:

- AS 1428

2.5 Doors

2.5.1 Types

Requirements

Comply with the requirements of the NCC and AS 1428.1 as applicable for the provision of doorways, including all related ancillary requirements, such as construction, clearances, glazing, operation, hardware and signage.

Consider the application of AS 1428.2 to door opening widths and circulation space as a minimum as this standard provides more universal accessibility and better protection against disability discrimination complaint.

For areas occupied by patients with cognitive deficits and scheduled mental health patients, all necessary dispensations to the regulations should be sought and obtained.

Consider alternative door solutions and technology in ensuites, patient accessible rooms to improve access and improve functionality and increase fall prevention.

Consider door and one half (approximately 1200 mm wide) where possible.

Checkpoint

The design team is responsible for implementing the *Doors principles* in its architectural design and will demonstrate the outcome through:

- compliance with NCC and AS 1428.1 for the provision of doorways, including all related ancillary requirements, such as construction, clearances, glazing, operation, hardware and signage
- considered application of AS 1428.2 to door opening widths and circulation space as a minimum as this standard provides more universal accessibility and better protection against disability discrimination complaint
- for areas occupied by patients with cognitive deficits and scheduled mental health patients, all necessary dispensations to the regulations sought and obtained
- considered alternative door solutions and technology in ensuites, patient accessible rooms to improve access and improve functionality and increase fall prevention
- consider 'door and one half' 1200 mm for ensuite door
- consider door protection as necessary; refer to the principles of 3.4.4. wall protection.

2.5.1.1 Fire doors

Requirements

Fire compartment doors can, where necessary, be held open by magnetic hold-open devices connected to the fire alarm system. This ensures that these doors will not impede travel, create manual handling risks or create line of sight risks under normal circumstances.

Ensure minimum height clearances provided to the underside of the closers and magnetic locks where these are fitted to the underside of door frames.

Checkpoint

The design team is responsible for implementing the *Fire doors principles* in its architectural design and will demonstrate the outcome through:

- fire compartment doors held open by magnetic hold-open devices connected to fire alarm system, so as not to impede travel, create manual handling risks or create line of sight risks under normal circumstances
- minimum height clearances maintained to underside of closers and magnetic locks where fitted to underside of door frames.

2.5.1.2 Automatic doors

Requirements

Automatic sliding doors may be used in high traffic areas and routes, including entry doors to facilities and departments. They may also be used successfully in areas where hands-off access is necessary, such as in access routes for critical care, ambulance and helicopter cases or entries to operating unit.

Satisfy the requirements for emergency egress and fit automatic doors with sensors to activate opening that ensures safe use by infants, people with disability, frail patients and visitors. Consider the use of electronic drop bolt locking where lock down security is required.

Rationale/example

Note 1: requirements for power operated doors are covered within the NCC.

Note +2: automatic swing doors are not recommended on the grounds of safety, WHS, high maintenance and problems with wind gusts and air pressure differentials.

Automatic sliding doors are a practical design solution employed significantly within Queensland Health.

Checkpoint

The design team is responsible for implementing the *Automatic doors principles* in its architectural design and will demonstrate the outcome through:

- automatic sliding doors used in some high traffic areas and routes, entry doors to facilities and departments. Also where hands-off access is necessary, such as access routes for critical care, ambulance and helicopter cases or entries to operating unit
- satisfy requirements for emergency egress with automatic doors with sensors to activate opening to ensure safe use by infants, people with disability, frail patients and visitors. electronic drop bolt locking where lock down security required

Note 1: requirements for power operated doors covered within the NCC.

Note 2: automatic swing doors not used on the grounds of safety, WHS, high maintenance and problems with wind gusts and air pressure differentials.

2.5.1.3 Sliding doors

Requirements

Sliding doors (such as single, dual, telescopic) may be used subject to compliance with the BCA.

These guidelines recommend careful consideration when using sliding doors in healthcare facilities due to hygiene concerns, poor acoustic performance, maintenance problems and potential for locking in place.

Rationale/example

Sliding doors (such as single, dual, telescopic) used subject to compliance with the NCC and AS 1428.1 or AS 1428.2 if adopted.

Careful consideration when using sliding doors in healthcare facilities due to:

- hygiene concerns
- poor acoustic performance
- maintenance problems and
- potential for locking in place.

Note: NCC covers manually and power operated sliding doors in required exits in class 9a buildings.

Refer to NCC and AS 1428.1 or AS 1428.2 if adopted.

Checkpoint

The design team is responsible for implementing the *Sliding doors principles* in its architectural design and will demonstrate the outcome through:

- cavity sliders not used in the following areas:
 - Health Planning Unit (HPU) containing patient care areas or treatment areas
 - HPU containing sterile equipment
 - HPU containing patient diagnostic equipment
 - catering facilities
 - laboratory areas
 - mental health facilities
- surface mounted sliding doors used subject to the requirements of accessibility, egress and access in emergency situations
- top or bottom roller mechanisms, guides and channels fit for purpose and ensure safety of operation.

2.5.1.4 Door swing

Requirements

Ensure that doors do not open into a zone which impedes the manoeuvring of patients/residents nor swing out into a circulation area in a manner that might obstruct traffic flow or reduce the required corridor recommended minimum clear width.

Some doors may be required to swing out or in both directions for reasons of patient safety, such as patient bedrooms in mental health units, for reasons of staff safety, such as in consultation rooms, or where they form part of an escape route.

In consultation rooms ensure that privacy, door seals and acoustic performance are not compromised.

Automatic swing doors are not recommended.

Checkpoint

The design team is responsible for implementing the *Door swing principles* in its architectural design and will demonstrate the outcome through:

- no doors open into a zone which impedes the manoeuvring of patients/residents nor swing out into a circulation area so as to obstruct traffic flow or reduce the required corridor minimum clear width
- some doors swing out or in both directions for reasons of patient safety, such as patient bedrooms in mental health units, for reasons of staff safety, such as in consultation rooms, or where part of an escape route
- in consultation rooms ensured that privacy, door seals and acoustic performance not compromised
- automatic swing doors not recommended.

2.5.1.5 Doors in the path of fire egress

Requirements

All doors on the path of fire egress subject to the requirements of the NCC, whether single or double swinging leaves except where sliding doors (with conditions) are permitted for exits.

Note: Doors forming part of a fire or smoke compartment enclosure, shall when in the closed position, maintain the integrity of the enclosing structure.

Wherever possible, use hold-open devices controlled by smoke detectors to assist the safe movement of patients, staff and equipment through doorways.

Rationale/example

Note: doors forming part of a fire or smoke compartment enclosure, when in the closed position, maintain the integrity of enclosing structure.

Generally hold-open devices controlled by smoke detectors to assist safe movement of patients, staff and equipment through doorways.

Checkpoint

The design team is responsible for implementing the *Doors in path of fire egress principles* in its architectural design and will demonstrate the outcome through:

- all doors on the path of fire egress subject to the requirements of the NCC, whether single or double swinging leaves except where sliding doors (with conditions) permitted for exits.

2.5.1.6 Locking to doors in the path of travel

Requirements

Written approval from the local regulatory authority (fire service/building authority) is mandatory before any exit doors in the path of egress travel are locked. Such written building approvals are to be kept for the life of the building.

The fire and evacuation plan for the building to also include appropriate operational procedures/training requirements for the opening of locked fire exit doors in emergency situations.

The operation of a fire alarm and manual override devices, including the failsafe design of electronically locked exit doors in a path of egress travel, (automatically unlocked upon the operation of a fire alarm), are not to be configured/interfaced through, or be dependent upon the operational status of the fire alarm panel door switch.

Locked exit doors that are electronically locked and automatically unlocked upon the operation of a fire alarm are to have fail-safe manual override devices installed at the exit door including signage instruction for exit door unlocking.

In secure locations, such as patients with cognitive deficits and scheduled mental health patients where patients/clients could be subject to harm if they operated the manual override device, manual overrides shall be provided in secure locations, such as at nurse stations or within/near the fire indicator panel.

Checkpoint

The design team is responsible for implementing the locking doors principles in its architectural design and will demonstrate the outcome through:

- written approval from the local regulatory authority (fire service/building authority) mandatory before any exit doors in path of egress travel locked. Written approvals to be kept for life of building
- fire and evacuation plan for building to include:
 - appropriate operational procedures
 - training requirements for opening of locked fire exit doors in emergency
 - operation of fire alarm and manual override devices, including failsafe design of electronically locked exit doors in path of egress travel, (automatically unlocked upon the operation of a fire alarm), not to be configured/interfaced through, or be dependent upon operational status of fire alarm panel door switch.
- locked exit doors that are electronically locked and automatically unlocked upon operation of fire alarm have fail-safe manual override devices installed at exit door including signage instruction for exit door unlocking
- in secure locations, such as patients with cognitive deficits and scheduled mental health patients, where patients/clients could be subject to harm if they operated the manual override device, manual overrides provided in secure locations, such as nurse stations or within/near the fire indicator panel.

2.5.1.7 Mental health facilities fire egress

Requirements

- Latch and locking operation for doors associated with a required exit or path of travel are covered by the NCC. Provisions are required for immediate unlocking by a fail-safe control switch or by hand. Dispensation shall be sought for any variation of this provision.
- As a risk management measure all perimeter doors to be provided with locks to prevent unauthorized entry or exit. In the case of openings into a secure area or courtyard, security may still be breached in a variety of ways.
- Any decision to omit locks must be formally recorded.
- The use of alarms to indicate the unauthorised use of perimeter doors not used for public access and the use of secure hinges (with non-removable pins) to doors identified by risk assessment to be considered.
- Entry and exit points into a facility or department to be reduced to a minimum and provided with monitoring / access control as applicable.
- Provision to be made for use after hours and after dark.
- The provision of electronic locks on access and cupboard doors to Pharmacies and to clean utility / medication rooms to be considered to provide both security and a record of access.
- Do not implement security measures that adversely affect NCC compliant egress and fire safety.

Checkpoint

The design team is responsible for implementing the *Doors in mental health principles* in its architectural design and will demonstrate the outcome through:

- latch and locking operation for doors associated with required exit or path of travel covered by the NCC. Provisions required for immediate unlocking by fail-safe control switch or by hand. Dispensation required for any variation of this provision
- all perimeter doors to have locks to prevent unauthorized entry or exit. Decision to omit locks must be formally recorded
- consider use of alarms to indicate unauthorised use of perimeter doors not used for public access and use of secure hinges (with non-removable pins) to doors identified by risk assessment
- entry and exit points into facility or department minimised and provided with monitoring/access control as applicable
- provision for use after hours and after dark
- provision of electronic locks on access and cupboard doors to pharmacies and clean utility/medication rooms considered to provide security and record of access
- no security measures that adversely affect BCA egress and fire safety requirements.

2.5.1.8 Doors used by patients

Requirements

Use swinging single or double doors to rooms likely to be used by patients without staff assistance. See previous clause sliding doors. Swinging doors will generally open from corridors and distribution spaces into rooms for safety or egress. However, examples of some doors that may need to open out are:

- doors to small patient ensuites
- doors to accessible toilets and showers
- doors to small change cubicles
- doors in areas accessed by mental health patients to prevent patients locking/barricading themselves in the room.

Ensure that doors are easy to open and close (door weight) particularly where patients are using mobility aids, such as walkers. A full height or a wide single leaf solid core door can be relatively heavy and can cause injury.

Other lighter door leaf constructions that meet the required performance are recommended.

Doors required for emergency access to patients/occupants, such as toilets, to open out or use special purpose hardware to enable an open out over-ride option for emergencies.

Locksets and door handles to address risks, such as opportunities for self-harm in areas where patients are assessed and treated as being at risk of suicide, such as emergency departments, mental health units.

Rationale/example

Note 1: NCC requirements for access for people with disabilities in 9a buildings applies to all areas normally used by the public, patients or staff, and references AS 1428.1 for these areas.

Note 2: the interpretation and implementation of the relevant parts of the *Disability Discrimination Act 1992* may require expert advice. Doors within separating corridors are covered by the NCC for doors in the path of fire egress. For the purpose of these guidelines all corridors are on the path of egress.

Note: the NCC specifies minimum door clear widths on the path of travel to an exit within a patient care area and requirements for doors and hardware in required exits.

Provide the recommended minimum dimensions for doors as clear openings to inpatient bedrooms in new areas to ensure clearance for the movement of beds.

In patient care areas and acute care areas in particular, the minimum clear opening dimensions may need to be increased for large sized beds and equipment, for example bariatric beds exceeding 1200 mm width.

Existing doors of lesser dimensions may be considered acceptable in some instances where function is not adversely affected and replacement is impractical, such as adult mental health inpatient units.

Note: within a treatment or inpatient area the NCC specifies door clear widths relating to corridor clear widths.

To allow access for equipment expected to be used such as IV poles, fracture frames and electric beds, generally a door clear opening height of 2030 mm high is adequate. Where necessary this may be increased to 2330 mm high, for example for bariatric equipment and other special circumstances.

Note: Satisfy all provisions for smoke capture at openings where applicable.

Ensure that doors are easy to open and close (door weight), as a full height or wide single leaf solid core door can be relatively heavy or require supplementary hinges and can cause injury. Choose a lighter durable alternative where possible. Special attention should be given to seclusion room doors.

A minimum opening clear width of 1200 mm is recommended for doors into seclusion rooms, such as in emergency and mental health units. In general, clear door opening widths to rooms that may be accessed by stretchers, wheeled bed stretchers excluding beds, wheelchairs or persons with disabilities or using assistive devices should be a recommended minimum of 900 mm. To allow access for hoists and shower trolleys, increase the clear door opening width to a recommended minimum of 1000 mm. For clear door widths for bed access refer to the previous clause.

Manufacturers' recommendations for the equipment selected to be followed, and opening tolerances for new equipment and future use profiles to be considered.

Note 1: the NCC references AS 1428.1, where Section 7 covers accessibility requirements and correlation between doors and circulation space at doorways.

While the CIR are intended to facilitate access by personnel and mobile equipment, consideration to be given to the size of furniture and special equipment that is to be delivered via these access ways.

Allow for egress, safe access for maintenance, service and replacement of equipment in all door openings and circulation routes to plant rooms.

Checkpoint

The design team is responsible for implementing the *Patient doors principles* in its architectural design and will demonstrate the outcome through:

- swinging single or double doors to rooms likely to be used by patients without staff assistance
- swinging doors generally open from corridors and distribution spaces into rooms for safety or egress.

2.5.1.9 Emergency access

Requirements

Provide doors and hardware that permit emergency access from outside the room to rooms identified through risk assessment. These may be defined as rooms that:

- are used independently by patients
- have only one door
- are smaller than 6 square metres
- have less than 2.5 metres of clear space behind the single door
- form patient bedrooms, bathrooms and ensuites in mental health facilities
- form secure rooms in mental health facilities.

Rationale/example

Note: similar areas used by visitors and staff considered for emergency access as a part of risk assessment.

Checkpoint

The design team is responsible for implementing the *Emergency egress principles* in its architectural design and will demonstrate the outcome through:

- doors and hardware to permit emergency access from outside the room to rooms identified through risk assessment.

2.5.1.10 Mental health seclusion rooms

Requirements

In mental health seclusion rooms for WHS, patient safety and security, provide the following:

- two single leaf doors opening outwards and wide enough to accommodate a patient with two or more escorts. Ensure a suitable distance between doors and external locks
- electronic locks connected to a non-interruptible power supply and with at least two locking points should be considered. Do not provide internal handles
- doors and frames to be solid construction with multiple hinges and multiple locking points. Viewing panels to be constructed from non-breakable material with concealed fixings and designed to prevent removal from within the room
- doors to comply with *Queensland Mental Health Guidelines* and in case of fire are to be operated by staff member not automatically.

Checkpoint

The design team is responsible for implementing the doors in *Seclusion rooms principles* in its architectural design and will demonstrate the outcome through:

- mental health seclusion rooms for WHS, patient safety and security, require the following:
- two single leaf doors opening outwards and wide enough to accommodate patient with two or more escorts. Ensure suitable distance between doors and external locks
- electronic locks connected to non-interruptible power supply with minimum two locking points. No internal handles
- doors and frames solid construction with multiple hinges and multiple locking points. Viewing panels non-breakable material with concealed fixings to prevent removal from within room.

2.5.2 Hardware

2.5.2.1 Door handles

Requirements

Ensure that all door hardware is fit for purpose and complies with all relevant regulations, standards and policies, including those applying within each jurisdiction. This includes all matters of WHS, user and patient safety, DDA and accessibility, security, special requirements, durability and function.

Checkpoint

The design team is responsible for implementing the *Door handle principles* in its architectural design and will demonstrate the outcome through:

- door hardware fit for purpose complying with all relevant regulations, standards and policies, including those applying within Queensland. This includes all matters of WHS, user and patient safety, *Disability Discrimination Act 1992* and accessibility, security, special requirements, durability and function.

2.5.2.2 General

Requirements

Lever handles recommended for hinged doors and pull handles for sliding doors.

Handles to be between 900 mm and 1100 mm above the floor per the NCC referencing AS 1428.1, and appropriate height for staff to easily open doors whilst supporting or manoeuvring patients or residents. In areas with frequent staff movement by or through doorways, door handles should be selected with a shape minimising risk of snagging clothing or other items, such as lever handles with full return.

See AS 1428.2 for additional information on accessible door handles and hardware.

Checkpoint

The design team is responsible for implementing the *Doors in general door hardware principles* in its architectural design and will demonstrate the outcome through:

- handles between 900 mm and 1100 mm above the floor per the NCC referencing AS 1428.1, for staff to easily open doors whilst supporting or manoeuvring patients or residents. Where frequent staff movement by or through doorways, door handles to be selected with shape minimising risk of snagging clothing or other items, eg lever handles with full return.

See AS 1428.2 for additional information on accessible door handles and hardware.

2.5.2.3 Mental health

Requirements

In mental health facilities ensure door hardware cannot provide support point for self-harm, staff-only areas excepted. Use only tested and approved anti ligature products specifically designed to prevent self-harm.

Note: hardware to be recessed, concealed, flush door handles, and tapered doorknobs.

Checkpoint

The design team is responsible for implementing the *Door hardware in mental health principles* in its architectural design and will demonstrate the outcome through:

- selection of door hardware that cannot provide support point for self-harm, staff-only areas excepted
- use of tested and approved anti ligature products specifically designed to prevent self-harm
- all hardware to be recessed, concealed, flush door handles, tapered doorknobs.

2.5.2.4 Paediatric rooms

Requirements

In paediatric rooms where no latching is required consider providing two sets of push plate/pull handles—one at high level and one at low level. Door controls should meet AS 1428.3 as applicable to paediatric units.

Checkpoint

The design team is responsible for implementing the *Door hardware in paediatric rooms* principles in its architectural design and will demonstrate the outcome through:

- provide two sets of push plate/pull handles in paediatric units—one at high level and one at low level
- door controls to meet AS 1428.3 as applicable to paediatric units.

2.5.2.5 Locks

Requirements

Door handles may incorporate locks, snib latches, push buttons and indicators. Consider use of flexible hardware systems where functionality of the door may be changed without changing the hardware.

The type of locking function to be appropriate for the use of the room and prevent a person becoming inadvertently locked in a room.

Keyless entry systems may be required for controlled access areas.

Checkpoint

The design team is responsible for implementing the *Door lock principles* in its architectural design and will demonstrate the outcome through:

- door handles may incorporate locks, snib latches, push buttons and indicators. Consider flexible hardware systems where functionality of the door may change without changing hardware.
- locking function to be appropriate for use of the room and prevent person becoming inadvertently locked in a room.
- keyless entry systems may be required for controlled access areas.

2.5.2.6 Push plates/pull handles

Requirements

Rooms that do not require latching may work well with push plate/pull handle and self-closer.

Push plates/pull handles to be used in rooms used frequently by staff carrying objects, such as dirty utility rooms.

HVAC design may require door grilles or undercuts for return air, makeup air or pressure relief.

Door grilles or undercuts may be used in areas that do not compromise requirements of the NCC and other requirements of these guidelines.

Rationale/example

Do not use door grilles or undercuts in the following locations:

- areas with a particular air-pressurisation scheme, such as isolation
- rooms requiring acoustic isolation and privacy
- rooms requiring radiation shielding
- fire doors and smoke doors.

Do not use door grilles in patient accessible areas within mental health facilities due to potential for door grilles to suffer impact and damage, be used for self-harm or as a weapon.

Following requirements and recommendations apply to grilles and undercuts:

- door grilles to be positioned (above 290 mm) to avoid damage by wheelchair footrests in areas used by people in wheelchairs, refer to AS 1428.1, Figure 35
- door grilles are not recommended for bathrooms or ensuites
- large undercuts close to bathroom showers not to be used as they can result in water leaking or splashing into adjoining rooms.

As an alternative to a door undercut consider:

- an inward sloping door slot approximately 200 millimetres above the floor to reduce water egress whilst providing the same functionality as a door undercut for bathroom showers
- ceiling grilles connected via flexible duct within the ceiling space.

Door hold-open devices to be considered for doors that may need to remain open, such as doors on main traffic routes and delivery doors.

Devices to meet the following recommendations:

- hold-open devices to be capable of activation and de-activation without any need for the staff to bend down, reach upwards or reach behind the door
- hold-open devices not to be fitted to doors where this compromises doors that are required to achieve a specific air pressurisation or isolation scheme by these guidelines
- hold-open devices not to be fitted to the side of a door that may permit a disturbed patient to lock the door from inside or where they may provide a potential hanging point for patients who are at high risk of self-harm
- in areas frequently used by staff holding objects or pushing trolleys, the use of delayed action combined self-closer/hold-open device is recommended
- hold-open devices used for fire doors to comply with the NCC and be controlled either by smoke detectors or by activated fire alarms
- self-closers required for fire and smoke doors are covered under the NCC.

Self-closers to be provided for the following doors and rooms:

- doors required to achieve a certain airflow or air pressurisation scheme required by these guidelines
- entrance doors to any area nominated as a restricted area by these guidelines, including:
 - operating unit
 - CSSU

- kitchen
- sterile stock room
- isolation rooms
- birthing rooms.

Apart from the previous recommendation, the over-provision of self-closers can lead to unnecessary capital expenditure and maintenance costs. Door closers not to be fitted where they exacerbate or create manual handling risks, where they impede the movement of patients or where they reduce the independence of patients.

The use of door closers to utility and other high use rooms to be referred to the Project Control Group. The use of delayed action closers is an option where there is a high incidence of staff carrying objects or wheeling trolleys.

Refer to AS 1428.1 clause 11.1.1 for permissible maximum opening forces.

Door hardware is a specialist subject covering a wide range of products and product options. The selection of hardware for healthcare is particularly complex. The services and advice of experienced industry support staff is recommended.

Interior glazing in the form of glazed panels within partitions or doors is often required for the safe and efficient operation of the door or space. When provided in this context to be fit for purpose and comply with the relevant regulations, guidelines and standards, in particular:

- AS 1288, Glass in buildings, selection and installation
- AS 1905.1, Components for the protection of openings in fire resistant walls, Part 1, fire resistant door sets (for example glazing in fire doors).

Checkpoint

The design team is responsible for implementing the *Push/pull principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the principles of this section.

Specification

Doors—types

Refer:

- BCA
- AS1428.1 as applicable for the provision of doorways, including all related ancillary requirements such as construction, clearances, glazing, operation, hardware and signage.
- consider the application of AS1428.2 to door opening widths and circulation space as a minimum as this Standard provides more universal accessibility and better protection against disability discrimination complaint.

Automatic doors

Refer:

- Part D of the BCA for requirements for power operated doors.

Sliding doors

Refer:

- AS 1428.1 or AS 1428.2 if adopted.
- BCA clause D 2.19 covers manually and power operated sliding doors in required exits in class 9a buildings.

Doors in the path of fire egress

Refer:

- AusHFG Section 790 Safety.
- Note: BCA sections D1 and D2 cover doorways in or forming part of a required exit in class 9a buildings.

Mental health facilities fire egress

Refer:

- BCA clause D 2.21
- AusHFG Section 790 Security— Building Elements— Doors.

Specification continued

Doors used by patients

Refer:

- For design standards refer to AusHFG Section 790 Safety, and to Security—Building Elements—Doors.
- Note 1: BCA Part D3 covering access for people with disabilities in 9a buildings applies to all areas normally used by the public, patients or staff, and references AS 1428.1 for these areas.
- Note 2: The interpretation and implementation of the relevant parts of the *Disability Discrimination Act 1992* may require expert advice. Doors within separating corridors are covered by the BCA for doors in the path of fire egress. For the purpose of these guidelines all corridors are on the path of egress.
- Note 3: The BCA clause D 1.6 specifies minimum door clear widths on the path of travel to an exit within a patient care area. Clauses D 2.19 and D 2.20 cover requirements for doors and hardware in required exits.
- For issues with large/heavy door leaves refer to AusHFG 790 Safety. Door closers and hold open devices are dealt with later in this section.
- Note: Within a treatment or inpatient area the BCA. Clause D
- 1.6 specifies door clear widths relating to corridor clear widths.
- Note 1: The BCA references AS 1428.1, where section 7 covers accessibility requirements and correlation between doors and circulation space at doorways.

Hardware—door handles

Ensure that all door hardware is fit for purpose and complies with all relevant regulations, standards and policies including those applying within each jurisdiction. This includes all matters of WHS, user and patient safety, *Disability Discrimination Act 1992* and accessibility, security, special requirements, durability and function.

General

Install handles between 900mm and 1100mm above the floor to BCA, D3 referencing AS1428.1 and where applicable at an appropriate height to enable staff to easily open doors whilst supporting or manoeuvring patients or residents.

Refer:

- AS 1428.2 for additional information on accessible door handles and hardware.

Specification continued

Paediatric rooms

In paediatric rooms where no latching is required consider providing two sets of push plate/pull handles - one at high level and one at low level. Door controls should meet AS 1428.3 as applicable to paediatric units.

Push plates/pull handles

Door grilles or undercuts may be used in areas that do not compromise the requirements of the BCA and other requirements of these guidelines.

The following requirements and recommendations also apply to grilles and undercuts:

- Door grilles should be positioned (above 290mm) to avoid damage by wheelchair footrests in areas used by people in wheelchairs, refer AS 1428.1 fig 35.
- Self-closers required for fire and smoke doors are covered under the BCA.
- Note 1. Refer to AS 1428.1 clause 11.1.1 for permissible maximum opening forces
- Interior glazing in the form of glazed panels within partitions or doors is often required for the safe and efficient operation of the door or space. When provided in this context it should be fit for purpose and comply with the relevant regulations, guidelines and standards, in particular:
 - AS 1288 Glass in Buildings—Selection and Installation
 - AS 1905.1: Components for the Protection of Openings in Fire Resistant Walls - Part 1—Fire Resistant Door Sets (such as glazing in fire doors).

2.6 Ceilings

2.6.1 Ceiling heights

Requirements

A minimum ceiling height of 2400 mm is recommended for corridors, passages, recesses and non-treatment and non-activity areas, such as offices.

A minimum ceiling height of 2700 mm is recommended for treatment and activity areas, such as therapy rooms, conference rooms, intensive care (open plan) or kitchens.

For bariatric patient care the use of high beds, high mattresses, and large slings should be identified. The resulting clearance above the bed may require an increase in standard ceiling heights if some types of bariatric manual handling equipment and lifting devices are used.

Aesthetic and other considerations may also lead to variations such as increasing standard ceiling profiles and heights.

Generally, a minimum ceiling height of 2700 mm is recommended for mental health units with 3000 mm for seclusion rooms.

In portions of remodelled existing facilities, the corridor ceiling height may be reduced to 2250 mm but only over limited areas, such as where a services duct crosses a corridor.

Note: within egress routes the NCC provides a minimum unobstructed ceiling height of 2000 mm, and door height of 1980 mm. For class 9a healthcare buildings ceiling heights are to be not less than 2400 mm generally with exceptions as noted in clause F 3.1. In areas where access is restricted, for example drinking fountain recess, a minimum ceiling height of 2250 mm is acceptable.

In rooms with ceiling-mounted equipment, such as X-ray rooms, ceiling-mounted patient lifting devices may require increased ceiling heights and supporting structure. Ensure that heights reflect the equipment manufacturers' recommendations and are not less than the minimum requirements of the NCC.

In areas where bariatric manual handling equipment and lifting devices are to be used (both mobile or ceiling mounted), the minimum ceiling height required to be referred to the project control group or appropriate user body for determination.

Equipment shall be selected to avoid increasing existing ceiling heights or affecting overhead services, for example air conditioning ducts and hydraulics, where possible.

For external areas, such as entry canopies, ambulance entries and delivery dock canopies ensure that ceiling (soffit) heights provide adequate clearance for the vehicles expected to use them, and for the vehicle function, for example overhead skip removal. Give special consideration to the impact of whip aerials fitted to emergency vehicles, or specialist emergency vehicles designed and fitted to transport bariatric patients which may result in increased vehicle height and width.

A risk assessment analysis shall be conducted and include provision for such items as tour coaches and fire fighting vehicles at the main entry.

Provide plant rooms with adequate ceiling and door height clearance for equipment and allow safe access for service, maintenance and future replacement of equipment. A minimum ceiling height of 2400 mm is recommended, with 2000 mm clear below intermittent ductwork. Provide safety markings as required.

Reinforce the ceiling support structure or mount independently of the ceiling support structure where overhead patient hoists are to be installed. This must be noted in the project brief.

Where an increase in bariatric patient intake is predicted, in particular in acute patient care areas, the provision of adequate support for ceiling mounted equipment to be considered in terms of location (flexibility), method and timing (pre or post occupancy).

In addition, review the information provided by equipment manufacturers in terms of the needs of particular items of equipment for passage through full-height door openings for example to ensuite bathrooms or that may affect the positioning of bed screen tracks or other such fixtures in multi-bed rooms.

Checkpoint

The design team is responsible for implementing the *Ceiling principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

2.6.2 Ceiling systems and finishes

Requirements

Consider the following issues when selecting a ceiling finish.

Surface durability and soil resistance are important where ceilings may be damaged or need to be kept clean. Other factors include the need for effective noise reduction, light reflection, moisture resistance or need to accommodate the support of heavy equipment, such as medical imaging or other screening machines, patient lifters and other devices.

Rationale/example

Ceilings should be easy to maintain and repair. Locally available standard systems are recommended to ensure continuity for replacement of damaged parts.

Ceilings will generally be subjected to the cleaning protocols documented in the operational policies for the facility or for the specific unit.

Access panels should be fit for purpose, minimise the ingress of dust and be secure i.e. accessed only with a special key tool to prevent unauthorized access.

Ceilings should comply with applicable ESD regulations and guidelines.

Checkpoint

The design team is responsible for implementing the *Ceiling systems principles* in its architectural design and will demonstrate the outcome through:

- selection of materials considers surface durability, soil resistance, effective noise reduction, light reflection or moisture resistance
- locally available standard systems have been specified to ensure continuity for replacement of damaged parts
- access panels are fit for purpose
- ceilings comply with applicable ESD regulations and guidelines.

2.6.2.1 Resistance to surface damage

Requirements

The specification for the proposed finish should be adequate for the particular requirements for each location including resistance to impact and fracture, surface scratching, mould and air diffuser soiling.

Rationale/example

Ceilings in corridors, emergency receiving areas and mental health units may need to withstand surface impact or other forms of abuse.

Checkpoint

The design team is responsible for implementing the *Resistance to surface damage principles* in its architectural design and will demonstrate the outcome through:

- the design shall specify a surface adequate for the particular requirements for each location including resistance to impact and fracture, surface scratching, mould and air diffuser soiling.

2.6.2.2 Infection Control**Requirements**

Select and design ceilings to support the level of infection control management required in each space. Collaboration with the facility infection control representative and compliance with the current infection control policy in each jurisdiction is a required part of the risk management process.

Rationale/example

Each area within a facility will require a different degree of infection control management or standard of hygiene.

Ceilings are covered by Handbook (HB) 260, Hospital acquired infections—engineering down the risk as follows. In Section 5, Rooms suitable for infection control purposes—recommendations for ceilings for type 4 and 5 rooms (standard isolation and respiratory isolation) include:

- ease of cleaning and suitability for cleaning methods to be used
- continuous, impervious and durable finishes
- elimination of joints, gaps and features supporting microbial growth
- ability to withstand disinfecting and cleaning agents without deterioration
- sealed penetrations for fittings in walls and ceilings, for example pipes, light fittings, for type 5 rooms for respiratory isolation.

In areas requiring a pressure differential for infection control, ceilings and support systems should meet the individual performance criteria, including structural soundness and stability, for example air pressure change and earthquake forces.

Although ceilings rarely become soiled with any hazardous matter, use a smooth washable finish in areas where splash or spillage might occur, for example resuscitation rooms in emergency departments, operating rooms or where routine washdown or isolation is required.

For further information regarding infection control refer to the AusHFG, Part D.

Checkpoint

The design team is responsible for implementing the *Infection control principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

2.6.2.3 Use of acoustic finishes**Requirements**

Ceilings can be used independently or together with floor and wall finishes and furnishings to control the acoustic environment in occupied spaces.

Rationale/example

Control of acoustic reverberation within a space is important for a combination of factors including:

- controlling internal noise levels within the space (particularly for noisy spaces)
- improved speech intelligibility within spaces
- the acoustic comfort and feel of the space.

Spaces with a high degree of reverberation (due to a lack of acoustic finishes) will typically feel echoey and reverberant. Such an environment can make communication difficult due to the impact on speech intelligibility.

For recommended reverberation times refer to AS/NZS 2107. For additional background refer Section 3.12, Part C - Design for Access, Mobility, Safety and Security of AusHFG. The AAAC Healthcare Facilities Guideline also provides guidance on ceilings for reverberation control based on typical healthcare spaces.

Sound control includes reducing the transmission of air-borne sound from space to space, using the mass of the material layer, for example solid plasterboard, fibre cement and/or reducing the reverberation time or reflected sound within a space by absorption, for example using mineral fibre or perforated surfaces. The industry label 'acoustic' is generally used to indicate low-mass, sound absorbent products.

Most acoustic ceiling tile products consist of absorbent materials with a porous surface and are generally used with a suspended grid system either exposed or concealed. Both of these factors usually exclude their use in areas where infection control or hygienic conditions are required.

Acoustic products specifically produced for use in clean areas should be assessed on their tested performance. Do not use acoustic and/or tiled ceilings where particulate matter may interfere with hygienic environmental control.

Checkpoint

The design team is responsible for implementing the acoustic finishes principles in its architectural design and will demonstrate the outcome through:

- confirmation of acoustic finishes provided for reverberation control.

2.6.2.4 Avoidance of deformation and sagging

Requirements

The design shall avoid deformation of ceilings.

Rationale/example

Sagging ceilings are often the result of moisture exposure in high humidity areas, such as laboratories, kitchens, laundries, locker rooms, shower areas and indoor pools.

Ensure that exhaust and fan systems are appropriate, for example dedicated, single use systems and adequate for processes and occupancy. Provide remote alarm indication of fan failure where required.

By avoiding where possible the following situations, the incidence of ceilings sagging may be reduced or removed:

- intermittent, seasonal use of facilities or long refurbishment where HVAC systems might be shut down for extended periods
- installation of ceiling systems prior to the activation of the HVAC system in new construction or renovation projects
- attempted refreshment of indoor air quality by increasing the percentage of outside air that is circulating through a ventilation system.

For air conditioning equipment installed within the ceiling space provide condensate pans and drains as necessary. Refrigerant and chilled water piping should have appropriate lagging and be supported along its length to prevent moisture from pooling and damaging the ceiling. Penetrations above the ceiling should be appropriately sealed to prevent the ingress of moisture and to maintain the integrity of fire/smoke compartments.

Checkpoint

The design team is responsible for implementing the *Avoidance of ceiling deformation principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

2.6.2.5 Suspended and exposed grid systems**Requirements**

The design of suspended exposed grid ceiling systems shall have adequate resistance to corrosion, fire and sagging, and be dimensionally stable.

Rationale/example

Exterior soffit linings and support systems in adverse environments, such as coastal locations and indoor hydrotherapy pools require special consideration.

Checkpoint

The design team is responsible for implementing the *Suspended and exposed ceiling grid principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

2.6.3 Fixtures and fittings

Requirements

For the purpose of these guidelines all fixtures and fittings that are installed, that is fixed to the building, are part of the building and subject to the requirements of these guidelines. As such the relevant requirements of all parts of the AusHFG apply.

Rationale/example

Refer to items that are generally factory made or otherwise manufactured off-site then installed in the building.

Some fixtures and fittings may be present at the time of the completion of the construction or renovation. Others may be installed at a later date.

The relevant requirements of all parts of the AusHFG apply, in particular:

- ergonomics
- human engineering
- safety precautions
- fire safety
- security
- infection control.

Note: consult with employees and identify, assess and control risks when selecting, purchasing and installing FFE. Refer to WHS legislation and regulations in each jurisdiction.

Refer to:

- AS 4145.3 - Locksets, Part 3: Mechanical locksets for windows in buildings
- AS 5039 - Security screen doors and security window grilles
- AS 5040 - Installation of security screen doors and window grilles.

Ceiling type and finish have an impact on the aesthetics, acoustics and general atmosphere of a room. Ensure that the effect of the ceiling finish and colour do not adversely affect the level of lighting in a room.

Checkpoint

The design team is responsible for implementing the *Ceiling fixtures and fittings principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

2.6.4 Wet areas

Requirements

Appropriate ceiling solutions and materials shall be specified in wet areas. The use of plasterboard ceilings is recommended but not mandatory.

Refer to the AusHFG for detailed requirements.

Rationale/example

The use of acoustic tiles should be avoided in areas where splash spillage can occur. Although ceilings rarely become soiled with any hazardous matter, use a smooth washable finish in areas where splash or spillage might occur.

Checkpoint

The design team is responsible for implementing the Wet areas principles in its architectural design and will demonstrate the outcome through:

- the design shall comply with the AusHFG requirements.

2.6.5 Patient areas

Requirements

The design of ceilings in patient areas shall be:

- functional and accessible to accommodate servicing of equipment
- contribute to the ambience and clarity of the space
- shall respond to infection control requirements.

Rationale/example

Ceilings to patient areas in mental health units should be designed to prevent patients from accessing ceiling spaces. Provide access to services and ceiling voids through ceilings as required except in areas, such as operating and procedure rooms, isolation and controlled environments.

The ceilings are an important element of wayfinding and also the ambience of the spaces suspended ceilings may add to the 'institutional' feel of many spaces.

Checkpoint

The design team is responsible for implementing the Ceiling in patient areas principles in its architectural design and will demonstrate the outcome through the design shall:

- be functional and accessible to accommodate servicing of equipment
- contribute to the ambience and clarity of the space
- respond to infection control requirements.

2.6.6 Public areas

Requirements

The design of ceilings in patient areas shall be:

- shall be a major contributor to way finding
- shall be functional and accessible to accommodate servicing of equipment
- contribute to the clarity of the space and shall promote a non-institutional ambience
- shall respond to infection control requirements.

Rationale/example

Suspended modular ceiling systems may be used where access to services is required and a smooth seamless finish is not required.

Access panels should be opened only with a special key tool to prevent unauthorised access.

Checkpoint

The design team is responsible for implementing the Ceilings in public areas principles in its architectural design and will demonstrate the outcome through:

- the design shall be a major contributor to wayfinding
- the design shall be functional and accessible to accommodate servicing of equipment
- the design shall contribute to the clarity of the space and shall promote a non-institutional ambiance
- the design shall respond to infection control requirements.

2.6.7 Clinical areas

Requirements

The design of ceilings in patient areas shall be:

- a major contributor to way finding
- functional and accessible to accommodate servicing of equipment
- responsive to infection control requirements.

Rationale/example

Materials should be selected to achieve the recommendations of AS/NZS 2107 while not compromising the medical or functional performance required in each area, for example infection control, hygiene, WHS, cleaning and maintenance.

In areas requiring a pressure differential for infection control, ceilings and support systems should meet the individual performance criteria including structural soundness and stability for example air pressure change and earthquake forces.

Checkpoint

The design team is responsible for implementing the Ceilings in clinical areas principles in its architectural design and will demonstrate the outcome through the design shall:

- be a major contributor to way finding
- be functional and accessible to accommodate servicing of equipment
- respond to infection control requirements.

2.6.8 Accessibility for maintenance

Requirements

Provide access to services and ceiling voids through ceilings as required except in areas, such as operating and procedure rooms, isolation and controlled environments. If access panels are used in procedural areas, they should be provided with an effective air pressure seal.

Rationale/example

In areas requiring security or restricted access, such as cash holding, pharmacy, stores, medication/clean utility rooms and stores, suspended ceilings or partitions should incorporate measures to prevent unauthorised entry. This could include steel mesh, or locked access panels. In mental health units compressed fibre cement sheet may be required to reduce damage and prevent access.

Checkpoint

The design team is responsible for implementing the *Ceiling accessibility principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

2.6.9 Security

Requirements

Where ceilings extend over secure areas, such as pharmacy departments, the partition walls must be taken through to the underside of the roof/floor slab above, or some other form of security, such as steel mesh installed to prevent access to secure areas through the ceiling space.

Checkpoint

The design team is responsible for implementing the *Ceiling security principles* in its architectural design and will demonstrate the outcome through:

- the design shall comply with the requirements of this section.

Specifications

Ceiling—Ceiling systems and finishes

Resistance to surface damage

Refer:

- AS HB260 Hospital Acquired Infections.

Use of acoustic finishes

Refer:

- AS/NZS 2107 for recommended design sound levels and reverberation times for building interiors in particular Table 1: Recommended design sound levels for different areas of occupancy in buildings
- Section 3.12, Part C - Design for Access, Mobility, Safety and Security of AusHFG Section 790 - Noise Reduction for WHS.

Ceiling heights

Note: Within egress routes the BCA clause D 1.6 provides a minimum unobstructed ceiling height of 2000mm, and door height of 1980mm. For class 9a health-care buildings ceiling heights are to be not less than 2400mm generally with exceptions as noted in clause F 3.1.

Fixtures and fittings

Refer:

- AusHFG Section 705 Planning Models for WHS consultation.
- AusHFG Section 790 Safety and Security for Precautions.
- AS 4145.3 Mechanical locksets for windows in buildings
- AS 5039 Security screen doors and security window grilles
- AS 5040 Installation of security screen doors and window grilles.

Clinical areas

Refer:

- Materials should be selected to achieve the recommendations of AS/NZS 2107 while not compromising the medical or functional performance required in each area such as infection control, hygiene, WHS, cleaning and maintenance
- Radiation Licensing requirements and Regulations administered by the Department of Environment and Climate Change (DECC).
www.environment.nsw.gov.au/radiation/index.htm

Specifications continued

Security

Refer:

- RPS14.2 Section 10 - (ARPANSA 2008) and RPS11—Security of Radioactive Sources, (ARPANSA 2007)
- AS 4485 Security for health care facilities
- AS 4485.1 General requirements AS 4485.2 Procedures guide.

Signage

Refer:

- AS 1319 for warning sign requirements. Provide visible warning signs at any general access point to a room where unsealed radioactive material is stored or used
- AS 1428.1.-The planning and design of the signage must comply with the current standard for People with Disabilities.

Statutory requirements

Refer:

- BCA Specification D3.6 and AS 1428.1.

2.7 Set downs

2.7.1 General

Requirements

Floors that are set down allow for greater flexibility in floor finishes and changes in area usage throughout the structure life.

Rationale/example

Where there are balconies that patients use to access the exterior, the thresholds to these doors must be DDA compliant and therefore cannot have a step. Similarly any doors to trafficable roofs DDA compliant.

To achieve a step free threshold in these locations, one option is to step down the concrete slab to these balconies by a minimum of 150 millimetres below the required finished floor level and the area finished with open jointed concrete pavers finished flush with the adjacent floor level. These pavers are may be supported on pedestal units standing on the set down slab.

The slab has an applied will have a waterproof membrane and water drains through the open joints between the pavers and would be collected in a floor waste in slab below connected to the storm

water drainage system. In the event of drainage back up overflow spitters should be incorporated to remove the water from between the slab and the pavers.

If there is to be equipment which is likely to be provided at a future date, which requires EMI shielding such as an MRI scanner consider allowing for a set-down of 150 millimetres in the slab topping which will allow for the floor shielding required for this equipment. The provision of 150 millimetres set-down will be sufficient to address any floor shielding requirements.

Checkpoint

The design team is responsible for implementing the *Set down principles* in its architectural design and will demonstrate the outcome through:

- the design shall consider the location of set down areas based on consultation process with the users and the future forecasting of health services to be delivered in that facility.

2.7.2 Wet areas

Requirements

The designer should consider the issue of floor topping considerations versus set down wet areas. Set downs should be maintained at a consistent height and dimension to increase speed and cost efficacy of construction.

Rationale/example

The designer should consider the issue of floor topping considerations versus set down wet areas. Set downs should be maintained at a consistent height and dimension to increase speed and cost efficacy of construction.

A ‘topping’ of 50 millimetres to 75 millimetres is often allowed to relevant areas. This zone allows for wet area set-downs without the need to step the soffit of the slab, which maintains a simpler formwork and reinforcement arrangement. It also provides for future adaptability of the floor slab with regard to wet areas. This topping thickness should be bonded to the slab and thus may be included in the vibration performance modelling which means it is used structurally.

Checkpoint

The design team is responsible for implementing the *Set down wet areas principles* in its architectural design and will demonstrate the outcome through:

- the design shall evaluate the use of floor topping versus set down wet areas based on consultation process with the users and the future forecasting of health services to be delivered in that facility.

2.7.3 Penetrations

Requirements

The design should consider a range of future flexibility allowances in the form of penetration allowances for medium size services requirements as part of future alterations and expansions.

Rationale/example

The design shall consider a suitable solution for future penetrations such as implementation of 500 x 300 services riser penetrations which may be backfilled or sleeved to be allowed against each concrete column. One additional 150 DIA future penetration to be allowed against the column.

With the exception of penetrations for sanitary waste, risers shall be vertically contiguous and provided on the basis that each riser is capable of servicing a maximum 25 metres radius.

Checkpoint

The design team is responsible for implementing the *Set down penetrations principles* in its architectural design and will demonstrate the outcome through:

- the design shall develop a penetration strategy that allows sufficient flexibility for future penetration requirements without causing major functional interruptions or major structural strengthening requirements.

2.7.4 Falls

Requirements

These are allowed in the topping thickness of a slab.

External falls should always be away from the building to minimise the chance of water entering the building.

Rationale/example

Minimise falls as much as possible on ambulance decks.

Checkpoint

The design team is responsible for implementing the *Set down falls principles* in its architectural design and will demonstrate the outcome through:

- allowed for in topping thickness of slab
- external falls always away from building to minimise chance of water entering building
- minimise falls on ambulance decks.

2.8 Disability Discrimination Act compliance

2.8.1 Disability Discrimination Act 1992

Requirements

The *Disability discrimination Act 1992* influences many aspects of the design and construction of health facilities covered by these guidelines. This influence goes beyond the other disabled access standards, such as AS 1428 series. Designers are strongly advised to review the Act—it is helpful to employ a disability specialist to recommend the best way of complying with the *Disability discrimination Act 1992* requirements without causing conflicts with these and other guidelines and codes.

The proposed development should include appropriate and adequate facilities for building users and occupants to encourage and accommodate pedestrian and cycling activities.

Checkpoint

The design team is responsible for implementing the *Disability Discrimination Act 1992 principles* in its architectural design and will demonstrate the outcome through:

- the Act influences many aspects of the design and construction of health facilities and goes beyond the other disabled access standards, such as AS 1428 series
- it is helpful to employ a disability specialist to recommend the best way of complying with the Act requirements without causing conflicts with these and other guidelines and codes
- facility to include appropriate, adequate facilities for building users and occupants to encourage and accommodate pedestrian and cycling activities.

2.8.2 Disability Discrimination Act 1992 requirement

Requirements

Where full access is unachievable due to the required functions of the space, a policy may detail or include reference to the proposed management plan to be implemented, to ensure accessibility is not compromised.

Rationale/example

Access and security to individual areas and likelihood of access by people with disabilities may be defined in accordance with the following:

- area accessible by public, contractors, patients and visitors, including those who may have a disability:
 - access by people with disabilities is highly likely and full compliance with AS 1428.1, AS 1428.2, NCC and additional Act recommendations to be provided.
- area secured, all visitors accompanied:
 - access by people with disabilities is likely, however may be managed on a case by case basis.
- area secured and accessible by employees only:
 - environmental modifications and staff facilitation to be undertaken as required.
- function and tasks likely to be undertaken by ambulant personnel only:
 - highly unlikely access by people with disabilities will be required in the future. This may include dirty linen or other service and maintenance areas.

Checkpoint

The design team is responsible for implementing the *Disability Discrimination Act 1992 requirement principles* in its architectural design and will demonstrate the outcome through:

- If full access is unachievable due to required functions of space, policy may detail or include reference to proposed management plan to be implemented, to ensure accessibility not compromised.

2.8.3 Visual impairment

Requirements

Give consideration to lighting uniformity to ensure unevenness and glare do not accentuate problems for people with vision impairment.

Provide a means of enabling independent travel for people who are blind or have a vision impairment. This should connect the main transport access points in a seamless, integrated way, to the public entrances and across wide areas of paved surfaces.

Rationale/example

The means of enabling independent travel can include the following:

- raised kerbs with adequate luminance contrast
- a hard walking surface bounded by grass, or bounded by a well pruned garden which does not overhang the path
- walls and fences
- building elements
- appropriate signage
- tactile ground surface indicators.

Tactile ground surface indicators can cause inconvenience to some people and, therefore, their use shall be minimised. Appropriate design solutions shall provide a continuous path of travel with minimal use of the indicators.

This should be per the NCC and AS 1428.4.1. See also AS 1428.1, Figures 25 and 26, meet AS 1428.4.1 generally.

Note: TGSIs are not required at a fire-isolated stairway, fire-isolated ramp (unless also an accessway), step ramp, kerb ramp or swimming pool ramp.

Regard the illumination levels nominated in the standards as absolute minimums. Recognise that older people and people with impaired sight require higher levels.

Provide a graduated level of illumination leading towards building entries and exits to assist people with a vision impairment.

Provide a minimum of 50 lux outside each entry or exit.

Wayfinding refers to the means and techniques utilised by people who are blind or vision impaired as they move from place to place independently, safely and with dignity.

In order to allow independent orientation and mobility for people who are blind, vision impaired or deaf, the successful wayfinding system should provide information for users to:

- confirm that they are at the correct start or finish point of an individual journey
- identify their location within a building or an external space

- reinforce they are travelling in the correct direction
- orient themselves within a building or external space
- understand the location of and identify any potential hazards
- identify their destination on arrival
- exit safely in an emergency
- retrace their path.

The provisions of NCC are inadequate for the needs of people with vision impairment and those who are blind because they do not replicate the information available to sighted persons, except at sanitary facilities. A simple principle is to assume that wherever it is thought necessary to place an information or direction sign in a building, a method of informing or directing a person who can't see it should be engaged.

Checkpoint

The design team is responsible for implementing the *Visual impairment requirement* principles in its architectural design and will demonstrate the outcome through:

- lighting uniformity to ensure unevenness and glare do not accentuate problems for people with vision impairment
- provide means of enabling independent travel for people who are blind or have vision impairment. Connect main transport access points in seamless, integrated way, to public entrances and across wide areas of paved surfaces
- means of enabling independent travel includes:
 - raised kerbs with adequate luminance contrast
 - hard walking surface bounded by grass, or by well pruned garden which does not overhang path
 - walls and fences
 - building elements
 - appropriate signage
 - TGSIs.
- TGSIs can cause inconvenience to some people, therefore, use shall be minimised. Appropriate design solutions to provide continuous path of travel with minimal use of indicators
- this should be per the NCC and AS 1428.4.1. See also AS 1428.1, Figures 25 and 26 meet AS 1428.4.1 generally
- Note: TGSIs not required at fire-isolated stairway, fire-isolated ramp (unless also an accessway), step ramp, kerb ramp or swimming pool ramp
- illumination levels in the standards are absolute minimums. Older people and people with impaired sight require higher levels
- provide graduated level of illumination towards building entries and exits to assist people with vision impairment
- provide minimum of 50 lux outside each entry or exit
- 'wayfinding' refers to means and techniques used by people who are blind or vision impaired as they move from place to place independently, safely and with dignity

- to allow independent orientation and mobility for people who are blind, vision impaired or deafblind, successful wayfinding system to provide information for users to:
 - confirm they are at correct start or finish point of individual journey
 - identify their location within building or external space
 - reinforce they are travelling in correct direction
 - orient themselves within building or external space
 - understand location of and identify potential hazards
 - identify destination on arrival
 - exit safely in an emergency
 - retrace their path.

2.8.4 Hearing impairment

Requirements

The facility shall consider the implementation of an augmented hearing loop at the main entry reception/enquiries counter and admissions area generally.

Rationale/example

- This should be per the NCC.
- Note: AS 1428.5, Communication for people who are deaf or hearing impaired, of value to designers.
- Fire-isolated stairways as access ways, regarded as regular stairways and the TGSi requirements of AS 1428.4.1 applied.

Checkpoint

The design team is responsible for implementing the *Hearing impairment requirement principles* in its architectural design and will demonstrate the outcome through:

- augmented hearing loop (to cater for people who are hearing impaired) to be considered at the main entry reception/enquiries counter and admissions area generally.

2.8.5 Ramps

2.8.5.1 Performance requirements

Requirements

Ramps may be required as part of general facility circulation. Ramps for access by people with disability are frequently used for general access and for moving beds, ambulance trolleys and other equipment between different levels.

Where there is a requirement for bed or patient trolley circulation, provide ramps with the required slope, clear width and turning circles based on the size and weight of an occupied bed, including a bed mover. These should consider larger turning circles and lower gradients than those needed for wheelchairs. As a guide, more appropriate dimensions would be slope 1:20, with rise of 750 mm maximum between landings and 2500 millimetres landing length.

Meet all WHS requirements for the movement of beds and equipment through risk analysis in consultation with end users.

The slip-resistance rating for materials used on slopes and ramps may vary from those used on horizontal surfaces, and should be selected for the incline and specific conditions of use. Refer to AS 4586, Slip resistance classification of new pedestrian surface materials, and HB 197 An introductory guide to the slip resistance of pedestrian surface materials.

Rationale/example

Note: the minimum requirements for gradients and spacing of landings for ramps and walkways for egress and accessibility in class 9a and patient care areas are covered by the NCC, which references AS 1428.1.

Note: application of AS 1428.2 as a recommended minimum provides more universal accessibility and better protection against disability discrimination complaint.

Checkpoint

The design team is responsible for implementing the *Ramps requirement principles* in its architectural design and will demonstrate the outcome through:

- Ramps may be required as part of general facility circulation. Ramps for access by people with disability frequently used for general access and moving beds, ambulance trolleys and other equipment between different levels.
- Where a requirement for bed or patient trolley circulation, provide ramps with required slope, clear width and turning circles based on size and weight of occupied bed, including a bed mover. Design larger turning circles and lower gradients than those needed for wheelchairs. As a guide, more appropriate dimensions are slope 1:20, with rise of 750 mm maximum between landings and 2500 mm landing length.
- Meet all WHS requirements for movement of beds and equipment through risk analysis in consultation with end users.

The slip-resistance rating for materials used on slopes and ramps may vary from those on horizontal surfaces, to be selected for the incline and specific conditions of use. Refer to AS 4586, Slip resistance classification of new pedestrian surface materials, HB 197 An introductory guide to the slip resistance of pedestrian surface materials.

Specifications

DDA Compliance

This Federal Act influences many aspects of the design and construction of health facilities covered by these minimum requirements. This influence goes beyond the other disabled access standards for example AS 1428 series. Designers are strongly advised to review the DDA and proceed with caution. It is helpful to employ a disability specialist to recommend the best way of complying with the DDA requirements without causing conflicts with these and other guidelines and codes.

Visual impairment

Refer:

- BCA D3.
- AS 1428.4.1
- AS 1428.1 figures 25 and 26
- AS 1428.4.1
- Minimum of 50 lux outside each entry or exit.

Hearing impairment

Refer:

- BCA D3.7
- AS 1428.5—Communication for people who are deaf or hearing impaired
- Fire-isolated stairways as access ways. These should be regarded as regular stairways and the TGS requirements of AS 1428.4.1 applied.

Ramps - Performance requirements

Where there is a requirement for bed or patient trolley circulation, provide ramps with the required slope, clear width and turning circles based on the size and weight of an occupied bed including a bed mover. These should consider larger turning circles and lower gradients than those needed for wheelchairs. As a guide, more appropriate dimensions would be slope 1:20, with rise of 750mm max between landings and 2500mm landing length.

Safety—patient handling and lifting

The slip-resistance rating for materials used on slopes and ramps may vary from those used on horizontal surfaces and should be selected for the incline and specific conditions of use.

Refer:

- AS 4586 Slip resistance classification of new pedestrian surface materials
- AS HB97 An introductory guide to the slip resistance of pedestrian surface materials
- BCA Section D which references AS 1428.1
- AS 1428.2 as a recommended minimum provides more universal accessibility and better protection against disability discrimination complaint.

2.9 Under crofts

2.9.1 Accessible

Requirements

Accessible under crofts, such as carpark areas must be designed in accordance with all relevant NCC requirements and DDA legislation.

Low maintenance long-life materials should be used, as in any external spaces. Adequate lighting must be provided. The concepts of 2.1.18 Security CPTED should be followed. In high rainfall, high humidity areas materials should be resistant to mould growth. It is important to enable reasonable ventilation.

Checkpoint

The design team is responsible for implementing the *Under croft accessibility requirement principles* in its architectural design and will demonstrate the outcome through:

- accessible under crofts, such as carpark areas designed in accordance with all relevant NCC requirements and DDA legislation
- low maintenance long-life materials to be used, as in external spaces. Adequate lighting provided. Concepts of 2.1.18 Security CPTED to be followed. In high rainfall, high humidity areas materials to be resistant to mould growth
- enable reasonable ventilation.

2.9.2 Non-accessible

Requirements

Non-accessible under crofts to be designed with the CPTED principles in mind.

Low maintenance, long-life materials are important as maintenance difficult. Resistance to mould is essential when choosing materials and finishes.

Reasonable ventilation required.

Checkpoint

The design team is responsible for implementing the non-accessible under crofts requirement principles in its architectural design and will demonstrate the outcome through:

- non-accessible under crofts designed to CPTED principles
- low maintenance, long-life materials important as maintenance difficult. Resistance to mould important when choosing materials and finishes
- reasonable ventilation.

2.10 Plant rooms

2.10.1 General

Requirements

General issues to consider are:

- location of plant space in the building or remote
- freedom for space planning in buildings/costs and architectural impacts
- noise and vibration impact
- future expansion of the plant room and building(s) generally
- maintenance access.

Projects with clearly identified future stages have appropriate spare space allowances in central plant rooms, or strategy for future expansion, for installation of future equipment and services, and facilities to allow connections for extensions to be completed with minimal or no interruption to existing systems.

Rationale/example

For further information on all plant matters refer to the various discussions of requirements per discipline/trade throughout Volume 4.

Checkpoint

The design team is responsible for implementing the *Plant room general requirement principles* in its architectural design and will demonstrate the outcome through:

- location of plant space in the building or remote
- freedom for space planning in buildings/costs and architectural impacts
- noise and vibration impact
- future expansion of the plant room
- maintenance access
- projects identified future stages have spare space allowances in central plant rooms, or strategy for future expansion, for installation of future equipment and services, and facilities to allow connections for extensions to be completed with minimal or no interruption to existing systems.

2.10.2 Plant accommodation

Requirements

Access for maintenance or replacement of equipment is very important. Often these are forgotten but become a major problem if equipment must be replaced.

Plant and equipment access will take into account the access needs for the replacement of all major components. Access and removal routes will be planned and be documented as part of the project BIM artefacts. This access includes the route from where equipment enters and travels through the site and within the building. The cost of maintenance/replacement can be far greater if access is difficult.

Locate plant and equipment within dedicated services cupboards or plant rooms. Wherever possible air handling plant rooms will be located within the fire compartment they serve. Equipment requiring access in services cupboards will be limited to a maximum height of 2.2 metres above floor level.

Plant and equipment will be located to avoid vibration and electromagnetic interference to sensitive areas. Equipment and plant accommodation will also take into account the acoustic requirements of adjoining occupied areas.

Access for the delivery and storage of water treatment chemicals (if required) shall be provided. Full containment shall be provided for possible spills.

Where duplicate services are employed, these services will be located in separate riser shafts and follow distinctly separate routes.

Access to equipment in plant rooms will be via normal walk-in access and will not require the use of specialised access equipment or temporary scaffolding. Permanent access platforms and ladders must be provided where safe maintenance access is not possible from floor level.

Fresh air intakes will be located to avoid air recirculation under prevailing wind conditions or as a result of helicopter movements. The requirements of AS 1668.2 shall apply.

Acoustic measures for the control of mechanical plant shall consider infection control and cleaning requirements. Noting that exposed insulation in ductwork is typically not acceptable and mylar facings or similar may be required for infection control and to manage potential for fibre migration.

Length of duct runs, number elbows, and air flow velocity must also be considered as part of the acoustic design.

All significant air exhausts and intake shall be attenuated as determined by acoustic assessment. This may include:

Air handling plant rooms fitted with acoustic louvres or with acoustically treated ducted supply.

- Cooling towers provided with acoustic louvers for water noise attenuation and variable speed drives to manage noise emissions during night-time operation.
- Chillers may be enclosed in a dedicated plant room with acoustic louvers fitted.

Generator noise shall be appropriately managed, either via noise attenuation and control within a plantroom or via a proprietary acoustic enclosure.

The spatial requirements for medical gases and plant may often be low but consideration shall be given to the effect of the building layout on the distribution or replication of plant.

Checkpoint

The design team is responsible for implementing the *Plant accommodation requirement principles* in its architectural design and will demonstrate the outcome through:

- Demonstrated provision of access for maintenance or replacement of equipment
- Locating plant and equipment within services cupboards/plant rooms.
- Providing air handling plant rooms generally within the fire compartment they serve.
- Locating plant and equipment to avoid vibration, electromagnetic interference or other relevant impact to sensitive areas.

- The equipment and plant accommodation takes into account acoustic requirements/criteria of adjoining occupied areas and off-site receptors.
- Duplicate services are provided with separate riser shafts and follow discrete routes.
- Provision of access to equipment in plant rooms via normal walk-in access and not require specialised access equipment or temporary scaffolding.
- Fresh air intakes located to prevent air recirculation under prevailing wind conditions or as result of helicopter movements.
- Provision of acoustic attenuation and treatment to ductwork systems to prevent in-duct noise transmission to sensitive receivers and to prevent radiated noise transmission to other spaces.
- Provision of noise attenuation and treatment as appropriate to major plant such as chillers, cooling towers, major exhausts etc.
- Provision of appropriate spatial requirements for medical gases and plant.

2.10.2.1 Design

Requirements

In the early design stages an assessment of plant distribution and plant room areas shall be made and incorporated into preliminary planning for the building.

Where possible both plant and storage for each service shall be centralised and reticulation provided throughout the facility from this central source.

Plant rooms of sufficient size are required to accommodate all the mechanical and electrical plant.

Service supply lines (compressed air, vacuum or extraction systems) and plumbing lines shall where possible be run under a suspended floor slab to allow for easy service maintenance and future alteration, expansion or upgrade of equipment. For an on the ground concrete slab, services are to be placed in a covered (removable) services trench.

Control of vibration will be a key issue for equipment such as generators, chillers, pumps and other large moving or rotating plant. Plant located over inpatient units and other noise sensitive spaces have the potential to create regenerated noise in the space below arising from vibration induced in the floor slab. Allowance shall be made for high performance vibration isolation mounts.

Checkpoint

The design team is responsible for implementing the *Plant design requirement principles* in its architectural design and will demonstrate the outcome through:

- assessment of plant distribution and plant room areas made in early design stages and incorporated into preliminary planning for building
- where possible plant and storage for each service to be centralised and reticulation provided throughout facility from this central source
- plant rooms of sufficient size required to accommodate all mechanical and electrical plant
- service supply lines (compressed air, vacuum or extraction systems) and plumbing lines where possible run under suspended floor slab for easy service maintenance and future alteration, expansion or upgrade of equipment. Where on ground concrete slab, services placed in covered (removable) services trench

- control of vibration key issue for major equipment. Plant located over inpatient units and other noise sensitive spaces have potential to create regenerated noise in space below from vibration induced in the floor slab.

2.10.3 Indoor

Requirements

Plant and equipment installations will be located where outside of clinical or occupied accommodation areas. This is to enable easier access for scheduled maintenance servicing.

Access for maintenance will not be through clinical treatment or patient areas.

Checkpoint

The design team is responsible for implementing the *Indoor plant requirement principles* in its architectural design and will demonstrate the outcome through:

- plant and equipment arranged so equipment and plant that requires scheduled maintenance servicing located outside of clinical or occupied accommodation areas
- access for maintenance not through clinical treatment or patient areas.

2.10.4 Roof space

Requirements

Plant which is located in roof spaces must be identified early in the design process and the required strengthening, acoustic control, vibration suppression, ventilation, provision of ducts, risers, power and other utilities shall be all allowed for. Access for maintenance and replacement of equipment must be considered and allowed for. Acoustic treatment will also be important for walls and floors per the acoustic design assessment.

Checkpoint

The design team is responsible for implementing the *Plant roof space requirement principles* in its architectural design and will demonstrate the outcome through:

- plant in roof spaces identified early in design process, strengthening, acoustic control, vibration suppression, ventilation, provision of ducts, risers, power and other utilities access for maintenance and replacement of equipment allowed for.

2.10.5 Risers

Requirements

The issues to be considered are:

- acoustics
- ease of access
- room for future expansion
- vibration.

Services risers must be separate to plant rooms where the service does not directly support the plant room (ie. chilled water pipe risers into or through a mechanical plantroom may be acceptable, but an open communications cable riser through the plantroom is not—this would require a separate, dedicated riser shaft and cupboard). This will ensure appropriate segregation and separation, including for fire and building compartment compliance

No plant or equipment will be located such that access to or in riser shafts is impeded.

Each riser shall be designed to have a minimum of 25 per cent spare capacity available for future installation of services with this requirement clearly shown as such within the BIM and on drawings, and then to be clearly labelled as such upon completion. For greenfield projects or buildings, the spare capacity shall be assessed at handover post-construction, not just based on design. Allowance shall be made within the design for adjustments to services in risers during the construction process whilst maintaining minimum total space capacity in the riser.

It would be ideal for the vertical risers and the associated areas served to coincide with fire compartments to facilitate the use of the air handling systems as smoke control systems in fire mode. This will also minimise ducts crossing fire compartments and the resultant fire rating.

Checkpoint

The design team is responsible for implementing the *Risers requirement principles* in its architectural design and will demonstrate the outcome through:

- services in riser shafts separate to that of plant rooms
- no plant or equipment located such that access to or in riser shafts impeded
- risers designed with minimum 25 per cent spare capacity for future with this requirement clearly shown in the BIM and on drawings and clearly labelled as such upon completion
- vertical risers and associated areas served coinciding with fire compartments to facilitate use of air handling systems as smoke control systems in fire mode.

2.10.6 Ducts

Requirements

The issues to be considered are

- acoustics
- ease of access
- room for future expansion within ducts

- vibration.

Ducts that penetrate construction intended to protect against X-ray, magnetic, radio frequency interference, or other radiation shall not impair the effectiveness of the shielding protection.

Checkpoint

The design team is responsible for implementing the *Ducts requirement principles* in its architectural design and will demonstrate the outcome through:

- ducts that penetrate construction intended to protect against X-ray, magnetic, radio frequency interference, or other radiation shall not impair the effectiveness of the shielding protection
- insulation for ductwork to achieve thermal and acoustic performance.

2.10.7 Plenums

Requirements

Sound passing between spaces which share an enclosed ceiling space must be designed with acoustics in mind.

- roof voids shall not be used for air plenums for return air. Ceiling voids shall not be used for air plenums for return air where the ceiling is likely to contaminate the air quality, or introduce unwanted heat gain or heat loss to the system
- intake plenums may require acoustic insulation.

Checkpoint

The design team is responsible for implementing the *Plenum requirement principles* in its architectural design and will demonstrate the outcome through:

- roof voids shall not be air plenums for return air
- ceiling voids shall not be air plenums for return air where ceiling may contaminate air quality, or introduce unwanted heat gain or loss
- intake plenums provided with appropriate acoustic insulation.

2.10.8 Raised floors

Requirements

Where raised floors occur, it is important that all the issues of ease of maintenance and fire implications considered.

Checkpoint

The design team is responsible for implementing the *Raised floor requirement principles* in its architectural design and will demonstrate the outcome through:

- where raised floors occur, issues of ease of maintenance and fire implications considered.

2.10.9 Plant in ceilings

Requirements

The issues are:

- acoustics, as ceilings are generally very important acoustically
- ease of access through suspended ceiling or access panels
- care must be taken to consider the impact of any failure of plant and services in ceiling spaces
- fire implications.

A risk assessment of the consequences of problems with or failure of plant and equipment must be made and this must dictate the nature of the spaces that may be positioned under the equipment.

Checkpoint

The design team is responsible for implementing the *Plant in ceiling requirement principles* in its architectural design and will demonstrate the outcome through:

- risk assessment of consequences of problems with or failure of plant and equipment to be made and this dictates nature of spaces to be positioned under equipment.

Specifications

Plant rooms—General

- For further information on all plant matters refer to *CIR Volume 4, Engineering and Infrastructure*.

2.11 Vertical transport

For further information on all lift matters refer to the following chapter of Volume 4 Engineering Section 2 Chapter 9.

2.11.1 Lifts and escalators

2.11.1.1 Lifts

Requirements

The types of lifts to be selected are determined by the traffic requirements which can be broadly divided into three groups:

- Passengers, used for staff, ambulant patients, visitors
- Goods, use for food trolleys, medical supply trolleys, linen trolleys, furniture and equipment, garbage and waste
- bed trolley lifts used for patients in beds and empty bed.

For a multi-lift installation (particularly for a high-rise building), it will be cost efficient to assign different lift type and car size to suit a particular type of traffic grouping.

For a medium to low rise building, multi-purpose lifts could be selected to minimise initial capital and recurrent costs.

Checkpoint

The design team is responsible for implementing the *Lift and escalator requirement* principles in its architectural design and will demonstrate the outcome through:

- for a multi-lift installation (particularly for a high-rise building), it will be cost efficient to assign different lift type and car size to suit a particular type of traffic grouping
- for a medium to low rise building, multi-purpose lifts could be selected to minimise initial capital and recurrent costs
- compliance with relevant standard.

2.11.1.2 Minimum standards**Requirements**

A healthcare facility with patient services located on a level other than the ground floor shall install one or more passenger lifts.

It is recommended that no less than two be provided for redundancy.

Checkpoint

The design team is responsible for implementing the vertical transport minimum standards requirement principles in its architectural design and will demonstrate the outcome through:

- a health facility with patient services located on a level other than the ground floor shall install one or more passenger lifts.

2.11.1.3 Requirements for lifts**Requirements**

Lift car sizes shall be determined by a traffic study which will result in a recommendation for the number, type, speed and occupancy requirements of the lift/s in the facility. The traffic study will determine the lift dimensional requirements.

When on emergency power lift/s required for transporting patients on beds and emergency lift car/s shall be capable of accepting the largest hospital bed with emergency equipment attachments and attendants.

Each lift shall start sequentially and 'home' to the ground floor at rated speed open its doors and allow any passengers to alight, then shut down with doors open. The preceding lift must shut down before the next lift starts.

All lifts shall illuminate a 'returning to ground floor' indicator on the car operating panel until the lift has arrived and the doors opened. Car lighting and ventilation fan within each lift shall remain operative while on emergency power operation.

On completion of the homing assignment a minimum of one lift shall continue to run and answer calls on a two-button collective system and on fire service control as applicable. The other lifts shall be prevented from starting until normal mains power is restored.

Patient transfer lifts shall have clinical observation lighting complying to AS/NZS 1680.2.5, Interior lighting—hospital and medical tasks.

Lift car doors shall be of the horizontal opening, power operated type.

Door operators shall be adjustable speed and torque type to provide positive, efficient, quiet and smooth door closing.

Each lift car door shall be provided with a passenger protection device of the solid state modulated multi-beam infra-red type with extended convergence zone protection into the hallway for greater passenger protection and to reduce the doors being damaged by trolleys and hospital beds.

Checkpoint

The design team is responsible for implementing the *Lift requirements requirement principles* in its architectural design and will demonstrate the outcome through:

- lift car sizes determined by traffic study resulting in a recommendation for the number, type, speed and occupancy requirements of the lift/s in the facility. The traffic study will determine the lift dimensional requirements
- lift/s for transporting patients on beds and emergency lift car/s capable of accepting largest hospital bed with emergency equipment attachments and attendants
- On emergency power each lift shall start sequentially and 'home' to the ground floor at rated speed open its doors and allow any passengers to alight, then shut down with doors open. The preceding lift must shut down before the next lift starts
- all lifts illuminate a 'returning to ground floor' indicator on car operating panel until the lift arrived and doors opened. Car lighting and ventilation fan within lift must remain operative while on emergency power
- on completion of homing assignment a minimum of one lift must continue to run and answer calls on a two button collective system and on fire service control as applicable. The other lifts prevented from starting until mains power restored this is dependent upon the number of lifts required to operate to suit the requirements of the individual hospital
- patient transfer lifts have clinical observation lighting complying to AS/NZS 1680.2.5, Interior lighting—hospital and medical tasks
- lift car doors horizontal opening, power operated type
- door operators adjustable speed and torque type for positive, efficient, quiet and smooth door closing
- each lift car door has passenger protection device of solid state modulated multi-beam infra-red type with extended convergence zone protection into the hallway for passenger protection and reduce doors being damaged by trolleys and hospital beds.

2.11.1.4 Automated service lift (dumbwaiters)

Requirements

The installation of service lifts with automated loading and unloading ability is recommended to be considered between:

- sterile supply unit and operating units
- pharmacy and inpatient units.

Good planning will minimise the need for vertical transport services. Service lifts and dumb waiters cost less to install than passenger lifts.

Consider relative position of sterile areas and pharmaceutical distribution systems.

Checkpoint

The design team is responsible for implementing the automated service lift requirement principles in its architectural design and will demonstrate the outcome through:

- the installation of service lifts with automated loading and unloading ability recommended between:
 - sterile supply unit and operating units
 - pharmacy and inpatient units.
- good planning to minimise need for vertical transport services. Service lifts and dumb waiters cost less than passenger lifts
- consider relative position of sterile areas and pharmaceutical distribution systems.

2.11.2 Alternative vertical transport

Requirements

This includes telelift, document hoist and pneumatic tube systems. The installation of document and materials transport systems shall be considered to assist in reducing demand on passenger lifts.

Checkpoint

The design team is responsible for implementing the *Alternative to vertical transport requirement principles* in its architectural design and will demonstrate the outcome through:

- includes telelift, document hoist and pneumatic tube systems
- document and materials transport systems assist in reducing demand on passenger lifts.

2.11.3 Visitor/staff

Requirements

For lift installations with four or more cars, the lift car entrance at the main landing for loading of food trolleys and other supplies trolleys shall be separated from the normal lift lobby.

Where functionally allowable, patient and public lifts shall be separated. Lifts shall be easily visible and are a vital part of wayfinding.

Checkpoint

The design team is responsible for implementing the *Visitor/staff lift requirement principles* in its architectural design and will demonstrate the outcome through:

- for lift installations with four or more cars, the lift car entrance at the main landing for loading of food trolleys and other supplies trolleys shall be separated from the normal lift lobby
- where functionally allowable, patient and public lifts separated. Lifts easily visible as vital part of wayfinding.

2.11.4 Bed lifts

Requirements

Bed/passenger lifts are to be used for both people and vehicular traffic for moving goods and patients on trolleys.

Orthopaedic bed/passenger lifts may be used in place of bed/passenger lifts provided that the need for a larger lift car can be justified on the basis of clinical need.

Checkpoint

The design team is responsible for implementing the *Bed lift requirement principles* in its architectural design and will demonstrate the outcome through:

- bed/passenger lifts used for people and vehicular traffic for moving goods and patients on trolleys
- orthopaedic bed/passenger lifts used in place of bed/passenger lifts provided need for a larger lift car justified on the basis of clinical need.

2.11.5 Goods and service lifts

2.11.5.1 Food service/goods lifts

Requirements

Where possible provide enough lifts to allow the exclusive use of at least one lift for food services. In off peak times these lifts can be used for other domestic type duties. However, justification for the provision is required.

Rationale/example

As service lifts require persons to both load and unload them, problems can arise when there is no one at a destination floor to open/close the doors or to unload the service lift.

In any facility requiring vertical transportation, the food service requires exclusive use of at least one lift at meal times. Planning should provide free access to this lift in a manner that the delivery of raw material, meals and collection of dirty dishes does not interfere with and/or hinder other traffic. The same lift cannot be used for linen delivery and dirty linen collection. This lift should be served by a lobby separate from those provided for normal passenger use.

Ideally the transportation of waste and dirty linen shall use a separate lift to that used for the food services.

If vertical goods transportation is required, service lifts/dumb waiters are cheaper than passenger lifts.

Both the goods lifts and the service lifts mentioned above can relieve traffic loading from the main costly hospital bed/passenger lifts and can reduce main lift requirement and consequent cost. Goods lifts shall be designed to accommodate the largest trafficable item of plant that could be reasonably expected to be moved between floors.

Checkpoint

The design team is responsible for implementing the *Goods and services lift requirement principles* in its architectural design and will demonstrate the outcome through:

- where possible provide enough lifts to allow exclusive use of at least one lift for food services. Off peak times these lifts used for other domestic type duties
- food service requires exclusive use of at least one lift at meal times
- planning to provide free access to lift so delivery of raw material, meals, collection of dirty dishes does not interfere and/or hinder other traffic
- ideally transportation of waste and dirty linen uses a separate lift to that used for food services
- goods lifts designed to accommodate largest trafficable item of plant reasonably expected to be moved between floors.

2.11.6 Hot lift

Requirements

When a rooftop helipad is required, a dedicated lift to the helipad (a hot lift) shall be considered and shall be equipped with the suitable audio-visual, safety, fire safety control and radio control equipment. It shall be positioned in the most optimum position to limit the travel path and travel time between the helipad and the emergency department and shall be designed to facilitate the most direct path of travel. Where there are multiple lifts the traffic flow to the helipad may not warrant the allocation of a dedicated hot lift. The provision of two lifts within the group of bed lifts to serve the helipad provides redundancy and allows additional lift capacity for peak patient transfer times.

Rationale/example

The hot lift shall be designed to a suitable size and speed to cater for the local requirements of the emergency medicine response team.

The type of lift shall be of a kind that requires minimal maintenance to limit the frequency of the lift being out of action during emergency transfers.

The lift shall be equipped with a security override to facilitate the dedicated status during emergency transfers.

Checkpoint

The design team is responsible for implementing the *Hot lift principles* in its architectural design and will demonstrate the outcome through:

- the design team shall demonstrate that it has positioned the hot lift in a position where it facilitates the most direct, safe and quickest travel route between the helipad and the emergency department
- the design team shall demonstrate that it has specified a lift type that meets the requirements of the local emergency department response team in terms of speed, size and maintenance requirements.

2.11.7 Stairs

Requirements

All ramps and stairs shall be designed to comply with all requirements, including Australian standards, NCC, WHS, and patient emergency evacuation procedures.

Rationale/example

- Note 1: the NCC distinguishes between ‘required’ stairs for example for egress and ‘non-required’ stairs and ramps with differing requirements.
- Meet AS 1428.1 for step ramps, stairways, and landings.
- Note 2: consider designing to AS 1428.2 to enhance accessibility. Meet all DDA requirements.

Checkpoint

The design team is responsible for implementing the *Stairs requirement principles* in its architectural design and will demonstrate the outcome through:

- Note 1: NCC distinguishes between ‘required’ stairs for example for egress and ‘non-required’ stairs and ramps with differing requirements
- meet AS 1428.1 for step ramps, stairways, and landings
- Note 2: consider design to AS 1428.2 to enhance accessibility. Meet all DDA requirements
- all ramps and stairs designed to comply with all requirements, including Australian Standards, NCC, WHS, and patient emergency evacuation procedures.

2.11.7.1 Visible stairs**Requirements**

The design of a facility shall encourage the use of stairs for vertical circulation, whilst providing lifts for the goods, servicing, disabled and patient transfer.

Rationale/example

The objective of providing visible stairs is to provide a viable alternative to vertical transport (lifts), in multi storey buildings. Stairs provide an alternative which reduces dependency on lifts, reduces lift congestion, reduces waiting time, provides energy-savings and promotes incidental exercise.

To enable stairs to provide an alternative to the lifts, they shall be located adjacent to lift wells and be clearly visible though use of glass partitions and/or ‘hold open’ doors.

Stairwell pressurisation systems must be provided for fire-isolated exits.

The head and foot of an adjacent stair or ramp shall be visible from the head and foot of the other. The alternative paths of travel shall be visible and obvious to a potential user.

Checkpoint

The design team is responsible for implementing the *Visible stairs requirement principles* in its architectural design and will demonstrate the outcome through:

- the design shall encourage the use of stairs, whilst providing lifts for goods, servicing, disabled and patient transfer
- visible stairs to provide a viable alternative to vertical transport (lifts), in multi storey buildings. Stairs reduce dependency on lifts, reduces lift congestion, reduces waiting time, provides energy-savings and promotes incidental exercise
- stairs shall be located adjacent to lift wells and be clearly visible though use of glass partitions and/or ‘hold open’ doors
- stairwell pressurisation systems must be provided for fire-isolated exits

- head and foot of an adjacent stair or ramp shall be visible from the head and foot of the other. Alternative paths of travel to be visible and obvious to a potential user.

2.11.7.2 Fire stairs

Requirements

Automatic air pressurisation system to AS 1668.1 to enclosed fire-isolated exit stairs.

Rationale/example

Even when designing a fire stair it is possible to design the stairs to be as open as possible, given the constraints imposed by fire requirements, to facilitate use of space, entry visibility and vertical circulation. This makes the stairs a clear alternative to that of using any adjacent public lifts.

Checkpoint

The design team is responsible for implementing the *Fire stairs requirement principles* in its architectural design and will demonstrate the outcome through:

- automatic air pressurisation system to AS 1668.1 to enclosed fire-isolated exit
- fire stair designed to be as open as possible, given the constraints imposed by fire requirements, to facilitate use of space, entry visibility and vertical circulation
- stairs a clear alternative to that of using any adjacent public lifts.

Specifications

Vertical transport—Lifts and escalators

Lifts

- For further information on all lift matters refer to *CIR Volume 4, Engineering and Infrastructure*.
- Patient transfer lifts shall have clinical observation lighting complying to AS/NZS 1680.2.5 'Interior lighting - Hospital and medical tasks'.

Emergency lifts

- Patient transfer lifts shall have clinical observation lighting complying to AS/NZS 1680.2.5 'Interior lighting—Hospital and medical tasks'.

Stairs

Refer:

- AS 1428.1 for step ramps, stairways, and landings.
- Note 1: The BCA distinguishes between 'required' stairs such as for egress and 'non-required' stairs or ramps with differing requirements.
- Note 2: Consider designing to AS1428.2 to enhance accessibility. Meet all DDA requirements.

Fire stairs

- Automatic air pressurisation system to AS 1668.1 to enclosed fire-isolated exit stairs.

3 External and Landscape

3.1 General

Requirements

The landscaping and external areas of the site must complement the building's form and its functional requirements, enhance the amenity of the local area and positively responds to landscape, heritage, conservation and environmental values.

Attention shall be given to balancing readily accessible and visible external access points to the facility with the ability to control and secure all access points in the event of an emergency.

Factors, such as adequate exterior lighting in parking lots and entry points to the facility and appropriate reception/security services are essential to ensuring a safe environment.

Rationale/example

There needs to be recognition of need to protect significant vegetation identified for retention throughout the planning and construction phases of these projects in accordance with appropriate site management guidelines, including AS 4970, Protection of trees on development sites.

Checkpoint

The design team is responsible for implementing General external and landscape principles in its external planning and design and will demonstrate the outcome through:

- provision of places of respite with direct connection to the natural environment for patients, visitors, and staff
- landscape diversity
- enhance site with native vegetation and species
- create self-sustaining landscapes with minimised need for irrigation
- atmospheric hygiene
- reduce 'heat island' effects
- reduce light pollution
- use groundcover and shade to reduce reflection around road
- minimum external lighting required for safety and minimal external building illumination.

3.2 Car parking

Requirements

Car parking facilities shall be planned to reduce urban and site impact whilst providing easy access from both street and facility entrance. The designated car parking area shall be an illuminated safe area for staff and visitors to park.

Checkpoint

The design team is responsible for implementing Car parking principles in its external planning and design and will demonstrate the outcome through:

- clear signposting of car parking facilities to allow easy access from adjacent street,
- use of landscape and vegetation to reduce visual impact of car park on facilities and surrounding area
- use of landscape and vegetation to reduce heat load
- illumination of the area to allow good visual access and safety
- use of traffic calming or slow zones to increase pedestrian safety
- well planned pedestrian flows to encourage safe crossing of vehicle paths
- drop off zones with easy, covered access to the facility
- access for disabled as per Australian Standards.

See relevant section, Volume 4.

3.2.1 Car park numbers

Requirements

Car parking requirements will be site specific depending on such factors as availability of reliable public transport, proximity to staff catchment area, attractiveness of other methods of travel (by bicycle or on foot) and collocation with other facilities.

Checkpoint

The design team is responsible for implementing *Car park numbers principles* in its external planning and design and will demonstrate the outcome through:

- car parking numbers calculated and confirmed with client.

3.2.2 Car park layout

Requirements

Car parking facilities shall be planned to reduced urban and site impact whilst providing an illuminated safe area for staff and visitors to park.

Rationale/example

Large parking lots have a way of taking over the landscape, creating unpleasant places and having a depressing effect on open space around them.

Checkpoint

The design team is responsible for implementing *Car park layout principles* in its external planning and design and will demonstrate the outcome through:

- allocation of space to car parking facilities in building development and design is consistent with policies to support the use of active and public transport
- vehicular access and parking arrangements respect the need for an uninterrupted network of safe landscape spaces
- minimise the adverse urban impacts of car parking facilities on streetscape character and pedestrian amenity. On site ground level car parking facilities need not be located at a street frontage. Car parking facilities may be located in a basement or at the rear of the building
- Open on-grade car parking facilities include significant landscaping and paving treatments to reduce heat loads and reduce visual impact of car parking. Car parking facilities located above the ground floor of the building are best to be sleeved or screened by other facilities or elements so as to conceal the car parking facilities from surrounding development and public spaces
- locate car parks away from sleeping areas and outdoor communal areas. Turning and egress low plantings at intersections and corners. Slow points at regular intervals
- provide trees between parking bays, install lighting and ensure visual links to facility. Car park must not dominate complex or compromise privacy
- car parking facilities well illuminated and subject to adequate on-going surveillance opportunities
- parking for staff is best in a separate are to public parking, may be near the also provided adjacent to supply
- parking space for funeral services vehicles provided

- disabled parking provided within close proximity to the entrances.

3.2.3 Daytime

Requirement

The car parking facilities shall be designed to accommodate peak traffic during daytime operating hours.

Checkpoint

The design team is responsible for implementing *Car parking daytime principles* in its external planning and design and will demonstrate the outcome through:

- car parking facilities designed to accommodate peak traffic during daytime operating hours.

3.2.4 After-hours

Requirements

After-hours safety in the car park shall be highest priority and incorporate good visual surveillance and good artificial illumination. Avoid creation of areas where people can loiter unnoticed.

Checkpoint

The design team is responsible for implementing *Car parking after-hours principles* in its external planning and design and will demonstrate the outcome through:

- after-hours safety in the car park is highest priority and incorporates good visual surveillance and good artificial illumination. Avoid areas where people can loiter unnoticed.

3.2.5 Drop off area

Requirements

Dedicated drop off zones shall be provided with well signed, easy access from adjoining street. The front entrance door must be easily identifiable from the patient or taxi drop off area. This area shall be sheltered by an adjoining canopy, or Port Cochere which enables dry access to the facility. There must be access to nearby car parking.

Checkpoint

The design team is responsible for implementing *Drop off area principles* in its external planning and design and will demonstrate the outcome through:

- dedicated drop off zones provided with well signed, easy access from adjoining street
- the front entrance door easily identifiable from the patient or taxi drop off area. This area is sheltered by an adjoining canopy, or Port Cochere enabling dry access to the facility
- access provided to nearby short-term car parking.

3.2.6 Emergency drop off

Requirements

The emergency drop-off must be close to the emergency department and requires the same level of access for emergency vehicles and public drop off. There should be illuminated signposting and access from emergency drop-off to nearby car-parking and access road. This area shall be sheltered by an adjoining canopy, or Port Cochere which enables dry access to the facility. There must be access to nearby short-term car parking. This emergency drop-off area should have permanent parking for ambulances and emergency and police vehicles.

Checkpoint

The design team is responsible for implementing *Emergency drop off area principles* in its external planning and design and will demonstrate the outcome through:

- emergency drop-off close to the emergency department with same level of access for emergency vehicles and public drop off. Illuminated signposting and access from emergency drop-off to nearby car-parking and access road. Area sheltered by canopy, or port cochere enabling dry access to the facility. Access provided to nearby short-term car parking
- emergency drop-off area has permanent parking for ambulances, emergency and police vehicles.

3.2.7 Ambulance road

Requirements

Separation of ambulance access and general traffic access is important. Provision of a separate road for ambulance is preferred and if not possible, a separate lane clearly marked for ambulance only is required. The ambulance access should lead directly to emergency department.

There should also be two possible accesses available for ambulance in case there is a blockage to the main ambulance access. If possible this access should connect to a different street in the local road network. This prevents a blockage in the local road network from preventing access for ambulances.

Checkpoint

The design team is responsible for implementing Ambulance road principles in its external planning and design and will demonstrate the outcome through:

- separate road for ambulance preferred and if not possible, a separate lane clearly marked for ambulance only is required. Ambulance access to lead directly to emergency department
- two accesses available for ambulance in case of blockage to the main ambulance access and if possible this access connects to a different street in the local road network.

Specifications

Car parking—external wayfinding and signage

Refer:

- *Disability Discrimination Act 1992*
- *Anti Discrimination Act 1991*
- Building Code of Australia (BCA)
- AS1428 Part 1 – 4
- Wayfinding in the Built Environment©—CRC Construction Innovation 2007
- Good Sign Practices© 1998—Collis E, Peterson I, Tolliday B.
- The Sign Design Guide© 2000 – Barker P, Fraser J.

Ramps

Refer:

- *Disability Discrimination Act 1992*
- *Anti Discrimination Act 1991*
- BCA
- AS1428 Part 1 – 4.

3.3 Gardens and courtyards

Requirements

The design of the facility shall incorporate gardens and courtyards to enhance the amenity and provide for patient and staff respite and comfort. These shall be designed with consideration to the local environment and climate as well as the requirement for low maintenance grounds.

Rationale/example

Subject to site constraints, healthcare facilities shall consider opportunities to promote physical activity and/or outdoor uses for staff and visitors. Therapeutic uses of landscape elements, such as healing gardens or natural landscapes should be integrated into healthcare facilities wherever possible.

Some patients have cultural backgrounds which place importance on tending gardens and tilling soil. A continuing connection with these activities may be a source of great comfort.

Refer to *CIR Volume 3 Architecture and health facility design Section 1 Principles* sub-section 3.2.3.2 Physical access to outdoor areas.

Checkpoint

The design team is responsible for implementing Garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- provision of at least one garden or courtyard for respite

- provision of seating/rest areas within the garden/courtyard
- use of vegetation which requires minimal irrigation and maintenance
- specific safety considerations for those gardens designed for mental health, aged care and dementia patients.

3.3.1 Public gardens and courtyards

Requirements

Courtyards to provide opportunities for contemplation and active use.

Rationale/example

Seating areas may be provided to form additional quality spaces for waiting, retreat or just a short break. Throughout these spaces artwork opportunities should be pursued to provoke interest and awareness of health, cultural and social issues.

Checkpoint

The design team is responsible for implementing Public garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- design creates subtle privacy pockets whilst maintaining safety, legibility and functionality
- if possible, one garden/courtyard should be exclusively for the use of staff and only have staff access.

3.3.2 Patient gardens and courtyards

Requirements

As with public courtyards, courtyards provide opportunities for contemplation and active use for patients who are able to use them.

Rationale/example

Seating areas may be provided to form additional quality spaces for waiting, retreat or just a short break. Throughout these spaces artwork opportunities should be pursued to provoke interest and awareness of health, cultural and social issues.

Checkpoint

The design team is responsible for implementing Patient garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- the design creates subtle privacy pockets whilst maintaining safety, legibility and functionality.

3.3.3 Rehabilitation/treatment gardens and courtyard

Requirements

Rehabilitation courtyards provide opportunities for exercise and may be located in close proximity to the inpatient unit. Direct access to the garden from a variety of internal spaces is important.

Checkpoint

The design team is responsible for implementing Rehabilitation and treatment garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- a range of surface finishes and integrated furniture considered to mimic real life situation within controlled environment, and may feature a number of resting spots.

3.3.4 Mental health gardens and courtyards

Requirements

Such a courtyard shall provide a secure break out space and a calming environment with natural screening.

Checkpoint

The design team is responsible for implementing Mental health garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- special consideration made to ensure the safe use by mental health patients and removal of possible features which may allow self-harm.

3.3.5 Mental high dependency gardens and courtyards

Requirements

These shall provide a secure and comforting space, be supervision friendly and non-threatening for patients to use.

Checkpoint

The design team is responsible for implementing Mental high dependency garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- designed to avoid jarring or discomforting changes in spatial arrangement and materials. Special consideration made to ensure the safe use by mental health patients and removal of possible features which may allow self-harm.

3.3.6 Mortuary gardens and courtyards

Requirements

Mortuary courtyard may be sited directly adjacent to the mortuary and provide private grieving space. The landscape and flow of this space is to be designed to enable large groups to gather.

Checkpoint

The design team is responsible for implementing Mortuary garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- discreet siting of this courtyard provides for the high levels of privacy and personal space requirements particularly significant to many communities, including Indigenous groups.

3.3.7 Aged care gardens and courtyards

Requirements

These courtyards may be located close to palliative care areas and develop a green retreat with plant selections encouraging bird life and other friendly fauna.

Checkpoint

The design team is responsible for implementing Aged care garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- located close to palliative care areas.

3.3.8 Indigenous gardens and courtyards

Requirements

Some Indigenous groups have a culture which places high importance on being with a family member who is ill. Gardens and courtyards must be designed accordingly and able to take a large number of people.

Checkpoint

The design team is responsible for implementing Indigenous garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- gardens and courtyards designed to take a larger number of people.

3.3.9 Dementia gardens and courtyards

Requirements

Safety must be particularly considered in design and selection of materials and plant species. Surveillance must be possible at all times and the courtyard must only have access from the internal spaces of the health facility.

Checkpoint

The design team is responsible for implementing Dementia garden and courtyard principles in its external planning and design and will demonstrate the outcome through:

- safety considered in design and selection of materials and plant species. Surveillance possible at all times
- courtyards only have access from the internal spaces of the health facility
- design avoids jarring or discomfoting changes in spatial arrangement and materials.

3.4 Fences and walls

Requirements

Where secure spaces are required within the facility, fences and walls shall be designed to limit the feeling of confinement.

Rationale/example

Confinement becomes easier to bear when the methods of confinement are subtle.

Checkpoint

The design team is responsible for implementing Fences and walls principles in its external planning and design and will demonstrate the outcome through:

- use of landscape or vegetation (such as climbing plants) to soften the transition between ground and fence or wall
- less intrusive, alternative solutions used to fence or wall for the purpose of space separation or flow barrier, such as raised garden bed, seating bench or low wall
- materials chosen to enhance climatic effect on outdoor space.

3.5 Outdoor furniture

Requirements

Outdoor furniture shall be provided to enhance amenity for patients, visitors and staff. Outdoor furniture shall be low maintenance and designed to reduce vandalism and theft. Safety during storm or extreme wind shall be priority.

Checkpoint

The design team is responsible for implementing Outdoor furniture principles in its external planning and design and will demonstrate the outcome through:

- provision of outdoor furniture in appropriate locations to provide rest and respite to patients and visitors
- selection of materials which are low maintenance, durable and impervious to vandalism
- use of appropriate fixings to reduce theft and danger during extreme winds
- furniture selected to minimise use for any other purpose (such as skaters).

3.6 Breezeways/covered outdoor space

Requirements

Outdoor space oriented for comfortable daytime temperature and good natural ventilation from prevailing winds. Summer sun shall be minimised through suitable treatment to space.

Checkpoint

The design team is responsible for implementing Breezeways/covered space principles in its external planning and design and will demonstrate the outcome through:

- appropriate shading to minimise direct summer sun access
- location to provide good natural ventilation
- location to provide protection from strong winds and driving rain
- provision of covered space at all entrance points and other main pedestrian access points.

3.7 Landscaping/planting schedule

Requirements

Landscaping scheme shall be provided to ensure that the outdoor spaces are pleasant areas for patients to view from their beds and in which patients, visitors and staff may relax. It is important that safety of patients is considered in the selection of suitable plants and also it is important to avoid any plants that are known for having an influence on allergies or skin irritations, have any form of thorns or barbs or are poisonous in some way.

Rationale/example

Water conservation shall be a consideration when designing layouts and selecting plants. Bore water (if available) for reticulation is recommended. The use of mains water for reticulation is restricted. The relevant authority should be consulted for current regulations.

Where existing mature trees have been retained, plant complementary species that are in keeping with the design character and where possible are native to area. This does not preclude the use of suitable exotic species.

The scheme should also ensure that the buildings blend into the surrounding environment, built or natural.

Checkpoint

The design team is responsible for implementing Landscape/planning schedule principles in its external planning and design and will demonstrate the outcome through:

- selection of plants which provide least risk of risk to facility users
- selection of plants which integrate into local environment and climate
- selection of plants which requires minimal irrigation and maintenance
- use of alternative water supply for irrigation such as tank or bore water.

3.8 Safety

Requirements

Landscape elements are most likely to provide a hazard for ongoing safety. Edges of gardens, steps, plant types, mulch and detritus, and water retention all have an effect on the hazard level of an area and must be considered when designing external and landscape areas.

Rationale/example

Safety is paramount for all persons and Queensland Health has a duty of care for all in their employ and care.

Checkpoint

The design team is responsible for implementing Safety in external and landscape principles in its external planning and design and will demonstrate the outcome through:

- selection of plants which provide least risk of risk to facility users
- covered walkways which provide safe passage for pedestrians with limited slip risks
- well-lit areas to aide safe passage at night or during limited visibility.

3.9 Loading bay

Requirements

Loading bay generally accessed by a separate road to public access. It shall also be positioned out of the public eye and/or screened for visual privacy.

It must be large enough to cope with the largest vehicle that will be use it. In larger facilities there will be multiple bays .

Rationale/example

Loading bay associated with the ‘back of house’ logistics function.

Checkpoint

The design team is responsible for implementing Loading bay principles in its external planning and design and will demonstrate the outcome through:

- loading bay accessed by separate road to public access
- positioned out of public eye and/or screened for visual privacy
- sized to accept with largest vehicle that will use it. In larger facilities there will be multiple bays
- check actual turning radius of vehicles that will use the bay/s as AS requirements may be less than actual vehicle radiuses.

3.10 Supply zone

Requirements

The supply zone will be associated with the ‘back of house’ logistics functions of the facility. It will generally be accessed by a separate road to public access.

Rationale/example

Like all back of house functions it shall also be positioned out of the public eye and/or screened for visual privacy. This area shall have several short-term parking bays to cater for delivery/maintenance vehicles.

Checkpoint

The design team is responsible for implementing *Supply zone principles* in its external planning and design and will demonstrate the outcome through:

- generally accessed by separate road to public access and have several short-term parking bays to cater for delivery/maintenance vehicles
- like all ‘back of house’ functions to be positioned out of public eye and/or screened for visual privacy.

3.11 Helipad

Requirements

A specialist consultant shall be engaged if there is a helipad in the proposed facility.

Helicopter landing pads and flight approach paths shall comply with applicable regulations governing placement, safety features, lighting, fencing, and other site elements to accommodate safe and secure transport services.

Facilities with a helipad shall incorporate noise mitigation strategies to meet the acoustic requirements outlined in the CIR. The location of the helipad on a hospital site should be evaluated for noise impacts on the facility and community.

Helipad should provide the opportunity to establish a direct vertical relationship via high speed lifts (‘hotlifts’) to:

- emergency department
- ICU
- PICU, NICU
- operating suite.

Checkpoint

The design team is responsible for implementing Helipad principles in its external planning and design and will demonstrate the outcome through:

- use of a specialised aeronautical consultant for the project
- helicopter landing pads and flight approach paths comply with applicable regulations governing placement, safety features, lighting, fencing, and other site elements to accommodate safe and secure transport services
- facilities with a helipad incorporate noise mitigation strategies to meet the acoustic requirements outlined in the CIR. The location of the helipad on a hospital site evaluated for noise impacts on the facility and community.
- helipad has a direct vertical relationship via high speed lifts (‘hotlifts’) to:
 - emergency department
 - ICU
 - PICU, NICU

- operating suite.

3.12 Walkways

Requirements

External walkways, footpaths and entrances to be designed and constructed with taking account of ground movement, storm water drainage, surface type to prevent slipping when wet or icy, thermal movement and durability.

Coverings to walkways shall be designed and constructed to provide waterproofing, protection from weather and be well lit for users both day and night.

Rationale/example

Safety within the facility should be addressed through the design of circulation paths and functional relationships.

Roofs may be constructed with metal sheeting supported on timber or steel purlins spanning between timber or steel trusses or beams. Columns may be timber, steel, concrete or brick. All timber used shall be properly seasoned.

Unless alternative paving is required, all areas are recommended to be concrete paved with appropriate edge thickenings and column footings.

Checkpoint

The design team is responsible for implementing Walkway principles in its external planning and design and will demonstrate the outcome through:

- walkways, footpaths and entrances designed to provide safe, easy pedestrian access from site boundaries or car parking areas to facility entrance
- well-lit for night use.

3.13 External wayfinding and signage

Requirements

The external wayfinding strategy shall be integrated with the overall site strategy and be in accordance with Queensland Health's Wayfinding Design Guidelines. The wayfinding design must simplify the wayfinding experience, reduce stress associated with disorientation, and engage all people regardless of their language, ability or culture. The wayfinding design must be welcoming and non-institutionalised.

Rationale/example

In a hospital environment good wayfinding design can directly reduce stress for patients, staff and visitors. Disorientation, caused by poor wayfinding design, contributes directly to facility's operating costs as a result of people becoming lost, missing or being late for appointments, as well as contributing to increased stress which in turn can drive staff absenteeism and reduce healing outcomes.

The concept essentially involves knowing where you are, where you want to go (your destination), working out the best possible route to that destination, recognising the destination upon arrival and then being able to return back to the point of origin or to another destination.

The wayfinding design must make a strong connection with all available environmental and sensory cues and markers, whether built or part of the natural environment.

References to be applied to the design must include:

- Queensland Health *Wayfinding Design Guidelines* (QH-GDL-343-6-1)
- *Disability Discrimination Act 1992*
- *Anti-Discrimination Act 1991*
- NCC
- AS 1428 series Parts 1 to 4.

Checkpoint

The design team is responsible for implementing *External wayfinding and signage principles* in its external planning and design and will demonstrate the outcome through:

- site-wide integrated wayfinding strategy, carried through to external application
- compliance with relevant codes and standards.

3.14 Ramps

Requirements

Ramps shall be provided to ensure easy access for disabled, aged and less mobile patients and visitors. They shall be designed in accordance with relevant standards and codes.

Rationale/example

The need for ramps and their length must be identified early on in the design stages. Ramps take a lot of space and there needs to be a good understanding of present and finished levels to make sure the correct length and slope of ramps is possible.

Ramps must be provided in accordance with the following

- Queensland Health *Wayfinding Design Guidelines* (QH-GDL-343-6-1)
- *Disability Discrimination Act 1992*
- *Anti-Discrimination Act 1991*
- NCC
- AS 1428 series Parts 1 to 4.

Checkpoint

The design team is responsible for implementing Ramps principles in its external planning and design and will demonstrate the outcome through:

- compliance with relevant codes and standards.

4 Interior design

4.1 Design parameters

4.1.1 Design concepts

Requirements

To enable design concepts to translate to a health facility building there are to four main design principles:

1. Community—the interior design of the facility will aim to foster the growth of a workplace community.
2. Collaboration—the making of internal and external environments that create and enhance collaborative work environments.
3. Innovation—the process of making improvements and finding the appropriate solution by questioning the status quo.
4. Wellness—at the centre of all endeavours are people and their physiological and psychological health and wellbeing.

Rationale/example

The aim is to achieve as ‘non-institutional’ an environment as possible.

People feel most comfortable when they are at home. Aspects of the home incorporated into a design will increase levels of consumer comfort and promote recovery.

Provide building occupants with a connection between indoor spaces and the outdoors by introducing daylight and views into the building’s regularly occupied areas. Improve alertness levels, work performance, staff satisfaction and health, and reduce medical errors, by providing high efficiency lighting systems.

Where possible establish direct line of sight to glazing for building occupants in all staff occupied areas, including offices, corridors, nursing station, break rooms, cafeterias, and lobbies.

Provide electric lighting systems and controls for patient areas and staff work areas that allow for variation in day and night lighting characteristics.

Provide a combination of direct day lighting and indirect day lighting.

Size windows to enhance day lighting and ventilation options.

DD stage to consider that electric light usage will be dependent on daylight availability and degree of control of the light quality possible.

Individual switching of task lights are required for control the light level and direction integration of day lighting and artificial lighting.

Internal room finishes generally to be smooth, light coloured and reflective.

Evidence based healthcare architecture creates safe and therapeutic environments for patient care and encourages family involvement. It promotes efficient staff performance and is restorative for

workers under stress. These designs ultimately should improve the organisation’s clinical, economic, productivity, satisfaction, and cultural measures.

The ambience of interior spaces is important for both staff and patient satisfaction and can contribute to the effective recuperation of patients and stress relief.

Factors affecting ambience include:

- decor, colour/finishes schemes and furniture choices and arrangements, should be pleasant and comfortable for both patients, their families and staff, with an aim to improve peoples’ moods and physiological states and help relieve stress
- positive distractions (artwork, music and entertainment) can reduce a patients’ preoccupation with their pain and illness through sensory stimulation that elevates mood and coping skills
- influence of nature (plants, flowers, water, wildlife, nature sounds) research shows that connection to the natural world aids healing by reducing stress
- luminosity and brightness, natural and artificial—providing better lighting and access to natural light to reduce stress and improve patient safety
- ecological health—(air freshness, temperature, flow and humidity, low VOCs in paints, adhesives and tiles, PVC reduction policy).

The interior concept may draw from the local environment and use a natural palette of finishes with occasional visual surprises to provide temporary visual relief for staff and patients.

The legibility of circulation should be addressed thematically or by colour as effective means to facility way finding.

Checkpoint

The design team is responsible for implementing Design concept principles in its interior planning and design and will demonstrate the outcome through:

- achieve as ‘non-institutional’ an environment as possible
- meet the four design principles:
 1. Community—interior design of the facility fosters the growth of a workplace community.
 2. Collaboration—internal and external environments create and enhance collaborative work environments.
 3. Innovation—making improvements and finding the appropriate solution by questioning the status quo.
 4. Wellness—people and their physiological and psychological health and well-being.

4.1.2 Indoor environmental quality

Requirements

Design for a healthy and productive indoor environment shall be accomplished through measures, such as the use of adequate ventilation, low VOC finishes and furnishings, reduced moisture entrapment, daylighting, and acoustical design measures. These measures must not conflict with healthcare safety and infection control codes and standards.

Checkpoint

The design team is responsible for implementing Indoor environmental quality principles in its interior planning and design and will demonstrate the outcome through:

- ensure adequate ventilation, low voc finishes and furnishings, reduced moisture entrapment, daylighting, and acoustical design measures
- measures must not conflict with healthcare safety and infection control codes and standards.

4.1.3 Volume and spaces

Requirements

Vary volumes to suit function and occupancy. Vary ceiling heights with volumes to accentuate the relative importance placed on the particular space.

Checkpoint

The design team is responsible for implementing Volume and spaces principles in its interior planning and design and will demonstrate the outcome through:

- vary volumes to suit function and occupancy
- vary ceiling heights with volumes to accentuate relative importance of the particular space.

4.1.4 Flexibility of use

Requirements

Internal spaces to be planned and designed to be adaptable and suitable for numerous purposes. Material choice shall consider various acoustic requirements and not be a hindrance to adaptability.

Rationale/example

Large spaces may not be in continual use and the requirement for many smaller areas can be accommodated by the use of flexible space-dividers and moveable walls. Also, some spaces may require specific proportions to allow for flexibility of furniture layouts. This also aids future proofing.

This is particularly so with patient controlled spaces, such as bedrooms and at the design stage some consideration should be given to some flexibility of rooms, for example the possibility of combining two single bedrooms into one larger room or of converting two smaller activity spaces into a larger activity space. This may affect the types of walls used in construction in certain areas, and the activities proposed along those walls.

Checkpoint

The design team is responsible for implementing Flexibility of use principles in its interior planning and design and will demonstrate the outcome through:

- internal spaces planned and designed to be adaptable and suitable for numerous purposes
- material choice considers various acoustic requirements and not hinder adaptability.

4.1.5 Ambience

Requirements

Avoid institutional feel as much as possible.

Rationale/example

The ambience of any space is often related to design elements, of form, colour, light and fittings, but is often difficult to isolate in terms of any one element.

The personalisation and domestication of space may be related to quite simple gestures, which have quite particular and individual characteristics. Homeliness and domesticity are more likely to be engendered through provision of domestic symbols, scale, form and design attitude that allows for personalisation of space.

Checkpoint

The design team is responsible for implementing *Ambience principles* in its interior planning and design and will demonstrate the outcome through:

- institutional feel avoided as far as possible
- avoid institutional use of fluorescent lights.

4.1.6 Public space

Requirements

Public spaces shall be planned and designed to be adaptable and suitable to numerous purposes. Material choice should consider various acoustic requirements and not be a hindrance to adaptability.

Rationale/example

The term public space includes most circulation spaces, such as corridors, foyers, lift lobbies, stairs, foyers, café spaces and public toilets.

These are spaces where the patient can go with a high degree of freedom and not interfere with the running of the facility. Colours, choice of materials and finishes, FFE, volume of space will all contribute to this.

Checkpoint

The design team is responsible for implementing Public space principles in its interior planning and design and will demonstrate the outcome through:

- internal spaces adaptable and suitable to numerous purposes
- material choice considers maintenance and acoustic requirements and not be a hindrance to adaptability
- spaces have clear visual markers to indicate that they are meant for public use.

4.1.7 Shared space

Requirements

Shared spaces shall be planned and designed to be adaptable and suitable to numerous purposes. Material choice should consider various acoustic requirements and not be a hindrance to adaptability.

Rationale/example

This term applies to spaces, such as waiting rooms and interview rooms where the patient will need to go into by themselves for specific purposes but not go into without a specific reason. Signing, colour, choice of materials and finishes, FFE, volume of space form the markers to indicate shared space.

Checkpoint

The design team is responsible for implementing Shared space principles in its interior planning and design and will demonstrate the outcome through:

- shared spaces planned and designed to be adaptable and suitable to numerous purposes
- material choice should consider various maintenance and acoustic requirements and not be a hindrance to adaptability
- spaces have clear visual markers to indicate that they are meant for shared use.

4.1.8 Private space

Requirements

Private spaces shall be planned and designed to be adaptable and suitable to numerous purposes. Material choice to consider various acoustic requirements and not be a hindrance to adaptability.

Rationale/example

This applies to staff areas, such as offices, clinical areas where a patient would not go without a staff member, and patient rooms where a patient would not go without being invited to enter. Signing, colour, choice of materials and finishes, volume of space again form the markers to indicate private space.

Checkpoint

The design team is responsible for implementing Private space principles in its interior planning and design and will demonstrate the outcome through:

- private spaces shall be planned and designed to be adaptable and suitable to numerous purposes
- material choice to consider various acoustic requirements and not be a hindrance to adaptability
- spaces have clear visual markers to indicate that they are meant for private use.

4.1.9 Non-clinical workplace, offices

Requirements

The workspaces shall be designed to support the diverse and changing work practices of all staff and associated students (clinical, administrative, academic, research).

Rationale/example

The diversity of settings acknowledges that different work activities require varying levels of interaction, concentration, confidentiality, and technological support. Additionally, as the facility evolves and changes with time, the diversity in settings increases the flexibility of the workspace, allowing it to be used by any variety of users groups, and still support the core work practices with minimal reconfiguration.

Refer to Queensland Health *Workplace and Office Accommodation Guideline* (QH-GDL-057-2008) for further details.

Design considerations include:

- use of transparent and semi-transparent materials in enclosed rooms to manage visibility of interaction
- ICT embedded in all work settings (both primary and secondary) to enable and encourage mobility within the workspace
- private offices built on the interior, as per Queensland Government office guidelines, to facilitate daylight and aspect for the maximum number of staff
- modular, flexible furniture that allows for ease of reconfiguration
- standardised workstations throughout, both in open plan and enclosed single person offices, to allow for adaptability and reuse over time
- access to natural light and fresh air in all workspaces
- primary work settings allocated by function, not status.

The workplace will require the following space types:

- Primary work settings support the majority of day-to-day administrative activities that occur within the facility through three standard space types:
 - office—single person: an enclosed private room of a standard size that shall support a single workstation and space for one on one meetings. The allocation of offices will be based facility policy, with a total not to exceed 10 per cent of overall desk count
 - workstation—open plan: a standard, modular work point in an open environment that fits the planning grid used throughout. Both dedicated and shared work points will be allocated, based on staff activity profiles
 - touchdown desk—a modular work point in an open environment that allows flexible and part-time staff, as well as staff from other parts of the facility (researchers, clinicians, administrators), to work on an ad-hoc basis. Touchdown desks shall be evenly dispersed throughout villages and departments, and located within work areas as well as combined with support and amenity spaces.
- Secondary work settings support primary work settings by providing areas for quiet concentrated work, local team meeting, and informal interaction:
 - quiet/focus workroom (one to two people): a small acoustically private room used for quiet concentrated work, private or confidential conversation, or work requiring acoustic privacy (for example conference call). Quiet workrooms shall be equipped with a workbench or small meeting table to accommodate paper based and technology-based work, and will be available as a non-bookable/ad-hoc space
 - meeting room—small (two to four people): a room to accommodate a team meeting or confidential discussion. This room modular shall be identical in size to a single person office, to increase flexibility over time. Available as bookable and non-bookable/ad-hoc space
 - open meeting table (two to four people): open team breakout space to support informal and ad-hoc meetings, small group collaboration, and social activities. Open meeting table will be dispersed throughout the workspace

- support spaces—allow for necessary support for workspace activities
- copy/print/fax station: area within the general workspace area accommodating copy, print, fax, and supply storage
- local tea point: team breakout and informal meeting space that includes tea, coffee, and food storage facilities
- local team storage: linear and compactus storage as needed to accommodate specific team requirements. Emphasis will be for online and electronic based records, and onsite storage will be provided only for items requiring frequent access in hard copy form
- mobile storage unit: mobile storage units provided to staff allocated a shared standard work point. Staff with a dedicated office or workstation shall not require a mobile storage unit
- staff lockers: secure personal storage grouped together in a central location to provide staff, particularly part time and flex workers, with space to store their personal belongings while in the workspace.

Checkpoint

The design team is responsible for implementing Non-clinical workspace principles in its interior planning and design and will demonstrate the outcome through:

- the required space types for workspace are generic and support the basic activities of all staff within the facility, regardless of specialty
- the workspace is zoned. Spaces that encourage activity and interaction are pulled away from the core areas that support quiet and individual work
- the need for confidentiality is managed through the design and use of the workspace:
 - a range of work settings allows for confidential discussions to happen as need in the appropriate type of space
 - the respect for confidentiality is enforced through a space use policy rather than the allocation of private dedicated spaces.

4.1.10 Teaching and research

Requirements

- To provide a precinct that reflects a multidisciplinary approach to education.
- To provide an integrated campus fostering collegiality discussion and interaction between clinical research and education disciplines and form a part of the hospital culture.
- To provide spaces that are flexible, changeable and responsive to emerging research trends.
- To provide areas that encourage and welcome staff and community involvement in education on a daily basis.

Rationale/example

Health facilities are learning organisations, as such the ongoing educational and professional development requirements of its staff will be an important element in the hospital community.

It is also recognised that the training, information exchange and education of patients, their carers and families, and the community at large is part of the role and responsibilities of a contemporary public hospital.

All teaching and learning spaces within clinical areas shall have the capacity for flexible usage that could include multi-disciplinary meetings, handover, team meetings or telemedicine sessions. Patient care areas, including inpatient units, technical suites, emergency, ICU and outpatients must support group teaching and individual supervision of post graduate trainees and students at various stages of clinical placement. These areas must have direct access to multipurpose space and shared workspace, allowing training clinicians to receive tuition, look up references, and access clinical decision-making support.

In addition to teaching and learning spaces, consideration will need to be given to the accommodation of students throughout the facility, including larger consultation rooms to enable students to participate in patient interviews, AV connection of operating rooms to lecture theatres, and extra write up space in patient areas for student use.

Staff development at the facility will incorporate ongoing education initiatives for all staff in association with universities and other training organisations. These initiatives will include:

- staff orientation
- re-entry refresher programs
- general training initiatives, including clinical skills training, clinical leadership program, communications, aggression management, manual handling practice, occupation health and safety training, and fire training.

Staff development will work closely with all areas of the facility and shall establish links with rural and other smaller centres to assist them in maintaining necessary staff competencies.

Required space types:

- Central teaching and learning hub—the main education area shall incorporate spaces designed to facilitate large format learning, and will be capable of supporting a range of training and education methods through the following space types:
 - lecture theatre/meeting hall—a multipurpose function space with the capacity to form a number of smaller spaces if required, with ante rooms and kitchen nearby to enable use as a public hall
 - seminar room—a flexible space capable of being divided into smaller tutorial rooms
 - learning studio—a flexible space capable of being divided into smaller break out rooms
 - e-learning lab—a teaching lab and computer work area with individual computer access
 - library services—an area incorporating workspace for librarians, a reading area, and touchdown workspace with access to the online library catalogue for use by students, researchers, and clinical staff
 - simulations/skills lab—an area designed to offer interactive, immersive, and hands on education using the full range of commercially available technologies used in simulation for education of healthcare professionals There are opportunities to incorporate part of this simulation space within the inpatient area as an inpatient 'learning lab'.

- Distributed teaching and learning space: the distributed teaching and learning spaces will accommodate smaller format teaching and learning that occurs closer to clinical functions and in a dispersed manner throughout the facility:
 - distributed teaching and learning rooms—a flexible space that is capable of being divided into smaller meeting rooms
 - student amenities—including common room, prayer rooms, lockers and access to study areas and supporting technology will be provided.

Checkpoint

The design team is responsible for implementing Teaching and research principles in its interior planning and design and will demonstrate the outcome through:

- a ‘loose fit’ philosophy that ensures the flexibility of the space is not comprised due to overcrowding with furniture in certain configurations
- provision of maximum access to technology, including AV, videoconferencing, teleconferencing, intranet/internet access, wireless technology, and the devices needed to access and present information
- access to natural light, either directly or via transparency afforded by glazing
- maximum flexibility though the use of operable walls, highly mobile furniture, and technology to support each individual space as well as the larger amalgamation
- use of transparent and semi-transparent materials to maintain visual connection with the clinical space while still providing the appropriate level of privacy
- a high degree of acoustic attenuation to contain noise and reduce sound transfer across spaces
- storage areas that allow equipment to be brought out or stacked away easily to meet changing education needs.

4.1.11 Corridors

Requirements

The requirements for corridor clear widths represent the recommended minimum required.

These requirements take into account the need to allow for the safe movement of trolleys, beds, wheelchairs and other mobile equipment, including the passing of such equipment

Rationale/example

For more information regarding corridor widths refer to Section 5.1.1, Corridors.

Checkpoint

The design team is responsible for implementing corridors principles in its interior planning and design and will demonstrate the outcome through:

- the requirements for corridor clear widths represent the recommended minimum required, taking into account the need for the safe movement of trolleys, beds, wheelchairs and other mobile equipment, including the passing of such equipment.

4.1.12 Infection control

Requirements

The interior design of the facility must assist in the prevention of infection diseases being spread through the facility to ensure patient/staff safety.

All food service areas shall comply with the *Food Act 2006 (Qld)* and the Australia New Zealand Food Standards Code.

Rationale/example

Healthcare associated infections (HAI) are infections caused by a wide variety of common and unusual bacteria, fungi, and viruses during the course of receiving medical care. These infections related to medical care can be devastating and even deadly. As our ability to prevent HAIs grows, these infections are increasingly unacceptable. Wherever patient care is provided, adherence to infection prevention requirements is needed to ensure that all care is safe care.

Interior design plays a large part in aiding the prevention of HAI.

Refer to *CIR Volume 1 Overview* Section 2.2 Associated requirements.

Checkpoint

The design team is responsible for implementing *Infection control principles* in its interior planning and design and will demonstrate the outcome through:

- consultation and collaboration with the local infection control expertise
- consultation with the Food Services Support and Coordination Unit, Health Services and Clinical Innovation Division, Department of Health, for any designs impacting upon kitchens and other related infrastructure
- the design considers the following known causes of HAI
- avoid materials or construction systems that trap moisture and promote microbial growth
- all permeable building materials protected from exposure to moisture prior to and during construction
- joints for floor openings for pipes, ducts, and conduits tightly sealed. Joints of structural elements similarly sealed
- acoustic and/or lay-in ceilings not used where particulate matter may interfere with infection control
- unnecessary horizontal, textured, moisture retaining surfaces or inaccessible areas where moisture or soil will accumulate are avoided.

4.1.13 Surface materials

Requirements

Materials, finishes fitments and design detail shall:

- be durable
- be easy to clean and maintain
- be locally sourced where possible

- be environmentally sustainable (life cycle of product and non-toxic materials).

Rationale/example

All fixtures and fittings should be designed to allow easy cleaning and to discourage the accumulation of dust. Blinds are preferable to curtains for this reason.

Where there is likely to be direct contact with patients, or with blood or body fluids, floors and walls should be surfaced with smooth, impermeable seamless materials, such as vinyl. In equipment processing areas, work surfaces should be non-porous, smooth and easily cleaned.

All surfaces in high risk clinical areas, including the operating unit, ICU, obstetrics unit and neonatal special care nurseries, should be smooth and impervious.

Checkpoint

The design team is responsible for implementing Surface material principles in its interior planning and design and will demonstrate the outcome through:

- specification of materials, finishes, fitments and design details which are:
 - durable
 - easy to clean and maintain
 - locally sourced where possible
 - environmentally sustainable (life cycle of product and non-toxic materials).

4.1.14 Work health and safety

Requirements

The interior design shall consider WHS in the selection and introduction of materials, furniture and fittings within the facility.

Rationale/example

Carpeting, upholstery, paint, adhesives, and manufactured wood products may emit volatile organic compounds (VOCs), including formaldehyde and benzene. Substitute low or zero VOC paints, stains, adhesives, sealants, and other construction materials, where practical, for building products that emit formaldehyde and other known carcinogens and irritants.

- High volume photocopiers, portable sterilising equipment, and aerosolised medications have been identified as important sources of indoor air pollution in healthcare settings. Dedicated exhaust ventilation may be necessary for speciality areas, such as housekeeping, copying rooms or sterilisation areas in which such chemical use occurs.

Refer to section 6—Access, mobility and WHS of these guidelines for further information.

Checkpoint

The design team is responsible for implementing WHS *principles* in its interior planning and design and will demonstrate the outcome through:

- appropriate ventilation (potentially mechanical) to speciality areas including, but not limited to laundry, housekeeping, sterilisation and copy rooms
- selection of furniture, fittings and equipment (FFE) with consideration to low VOC materials.

4.1.15 Whole-of-life

Requirements

Design to reflect Queensland Health's commitment to the principles and practices of strategic asset management which focuses on WOL management of assets underpinned by the fact that the cost of building assets over their life cycle is many times greater than the capital cost of construction.

Rationale/example

Refer to *CIR Volume 2 Functional design brief Section 1 Principles* for more information.

Checkpoint

The design team is responsible for implementing WOL principles in its interior planning and design and will demonstrate the outcome through:

- the principles and practices of strategic asset management which focus on WOL management of assets have been considered in all design decisions.

4.1.16 Maintenance

Requirements

The designer shall consider maintenance requirements as a critical factor in the selection of materials, finishes and FFE items. This includes the amount of maintenance required, the level of special skill required to carry out maintenance, and the ease of access to carry out maintenance.

Rationale/example

Maintenance is a substantial component of the WOL cost of a facility. It is important to select low maintenance, long-life materials, finishes, FFE. Access to all areas that require regular or less infrequent maintenance all must be considered during the design process. Seemingly minor items like access to light fittings can become very expensive issues when ease of access is not considered.

Checkpoint

The design team is responsible for implementing Maintenance principles in its interior planning and design and will demonstrate the outcome through:

- maintenance requirements have been a critical factor in the selection of materials, finishes and FFE items, including maintenance required, special skills required to carry out maintenance and the ease of access to carry out maintenance.

4.1.17 Colour scheme

Requirements

Colours may affect the behaviour of patients and staff and shall be chosen for their beneficial psychological effect. Colour shall also be used to aid wayfinding and differentiate the various functional areas and public, shared and private space.

Checkpoint

The design team is responsible for implementing Colour scheme principles in its interior planning and design and will demonstrate the outcome through:

- design reflects the effect of colour on patients and staff and also as an aid to wayfinding
- colour rendering properties have been addressed in lamp selection.

4.1.18 Acoustics

Requirements

The aim of the acoustic design process is to design spaces with a noise environment suitable for their intended purpose. The ideal acoustic environment is to minimise extraneous and intrusive noise, whilst using a certain level of broadband background noise to assist with acoustic privacy/masking.

Rationale/example

Good acoustics have positive effects not only on patients but also staff. These include improved quality of patient care, better sleep quality, and better speech intelligibility.

The provision of some aspects of healthcare is often undertaken in private where acoustic requirements of spaces are paramount. Walls, doors, ceilings and windows may all need some measure of acoustic privacy control. The seclusion and acute care areas may require sound attenuation and reverberation control.

Checkpoint

The design team is responsible for implementing Acoustics principles in its interior planning and design and will demonstrate the outcome through:

- confirmation of acoustic finishes for reverberation control
- confirmation of sound insulation performance for internal partitions.

Specification

Interior design—Design parameters

Ambience

Refer:

- AusHFG 350.14.05 Lighting
- AS1680 Part 5
- AS1680 Part 2: Recommendations for specific tasks and interiors.

Private space

Refer

- AusHFG
 - Part B 350.14.10 Privacy and Observation
 - Part B - General Requirements Section 80.14.34—Sacred Spaces and Religious Observance.

Work health and safety

Refer:

- AS3864 Medical refrigeration equipment—for the storage of blood and blood products.
- The Australian Immunisation Handbook, 8th Edition, Section 1.10 Transport, Storage and Handling of Vaccines, National Health & Medical Research Council (NHMRC), 2003.
- AS/NZS 2982.1 for details regarding location of safety showers and eye wash facilities.

Colour scheme

Refer:

- AusHFG Part B 350.14.15 Décor.

Acoustics

Refer:

- AS/NZS 2107—Acoustics—recommended design sound levels and reverberation times for building interiors. (This standard recommends design sound levels and reverberation times for different areas of occupancy in various categories of buildings. It specifies methods of measuring the ambient sound level reverberation time. It is intended for use in assessing the acoustic performance of the buildings and building services. It does not apply to the evaluation of occupancy noise).
- AAAC Healthcare Facilities Guideline. This guideline provides general guidance on recommended acoustic criteria for healthcare facilities. It offers three methods for determining the sound insulation requirements for partitions.

4.2 Walls

Requirements

Walls provide a variety of containment functions while still fulfilling the need for light, privacy, security and acoustic control. Different wall types have applicability for fire control, structural sufficiency (either as supporting or bracing walls) and for encasing services. Wall and corner protection shall be provided to suit the type and frequency of traffic and the height of the impact up the wall.

Rationale/example

Minimum clear widths for corridors are set by the NCC for fire egress and accessibility purposes. The minimum clear width recommended will generally exceed that set by the NCC for other reasons, including the safe movement of patients on trolleys and safe staff work practices.

'Clear width' means a clear, unobstructed width where items, such as handrails, drinking fountains, hand basins, telephone booths, vending machines, furniture or portable/mobile equipment of any sort, do not reduce the minimum clear width or impede traffic flow.

Handrails must be installed as required by the NCC and AS 1428.1.

Comply with the NCC access and egress requirements.

Wheeled furniture and some user behaviour require robust surfaces and protection on walls throughout the facility.

Refer to 5.1.4, Corridors for more information.

Checkpoint

The design team is responsible for implementing Wall principles in its interior planning and design and will demonstrate the outcome through:

- checkpoints relating to finishes, material, colour and graphics
- standard room schedules include reference to appropriate wall finishes and materials.

4.2.1 Finishes

Requirements

Understanding and consideration of the wall location and functionality is required to ensure wall finishes are appropriate to suit the specific location of the wall. This includes, but is not limited to specific requirements for wet areas, food services areas, high traffic corridors, relaxation and respite areas.

Rationale/example

Other than special design treatments included as feature face work in public or staff relaxation areas, wall finishes in clinical areas shall be washable with smooth surfaces, and in the immediate vicinity of plumbing fixtures, shall be smooth and water-resistant.

Wall finishes in operating rooms, caesarean delivery rooms, isolation rooms, and sterile processing rooms shall be free of fissures, open joints, or crevices that may retain or permit passage of dirt particles.

In food preparation areas wall construction, finish, and trim, including the joints between the walls and the floors, shall be free of insect- and rodent-harboring spaces.

Wall surfaces in wet areas (for example, kitchens and environmental services closets) shall be monolithic and all seams shall be covered and/or sealed.

Wall bases in areas that require frequent wet cleaning (for example, kitchens, soiled and clean utility rooms, environmental services rooms with mop sinks, public bathrooms) shall be monolithic and coved with the floor, tightly sealed to the wall, and constructed without voids. The presence of water around hand-washing sinks has consistently proven to encourage the presence of opportunistic fungi and moulds in the substrate materials if the countertops are not properly sealed and maintained. Integral backsplashes eliminate intersections that need to be caulked.

Checkpoint

The design team is responsible for implementing Wall finishes principles in its interior planning and design and will demonstrate the outcome through:

- wall finishes are appropriate to suit the specific location of the wall. This includes, but is not limited to specific requirements for wet areas, food services areas, high traffic corridors, relaxation and respite areas.

4.2.2 Materials

Requirements

Understanding and consideration of the wall location and functionality is required to ensure wall materials are appropriate to suit the specific location of the wall. This includes, but is not limited to specific requirements for wet areas, food services areas, high traffic corridors, relaxation and respite areas.

Checkpoint

The design team is responsible for implementing Wall materials principles in its interior planning and design and will demonstrate the outcome through:

- wall finishes are appropriate to suit the specific location of the wall. This includes, but is not limited to specific requirements for wet areas, food services areas, high traffic corridors, relaxation and respite areas.

4.2.3 Colours

Requirements

Understanding and consideration of the wall location and functionality is required to ensure wall colours are appropriate to suit the specific location of the wall.

Rationale/example

Colours have the ability to invoke a variety of moods. Although not everybody will have the same feelings seeing a certain colour the psychological effects are shared by the majority of users. The effect of colour strongly depends on how the colour(s) is used, the combination, the purity of the colour, the purpose of the room and the type of people who are going to use the area.

For example, the colour red is very stimulating, and excites the brain. It is, however also related with aggression and violence and may not be suitable for some areas in the facility.

There is much research on the psychological effects of colour.

Checkpoint

The design team is responsible for implementing Wall colours principles in its interior planning and design and will demonstrate the outcome through:

- wall colours are appropriate to suit the specific location of the wall.

4.2.4 Graphics

Requirements

Understanding and consideration of the wall location and functionality is required to ensure wall graphics are positioned to maximise interior design and wayfinding strategies.

Rationale/example

Graphics are an important part of signage and wayfinding. Graphics convey a message more quickly and are recognised by a broader range of people than a written message, for example an internationally recognised symbol for male or female toilet is more recognisable to some than the words alone.

Graphics also assist in wayfinding by providing a more easily remembered image.

The deliberate introduction of graphic elements can assist the visitor's development of a mental map and memory of their environment colour coding. The designer must avoid endless blank corridors.

Graphics emphasise stopping points and speed up travel. Graphic pictograms and maps (such as 'you are here') are particularly useful.

Graphics that are illuminated are desirable to allow visibility at night. For example, the use of graphic and character displays, such as a white cross on a red background with the word emergency is encouraged.

Checkpoint

The design team is responsible for implementing Wall graphics principles in its interior planning and design and will demonstrate the outcome through:

- wall graphics are positioned to maximise interior design and wayfinding strategies.

Specification

Walls

Refer:

- BCA Clause 2.17 and AS1428.1 relating to handrail installation
- BCA Section D Access and Egress for maximum travel distances for egress and other requirements
- Radiation Licensing requirements and Regulations administered by the Department of Environment and Climate Change (DECC)
- www.environment.nsw.gov.au/radiation/index.htm.

4.3 Floors

Requirements

Selected flooring surfaces shall be easily maintained, readily cleanable, and appropriately wear-resistant for the location. Flooring surfaces shall allow for ease of ambulation and self-propulsion. All flooring surfaces shall allow easy movement of all wheeled equipment required by the functional program.

Rationale/example

Floors in particular conjure images of institutional living because of the practice of having only one material type throughout. To assist in de-institutionalisation, floor surfaces and colours are most appropriately subjected to a variety of texture, type and colour.

Flooring surfaces shall provide smooth transitions between different flooring materials.

Floor construction in food preparation or food assembly areas shall be water-resistant, greaseproof and free of spaces that can harbour pests. Floors in these areas shall be designed to comply with food hygiene regulations.

Carpet and carpet with padding in patient areas shall be glued down or stretched taut and free of loose edges or wrinkles that might create hazards or interfere with the operation of lifts, wheelchairs, walkers, wheeled carts, or residents using orthotic devices.

In new construction or major renovation work, the floors and wall bases of all operating rooms, interventional imaging rooms, caesarean delivery rooms, treatment areas, cardiac catheterisation labs, endoscopy procedure rooms, and cystoscopy, urological, and minor surgical procedure rooms shall not be carpeted, but will be monolithic and joint free. Vinyl should be located under all hand wash basins.

The flooring should be easily cleaned and in good repair.

Floor surfaces, including joints in tiles in such areas, shall be resistant to food acids. In all areas subject to frequent wet cleaning methods, floor materials shall not be physically affected by germicidal cleaning solutions.

Highly polished flooring or flooring finishes that create glare shall be avoided.

Wall bases in kitchens and all clinical areas, soiled workrooms and other areas subject to frequent wet cleaning methods shall be made integral with the floor, tightly sealed against the wall, and constructed without voids.

Airborne infection isolation and protective environment rooms, and anterooms (where provided) shall have seamless flooring with integral coved base.

Floors in areas and rooms in which flammable anaesthetic agents are stored or administered shall comply with requirements of AS 4586.

Checkpoint

The design team is responsible for implementing Floor principles in its interior planning and design and will demonstrate the outcome through:

- Checkpoints relating to finishes, material, colour and graphics
- standard room schedules include reference to appropriate floor finishes and materials
- selected flooring surfaces shall be:
 - easily maintained, readily cleanable, and appropriately wear-resistant for the location
 - allow for ease of ambulation and self-propulsion
 - allow easy movement of all wheeled equipment required by the functional program.

4.3.1 Slip resistance

Requirements

Slip-resistant flooring products shall be used for flooring surfaces in wet areas (for example kitchens, shower and bath areas), ramps, stairways, entries from exterior to interior space, and other areas as determined by the functional program. Flush thresholds shall be used to reduce tripping. When choosing floor finishes, one must consider the co-efficiency of friction and both wet and dry performance.

Rationale/example

Flooring surfaces that are to be slip-resistant shall be in accordance with AS 4586.

Checkpoint

The design team is responsible for implementing Slip resistance principles in its interior planning and design and will demonstrate the outcome through:

- slip-resistant flooring products used for flooring surfaces in wet areas (for example, kitchens, shower and bath areas), ramps, stairways, entries from exterior to interior space, and other areas as determined by the functional program
- flush thresholds used to reduce tripping
- coefficients of friction and both wet and dry performance considered.

4.3.2 Finishes

Requirements

Where a finish coat is required, smooth flooring surfaces shall be sealed with a matte finish to reduce surface glare. Highly polished flooring or flooring finishes that create glare shall be avoided. All finishes must as far as possible be low maintenance and able to be easily cleaned.

Checkpoint

The design team is responsible for implementing *Floor finishes principles* in its interior planning and design and will demonstrate the outcome through:

- where a finish coat is required, smooth flooring surfaces sealed with a matte finish to reduce surface glare
- highly polished flooring or flooring finishes that create glare avoided
- all finishes are generally low maintenance and easily cleaned.

4.3.3 Materials

Requirements

Highly polished flooring or flooring finishes that create glare shall be avoided. All finishes must, as far as possible, be low maintenance and able to be easily cleaned.

Rationale/example

The selection of non-wax flooring eliminates finish glare. Where a finish coat is required, smooth flooring surfaces should be sealed with a matte finish to reduce surface glare.

Soft flooring (such as carpet, cushioned flooring) can be used to reduce the risk of falls and impact of associated injuries.

Portable lifting equipment without powered wheels may require more exertion by staff than ceiling-mounted equipment to move an elevated resident around and through a space. The exertion required by staff may increase with the use of carpet; however different types and brands of carpet may have significantly different levels of resistance to wheeled devices.

Installation of a mock-up to test flooring materials in relationship to wheeled equipment and devices used in a facility is recommended. Carpet should not be automatically discounted as inappropriate due to this challenge, as it has major advantages over hard-surface flooring in terms of noise reduction, acoustics, and residential appearance, all of which are important in creating a comfortable, attractive living environment for patients. It must also be remembered that soft flooring is much less fatiguing for staff to stand and walk on.

Checkpoint

The design team is responsible for implementing *Floor materials principles* in its interior planning and design and will demonstrate the outcome through:

- highly polished flooring or flooring finishes that create glare avoided
- all finishes, as far as possible, low maintenance and able to be easily cleaned.

4.3.4 Colours

Requirements

Understanding and consideration of the floor is required to ensure wall colours are appropriate to suit the specific location of the floor.

Rationale/example

Colour contrast between walls and floors and minimised transitions between different types of flooring may reduce falling risk

Colour should be chosen as an aid to wayfinding. The deliberate introduction of colour can assist the visitor's development of a mental map and memory of their environment colour coding. The designer must avoid endless blank corridors.

Checkpoint

The design team is responsible for implementing Floor colours principles in its interior planning and design and will demonstrate the outcome through:

- wall colours are appropriate to suit the specific location of the floor.
- colours have been chosen as an aid to wayfinding.

Specifications

Floors

Refer:

- AS 4586 for floors in areas and rooms in which flammable anaesthetic agents are stored or administered
- Note that a PET/CT scanner weighs approximately 3-4 tonne with ancillary equipment. Assessment of the floor adequacy and support structure will be required.

Slip resistance

Refer:

- AS 4586 for flooring surfaces that are to be slip-resistant.

Materials

Refer:

- Radiation Licensing Requirements and Regulations administered by the Department of Environment and Climate Change (DECC)
- www.environment.nsw.gov.au/radiation/index.htm.

4.4 Ceiling

Requirements

All exposed ceilings and ceiling structures in areas occupied by patients or staff, and in food preparation or food storage areas, shall be finished so as to be readily cleanable with equipment routinely used in daily housekeeping activities.

Rationale/example

In food preparation and other areas where dust fallout would present a potential problem such as clinical areas, supply and storage areas and sterile stock storage, there shall be a finished ceiling that covers all conduits, piping, duct work and open construction systems.

Ceilings in operating and birthing rooms, isolation rooms, nurseries, sterile processing rooms, bone marrow transplant units and oncology units shall be monolithic from wall-to-wall without fissures, open joints, or crevices that may retain or permit passage of dirt particles.

Light fittings shall also be recessed and flush fitting and sealed to prevent dust ingress.

Acoustic and/or lay-in ceilings shall not be used where particulate matter may interfere with infection control. Acoustic and lay-in ceiling, where used, shall not create ledges or crevices.

Checkpoint

The design team is responsible for implementing Ceiling principles in its interior planning and design and will demonstrate the outcome through:

- all exposed ceilings and ceiling structures in areas occupied by patients or staff, and in food preparation or food storage areas, are readily cleanable.

4.4.1 Semi-restricted areas

Requirements

Ceiling finishes in semi-restricted areas (for example, airborne infection isolation rooms, protective environment rooms, clean corridors, central sterile supply spaces, specialised radiographic rooms, and minor surgical procedure rooms) shall be smooth, washable, non-absorptive, non-perforated, capable of withstanding cleaning with chemicals, and without crevices that can harbour mould and bacterial growth.

Checkpoint

The design team is responsible for implementing Semi-restricted areas ceiling principles in its interior planning and design and will demonstrate the outcome through:

- ceiling finishes in semi-restricted areas (for example, airborne infection isolation rooms, protective environment rooms, clean corridors, central sterile supply spaces, specialised radiographic rooms, and minor surgical procedure rooms) are smooth, washable, non-absorptive, non-perforated, capable of withstanding cleaning with chemicals, and without crevices that can harbour mould and bacterial growth
- where lay-in ceiling provided, it is gasketed to prevent the passage of particles from the cavity above the ceiling plane into the semi-restricted environment. Perforated, regular, serrated cut or highly textured tiles are not used.

4.4.2 Restricted areas

Requirements

Ceilings in restricted areas (for example operating rooms) shall be of monolithic construction. Ceiling finishes shall be washable and capable of withstanding cleaning and/or disinfecting chemicals. All access openings in these ceilings shall be gasketed.

Rationale/example

Cracks or perforations in these ceilings shall not be permitted.

A central diffuser array, which supplies ventilation air (for example for an operating room) is not considered part of the monolithic ceiling.

A central diffuser array consisting of unidirectional flow diffusers and/or architectural fill-in panels should form a single assembly in the ceiling. The array should be gasketed between the diffuser array system and the ceiling and also between the system framing and the individual diffusers. Where booms and other equipment are located within the central diffuser array, the array should be provided with fill-in panels cut to accommodate the booms or other equipment. Fill-in panels are to be gasketed at the framing and at the perimeter of any cuts made to accommodate the equipment.

Checkpoint

The design team is responsible for implementing Restricted areas ceiling principles in its interior planning and design and will demonstrate the outcome through:

- ceilings in restricted areas (for example, operating rooms) are of monolithic construction
- ceiling finishes are washable and capable of withstanding cleaning and/or disinfecting chemicals
- all access openings in these ceilings gasketed.

4.4.3 Dietary and laundry areas

Requirements

Either a sealed monolithic and scrub able gypsum board ceiling or a lay-in ceiling shall be provided. If a lay-in ceiling is provided, it shall include the following:

- a rust-free grid
- ceiling tiles that are smooth, scrub able, non-absorptive, non-perforated, and capable of withstanding cleaning with chemicals.

Checkpoint

The design team is responsible for implementing Dietary and laundry area ceiling principles in its interior planning and design and will demonstrate the outcome through:

- either a sealed monolithic and scrub able gypsum board ceiling or a lay-in ceiling provided
- for lay-in ceiling, the following is included:
 - a rust-free grid
 - ceiling tiles are smooth, scrub able, non-absorptive, non-perforated, and capable of withstanding cleaning with chemicals.

4.4.4 Penetrations

Requirements

Ceilings penetrated by pipes, ducts, and conduits shall be tightly sealed to minimise entry of rodents and insects. Joints of structural elements shall be similarly sealed.

Checkpoint

The design team is responsible for implementing Ceiling penetration principles in its interior planning and design and will demonstrate the outcome through:

ceilings penetrated by pipes, ducts, and conduits are tightly sealed to minimise entry of rodents and insects

- joints of structural elements similarly sealed.

4.4.5 Mental Health patient locations

Requirements

In mental health patient rooms, toilets, and seclusion rooms, the ceiling and air distribution devices, lighting fixtures, sprinkler heads, and other appurtenances shall be of a tamper-resistant type.

Checkpoint

The design team is responsible for implementing Mental health ceiling principles in its interior planning and design and will demonstrate the outcome through:

- in mental health patient rooms, toilets, and seclusion rooms, the ceiling and air distribution devices, lighting fixtures and sprinkler heads are tamper-resistant.

Specification

Ceiling

Refer:

- Radiation Licensing requirements and Regulations administered by the Department of Environment and Climate Change (DECC)
- www.environment.nsw.gov.au/radiation/index.htm
- AusHFG Part C, Section 710.55 Ceiling Finishes
- AS 1530 for Fire Index Ratings.

4.5 Joinery

4.5.1 High Counters

Requirements

A high counter is used to shield objects, equipment and records from inappropriate viewing. A high counter may also provide a convenient writing surface for visitors and staff, and may be referred to as a parcel shelf or service counter. A high counter used for direct interaction between staff and visitors or patients shall be designed to allow for the transfer of objects across the work surface without excessive reaching.

Rationale/example

Flat panel displays should be used with an effective work surface width of 750 millimetres. The use of CRT displays is not recommended as these require excessive width. In conjunction with a work surface designed at 720 millimetres above the floor, the recommended height of the top counter is 1150 millimetres above the floor. This height will allow a seated person sufficient privacy to work whilst being able to see visitors who are standing or sitting.

According to AS 3590.2 the recommended maximum height to the top counter above floor level is 1200 mm above the floor level.

High counters can make it difficult for staff and clients to communicate, especially where the client is of short stature, a child, in a wheelchair or if the client or staff member is hearing impaired. This can exacerbate the risks of frustration and aggression. High and wide counters can also create risk and difficulties for staff who do not fit into the average percentile design range for height and reach.

Security risk assessments to AS/NZS ISO 31000 should form the basis on which to determine the type of mitigation works/security treatments required, for example whether to have barriers or the type of barrier.

Checkpoint

The design team is responsible for implementing High counter principles in its interior planning and design and will demonstrate the outcome through:

- high counters shield objects, equipment and records from viewing
- high counters used for direct interaction between staff and visitors or patients allow for the transfer of objects across the work surface without excessive reaching.

4.5.2 Wheelchair access

Requirements

- The designer shall apply the requirements of AS 1428.2, Clause 24 to the public/patient side of the staff station and reception counters by providing dual surfaces 730 mm and 850 mm high.
- Finished tops, heights and clearance beneath for adjustable, single and double unit instances in addition to knee and foot clearances and limits of reach are also considered.

Checkpoint

The design team is responsible for implementing Wheelchair access principles in its interior planning and design and will demonstrate the outcome through:

- compliance with AS 1428.2, Clause 24.

4.5.3 Low counter

Requirements

In some situations, a lower counter at which staff and patients sit may be considered. These have the advantage of creating a more intimate situation.

Rationale/example

They are easily accessed by people of all heights and those who may be in a wheelchair. It has also been stated that people are less likely to become aggressive and physically threatening when they are seated.

Checkpoint

The design team is responsible for implementing Low counter principles in its interior planning and design and will demonstrate the outcome through:

- where an intimate situation required, low counters have been considered.

4.5.4 Security barriers

Requirements

- The design of the barrier shall be fit for purpose for example protects counter-staff from thrown objects/liquids or attack with an object or weapon.
- Where it is necessary to provide a security barrier at a counter, the design, including associated access doors shall allow for the type of interaction required including:
 - the transfer of small objects and speech

- accessibility standards for example ergonomic, hearing/vision impairment
- the needs of special user groups, for example mental health, cognitive impairment
- WHS and security requirements
- passing large or special objects for example pharmacy
- transfer of mobile transfer equipment/containers, for example goods, cash.

Rationale/example

The barrier may be an open grille, glazed, or some other material/method, for example monitor/intercom. If an operable security grille or similar device is provided, ensure that the function and operation complies with WHS and duty of care requirements.

Checkpoint

The design team is responsible for implementing Security barrier principles in its interior planning and design and will demonstrate the outcome through:

- a security risk assessment to AS/NZS ISO 31000, Risk management to ensure appropriate security/risk mitigation treatments are implemented
- glazed screens should comply with AS 2208, Safety glazing materials in buildings and AS/NZS 2343, Bullet resistant panels and elements, as required.

4.5.5 Finishes

Requirements

The joinery finish shall be generally low maintenance, easy to keep clean and hygienic, with no crevices or cracks which can harbour bacteria and resistant to the types of cleaning and disinfectant products used in the facility.

Checkpoint

The design team is responsible for implementing Joinery finishes principles in its interior planning and design and will demonstrate the outcome through:

- specified joinery finishes generally:
 - low maintenance, easy to keep clean and hygienic
 - no crevices or cracks which can harbour bacteria
 - resistant to the types of cleaning and disinfectant products used in the facility.

4.5.6 Materials

Requirements

Understanding and consideration of the joinery location and functionality is required to ensure the selection of joinery materials is appropriate. Low maintenance and long-life key selection criteria.

Checkpoint

The design team is responsible for implementing Joinery materials principles in its interior planning and design and will demonstrate the outcome through:

- joinery materials are low maintenance and long-life.

4.5.7 Colours

Requirements

Joinery colours must be chosen as part of the total colour scheme for the facility, and not be jarring or disturbing.

Checkpoint

The design team is responsible for implementing *Joinery colours principles* in its interior planning and design and will demonstrate the outcome through:

- joinery colours fit colour scheme and are not jarring or disturbing.

Specifications

Joinery

High counters

Flat panel displays should be used with an effective work surface width of 750mm. The use of CRT displays is not recommended as these require excessive width. In conjunction with a work surface designed at 720mm above the floor, the recommended height of the top counter is 1150mm above the floor. This height will allow a seated person sufficient privacy to work whilst being able to see visitors who are standing or sitting.

According to AS 3590.2, the recommended maximum height to the top counter above floor level is 1200mm above the floor level.

Security risk assessments to AS/NZS ISO 31000 should form the basis on which to determine the type of mitigation works/security treatments required such as whether to have barriers or the type of barrier.

Counters should be to a maximum depth of 1410mm (AS 1428), but a width of 900mm to 1200mm is recommended. A standing counter is essential; it will be 850mm (+/- 20mm) high, with clearance beneath the unit from the floor of 820mm (+/-20mm). In addition, if it is possible to provide a counter for seated interactions, the second counter is recommended at 750mm (+/- 20mm) with clearance beneath the counter from the floor of 730mm (+/- 20mm).

- Refer:
- AS 1428 Design for Access and Mobility outlines best practice requirements for counters and desks
- AS 3590.2
- AS/NZS ISO 31000
- AusHFG Part B, 430.16.00 for reception counters.

Specification continued

Wheelchair access

- Refer AS 1428.2 clause 24 in relation to the public/patient side of the staff station and reception counters by providing dual surfaces 730mm and 850mm high.

Security barriers

Refer:

- AS/NZS ISO 31000: Risk Management to ensure appropriate security/risk mitigation treatments are implemented
- AS 2208 Safety glazing materials in buildings
- AS/NZS2343 Bullet resistant panels and elements, as required.

4.6 Loose furnishings

Requirements

The selection of loose furniture shall consider the requirements to keep the items clean and hygienic.

Rationale/example

Incontinence, accidental spillage and other acts may necessitate removal of cushions, covers, upholstery and bedding for washing. Domestic-style fabrics may not protect furniture sufficiently. Water-resistant under-covers should be considered where water-resistant covers are inappropriate to use.

Checkpoint

The design team is responsible for implementing Loose furnishings principles in its interior planning and design and will demonstrate the outcome through:

- requirements for washing considered
- water resistant covers or under-covers provided.

4.6.1 Indoor plants

Requirements

Proximity to plants and availability of plants in rooms may be as beneficial to some occupants as access to outdoors.

Careful consideration should be given to the possible introduction of microbial contamination from the introduction of indoor plants to the facility.

Checkpoint

The design team is responsible for implementing Indoor plant principles in its interior planning and design and will demonstrate the outcome through:

- proximity to plants and availability of plants in rooms provided
- microbial risk assessment associated with the introduction of indoor plants.

4.6.2 Furniture and equipment

Requirements

Furniture shall be upholstered with impervious materials according to the functional program and an ICRA.

Furniture and equipment in clinical areas that is not easily moved by environmental services personnel, and where sufficient access is not provided to permit cleaning under and behind the unit, shall be sealed against floors and adjoining walls.

Equipment, such as refrigerators, medicine and clean supply dispensing units, kitchen equipment and similar types of furnishings, shall be installed so they can be routinely moved for cleaning.

Hand-washing basins/countertops shall be made of porcelain, stainless steel, or solid surface materials.

If hand-washing basins are set into plastic laminate countertops, at a minimum the substrate shall be marine-grade plywood, or an equivalent material, with an impervious seal.

Blinds, or other patient-controlled window treatments shall be provided within patient rooms to control light levels and glare.

Window treatments shall not compromise patient safety and shall be easy for patients and staff to operate.

Checkpoint

The design team is responsible for implementing Furniture and equipment principles in its interior planning and design and will demonstrate the outcome through:

- furniture upholstered with impervious materials according to the functional program and an ICRA
- furniture and equipment in clinical areas that is not easily moved by environmental services personnel, and where sufficient access is not provided to permit cleaning under and behind the unit, sealed against floors and adjoining walls
- equipment, such as refrigerators, medicine and clean supply dispensing units, kitchen equipment and similar types of furnishings can be routinely moved for cleaning.
- hand-washing basins/countertops made of porcelain, stainless steel, or solid surface materials.
- hand-washing basins set into plastic laminate countertops, have substrate of marine-grade plywood, or an equivalent material, with an impervious seal
- blinds, or other patient-controlled window treatments provided within patient rooms to control light levels and glare
- window treatments do not compromise patient safety and are easy for patients and staff to operate.

4.6.3 Finishes

Requirements

As with all items in a health facility, the finish shall be generally low maintenance, easy to keep clean and hygienic, with no crevices or cracks which can harbour bacteria and resistant to the types of cleaning and disinfectant products used in the facility.

As always, ease of cleaning and keeping hygienic are important, resistant to the cleaning products used in the facility.

Checkpoint

The design team is responsible for implementing Loose furniture finishes principles in its interior planning and design and will demonstrate the outcome through:

- finishes generally low maintenance, easy to keep clean and hygienic, with no crevices or cracks and resistant to cleaning and disinfectant products used in the facility.

4.6.4 Materials

Requirements

Low maintenance and long-life key selection criteria. The material will be impervious to crevices or cracks which can harbour bacteria and resistant to the types of cleaning and disinfectant products used in the facility. Materials shall be resistant to staining and accidental wetting.

An emphasis on keeping a non-institutional feel to the facility, especially areas, such as inpatient units, patient rooms shall be considered in material selection for loose furnishings.

Checkpoint

The design team is responsible for implementing Loose furniture materials principles in its interior planning and design and will demonstrate the outcome through:

- materials low maintenance and long-life, no crevices or cracks and resistant to the types of cleaning and disinfectant products used in the facility. Materials resistant to staining and accidental wetting
- material selection for loose furnishings emphasise a non-institutional feel to the facility, especially areas, such as inpatient units and patient rooms.

4.6.5 Colours

Requirements

Loose furnishing colours must be chosen as part of the total colour scheme for the facility, and not be jarring or disturbing.

Checkpoint

The design team is responsible for implementing Loose furniture colours principles in its interior planning and design and will demonstrate the outcome through:

- loose furnishing colours chosen as part of the total colour scheme for the facility, and not jarring or disturbing.

Specifications

Loose Furnishings—furniture and equipment

Refer:

- Equipment will include a dose calibrator, biohazard safety cabinet(s) Class 2 and/or Class 3. Refer to AS/NZS 2982.1.

5 Access mobility and workplace health and safety

5.1 Space standards and dimensions

5.1.1 Corridors

Requirements

The overriding principle in setting the minimum corridor width is the need to allow for a workable width that, in the event of an emergency evacuation procedure, does not impede egress.

Note 1: designers should note that the NCC also specifies minimum corridor widths for patient care areas. The requirements of these guidelines for certain areas may be higher than the NCC as fire safety is not the only focus of these guidelines. In addition to the above, corridor widths shall comply with the requirements of AS 1428, Series—design for access and mobility.

The minimum requirements for health facility corridor widths are summarised in the Table of Corridors' in AusHFG, Part C.

Rationale/example

Most large hospital units include a range of patient and staff only corridors. If staff only areas are clearly designated by planning and are not required for patient access, then the guidelines for patient corridors do not apply.

Note 3: all corridor widths are clear of handrails and/or crash rails. It is recommended that for design purposes (and considering construction tolerances) 100 mm be allocated to each handrail.

In areas where patient beds, trolleys and stretchers will be moved regularly, such as inpatient units, operating units, obstetric units and ICUs, the minimum clear corridor width shall be 2100 mm.

The recommended corridor width in areas where there is frequent bed and trolley movement is 2350 mm, however this is not mandatory. Even at this dimension, special consideration must be given to the width of doorways into adjacent rooms and widening corridors at the entry to the affected rooms to accommodate turning trolleys and beds.

Corridor widths in the above areas may be considered at lesser dimensions where an existing building is utilised, but special design and planning detail must be incorporated to overcome the problems of congestion and the potential risk to patients and staff in an emergency evacuation.

Note: in any event, the corridors may not be narrower than that required by the NCC for patient care areas.

In areas where irregular trolley or bed movement is expected, such as radiology, corridor widths can be reduced to 1800 mm. Special consideration must be given to the door widths to ensure the movement of trolleys or beds from corridor to adjacent rooms is not restricted.

In areas where there is no patient transportation requirement and where corridor runs are no longer than 12 metres, such as a corridor to a group of staff offices, corridor widths of 1200 mm are acceptable.

Corridor widths of less than 1200 mm are unacceptable in-patient care areas, except where forming part of an existing facility, and where written approval has been obtained for the lesser width.

The width of major inter-department arterial corridors and public corridors generally shall be as wide as is deemed necessary for the proposed traffic flow, but shall not be less than 2100 millimetres.

The width of lobbies within corridors shall be as wide as deemed necessary for the proposed traffic flow, and shall comply with the NCC.

Corridor widths shall mean clear, unobstructed widths. Items, such as handrails, drinking fountains, hand basins, telephone booths, vending machines and portable/mobile equipment of any type shall not reduce the minimum width or impede traffic flow.

Consideration shall be given to the elimination of potentially dangerous 'blind spots'.

Checkpoint:

The design team is responsible for implementing the Corridors principles in its planning and will demonstrate the outcome through:

- the design takes into account the need to allow for the movement of trolleys, beds, wheelchairs and other mobile equipment, including the passing of such equipment
- in setting the minimum corridor width it is critical that, in the event of an emergency evacuation procedure, it does not impede egress
- note 1: the NCC also specifies minimum corridor widths for patient care areas. The requirements of these guidelines for certain areas may be higher than the NCC as fire safety is not the only focus of these guidelines. In addition to the above, corridor widths shall comply with the requirements of AS 1428 series—design for access and mobility
- the minimum requirements for health facility corridor widths are summarised in the Table of Corridors' in AusHFG, Part C.

5.1.2 Ceiling heights

Requirements

The minimum ceiling height in occupied areas shall be 2400 millimetres, but 2700 mm is considered a more appropriate ceiling height in work areas, such as therapy rooms, conference rooms, ICUs

(open plan) and kitchens. Ceiling heights in ensuites can be reduced to 2250 mm where required, to accommodate building services and structure.

Minimum ceiling (soffit) heights of external areas, such as entry canopies, ambulance entries and delivery canopies suit the requirements of the vehicles expected to use them. Special consideration is given to the impact of whip aerials fitted to emergency vehicles.

Ceiling heights in plant rooms are to suit the equipment and allow safe access for service and maintenance. Minimum recommended height is 2400 millimetres.

Rationale/example

The minimum ceiling height in areas, such as corridors, passages and recesses shall be 2400 mm. In portions of remodelled existing facilities, the corridor ceiling height may be reduced to 2250 mm, but only over limited areas, such as where a mechanical duct passes over a corridor. A reduced ceiling height for no greater corridor length than 3000 mm is acceptable. The extent of any such variation from the above recommendations must be approved in writing.

In areas where access is restricted such as a drinking fountain recess, a minimum ceiling height of 2250 mm is acceptable.

Rooms with ceiling mounted equipment, such as X-ray rooms and operating rooms may require increased ceiling heights. Heights should comply with equipment manufacturers' recommendations. The most common ceiling height in such areas is 3000 millimetres.

Department sizes will depend upon the perceived facility role as set out in the operational policy and the organisation of services within the facility. Some functions may be combined or shared provided that the layout does not compromise safety standards and medical and nursing practices.

Checkpoint

The design team is responsible for implementing the Ceiling heights principles in its planning and will demonstrate the outcome through:

- the minimum ceiling height in occupied areas is 2400 millimetres, but 2700 mm is more appropriate ceiling height in work areas, such as therapy rooms, conference rooms, ICUs (open plan) and kitchens. Ceiling heights in ensuites reduced to 2250 mm where required, to accommodate building services and structure
- minimum ceiling (soffit) heights of external areas, such as entry canopies, ambulance entries and delivery canopies set to suit the requirements of the vehicles expected to use them. Ceiling heights in plant rooms are to suit the equipment and allow safe access for service and maintenance. Minimum height is 2400 millimetres.

5.1.3 Department sizes

5.1.3.1 General

Requirements

The concept of efficiency refers to the ratio between net functional areas and circulation space. It is more appropriate to allocate different circulation percentages for generically different planning units. Such a guide has been provided under the Schedule of circulation percentages, AusHFG, Part 3.

Inadequate circulation allowance in briefing documents is to be avoided.

It can result in undue pressure on designers to reduce sizes and therefore functionality. It must also be noted that the circulation percentages are a guide only. They apply to the health planning units (HPUs) included in these guidelines under generic schedule of Finishes. For larger planning units, a different percentage may be appropriate.

Checkpoint

The design team is responsible for implementing the Department size principles in its planning and will demonstrate the outcome through:

- different circulation percentages allocated for generically different planning units. See the Schedule of circulation percentages, AusHFG, Part 3
- circulation percentages used as a guide only. They apply to the HPUs included in AusHFG under Generic schedule of finishes. For larger planning units, a different percentage may be appropriate.

5.1.3.2 Net functional areas

Requirements

In briefing documents, net functional areas represent the sum of individual room areas without any corridors.

Refer to Part A, AusHFG, How to read for a description of how to measure areas off the plans.

Checkpoint

The design team is responsible for implementing the Net functional areas principles in its planning and will demonstrate the outcome through:

- net functional areas represent the sum of individual room areas without any corridors
- refer to Part A, AusHFG, How to read for a description of how areas have been measured off the plans.

5.1.3.3 Gross departmental areas

Requirements

Gross departmental areas are calculated by adding the net functional areas and departmental corridors. These are corridors that are entirely within one department (or HPU).

Rationale/example

In calculating the departmental corridors, the following must be taken into account:

- service cupboards and passing risers are excluded
- corridor wall thicknesses are excluded as these are included in room areas
- columns are included
- fire stairs are excluded
- lifts and lift shafts are excluded.

Checkpoint

The design team is responsible for implementing the *Gross department areas principles* in its planning and will demonstrate the outcome through:

- gross departmental areas are net functional areas plus departmental corridors.

5.1.4 Corridors (travel)

Requirements

'Travel' represents arterial corridors that connect the HPUs.

Rationale/example

Corridors are considered as intra departmental circulation, as in the circulation required to connect rooms or spaces together. Corridors are not always enclosed or partitioned. When corridors are based on a percentage of the NDA, the allowances in the AusHFG should be used as a guiding principle and verified with the specific requirements of that department in question.

Travel is required to allow passage from one unit to another without going through the internal corridors of another HPU. Travel can be considerably reduced in high rise buildings since in many instances corridors are replaced by vertical transportation.

In calculating travel, the following to be considered:

- wall thicknesses are excluded as these are part of the gross departmental areas
- fire stairs are included once for each floor to floor connection
- external wall thicknesses are excluded
- lift shafts are excluded
- service cupboards are excluded
- service shafts and risers are excluded
- lift lobbies are included.

Checkpoint

The design team is responsible for implementing the Corridors travel principles in its planning and will demonstrate the outcome through:

- in calculating travel, the following are considered:
 - wall thicknesses excluded as these are part of the gross departmental areas
 - fire stairs are included once for each floor to floor connection
 - external wall thicknesses are excluded
 - lift shafts are excluded
 - service cupboards are excluded
 - service shafts and risers are excluded.

5.1.5 Engineering

Requirements

Engineering refers to the area of plant rooms and other service areas.

Rationale/example

In calculating the engineering allowance the following areas included:

- service cupboards
- lift motor rooms
- service shafts and risers.
- plant rooms
- communications rooms
- ducts and risers
- lift shafts excluded.

For Schedule of recommended circulation percentages for typical HPUs see table in AusHFG, Part C.

Checkpoint

The design team is responsible for implementing the Engineering principles in its planning and will demonstrate the outcome through:

- engineering refers to the area of plant rooms and other service areas. In calculating the engineering allowance the following areas included:
 - service cupboards
 - lift motor rooms
 - service shafts and risers.

Specifications

Space standards and dimensions

Corridors

Refer:

- BCA for patient care areas.
- All corridor widths are clear of handrails and/or crash rails. It is recommended that for design purposes (and considering construction tolerances) 100mm be allocated to each handrail.
- In areas where patient beds, trolleys and stretchers will be moved regularly, such as inpatient units, operating units, obstetric units and intensive care units, the minimum clear corridor width shall be 2100mm.
- The recommended corridor width in areas where there is frequent bed and trolley movement is 2350mm. This, however, is not mandatory. Even at this dimension, special consideration must be given to the width of doorways into adjacent rooms and widening corridors at the entry to the affected rooms to accommodate turning trolleys and beds.
- In areas where irregular trolley or bed movement is expected, such as radiology, corridor widths can be reduced to 1800mm. Special consideration must be given to the door widths to ensure the movement of trolleys or beds from corridor to adjacent rooms is not restricted.
- In areas where there is no patient transportation requirement and where corridor runs are no longer than 12 metres, such as a corridor to a group of staff offices, corridor widths of 1200mm are acceptable.
- Corridor widths of less than 1200mm are unacceptable in-patient care areas, except where forming part of an existing facility, and where written approval has been obtained for the lesser width.
- The width of major inter-department arterial corridors and public corridors generally shall be as wide as is deemed necessary for the proposed traffic flow, but shall not be less than 2100mm.
- AS 1428 series—Design for Access and Mobility.
- AusHFG Part C 'Table of Corridors' for minimum requirements for health facility corridor widths.

Specification continued

Ceiling heights

- The minimum ceiling height in occupied areas shall be 2400mm, but consideration should be given to the size (aesthetic consideration) and use of the room. 2700mm is considered a more appropriate ceiling height in work areas such as therapy rooms, conference rooms, intensive care (open plan) and kitchens. ceiling heights in ensuites can be reduced to 2250mm where required, to accommodate building services and structure.
- The minimum ceiling height in areas such as corridors, passages and recesses shall be 2400mm. In portions of remodelled existing facilities, the corridor ceiling height may be reduced to 2250mm, but only over limited areas such as where a mechanical duct passes over a corridor. A reduced ceiling height for no greater corridor length than 3000mm is acceptable. The extent of any such variation from the above recommendations must be approved in writing.
- In areas where access is restricted such as a drinking fountain recess, a minimum ceiling height of 2250mm is acceptable.
- Rooms with ceiling mounted equipment, such as X-ray rooms and operating rooms may require increased ceiling heights. Heights should comply with equipment manufacturers' recommendations. The most common ceiling height in such areas is 3000mm.

5.2 Ergonomics

Requirements

All facilities to be designed and built in such a way that patients, staff, visitors and maintenance personnel are not exposed to avoidable risks of injury.

Rationale/example

Badly designed common elements, such as workstations and the layout of critical rooms have a great impact on the WHS of staff as well as the welfare of patients.

The field of ergonomics covers some aspects of the design of objects for common use. It is not appropriate for any standard to be regarded as ideal for every person. A writing bench or hand basin that is entirely suitable for one person may be inappropriate for another person. It is also unreasonable to expect all such objects to be designed in such a way that they can be adjusted for all users.

Given these limitations, the more practical role of ergonomics standards is to provide a reasonable common base for design. It is recommended that the actual design allows for various objects to be modified, if necessary to accommodate the special needs of the relevant staff.

Nothing in these standards is intended to create a situation where the needs of all possible preferences or indeed the highest possible standards are implemented in all situations.

The ergonomics standards included in these guidelines and AusHFG are those commonly debated in relation to health facilities. For items not covered in these guidelines, it is highly recommended that the Australian Standards for ergonomics is followed. Refer to the following:

- HB59 Ergonomics, the human factor, a practical approach to work systems design
- AS 3590.2 - Screen based workstations, Part 2, Workstation furniture
- AS/NZS 4443 - Office panel systems, Workstations
- AS 1680.2.2 - Interior lighting, Part 2.2, Office and screen-based tasks.

Where a facility is designed for staff or patients with special needs, some deviation from these standards may be appropriate. In such circumstances, it is recommended that designers seek advice from specialist ergonomics experts or occupational health and safety officers.

Checkpoint

The design team is responsible for implementing the Ergonomics principles in its planning and will demonstrate the outcome through:

- the design shall comply with the principles covered in this guideline and with the Australian Standards for ergonomics.

5.2.1 Disabled access

Requirements

The AS 1428 - Design for access and mobility, Parts 1, 2, 3 and 4 cover the issues of access for people with disabilities. Parts of the AS 1428 series are a mandatory requirement of the NCC and must be complied with. For these requirements refer to the NCC and AS 1428.

Rationale/example

It is a requirement of these minimum requirements that sections of the health facility or day procedure centre designed for frequent use by people with disabilities must comply with the relevant sections of the AS 1428 series. It is, however not a mandatory requirement of these guidelines to comply with every part of the Australian Standards 1428 series in every area of the hospital or day procedure centre. Parts of the facility may be specialised for use by patients (or staff) with particular disabilities. In such areas, the needs of the most common disabilities shall be considered and allowed for. In short, 'specialisation' is not seen by these guidelines as non-compliance in relation to AS 1428.

Checkpoint

The design team is responsible for implementing the disabled access principles in its planning and will demonstrate the outcome through:

- the AS 1428, Design for access and mobility, Parts 1, 2, 3 and 4 cover the issues of access for people with disabilities has been followed
- parts of the AS 1428 series are a mandatory requirement of the NCC and must be complied with. For these requirements refer to the NCC and AS 1428
- it is a requirement of these minimum requirements that sections of the facility designed for frequent use by people with disabilities complies with the relevant sections of the AS 1428 series. It is, not a mandatory requirement of these guidelines to comply with every part of the AS 1428

series in every area of the facility. Parts of the facility may be specialised for use by patients (or staff) with particular disabilities.

5.2.2 Staff station

Requirements

Part of a typical staff station is used as a workbench or workstation. For the ergonomic standards of these functions, refer to the appropriate sections of the AusHFG, Ergonomics.

Rationale/example

A staff station may be used for a variety of purposes including:

- a clerical workstation
- reception
- staff base
- reporting station or sub-station
- dispensing counter
- servery.

Checkpoint

The design team is responsible for implementing the Staff station principles in its planning and will demonstrate the outcome through:

- part of a typical staff station is used as a workbench or workstation
- for the ergonomic standards of these functions, refer to the appropriate sections of the AusHFG, Ergonomics.

5.2.2.1 High counter

Requirements

This is used to shield objects, equipment and records from outside view. They also provide a convenient writing surface for visitors and staff alike. A high counter used for direct interaction between staff and visitors or patients shall be designed to avoid the need for excessive 'reach' across the work surface.

Rationale/example

A high counter should be designed in such a way to permit the location of CRT type computer monitors whilst achieving an effective work surface width of 900 millimetres. Alternatively, the high counter should allow for the location of a flat panel display whilst achieving an effective work surface width of 750 millimetres. Where staff need to reach to the high counter to pass or receive documents, the maximum reach to the edge of the high counter shall be 600 mm for the relevant section only.

The recommended height of the top counter used against a work surface designed at 720 mm above the floor is 1130 mm above the floor. This height will allow a typical person to gain sufficient privacy for work whilst being able to look over the top to visitors, standing or sitting. The recommended height to the top counter used against a work surface designed at 900 mm to 1000 mm is between 1200 mm and 1250 mm above the floor level.

Refer to the AusHFG for more requirements.

Checkpoint

The design team is responsible for implementing the High counter principles in its planning and will demonstrate the outcome through:

- this is designed to shield objects, equipment and records from outside view and also provide a convenient writing surface for visitors and staff alike
- a high counter used for direct interaction between staff and visitors or patients is designed to avoid the need for excessive 'reach' across the work surface
- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.2 High-low design

Requirements

Where children or visitors using wheelchairs are expected at the staff station or reception counters, a design incorporating a high section (for staff privacy) as well as a low section is recommended.

Rationale/example

The low section is typically at 720 mm above the floor or a height which matches the staff work surface.

Checkpoint

The design team is responsible for implementing the High-low design principles in its planning and will demonstrate the outcome through:

- high-low design used where children or visitors using wheelchairs are expected at the staff station or reception counters
- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.3 Security barriers

Requirements

In some situations it may be necessary to provide a security barrier at the counter. Refer to the AusHFG for detailed requirements.

Rationale/example

This may be in high quality plastics or one of a variety of security glass. These include laminated glass, toughened glass, laminated and toughened glass and glass with a special security film. In such situations, the barrier will include a vertical or horizontal slot that is sufficient to allow the passage of sound and small objects. A slot of 125 mm is recommended. If a glazed security barrier is provided at a counter used for public interaction, then an intercom system shall be provided to amplify the sound for the hearing impaired.

Checkpoint

The design team is responsible for implementing the Security barriers principles in its planning and will demonstrate the outcome through:

- security barrier provided at the counter where necessary.

- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.4 Workbenches

Requirements

Workbenches may be designed for two typical work practices, sitting position or standing position. Refer to the AusHFG for detailed requirements.

Rationale/example

For example, some nursing staff prefer the workbench in a staff station to be used in the standing position whilst some staff prefer the sitting position. Both options are equally valid and acceptable. However, the ergonomic standards for the two will vary.

Checkpoint

The design team is responsible for implementing the Workbenches principles in its planning and will demonstrate the outcome through:

- workbenches designed for two typical work practices, sitting position or standing position
- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.5 Sitting position

Requirements

A workbench used in the sitting position to be at 720 mm above the floor.

Rationale/example

The typical minimum depth is 600 millimetres. This to be increased to 900 mm for the use of conventional CRT computer monitors or 750 mm for the use of flat panel computer displays.

Checkpoint

The design team is responsible for implementing the Sitting position principles in its planning and will demonstrate the outcome through:

- workbenches used in the sitting position 720 mm above the floor.
- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.6 Standing position

Requirements

It must be established if the bench is to also be used in the sitting position. Refer to the AusHFG for detailed requirements.

Rationale/example

If the bench is almost exclusively used in the standing position with a requirement for occasional typing, then the bench height of 1000 mm above the floor is recommended. If the bench is mostly used in the standing position with the occasional typing in the sitting position, then a bench height of 900 mm is recommended.

The first option (1000 millimetres) is most often requested for staff stations, reporting stations and smaller reception counters. The second option (900 millimetres) is most often used in utility rooms, laboratories, tea benches, kitchens and similar areas. Refer to the AusHFG.

Checkpoint

The design team is responsible for implementing the Sitting position principles in its planning and will demonstrate the outcome through:

- it must be established if the bench is to also be used in the sitting position
- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.7 Foot support

Requirements

Refer to the AusHFG for detailed requirements.

Checkpoint

The design team is responsible for implementing the Foot support principles in its planning and will demonstrate the outcome through:

- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.8 Bench support

Requirements

Many people tend to sit on the edge of the bench from time-to-time. It is important to support the bench with robust materials to avoid the collapse of the bench and danger to users.

Refer to the AusHFG for detailed requirements.

Rationale/example

The support may be gained by using sufficiently thick and sturdy materials such as 32 mm fibre board or thinner materials such as 25 mm fibre board supported by a steel frame. In any event, the maximum thickness of the bench, including any support over the user's knee to be no more than 50 millimetres. Supports to be designed to minimise contact with the user's knees.

Checkpoint

The design team is responsible for implementing the Bench support principles in its planning and will demonstrate the outcome through:

- bench designed to avoid the collapse of the bench and danger to users
- the design shall comply with the requirements outlined in the AusHFG.

5.2.2.9 Adjustable keyboard shelves

Requirements

If a fixed height workstation is selected, adjustable keyboard shelves can provide some flexibility in the provision of height adjustment.

Refer to the AusHFG for detailed requirements.

Rationale/example

The advantages of adjustable keyboard shelves are:

- lower keyboard location results in the hands and fingers being straight or leaning slightly forward. This typing posture is considered ergonomically preferred to hands and fingers leaning upward to reach the keyboard
- lower keyboard can better accommodate shorter staff without changing the height of the entire work surface
- note: ideally the keyboard shelf to be large enough to accommodate the computer mouse.

Checkpoint

The design team is responsible for implementing the *Adjustable keyboard shelves principles* in its planning and will demonstrate the outcome through:

- for fixed height workstation, adjustable keyboard shelves can provide some flexibility in the provision of height adjustment.
- the design shall comply with the requirements outlined in the AusHFG.

5.2.3 Computers

5.2.3.1 Monitor position

Requirements

Within the work surface depth, horizontal location of the monitor adjustable to suit different users

Rationale/example

The vertical position of the monitor depends on the height of the user. The best option is for an adjustable monitor arm, however expensive and are not recommended for all conditions. For most users, a fixed monitor is acceptable. The angle of view to the centre of the monitor to be within a range defined by a horizontal line taken from the user's eye down to 15 degrees depending on the user's preference.

Checkpoint

The design team is responsible for implementing the Monitor position principles in its planning and will demonstrate the outcome through:

- within the work surface depth, horizontal location of the monitor adjustable to suit different users.

5.2.3.2 Laptops

Requirements

This type of computer is acceptable for occasional typing and is recommended for maximum space saving.

Checkpoint

The design team is responsible for implementing the Laptops principles in its planning and will demonstrate the outcome through:

- this type of computer is acceptable for occasional typing and is recommended for maximum space saving.

5.2.3.3 Shelves

Requirements

The design of shelves to consider issues of depth, reach, spacing and strength.

Rationale/example

Shelves described in this section may be in the form of joinery shelf units, strip shelving, upright book cases, metal racks or similar devices. These standards also apply to shelves within a cupboard.

Checkpoint

The design team is responsible for implementing the Shelves principles in its planning and will demonstrate the outcome through:

- design has considered issues of depth, reach, spacing and strength.

5.2.3.4 Depth (Front to Back)

Requirements

The recommended depth for shelves below a work bench is the approximate full width of the bench.

Rationale/example

The recommended average depth for wall mounted shelves is 350 millimetres. This will suit wall cupboards in utility rooms or over workstations. If a door is provided over the shelf unit, then 350 mm will be the total depth.

The recommended depth of shelves for medical records shelving units is 400 millimetres. This depth also allows for metal dividers.

Checkpoint

The design team is responsible for implementing the Depth principles in its planning and will demonstrate the outcome through:

- depth for shelves below a work bench is the approximate full width of the bench.

5.2.3.4.1 Reach and Spacing

Requirements

Refer to the AusHFG for detailed requirements.

Checkpoint

The design team is responsible for implementing the Reach and spacing principles in its planning and will demonstrate the outcome through:

- the design shall comply with the requirements outlined in the AusHFG.

5.2.3.4.2 Strength

Requirements

Shelves must be designed to suit the weight of the objects most likely to be stored upon them.

Rationale/example

It shall be noted that adjustable shelves are not as strong as fixed shelves. Additional strength may be gained by using thicker and stronger material or by providing an edge downturn.

Checkpoint

The design team is responsible for implementing the Strength principles in its planning and will demonstrate the outcome through:

- shelves designed to suit the weight of the objects most likely to be stored upon them.

5.2.3.4.3 Disabled access

Requirements

Shelves designed for use by disabled patients or staff to comply with the requirements of AS 1428, Parts 2 or 3 as appropriate.

Rationale/example

It shall be noted that it is not the mandatory requirement of these guidelines to comply with the ergonomics standards of AS 1428, Parts 2 or 3 for all areas and all users.

Checkpoint

The design team is responsible for implementing the disabled access principles in its planning and will demonstrate the outcome through:

- shelves for use by disabled patients or staff comply with the requirements of AS 1428.2 and AS 1428.3 as appropriate.

Specifications

Ergonomics

Refer:

- Australian Standards
 - HB59 Ergonomics—The human factor, A practical approach to work systems design
 - AS 3590.2 Screen based workstations, Part 2 Workstation furniture
 - AS/NZS 4443 Office panel systems—Workstations
 - AS 1680.2.2 Interior lighting, Part 2.2 Office and screen-based tasks
 - AS 1428 Design for Access and Mobility, Part 2 Enhanced and additional requirements—buildings and facilities
 - Work Safe Publication: Office Wise—A Guide to Health & Safety in the Office.
- AusHFG Part C Section 730.12 under Access and Mobility.

Disabled access

Refer:

- AS 1428 Design for access and mobility, Parts 1, 2, 3 & 4.

Staff station

Refer:

- AS/NZS 1680.2.5 Interior Lighting—Hospital and medical tasks.
- AusHFG Ergonomics.

High counter

The recommended height of the top counter used against a work surface designed at 720mm above the floor is 1130mm above the floor. This height will allow a typical person to gain sufficient privacy for work whilst being able to look over the top to visitors, standing or sitting. The recommended height to the top counter used against a work surface designed at 900mm to 1000mm is between 1200mm and 1250mm above the floor level.

High-low design

The low section is typically at 720mm above the floor or a height which matches the staff work surface.

Sitting position

A workbench used in the sitting position should be at 720mm above the floor. The typical minimum depth is 600mm. This should be increased to 900mm for the use of conventional CRT computer monitors or 750mm for the use of flat panel computer displays.

Specifications continued

Standing position

If the bench is almost exclusively used in the standing position with a requirement for occasional typing, then the bench height of 1000mm above the floor is recommended. If the bench is mostly used in the standing position with the occasional typing in the sitting position, then a bench height of 900mm is recommended.

Foot support

Standing height work benches where high stools are used should be constructed with built-in footrests. The footrest should be located 700mm below the height of the counter, and recessed by about 150mm to prevent striking by shins.

Bench support

The support may be gained by using sufficiently thick and sturdy materials such as 32mm fibre board or thinner materials such as 25mm fibre board supported by a steel frame. In any event, the maximum thickness of the bench including any support over the user's knee should be no more than 50mm. Supports should be designed to minimise contact with the user's knees.

Adjustable keyboard shelves

If a computer with a conventional CRT type monitor is used, the depth of the main work surface containing the CRT should be 900mm. If the CRT is positioned in the corner, the 900mm depth is measured diagonally.

If a computer with a flat panel display is used, the depth of the main work surface containing the display should be 750mm. This option is preferred due to the reduced need for the staff to 'reach' across the work surface.

The depth of the return to the main work surface may be between 450mm and 750mm with 600mm being the optimum recommendation. This will allow for under bench storage, file or drawer units.

The optimum recommended configuration for a workstation includes one work surface of 750mm, one work surface of 600mm with the computer position in the corner.

If a computer is positioned in the corner, then the corner should be angled with a minimum dimension of 400mm.

The workstation should be designed to allow for adequate knee space. The space must be large enough so that the action of turning to use under bench units does not result in hitting the knees against these units.

One end of the workstation may be shaped to form a meeting table. For this purpose rounded edges are recommended.

If visitors are expected to sit across the workstation, then a modesty panel may be considered appropriate.

Workstations should have provision for safe cable management. The simplest system will involve an open tray under the work surface.

Specifications continued

In proprietary workstations, GPOs and data points may be internally run with outlets above the work surface. Alternatively these outlets may be on the adjoining wall at a height of 300 or 550mm above the floor level with access to the work surface via the cable tray and a plastic cable access cap.

Computers

Depth (front to back)

The recommended depth for shelves below a work bench is the approximate full width of the bench. The recommended average depth for wall mounted shelves is 350mm. This will suit wall cupboards in Utility Rooms or over workstations. If a door is provided over the shelf unit, then 350mm will be the total depth.

The recommended depth of shelves for medical records shelving units is 400mm. This depth also allows for metal dividers.

Reach and spacing

A shelf may be installed as low as 150mm above the floor or as high as 1810mm above the floor. Any surface above 1810mm should be regarded as inaccessible without the use of a safe step ladder.

The recommended starting point of wall mounted shelves above a work surface designed at 720mm above the floor is 1370mm above the floor. This brings the underside of the shelf to 1350mm above the floor.

The recommended starting point of wall mounted shelves above a work surface designed at 900mm - 1000mm above the floor is 1520mm above the floor. This brings the underside of the shelf to 1500mm above the floor.

A typical Medical Records storage unit will be a joinery or metal unit 2100mm high with 7 shelves starting from 150mm above the floor and finishing with a top shelf at 1800mm.

The recommended depth for wall shelves used for the storage of linen is 450mm spaced 400mm apart vertically.

Where possible and practical, all shelving should be adjustable. Typically the first and last shelf in a joinery unit will be fixed.

Note: In heavy use areas of hospitals, the conventional metal pins inserted into joinery walls often fail. In such situations, proprietary metal strips are recessed into the joinery walls to hold shelf support pins.

Disabled access

Refer:

- AS 1428 parts 2 or 3 as appropriate
- AS 1428 parts 2 or 3.

5.3 Human engineering

5.3.1 Performance requirements

Requirements

Comply with the relevant legislation, regulations, codes and policies, including:

- NCC
- WHS - occupational health and safety acts and regulations
- *Disability Discrimination Act 1992*
- Queensland anti-discrimination legislation as applicable.

Rationale/example

The NCC requires access to and through a healthcare facility to meet AS 1428.1 unless provision of access is considered to be inappropriate to the particular use. Disability discrimination legislation reinforces this requirement but may reference or advise a preferred compliance with AS 1428.2.

Exclusions are conventional sanitary facilities. Particular requirements for accessible facilities and where people with relevant disabilities are excluded usually for WHS reasons.

Checkpoint

The design team is responsible for implementing the Performance requirements principles in its planning and will demonstrate the outcome through:

- comply with the relevant legislation, regulations, codes and policies.

5.3.2 General

Requirements

The NCC covers some aspects of access for persons with disabilities. The *Disability Discrimination Act 1992* unlike the NCC is a complaint-based instrument. Section 23 covers discrimination in relation to means of access to, and within, premises (Commonwealth of Australia 1992).

Where the NCC or any law and the DDA cover the same issue, the more demanding requirement or broader interpretation will apply in addition to the mandatory requirement (AHRC). Seeking expert advice is advised for interpretation of the DDA in relation to accessibility matters

AS 1428, Design for access and mobility covers various aspects of design for people with disabilities. AS 1428 is often referred to in these guidelines and shall be followed in relevant areas. Human engineering for able bodied persons also requires careful consideration.

As the requirements of occupational health and safety and antidiscrimination legislation will apply, this section needs to be read in conjunction with the section on safety and security in AusHFG in addition to WHS related guidelines.

Note: AS 1428.1 and AS 1428.2 address identical building elements, but nominate different criteria for them. The latter is more inclusive and may be preferred as a basis for design to suit the widest number of people with disabilities. Compliance with AS 1428.2 will also achieve compliance with AS 1428.1.

Rationale/example

The subject of human engineering covers aspects of the design that permit effective, appropriate, safe and dignified use by all people, including those with disabilities. It includes occupational ergonomics which aims to fit the work practices, FFE and work environment

Consideration must be given to the wide range of disabilities including:

- mobility impairment
- visual impairment
- hearing impairment.

Compliance with AS 1428.2 will also achieve compliance with AS 1428.1. The differences apply to:

- width of path of travel
- distance between landings at ramps
- range of handrail heights
- clear width of doorway openings
- circulation space at doorways and sanitary facilities.

To minimise overall costs and to avoid the need for expensive modification of finished work, initial designs shall include specific consideration of the needs of the physically impaired. The majority of requirements can be easily accommodated during the planning stage at little or no additional cost; modifications required at a later time may be prohibitively expensive or impractical.

AS 1428 series - Design for access and mobility covers the issues of access for people with disabilities, and particular attention is given to access ways and circulation. Continuous traffic paths are required for use by people using wheelchairs. Provide facilities for people with ambulatory disabilities and for people with sensory and cognitive disabilities.

The sections of AS 1428 referenced by the NCC are mandatory. AS 1428.2 contains more inclusive provisions and extends to elements beyond the compass of the NCC, including furniture and fittings.

AS 1428.3 is seldom referenced being reserved for facilities designed exclusively for children and adolescents with disabilities.

Consider omitting on-ground tactile indicators in certain situations as these may cause tripping for users with walking frames, sticks or impaired gait and an adverse effect on patients with spinal problems transported by trolley over these raised indicators.

These guidelines require that a minimum number of rooms be sized and designed for use by people with disabilities regardless of the anticipated number of patients with disabilities. These are covered in the relevant sections of the HPU in Part B of AusHFG.

Checkpoint

The design team is responsible for implementing the General Human Engineering principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate that it complies with the principles of human engineering.

5.3.3 Dependent patients

Requirements

AS 1428 series primarily considers access by people with disabilities who are independent. Give consideration to access by people who are physically dependent and who may be assisted by one, two or more people and/or who may be transported on a bed or trolley. These considerations will have significant implications for the slope, clear width and turning circles on ramps, clear width of doors and corridors, size of lifts and vehicle access.

Checkpoint

The design team is responsible for implementing the Dependent patients principles in its planning and will demonstrate the outcome through:

- design gives consideration to access by people who are physically dependent and who may be assisted by one, two or more people and/or who may be transported on a bed or trolley
- these effect slope, clear width and turning circles on ramps, clear width of doors and corridors, size of lifts and vehicle access.

5.3.4 Handrails and grabrails

Requirements

Grabrails and handrails as required by the NCC these also provided for the purposes of patient/visitor safety and assistance in mobility. Locations and layout in patient care and public areas determined by risk analysis. The design, sizing and fixing of grabrails and handrails shall comply with AS 1428.1 and AS 1428.2 as applicable for example withstanding applied forces of 1100 N, clearances.

Rationale/example

Care should be taken to ensure the elimination of hand obstruction, and free ends that may snag clothing, equipment or cause head injuries to children.

Grabrails, handrails, vertical adjustable shower supports, towel rails, soap holders, footrests and any other fixture that may be used for support should have sufficient anchorage and strength to resist the sustained concentrated load of a falling and heavy person.

Consider the design of grabrails in areas, such as emergency departments and mental health units where patients may self-harm, and where aged patients and comorbidity are issues. Only approved anti-ligature fittings should be fitted.

Grab rails, handrails, vertical adjustable shower supports, towel rails, soap holders, footrests and any other fixture which may be used for support, shall have sufficient anchorage and strength to resist the sustained concentrated load of a falling heavy human.

Note: This effectively means that towel rails should be designed in a similar manner and strength to grab rails.

Checkpoint

The design team is responsible for implementing the Handrails and grabrails principles in its planning and will demonstrate the outcome through:

- grabrails and handrails as required by the NCC and for the purposes of patient/visitor safety and assistance in mobility. Locations and layout in patient care and public areas determined by risk analysis
- the design, sizing and fixing of grabrails and handrails complies with AS 1428as applicable. For example withstanding applied forces of 1100 N, clearances and AusHFG.

5.3.5 Fixtures and Fittings

Requirements

Location and arrangement of fittings for handwashing shall permit their proper use and operation.

Checkpoint

The design team is responsible for implementing the Fixtures and fittings principles in its planning and will demonstrate the outcome through:

- location and arrangement of fittings for handwashing permits proper use and operation
- care given to clearances required for elbow action type handles. Non-thermal transmitting standard handles preferred, with effective finger grips
- heights to suit the particular function, such as paediatric, disabled and standard.

5.3.6 Principle

Requirements

Hand-washing facilities shall be securely anchored to withstand an applied vertical load of not less than 115 kilograms on the front of the fixture.

Checkpoint

The design team is responsible for implementing the Principle principles in its planning and will demonstrate the outcome through:

- hand-washing facilities securely anchored to withstand an applied vertical load of not less than 115 kilograms on the front of the fixture.

Specifications

Human engineering—performance requirements

Comply with the relevant legislation, regulations, codes and policies for each jurisdiction, including:

- BCA (including amendments)
- Work Health and Safety Acts and Regulations
- *Disability Discrimination Act 1992*
- State or Territory jurisdiction level anti-discrimination legislation as applicable.

Refer:

- AS 1428.1 and AS 1428.2.

General

Refer:

- AS 1428 Design for Access and Mobility, Parts 1 to 4.
- The sections of AS 1428 (Parts 1 and 4) referenced by the BCA are mandatory. AS 1428.2 contains more inclusive provisions and extends to elements beyond the compass of the BCA including furniture and fittings.

Handrails and grabrails

Refer:

- AS 1428 Parts 1 and 2 as applicable such as withstanding applied forces of 1100 N or clearances.

Handwashing—staff

Hand-washing facilities shall be securely anchored to withstand an applied vertical load of not less than 115 kg on the front of the fixture.

5.4 Signage

Requirements

Appropriate and comprehensive signposting shall be provided for all health facilities.

Checkpoint

The design team is responsible for implementing the Signage principles in its planning and will demonstrate the outcome through:

- appropriate and comprehensive signposting provided
- signposting clearly identifies staff, patient and visitor areas, and draws attention to restricted areas. Refer to the AusHFG for further details.

5.4.1 General

Requirements

Internationally recognised symbols (pictograms) in lieu of room titles are acceptable.

Sizes of letters in relation to reading distances and mounting heights shall comply with the relevant standards.

Braille and tactile signage are recommended for all signs within reach range (refer to AS 1428).

Rationale/example

The preferred lettering style is 'helvetica medium' upper and lower case generally. Upper case only is recommended for the building main entry sign.

Refer also to New South Wales (NSW) Health, Technical Series 2, Signposting for Healthcare Facilities for assistance.

There should be a luminance contrast of 30 per cent minimum between the lettering and the background of all signs.

Checkpoint

The design team is responsible for implementing the General principles in its planning and will demonstrate the outcome through:

- internationally recognised symbols (pictograms) may be used in lieu of room titles
- sizes of letters in relation to reading distances and mounting heights. Comply with the relevant standards. Refer also to NSW Health, Technical Series 2, Signposting for Healthcare Facilities
- braille and tactile signage used for all signs within reach range (refer to AS 1428)
- luminance contrast of 30 per cent minimum between the lettering and the background of all signs.

5.4.2 Bed numbers

Requirements

Bed numbers shall be shown outside the patient bedroom.

Rationale/example

These shall be one number per bed. This is to assist in finding patients, and licensed beds, when appropriate.

In bedrooms with more than one bed, all bed numbers or the range of numbers shall be shown on the sign outside the room for example:

- beds 78 and 79
- beds 78 to 81. Refer to the AusHFG for more detail.

In bedrooms with more than one bed, each bed number shall be displayed at the bed head also.

Bed numbers outside the room must be clearly visible from the corridor and not be obscured by other objects or wall returns.

The provision of a room number is optional. When provided, it shall not visually compete with the bed numbers.

Each bed bay in groups of two or more shall have a number which is clearly visible, even with privacy bed screens closed.

It is no longer recommended to display signs containing information about a patient, such as patient details, doctor identification and special instruction at the patient bed head or in a visible place within the patient bedroom.

This is considered inappropriate due to the requirement for the privacy and confidentiality of patient records. Designers and managers wishing to install patient information holders in the rooms are advised to fully consider the impact on patient privacy.

Checkpoint

The design team is responsible for implementing the bed numbers principles in its planning and will demonstrate the outcome through:

- bed numbers shown outside the patient bedroom. One number per bed
- in bedrooms with more than one bed, all bed numbers or the range of numbers shown on the sign outside the room, for example:
 - beds 78 and 79
 - beds 78 to 81

Refer to the AusHFG for more detailed requirements.

5.4.3 Room signs

Requirements

Non-illuminated, internal and external room-function identification signs on doors require:

- easy replacement of the sign or sign inset
- deliberately omit signs on certain doors used only by staff
- special notes to identify restricted access to certain rooms/departments. Refer to the AusHFG for detailed requirements.

Rationale/example

- Note 1: vinyl-cut signs have proved to be a practical and economical option and capable of easy changing over time. However, removing them can damage some surfaces.
- Note 2: some signs using removable slats can be easily stolen unless a locking cap is used.
- Note 3: door signs in general are not mandatory.
- Egress installed in accordance with relevant statutory codes.

Checkpoint

The design team is responsible for implementing the Room signs principles in its planning and will demonstrate the outcome through:

- non-illuminated, internal and external room-function identification signs located on doors reflect the following considerations:
 - the format used allows easy replacement of the sign or sign inset when room
 - function changes
 - it may be appropriate to deliberately omit signs on certain doors used only by staff
 - special notes may be installed to identify restricted access to certain rooms or departments.

Refer to the AusHFG for more detailed requirements.

5.4.4 Egress signs

Requirements

External directional signs shall have white reflective letters on a blue background.

Rationale/example

The signs shall preferably be of steel or aluminium construction.

Checkpoint

The design team is responsible for implementing the Egress signs principles in its planning and will demonstrate the outcome through:

- external directional signs have white reflective letters on a blue background. The signs are of steel or aluminium construction.

5.4.5 External directional signs

Requirements

External illuminated signs for an emergency unit to have white letters on a red background.

External illuminated signs for the main entry and night entry to have white letters on a blue background.

Rationale/example

Note: emergency department is referred to as emergency unit in these guidelines. The sign, however should refer to emergency.

Checkpoint

The design team is responsible for implementing the External directional signs principles in its planning and will demonstrate the outcome through:

- external illuminated signs for an emergency unit have white letters on a red background
- external illuminated signs for the main entry and night entry have white letters on a blue background.

5.4.6 External illuminated signs

Requirements

Fire services signs to be installed in accordance with the relevant fire services standards (refer *CIR Volume 1 Overview*, section 10.1) and the NCC.

Checkpoint

The design team is responsible for implementing the External illuminated signs principles in its planning and will demonstrate the outcome through compliance with relevant Australian Standards and the NCC.

5.4.7 Fire services signs

Requirements

Refer to the AusHFG for detailed requirements.

Checkpoint

The design team is responsible for implementing the Fire services signs principles in its planning and will demonstrate the outcome through:

- refer to the AusHFG for detailed requirements.

5.4.8 Door numbers

Requirements

Door/frame numbering or tags may be required by the management for easy maintenance.

Rationale/example

Door/frame numbering or tags may be required by the management for easy maintenance. Door numbering is not mandatory. Unlike room signs, door numbering may be small and unobtrusive.

Miscellaneous signs, illuminated and non-illuminated are to be provided as required. These could include illuminated 'X-ray Room in Use' signs. The colours used shall meet the requirements of the relevant code or regulating authority.

Checkpoint

The design team is responsible for implementing the Door numbers principles in its planning and will demonstrate the outcome through:

- management consulted re door/frame numbering or tags for easy maintenance
- miscellaneous signs, illuminated and non-illuminated provided as required
- the colours used meet the requirements of the relevant code or regulating authority.

5.4.9 Miscellaneous signs

Requirements

Note: There are different requirements for:

- road marking
- street signs
- street directional signs
- emergency unit illuminated signs.

Checkpoint

The design team is responsible for implementing the Miscellaneous signs principles in its planning and will demonstrate the outcome through:

- road markings, such as parking bays, arrows, symbols and instructions white generally, blue for disabled and yellow for restricted zones
- street signs in accordance with the requirements of the local council and/or appropriate section of the state roads and traffic authority
- street directional signs enable easy location from the major access road in the area
- the emergency unit, if provided, has illuminated sign clearly visible from the entrance to the hospital site.

Specifications

Signage—general

There should be a luminance contrast of 30 per cent minimum between the lettering and the background of all signs.

Refer:

- AS 1428 Design for Access and Mobility, Part 1 General requirements for access - New Building Work
- AusHFG Part C - Access, Mobility WHS and Security, Section 750 - Signage
- AS 1319 Safety Signs for the Occupational Environment.

Fire services signs

Refer:

- AS 2444 Portable Fire Extinguishers Selection and Location
- Fire Hose Reel Cabinets: According to the BCA
- AS 2419 Part 1 'Fire Hydrant Installations, Systems Design, Installation and Commissioning'.

5.5 Doors

Requirements

Doors shall not swing into corridors in a manner that might obstruct traffic flow or reduce the required corridor width.

Rationale/example

This applies only to doors subject to constant patient or staff usage.

Where doors need to swing out into corridor they shall be set in a recess.

Checkpoint

The design team is responsible for implementing the Doors principles in its planning and will demonstrate the outcome through:

- doors do not swing into corridors in a manner that might obstruct traffic flow or reduce the required corridor width
- where doors need to swing out into corridor they are set in a recess.

5.5.1 Door swing

Requirements

All doors on the path of fire egress shall be single or double swing type and comply with NCC.

Rationale/example

All doors on the path of fire egress shall be single or double swing type.

These shall comply with the requirements of the NCC (Note: if such doors also form part of a fire or smoke compartment, they shall maintain those properties in the closed position).

Sliding doors may be used for exit doors opening directly to the outside if an approved failsafe system is provided to open the door in case of fire.

Checkpoint

The design team is responsible for implementing the Door swing principles in its planning and will demonstrate the outcome through:

- all doors on the path of fire egress single or double swing type and comply with the requirements of the NCC (Note: where doors also form part of a fire or smoke compartment, they maintain those properties in the closed position)
- sliding doors used for exit doors opening directly to the outside have approved failsafe system provided to open the door in case of fire.

5.5.2 Doors used by patients

Requirements

Doors to rooms that are likely to be used by patients without staff assistance shall be single or double swing type.

Rationale/example

Swing doors shall generally open from corridors and distribution spaces into rooms. The exceptions are as follows:

- doors to small patient ensuites shall generally open out
- doors to disabled toilets and showers shall open out
- doors to small change cubicles shall open out
- doors subject to the requirements of 'emergency access' shall open out
- or open in both directions.

Clear door openings between two sections of a corridor or from one corridor to another shall be as specified by the NCC for doors in the path of fire egress. In effect, for the purpose of these Guidelines all corridors are on the path of egress.

Checkpoint

The design team is responsible for implementing the Doors used by patients principles in its planning and will demonstrate the outcome through:

- doors to rooms that are likely to be used by patients without staff assistance are single or double swing type
- clear door openings between two sections of a corridor or from one corridor to another as specified by the NCC for doors in the path of fire egress.

5.5.3 Door width

Requirements

The minimum dimensions of clear door openings to patient bedrooms in new areas shall be 1400 mm wide and 2030 mm high.

Rationale/example

The design must ensure clearance for the movement of beds. Existing doors of lesser dimensions may be considered acceptable where function is not adversely affected and replacement is impractical. For further information see AusHFG.

In general, clear door openings to rooms that may be accessed by stretchers, wheeled bed stretchers, wheelchairs or handicapped persons, shall be a minimum of 900 millimetres. For situations such as hoists and shower trolleys 1000 mm is recommended.

While these standards are intended to facilitate access by personnel and mobile equipment, consideration must be given to the size of furniture and special equipment that is to be delivered via these access ways.

Certain rooms that are used by patients shall be equipped with doors and hardware that will permit emergency access from the outside. These rooms can be defined broadly as follows:

- rooms that are used independently by patients, have only one door
- are smaller than 6 sq.m
- rooms where there is less than 2.5 m of clear space behind the single door
- emergency access

- patient bedrooms, bathrooms and ensuites in mental health facilities
- mental health components of other health facilities
- secure rooms in mental health facilities.

When such rooms have only one opening the door shall be capable of opening outwards or in a manner that will negate the need to push against a patient who may have collapsed within the room. In other words, if the door normally opens inwards, in case of emergency, the staff must be able to open the door outwards without any need to use a key, Allen key or special device.

These guidelines recommend the use of retractable door stops within flat metal door frames together with coin operated door snibs. The snib can be opened with a coin while the door can be opened outward by simply pushing the door stop into the frame.

Important note: This requirement cannot be satisfied by any of the following alternatives:

- cavity sliding doors
- sliding doors on the inside of the room.

In all areas except mental health secure rooms, surface sliding doors installed on the outside of the room may satisfy the requirements of this clause. This can be achieved if:

- the door can be easily and safely removed off the track
- door removal is not prevented by the door locking mechanism.

Not with-standing the above possibility, manual sliding doors are not recommended by these guidelines for any area of the facility.

In mental health secure rooms, the following configuration is mandatory:

- one standard door, opening in
- one adjacent door minimum 450 mm wide, opening out
- both doors with external locks and fully recessed internal handles.

Checkpoint

The design team is responsible for implementing the Door width principles in its planning and will demonstrate the outcome through:

- the minimum dimensions of clear door openings to patient bedrooms in new areas to be 1400 mm wide and 2030 mm high
- existing doors of lesser dimensions considered acceptable where function is not adversely affected and replacement is impractical.

Refer to the AusHFG for requirements.

5.5.4 Door handles general

Requirements

In areas where staff frequently pass doors, consideration shall be given to the shape of the door handle so that it is not caught by the pockets in overalls. Handles with a full return are recommended.

Checkpoint

The design team is responsible for implementing the Door handles general principles in its planning and will demonstrate the outcome through:

- in areas where staff frequently pass doors, handles with a full return are used.

5.5.4.1 Mental Health

Requirements

Door handles in a mental health unit shall prevent self-harm by not providing a supporting point.

Rationale/example

This can usually be achieved by using recessed, concealed or flush hardware. Alternatively, specially formed knobs are available which do not allow 'hanging'.

Checkpoint

The design team is responsible for implementing the Mental health principles in its planning and will demonstrate the outcome through:

- door handles are recessed, concealed or flush. Alternatively, specially formed knobs are used which do not allow 'hanging'.

5.5.4.2 Shared ensuites

Requirements

Ensuites that are shared by two patients shall incorporate hardware to automatically lock one door and indicate 'room occupied' if the other door is operated. Both doors shall be unlocked once one of the doors is opened from inside.

Checkpoint

The design team is responsible for implementing the Shared ensuite principles in its planning and will demonstrate the outcome through:

- ensuites shared by two patients incorporate hardware to automatically lock one door and indicate 'room occupied' if the other door is operated. Both doors unlocked once one of the doors is opened from inside.

5.5.4.3 Paediatric rooms

Requirements

In paediatric rooms consideration shall be given to providing two sets of door handles one at high level and one at low level.

Checkpoint

The design team is responsible for implementing the Paediatric rooms principles in its planning and will demonstrate the outcome through:

- in paediatric rooms two sets of door handles, one at high level and one at low level, provided.

5.5.4.4 Door handles**Requirements**

Designers and specifiers to consider flexible hardware systems where the functionality of the door may be changed without necessarily changing the hardware.

Rationale/example

Door handles may incorporate locks, snibs, push buttons and indicators. The type of locking function shall be appropriate for the use of the room. In any event, the locking device shall prevent a person being inadvertently locked in a room, and shall be openable from inside with a single action.

Checkpoint

The design team is responsible for implementing the Door handles principles in its planning and will demonstrate the outcome through:

- door handles may incorporate locks, snibs, push buttons and indicators
- consider flexible hardware systems used where the functionality of the door may be changed without necessarily changing the hardware
- the type of locking function appropriate for the use of the room
- locking device to prevent a person being inadvertently locked in a room, and openable from inside with a single action.

5.5.4.5 Push/pull/plates**Requirements**

Push/pull plates are recommended in rooms that are used frequently by staff holding objects in their hands for example dirty utility rooms.

Checkpoint

The design team is responsible for implementing the Push/pull/plates principles in its planning and will demonstrate the outcome through:

- push/pull plates on doors used frequently by staff holding objects in their hands.

5.5.5 Door grilles and undercuts**Requirements**

Door hold-open devices to be considered for doors that should remain open, such as doors on main traffic routes and delivery doors.

Rationale/example

Door hold-open devices to be considered for doors that shall remain open, such as doors on main traffic routes and delivery doors.

The following requirements shall apply:

- hold open devices shall be capable of activation and de-activation without any need for the staff to bend down
- hold open devices shall not be fitted to doors where this compromises fire doors, smoke doors or other doors that are required to achieve a specific air pressurisation or isolation scheme by these guidelines
- hold open devices shall not be fitted to the side of a door which may permit
- a disturbed patient to lock the door from inside.

In areas frequently used by staff holding objects or pushing trolleys, the use of delayed action combined self-closer/hold open device is recommended.

Checkpoint

The design team is responsible for implementing the *Door grills and undercuts principles* in its planning and will demonstrate the outcome through:

- door hold-open devices considered for doors that must remain open, such as doors on main traffic routes and delivery doors
- in areas frequently used by staff holding objects or pushing trolleys, delayed action combined self-closer/hold open devices considered.

5.5.6 Hold Open Device

Requirements

Self-closers are required for fire and smoke doors nominated in the NCC and shall comply with its requirements.

Rationale/example

Self-closers shall be designed and installed to allow for the door opening a full 90 degrees. The nib space required for the self-closer arm shall be considered.

Self-closers used in double doors shall be accompanied by suitable sequencer hardware to allow the doors to be closed in the right sequence.

Self-closers that duplicate the functionality of a hold open device may also be considered.

Self-closers shall be provided for the following doors:

- doors required to achieve a certain airflow or air pressurisation scheme
- required by these guidelines
- all air locks, with or without an air pressurisation scheme.

Entrance doors to any area nominated as a restricted area by these guidelines, including:

- operating unit

- CSSU
- catering unit
- sterile stock room
- isolation rooms
- birthing rooms
- dirty utility rooms.

Apart from the above doors, self-closers are not required or encouraged.

Indeed an over-provision of self-closers can lead to unnecessary capital and maintenance costs.

Self-closers to the following rooms are discouraged:

- offices
- patient rooms
- bathrooms and ensuites
- rooms used independently by people with disabilities
- meeting rooms and interview rooms
- refer to the AusHFG for further details.

Checkpoint

The design team is responsible for implementing the Hold open device principles in its planning and will demonstrate the outcome through:

- self-closers used for fire and smoke doors nominated in the NCC and comply with its requirements
- self-closers provided for the following doors:
 - doors required to achieve a certain airflow or air pressurisation scheme
 - required by these guidelines
 - all air locks, with or without an air pressurisation scheme
 - entrance doors to any area nominated as a restricted area by these guidelines.
 - apart from the above doors, self-closers not required
 - self-closers to the following rooms are discouraged:
 - offices
 - patient rooms
 - bathrooms and ensuites
 - rooms used independently by people with disabilities
 - meeting rooms and interview rooms.

5.5.7 Glazed panels

Requirements

Glazed panels to be installed in accordance with AS 1288, Glass in buildings selection and installation, shall be provided in doors where visual observation for reasons of safety, security or patient observation is required.

Rationale/example

However, in fire doors the size must comply with AS 1905.1, Components for the protection of openings in fire resistant walls, Part 1, Fire resistant door sets.

Checkpoint

The design team is responsible for implementing the Glazed panels principles in its planning and will demonstrate the outcome through:

- glazed panel shall be in accordance with AS 1288, Glass in buildings—selection and installation, in doors where visual observation for reasons of safety, security or patient observation required.

5.5.7.1 Observation glass

Requirements

Observation glass is to be determined in discussion with client.

Refer to the AusHFG for more requirements.

Rationale/example

Observation glass recommended in:

- entry/exit doors to operating rooms or procedure rooms
- doors from scrub room to operating room
- doors to air-locks
- doors to clean and dirty utility
- work rooms frequently used by staff
- doors to rooms used to interview mental health or disturbed patients
- doors to rooms requiring an observation window but with no physical
- possibility of providing a window
- doors to kitchens and pantries.

Observation glass is not recommended in the following areas:

- doors to patient bedrooms generally
- doors to rooms requiring acoustic isolation[#]
- doors to mental health secure rooms
- doors to rooms resulting in an invasion of patient or staff privacy.

[#] glazing to rooms requiring acoustic isolation can be provided, however glazing needs to be selected to ensure the door does not significantly degrade due to viewing pane (glass type and area of extent).

Observation glass shall have a mechanism, device or material to protect the glass in the following areas:

- operating rooms and procedure rooms where laser may be in use
- rooms requiring X-ray or other radiation shielding
- rooms requiring electromagnetic shielding (such as a faraday cage).

Observation glass may be semi-frosted in areas where a clear vision of the room is not required. This type of glass or applied film may suit rooms where the primary concern is to avoid danger to staff passing through the door. Semi frosted glass is usually adequate to enable staff to avoid the danger. Semi-frosted glass is recommended in doors to the following rooms:

- clean utility
- dirty utility.

Beam activated automatic sliding or swing doors are considered highly desirable in high traffic areas such as main entrances and delivery points.

They may also be used successfully in areas where 'hands-off' access is necessary, such as entries to an operating unit. Where installed, they are to satisfy the requirements of emergency egress and to close at a rate that provides sufficient time for disabled and frail patients and visitors to enter/exit.

Checkpoint

The design team is responsible for implementing the Observation glass principles in its planning and will demonstrate the outcome through:

- observation glass shall be provided in the recommended areas
- no observation glass shall be provided in the not recommended areas
- observation glass shall have a mechanism, device or material to protect the glass in the specified areas
- observation glass may be semi-frosted in areas where a clear vision of the room is not required
- beam activated automatic sliding or swing doors in:
 - high traffic areas, such as main entrances and delivery points
 - where 'hands-off' access is necessary.

5.5.8 Automatic and sliding doors

Requirements

Sliding doors may be used subject to compliance with the NCC.

Cavity sliders may not be used in the following areas:

- planning units containing patient care areas or treatment areas
- planning units containing sterile equipment
- planning units containing patient diagnostic equipment
- catering facilities
- laboratory areas

- mental health facilities.

Surface sliding doors may be used subject to the requirements of 'emergency access'.

Rationale/example

Generally, these guidelines do not recommend the use of sliding doors in health facilities due to a number of reasons, including hygiene concerns, maintenance problems and potential for locking in place.

Sliding doors, if used to be of solid core or metal frame type to resist warping and therefore locking. Sliding doors to have tracks on top and bottom to ensure safety of operation.

Checkpoint

The design team is responsible for implementing the Automatic and sliding doors principles in its planning and will demonstrate the outcome through:

- sliding doors shall comply with the NCC and the following mandatory requirements:
 - cavity sliders may not be used in the following areas:
 - planning units containing patient care areas or treatment areas
 - planning units containing sterile equipment
 - planning units containing patient diagnostic equipment
 - catering facilities
 - laboratory areas
 - mental health facilities
 - surface sliding doors used subject to the requirements of 'emergency access'.

5.5.9 Insect control

Requirements

External doors that open directly into food preparation areas and are used for service deliveries or regular access, shall be fitted with air curtains, flexible doors or an equal control system to restrict the ingress of insects. Flyscreen doors, which can be propped open, and electronic insect traps within the kitchen, are not suitable as the only means of insect control.

Checkpoint

The design team is responsible for implementing the Insect control principles in its planning and will demonstrate the outcome through:

- external doors that open directly into food preparation areas and are used for service deliveries or regular access, are fitted with air curtains, flexible doors or an equal control system to restrict the ingress of insects
- flyscreen doors which can be propped open, and electronic insect traps within the kitchen, are not suitable as the only means of insect control.

Specifications

Doors

Door width

The minimum dimensions of clear door openings to Patient Bedrooms in new areas shall be 1400mm wide and 2030mm high.

Glazed panels

Refer:

- AS 1288 Glass in Buildings
- AS 1905.1 Components for the Protection of openings in Fire Resistant Walls, Part 1 - Fire Resistant Door Sets.

5.6 Grab rails and handrails

Requirements

- Grab rails shall be detailed as described in AS 1428.1, Design for access and mobility.
- Refer to the AusHFG for detailed requirements.
- Balustrade minimum heights as per NCC.

Checkpoint

The design team is responsible for implementing the *Grab rails and handrails principles* in its planning and will demonstrate the outcome through:

- grab rails detailed as described in AS 1428.1, Design for access and mobility.
- refer to the AusHFG for detailed requirements.
- balustrade minimum heights as per NCC.

5.6.1 Continuity

Requirements

In corridors accessed by patients, a grab rail to one side is mandatory.

Rationale/example

Depending on the plan the following will apply:

- the handrail shall be on the side of the wall leading to the majority of
- rooms or areas related to patients
- if the continuity of the grab rail is interrupted due to a large number of doors placed in close proximity, a grab rail shall be provided to the opposite wall, at least for the length of corridor affected.

Checkpoint

The design team is responsible for implementing the *Continuity principles* in its planning and will demonstrate the outcome through:

- in corridors accessed by patients, a grab rail to one side is mandatory
 - depending on the design, the following applies:
- the handrail is on the side of the wall leading to the majority of rooms or areas related to patients
 - where the continuity of the grab rail is interrupted due to a large number of doors placed in close proximity, a grab rail is provided to the opposite wall, at least for the length of corridor affected.

5.6.2 Prevention of self-harm

Requirements

In certain areas, such as mental health units, grab rails may present the possibility of self-harm by providing points of ligature. Refer to AS 1428.

Rationale/example

Depending on the operational policy, corridor handrails in mental health units shall be designed in such a way that the space between the base of the handrail profile and the wall is blocked. The top of the handrail shall be designed to meet the requirements of AS 1428. This arrangement does not totally eliminate the ligature point, but it makes it impossible to tie an object around the rail.

Checkpoint

The design team is responsible for implementing the Prevention of self-harm principles in its planning and will demonstrate the outcome through:

- in areas where self-harm is an issue, such as mental health units, grab rails designed in accordance with AS 1428.

5.6.3 Outside corners

Requirements

Handrails meeting outside wall corners should be either continuous around the corner or set back from the corners by approximately 100 mm.

Rationale/example

The aim is to minimise the chance of the rail grabbing onto clothing, especially large pockets. Any handrails continuing around 90-degree corners shall be rounded to avoid a dangerous sharp edge.

Checkpoint

The design team is responsible for implementing the Outside corners principles in its planning and will demonstrate the outcome through:

- handrails meeting outside wall corners either continuous around the corner or set back from the corners by approximately 100 mm.

Specifications

Grab Rails and Handrails

Refer:

- AS 1428.1 Design for Access and Mobility.

Prevention of self-harm

Refer:

- AS 1428.

Outside corners

Handrails meeting outside wall corners should be either continuous around the corner or set back from the corners by approximately 100mm.

5.7 Windows and glazing

Requirements

All rooms occupied by patients or staff on a regular basis shall have glazed windows or doors to achieve external views and/or make use of direct or borrowed natural light, where practical.

Checkpoint

The design team is responsible for implementing the Windows and glazing principles in its planning and will demonstrate the outcome through:

- all rooms occupied by patients or staff on a regular basis have glazed windows or doors to achieve external views and/or make use of direct or borrowed natural light, if practical.

5.7.1 General

Requirements

All patient bedrooms shall have external windows overlooking external areas.

Rationale/example

An external area is defined as the perimeter space around a building as well as naturally ventilated and lit atriums and courtyards.

In multi-level facilities with ducted air-conditioning systems, or in buildings in cyclone prone areas, it is not always possible to include an openable window component. In these circumstances, fixed windows are acceptable, although access for external window cleaning shall be considered.

It is also a requirement of the NCC that all overnight patient bedrooms must have an external window. This however does not apply to the operating unit, emergency unit, ICU and similar areas.

For the purpose of this clause, an internal atrium with artificial ventilation will be accepted if the area is more than 220 sq.m with a minimum dimension of 14 m and suitable permanent landscaping.

Checkpoint

The design team is responsible for implementing the General principles in its planning and will demonstrate the outcome through:

- all patient bedrooms have external windows overlooking external areas
- an external area includes the perimeter space around a building as well as naturally ventilated and lit atriums and courtyards
- BAC compliance mandatory.

5.7.2 Window types

Requirements

Operable windows shall have provision to restrict the degree of opening.

Each required external window and/or external glazed door shall have a net glazed area of not less than 10 per cent of the floor area of the room concerned. An opening component not less than five per cent of the floor area of that same room is considered highly desirable but not mandatory. These requirements together will ensure natural light and ventilation in the event of an electrical or air handling system failure.

Rationale/example

Locks shall be heavy duty, affixed to both sides of hopper windows and fixed securely through the frame with tamper proof fixings.

Hopper windows shall not be used in multi-storey buildings because they can act as smoke/heat scoops from fires in storeys below.

Hopper windows are also known as 'awning' windows. These refer to windows hinged from the top.

If it is often considered undesirable to allow patients to open windows, for reasons, such as avoiding potential problems with the central air-conditioning, then the opening section of the windows shall be operated with a lock or allen key held by the staff.

Any opening section of the window or door as described above shall be provided with a fly screen.

The provision of opening windows also facilitates energy management and conservation as artificial lighting and air-conditioning systems may not be necessary at certain times of the day and year.

Checkpoint

The design team is responsible for implementing the Window types principles in its planning and will demonstrate the outcome through:

- operable windows have provision to restrict the degree of opening
- each required external window and/or external glazed door has a net glazed area of not less than 10 per cent of the floor area of the room concerned
- an opening component not less than five per cent of the floor area of that same room is considered highly desirable but not mandatory.

5.7.3 Cleaning

Requirements

Window cleaning shall be considered and appropriate provisions made.

Rationale/example

The following options are provided for information:

- inward opening windows allow for the cleaning of the outside surface in a safe manner while standing inside the building
- with alternate outside opening windows it is possible to open one window to reach and clean the next window, however this type of window will require secure harness anchor points for the cleaner
- a window cleaning ledge or balcony may be provided only for window cleaning with no patient access. If no handrail is provided, a continuous harness system shall be provided with a harness cable or rail that must reach a safe access point
- a window cleaning cradle that typically descends from the roof may be used. Cradles must be accessible from a safe position on the roof and comply with all safety legislation.
- extension arms may be used to clean windows that are one level above the ground or accessible terrace
- facility management may enter into a window cleaning contract with a contractor who uses a mobile cherry pickers or similar lifting device
- note: for safety reasons cleaning windows using a ladder is not recommended.

Checkpoint

The design team is responsible for implementing the Cleaning principles in its planning and will demonstrate the outcome through:

- window cleaning to be considered and appropriate provisions made.

5.7.4 Size

Requirements

Glazing shall be in accordance with AS 1288 as applicable to public buildings except that:

- all glazing in balustrades shall comply with Part 1, Section 4.3.9 of the above standard, irrespective of the area or support of the glazing
- fully framed glazing to windows, doors partitions and screens, designed so that any part of the glass is less than 750 mm above the finished floor level, shall have such part glazed with safety glazing materials as defined under Clause 1.3.3 and in accordance with the size requirements of table 4.1 of the above standard.

Checkpoint

The design team is responsible for implementing the Size principles in its planning and will demonstrate the outcome through:

- glazing in accordance with AS 1288 as applicable to public buildings except that:
- all glazing in balustrades comply with Part 1, Section 4.3.9 of the above standard, irrespective of the area or support of the glazing
- fully framed glazing to windows, doors partitions and screens, designed so that any part of the glass is less than 750 mm above the finished floor level, has such part glazed with safety glazing materials as defined under Clause 1.3.3 and in accordance with the size requirements of Table 4.1 of the above standard.

5.7.5 Glazing

Requirements

Doors, sidelights, borrowed lights and windows in which the glazing extends to within or below 450 mm above the floor, and are subject to possible breakage, shall be glazed with safety glass that will not create dangerous cutting edges when broken. Refer to AS 2208, Safety glazing materials for use in buildings (human impact considerations).

Safety glass shall also be used for wall openings in activity areas, such as recreation and exercise rooms and for shower screens, internal doors and full height windows, including those in paediatric and psychiatric areas.

Checkpoint

The design team is responsible for implementing the Glazing principles in its planning and will demonstrate the outcome through:

- doors, sidelights, borrowed lights and windows in which the glazing extends to within or below 450 mm above the floor, and subject to possible breakage, glazed with safety glass Refer to AS 2208, Safety glazing materials for use in buildings (human impact considerations)
- safety glass used for wall openings in activity areas, such as recreation and exercise rooms and shower screens, internal doors and full height windows, including those in paediatric and psychiatric areas.

Specifications

Windows and glazing—general

For the purpose of this clause, an internal atrium with artificial ventilation will be accepted if the area is more than 220 m² with a minimum dimension of 14m and suitable permanent landscaping.

Size

Refer:

- AS 1288 as applicable to public buildings except that:
 - all glazing in balustrades shall comply with Part 1 Section 4.3.9 of the above standard, irrespective of the area or support of the glazing
 - fully framed glazing to windows, doors partitions and screens, designed so that any part of the glass is less than 750mm above the finished floor level, shall have such part glazed with safety glazing materials as defined under Clause 1.3.3 and in accordance with the size requirements of table 4.1 of the above standard.

Glazing

Doors, sidelights, borrowed lights and windows in which the glazing extends to within or below 450mm above the floor, and are subject to possible breakage, shall be glazed with safety glass that will not create dangerous cutting edges when broken.

Refer:

- AS 2208 Safety Glazing Materials for Use in Buildings (Human Impact Considerations).

5.8 Floors

5.8.1 Floor finishes

Requirements

The selection of floor finishes has direct impact on the safety of patients, staff and visitors. The choice also has potential legal implications (Workers Compensation and Tort Law) if not correctly addressed. Fire safety compliance is also a special consideration. A 'duty of care' exists where professionals, such as architects and interior designers are involved in the selection of products and responsibility must be addressed by purchasing officers and retailers/agents when purchasing replacement products.

Rationale/example

Floor finishes also have a direct impact on the WOL costs of any building where cleaning and maintenance is concerned. This is especially true in a hospital. Low capital cost may result in high WOL costs.

Checkpoint

The design team is responsible for implementing the Floor finishes principles in its planning and will demonstrate the outcome through:

- the design has considered the selection of floor finishes as these have an impact on the safety of patients, staff and visitors and also has potential legal implications, such as Workers Compensation and Tort Law
- fire safety compliance also considered in light of 'duty of care' obligations
- WOL implications of floor finishes have been considered.

5.8.1.1 Balance of considerations

Requirements

A number of issues shall be considered and balanced when making the choice of floor finish. Designers are encouraged to investigate alternative materials and if necessary organise for realistic onsite tests before making major decisions.

Checkpoint

The design team is responsible for implementing the Balance of considerations principles in its planning and will demonstrate the outcome through:

- designers have investigated alternative materials and where necessary organised for realistic onsite tests before making major decisions.

5.8.1.2 Movement of Objects

Requirements

The floor finishes chosen shall make the movement of such objects as trolleys, bed trolleys and wheelchairs sufficiently easy to minimise the potential for back injury to staff.

Rationale/example

The following shall be considered when selecting floor finishes:

- standard vinyl and similar products are easiest materials for movement of trolleys and wheelchairs
- carpet, if used to be direct stick, commercial density with short piles, preferably loop piles; a 90/10 or 80/20 wool/nylon mix is recommended
- flocked carpet should be considered where the 'look and feel' of carpet is desired with the ease of movement over vinyl
- many hospital staff consider that it is harder to move objects over cushioned vinyl. However, cushioned vinyl may still be preferred to standard vinyl for its sound absorption qualities.

Checkpoint

The design team is responsible for implementing the Movement of objects principles in its planning and will demonstrate the outcome through:

- the floor finishes chosen make the movement of such objects as trolleys, bed trolleys and wheelchairs sufficiently easy to minimise the potential for back injury to staff.

5.8.1.3 Noise generation and sound absorption

Requirements

The design shall consider the noise generation and absorption properties when selecting a floor material in relation to the area and the patient and staff functions that occur in that area:

- carpet
- cushioned vinyl
- ceramic/ terrazzo and similar.

Rationale/example

- Carpet type finishes not only minimise noise generation, they also dampen the noise generated by other sources. Carpet is particularly effective in corridor areas outside patient bedrooms where a great deal of noise can be generated. This quality shall be balanced against the ease of movement by trolleys, bed trolleys and wheelchairs.
- Cushioned vinyl is also effective in minimising noise generation but it does not dampen other noises as effectively as carpet.
- Ceramic tiles, Terrazzo and similar hard surfaces generate noise from walking staff and visitors.

Checkpoint

The design team is responsible for implementing the Noise generation and sound absorption principles in its planning and will demonstrate the outcome through:

- the design shall demonstrate it has considered the noise generation and absorption properties when selecting a floor material in relation to the area and the patient and staff functions that occur in that area.

5.8.1.4 Easy on the foot

Requirements

Consider the occupational health and safety implications of carpet, vinyl, (both standard and cushioned), ceramic/Terrazzo as well as cleaning, maintenance, life, slip resistance of different flooring.

Rationale/example

Surfaces, such as carpet and vinyl, both standard and cushioned are considered easy to stand on for long periods of time. Most OH&S experts consider surfaces, such as ceramic tiles and Terrazzo too hard to stand on for more than a few hours. These are, therefore not recommended in hospital work areas. However, they may be used in public areas such as foyers and courtyards.

Floor materials shall be easy to clean and have wear resistance appropriate for the location involved.

Floor finishes that are subject to traffic whilst wet, such as showers and bathrooms, kitchens and similar work areas, shall be capable of maintaining a nonslip surface. Note: the same applies to dry floors subject to the presence of fine powder such as baby powder.

A distinction must be made between antistatic and conductive flooring.

Antistatic flooring reduces the risk of static occurring while conductive flooring absorbs the electrical charge. However, if rubber soled shoes are worn on conductive flooring the effect is negated.

Checkpoint

The design team is responsible for implementing the Easy on the foot principles in its planning and will demonstrate the outcome through:

- The occupational health and safety implications of carpet, vinyl, (both standard and cushioned), ceramic/Terrazzo as well as cleaning, maintenance, life, slip resistance of different flooring have been considered.

5.8.1.5 Anti-static/conductive flooring**Requirements**

Anti-static or conductive flooring are not mandatory in any part of the facility. Any special requirement may be noted specifically on the project brief.

Rationale/example

In the past, anti-static flooring was required in operating rooms because of the use of flammable anaesthetic agents. These types of anaesthetics are no longer in use, so the requirement for this type of specialised flooring no longer applies.

Anti-static flooring is expensive, both to install and maintain. Most public and staff areas do not pose a problem with respect to generation of an electrical charge. Where there is any possibility of such an event, for example a computer technician working inside a computer or a worker in a specialized micro-electronics laboratory, use is made of anti-static mats which more than adequately provide the necessary barrier.

If there are areas and rooms in which flammable anaesthetic agents are stored or administered to patients, floors shall comply with AS ISO 60079 requirements regarding hazardous areas.

Conductive flooring may be omitted in anaesthetizing areas where flammable anaesthetic agents will not be used and appropriate notices are permanently and conspicuously affixed to the wall in such areas and rooms. Otherwise, appropriate conductive flooring shall be provided.

Checkpoint

The design team is responsible for implementing the Anti-static conductive flooring principles in its planning and will demonstrate the outcome through:

- anti-static or conductive flooring is not used in any part of the facility. Any special requirement may be noted specifically on the project brief.

5.8.1.6 Slip resistance

Requirements

Slip resistance is governed by the nature of the anticipated activity. In equating safety, consideration must be given to all the relevant variables, slip potential is a function of footwear, activities, gait, contamination, environment and other factors.

The choice of floor finish shall consider the slip resistance appropriate for different conditions. See AS 4586—Slip Resistance.

Rationale/example

The following can be used as a guide:

- standard vinyl is suitable for dry areas where patients and staff are expected to wear shoes (standard/dry)
- standard textured Vinyl is similar to standard vinyl but provides greater dry condition slip resistance (standard/slip resistant)
- studded vinyl flooring balances slip resistance with ease of cleaning, and is suitable for wet areas, such as patient showers where water, soap and body fat are present (non-slip)
- safety vinyl flooring that suits wet areas without soap or body fat where trolley movement is also expected, such as CSSU decontamination areas and dirty utilities (extra non-slip)
- ceramic tiles can be used for ensuite and bathrooms, but not clinical areas requiring seamless finishes. Smaller ceramic tiles generally provided greater slip resistance. The best combination of slip resistance and easy cleaning is commonly referred to as 'orange peel'.

Design considerations include:

- floor finishes and floor finish characteristics (wear resistance and clean ability)
- the amount and type of expected traffic (vehicles, trolleys people hurrying, elderly, disabled people with or without walking aids and children)
- consequences of exposure to contaminants including environmental design factors (visibility issues and contamination minimisation)
- management policy and maintenance practiced (frequency, type and effectiveness of cleaning equipment)
- compliance with occupational health and safety requirements
- special provision for slip hazards (guards and rails)
- alternative information sources (use of contrasting colours, tactile indicators and warning signs).

Stone and terrazzo are sometimes used in entrance foyer areas, however, on rainy days these finishes may present a danger to staff and visitors and in such circumstances proprietary non-slip chemical treatments shall be used to increase slip resistance.

The slip resistance levels as defined by the HB197, an introductory guide to the slip resistance of pedestrian surface materials, are mandatory: rooms/areas resistance level wet pendulum test.

Refer to the Department of Human Services, Victoria design guidelines for hospitals and day procedure centres, Part C.

Note: Refer to AS/NZS 4586—Wet pendulum test and ramp test classifications.

Checkpoint

The design team is responsible for implementing the Slip resistance principles in its planning and will demonstrate the outcome through:

- slip resistance is governed by the nature of the anticipated activity. In equating safety, consideration must be given to all the relevant variables; slip potential is a function of footwear, activities, gait, contamination, environment and other factors
- the choice of floor finish shall consider the slip resistance appropriate for different conditions. See AS 4586—Slip Resistance.

Specifications

Floors—floor finishes

Anti-static/conductive flooring

Refer:

- AS 1169 Minimising of combustion hazards arising from the medical use of flammable anaesthetic agents.

Slip resistance

Refer:

- AS 4586 Slip Resistance
- AS/NZS 4586 for details of the Wet Pendulum Test and Ramp.

5.9 Acoustics

Requirements

The design and construction shall address acoustic aspects of the work environment. The major design issues to be considered include:

- The engineering services and the building components shall be selected to achieve an acceptable noise level. Unless other requirements are stated in other parts of these guidelines, the ambient sound levels shall not exceed those stated in AS/NZS 2107, and noise emission from services and plant shall be designed to meet relevant local authority or State authority requirements as appropriate. For laboratories refer to AS/NZS 2243 Safety in laboratories Part 5: Non-ionizing radiations—Electromagnetic, sound and ultrasound for additional guidance.
- The building envelope shall be designed to consider noise ingress from external noise such as road traffic, rail traffic and aircraft movements as appropriate for the site. Steady state noise from road traffic is to be designed to satisfy AS/NZS2107. Noise from aircraft movements (excluding aerial ambulances) is to be designed to satisfy requirements of AS2021. Noise from aerial ambulances is to be designed to satisfy criteria provided under AAAC Healthcare Facilities Guideline. Noise impacts from emergency vehicles should also be reviewed.

- Acoustic finishes for reverberation control shall be applied for compliance with AS/NZS 2107 or the AAAC Healthcare Facilities Guideline. Where compliance is not practical justification shall be provided.
- The sound insulation of partitions shall be specified based on guidance for acoustic separation for healthcare facilities. Application of the AAAC Healthcare Facilities Guideline is recommended as this provides a number of options for determining the required acoustic separation. Consideration shall also be made to impact isolation from footfall as well building services and plant.
- Services penetrations are to be treated to maintain the sound insulation of the base partition. This should include consideration of flanking via mechanical ductwork and services penetrations.
- Plant and services to be installed with vibration isolation as appropriate to control felt vibration within occupied areas and ensure that vibration impacts on sensitive equipment and instrumentation is managed.
- Lift shafts and lift motor rooms to must be treated to control noise transfer to adjacent noise sensitive spaces.
- Noise emission from proposed development including plant and equipment should be assessed against relevant local or state authority requirement as appropriate. The assessment shall consider the times at which activities occur or plant operates to ensure the appropriate criteria is applied.
- Location of vibration sensitive plant (such as optical microscopes, electron microscopes) to be reviewed and isolated such that vibration from footfall, as well as plant and equipment within the building does not impact on operation. Other sources of vibration should also be considered such as transport corridors (e.g. road and rail) as well as loading docks on site.
- Specialist advice from a qualified acoustic engineer is recommended.

Rationale/example

The following can be used as a guide:

- Workplaces shall be designed to minimize the occupant's exposure to noise, noisy equipment and activities shall be remote or isolated from other work areas.
- Noisy equipment shall be acoustically enclosed where practicable and located away from noise sensitive uses.
- Noisy work areas such as workshops shall have acoustically absorbent ceilings to reduce the amount of noise other staff working nearby are exposed to.
- Consideration shall be given to the impact of ultrasonic noise generation.
- Sound insulation performance to be considered in the specification of partitions. Specified partitions shall typically include a weighted sound reduction index (R_w) which is a laboratory rating of the performance of the partition.
- Consideration shall be made to the impact of doors on sound insulation performance of the partition. Noting the upper limit of a typical acoustic door with full perimeter seals is R_w 30-32. For higher performance proprietary acoustic door sets are required which may not be desirable due to cost and impact on access. Accordingly, building layout shall minimise direct access

between spaces where acoustic separation is important. Typical approach should be to provide access off circulation areas or corridors rather than direct room to room.

Checkpoint

The design team is responsible for implementing the Acoustics principles in its planning and will demonstrate the outcome through:

- preparation of an acoustic brief for the project addressing the acoustic items described above as a minimum.

5.10 Security

5.10.1 General

Requirements

The issue of security is raised in 2.1.18 CPTED. Good initial planning and detail design assists in overcoming the principal problems of concealment of and ease of access by the undesirable element and containment of certain categories of patients.

Rationale/example

A hospital, even without an emergency unit, is a 24-hour operation. Visitors and staff enter and leave the building at all times, often on an informal and unscheduled basis. At these times, there is greater potential for unauthorized entry into the building and attacks on visitors and staff when walking to and from car parks and bus stops, especially at night.

The work environment may increase or decrease the risks associated with occupational violence and aggression depending on a range of issues.

This list is not intended to cover all issues, but to stimulate the designer to consider security as an important part of the design process.

Hospital units such as day procedure centres that are limited to daytime operation, especially if located in stand-alone buildings, shall be well secured against unauthorised entry after-hours.

Consideration shall be given to any additional facility requirements that result in a secure and safe environment for staff, patients and visitors.

Checkpoint

The design team is responsible for implementing the General principles in its planning and will demonstrate the outcome through:

- the design recognises the issue of security raised in 2.1.18 CPTED
- good initial planning and detail design assists in overcoming the principal problems of concealment of and ease of access by undesirable element and containment of certain categories of patients.

5.10.2 Windows and doors

Requirements

Issues that require consideration with respect to security are:

- areas difficult to monitor after dark
- service entries
- external illumination esp. car parks and entry
- points
- landscaping
- building features that allow ingress of intruders
- security systems (closed circuit TV)
- fencing
- drug storage
- night staffing levels, emergency or night visitors(after-hours)
- containment of difficult, disturbed or demented patients.

Fire exit doors should freely open from the inside, except the following:

- mental health, dementia, paediatric and neonatal. Appropriate operational policies supporting alternative solutions to the NCC requirements will be required
- doors locked from the inside but automatically unlocked upon a fire or smoke signal.

Rationale/example

Opening windows create security problems. All operable external building perimeter windows and doors shall be lockable. In general, operable external windows, vents and doors shall be fitted with fly screens. Doorways that are used on a regular basis, such as service and main entries need not be fly screened but shall be fitted with a self-closing device. Other exceptions to the above are windows in multi-storey or fully air-conditioned buildings, which are used for service access, or pivot/swing/tilt for cleaning purposes

All operable external building perimeter doors shall be lockable, so that they cannot be opened from the outside.

The design considered the following issues with respect to security:

- areas difficult to monitor after dark
- service entries
- external illumination esp. car parks and entry points
- landscaping
- building features that allow ingress of intruders
- security systems (closed circuit TV)
- fencing
- drug storage
- night staffing levels, emergency or night visitors(after-hours)
- containment of difficult, disturbed or demented patients.

Fire exit doors freely open from the inside except the following:

- mental health
- dementia
- paediatric
- neonatal.

Appropriate operational policies supporting alternative solutions to the NCC requirements will be required.

Checkpoint

The design team is responsible for implementing the Security for windows and doors principles in its planning and will demonstrate the outcome through:

- the design team shall demonstrate compliance with the principles in this section.

5.10.3 Entry/exit

Requirements

The workplace design shall minimise public access to all areas of the workplace.

Staff shall also have ready access to exits as escape routes if an aggressive incident occurs.

Emergency Units shall be designed to allow secure separation of treatment areas from public areas.

Rationale/example

The workplace design shall minimise public access to all areas of the workplace. Ideally, visitors shall have access to one main entrance and security shall be placed at this entrance if necessary. However, support services such as emergency response teams shall have maximum access to all areas of the workplace to facilitate their intervention in emergencies.

Staff shall also have ready access to exits as escape routes if an aggressive incident occurs. All staff, including sessional specialists and casual staff shall be provided with training on emergency response procedures.

In hospitals, security office/s adjacent to the main entrance and emergency units is recommended. Emergency units shall be designed to allow secure separation of treatment areas from public areas.

Security barriers may include glass fronted counters and access doors with card or keypad access.

In the main entrance and emergency units the provision of video security is recommended.

Any ambulance entrance shall have the same level of security protection as the main entrance.

Checkpoint

The design team is responsible for implementing the Entry exit principles in its planning and will demonstrate the outcome through:

- the workplace design shall minimise public access to all areas of the workplace
- staff shall also have ready access to exits as escape routes if an aggressive incident occurs
- emergency units shall be designed to allow secure separation of treatment areas from public.

5.10.4 Parking

Requirements

Staff parking to be provided under or within close range of the workplace. The area to be well lit and protected from the elements. Layout and landscaping shall exclude dark spots or hiding places. Dedicated parking areas for evening and night staff shall be close to the entrance/exit of the workplace. In high risk areas the car park may need to be monitored by security personnel or cameras.

Checkpoint

The design team is responsible for implementing the Parking principles in its planning and will demonstrate the outcome through:

- staff parking provided under or within close range of the workplace
- the area well-lit and protected from the elements
- layout and landscaping excludes dark spots or hiding places
- dedicated parking areas for evening and night staff close to the entrance/exit of the workplace. In high risk areas the car park monitored by security personnel and/or cameras.

5.10.5 Reception/waiting

Requirements

Reception and waiting areas shall be easily identifiable and accessible to patients and visitors. The design and layout shall provide reception staff with a clear view of all persons in the waiting area. The activities of clinical staff shall not be visible from the waiting room or reception area.

Rationale/example

Personal space is especially important in waiting areas particularly in emergency units where clients are more stressed. There is some evidence which indicates that persons experiencing high tension need greater interpersonal distance than others. Reception areas shall be spacious and quiet with comfortable seating. Seating to be either individual or bench type. To reduce boredom, activities, such as television, toys, books and games to be provided. Public telephones to be provided to enable ready communication with friends, relatives and employers.

Furniture to be attractive and comfortable but shall be selected with regard to its safeness and the possibility that it may be used as a weapon.

Colour is an important factor and shall be selected for its calming rather than stimulating qualities. Climate control will help maintain a comfortable and calming environment. Provision of public toilets is important to enhance comfort.

In emergency units, unless a glass barrier is provided, counters to be high enough to discourage an adult climbing over them. They shall also be wide enough to make it difficult for a client to strike a staff member. Vertical partitions or high counters should be provided to the extent required, to allow for some privacy when people are discussing private matters with staff. Each counter should be provided with a duress alarm system. In emergency units, the provision of security glass barriers to a minimum height of 1820 mm AFFL is recommended.

The ends of the reception counter should be closed to prevent clients walking into staff areas. These may be full height or half height.

Checkpoint

The design team is responsible for implementing the Reception/waiting principles in its planning and will demonstrate the outcome through:

- reception and waiting areas easily identifiable and accessible to patients and visitors
- the design and layout to provide reception staff with a clear view of all persons in the waiting area
- the activities of clinical staff to not be visible from the waiting room or reception area.

5.10.6 Screens and Grilles

Requirements

Security grilles, and appropriate impact resistant glass or electronic security system shall be installed wherever high security areas have external windows, such as pharmacy stores and workrooms and medical records stores.

Rationale/example

Security fly screened doors, where installed, shall not compromise emergency egress.

Separate rooms shall be provided to isolate distraught or emotionally disturbed patients, families or friends; people with acute behavioural psychiatric problems; and intoxicated or very noisy people.

Checkpoint

The design team is responsible for implementing the Screens and grills principles in its planning and will demonstrate the outcome through:

- security grilles and impact resistant glass or electronic security system installed wherever high security areas have external windows, for example pharmacy stores and workrooms and medical records stores.

5.10.7 Treatment/interview

Requirements

Treatment, interview and consultation rooms that are likely to be used by mental health or disturbed patients to be fitted with two doors opposite each other to allow easy escape by staff. One door is to lead in from the public area and the other from the staff area, another similar room or the outside.

Rationale/example

The door to the staff area or similar room to be secure.

Treatment and interview rooms likely to be used by mental health or disturbed patients to incorporate duress alarms and glass viewing panels on at least one door to allow observation by colleagues.

Multi-purpose treatment rooms that may be used for holding of mental health patients shall have secure roller doors or a similar lockable device to cover any medical service panels and sensitive wall mounted objects.

Checkpoint

The design team is responsible for implementing the Treatment interview principles in its planning and will demonstrate the outcome through:

- treatment, interview and consultation rooms likely to be used by mental health or disturbed patients fitted with two doors opposite each other to allow easy escape by staff
- one door leads in from the public area and the other from the staff area, another similar room or the outside.

5.10.8 Alarms

Requirements

Intruder alarm systems are highly recommended for parts of hospitals. Intruder alarm systems are mandatory for a number of areas.

Rationale/example

Security is important at:

- pharmacy units where dangerous drugs (Schedule 8) are kept
- all satellite pharmacy rooms where dangerous drugs (Schedule 8) are kept
- all drug safes where dangerous drugs (Schedule 8) are kept
- mortuary areas where bodies are stored
- external doors or windows to baby nurseries, including NICU and paediatric units
- clinical information unit and any remote archival areas.

The required intruder alarm systems shall be equal to or better than, in terms of coverage and functionality the following:

- reed switches for doors and windows
- movement detectors to cover spaces which can be used for access.

A required intruder alarm shall adequately indicate the location where security has been breached.

The acceptable systems may indicate the location by:

- a local audible alarm
- a remote indicator panel with a readout
- a security signal sent to 24-hour security room or staff station computers
- a general audible alarm and security pager signal indicating the location
- another system with equal or better functionality.

In larger facilities with sophisticated nurse call systems it is advisable to integrate the security systems including the intruder alarm, duress alarm and video with the nurse call system.

Ideally, the system will send a security signal to a dedicated security office or the 24-hour staff stations. The signal as well as video surveillance images may be seen on standard computer monitors which also pinpoint the location of the intrusion.

- a duress alarm system is intended for a number of purposes:

- to seek assistance for staff who may be directly exposed to a threat of violence
- to indicate inappropriate or aggressive behaviour by visitors or patients.

Checkpoint

The design team is responsible for implementing the Alarms principles in its planning and will demonstrate the outcome through:

- the design team shall have reviewed the requirements and suitability for intruder alarms as part of its security strategy
- the design shall provide intruder alarm systems for the mandatory areas.

5.10.8.1 Duress alarm

Requirements

A duress alarm system is mandatory in the following areas:

- all staff stations
- all reception counters
- all examination/consult/treatment rooms which are likely to be visited by mental health or otherwise disturbed or aggressive patients
- all consultation rooms in psychiatric units
- emergency unit triage/clerical reception areas.

Rationale/example

In acute psychiatric units, a mobile-locator system to be installed and mobile sets made available to all staff who deal directly with the patients.

The requirement for duress alarms is also noted in various sections of these guidelines including the standard components RDS and room layout sheets.

Checkpoint

The design team is responsible for implementing the Duress alarm principles in its planning and will demonstrate the outcome through:

- a duress alarm system is mandatory in the following areas:
 - all staff stations
 - all reception counters
 - all examination/consult/treatment rooms which are likely to be visited by mental health or otherwise disturbed or aggressive patients
 - all consultation rooms in psychiatric units
 - emergency unit triage/clerical reception areas.

5.10.8.2 Audible and visible**Requirements**

The design uses audible and visible alarms as required by client discussions.

Rationale/example

The trigger button shall be close to the staff work area, such as under the reception desk or a nearby wall on the staff side. Since this type of alarm relies on startling the aggressor, the trigger button may be deliberately located in a highly visible area close to the staff and if necessary, sign-posted. The trigger button itself acts as a deterrent. The audible alarm shall be close to the general area where the staff are located.

The visible alarm (if provided) shall be on the ceiling or nearby wall, clearly pointing attention to the problem area. The visible alarm may be similar to a flashing blue or red light. This type of alarm ideally suits busy emergency units.

This type of duress alarm is intended to immediately attract attention in the hope that the threat of violence may cease at once. The alarm is either heard or seen close to the point of activation. The alarm may also send a signal to a central security office or 24-hour staff station.

In certain areas with a high likelihood of disturbed patients or visitors, such as emergency unit waiting areas, audible and visible alarms within the same space are recommended if staff are already protected behind a security glass barrier. Such alarms may startle the violent person and result in an immediate behaviour modification. A decision to provide an audible and visible alarm in the same space shall be taken in consultation with security officers and/ or the police.

Checkpoint

The design team is responsible for implementing the Audio and visible principles in its planning and will demonstrate the outcome through:

- the design uses audible and visible alarms as determined through user consultation.

5.10.8.3 Silent**Requirements**

The design uses silent alarms as per requirements identified through user consultation.

Rationale/example

This type of duress alarm is intended to call for discreet assistance without causing local alarm to the aggressor or others who may be present. The signal is sent to a security office or 24-hour staff station. The trigger button is not visible from the patient/visitor side of the staff station or desk. This type ideally suits consult/treatment rooms where staff members are alone with patients.

Checkpoint

The design team is responsible for implementing the Silent principles in its planning and will demonstrate the outcome through:

- the design uses silent alarms as determined through user consultation.

5.10.8.4 Mobile-locator (man-down)**Requirements**

The design uses Mobile-locator (man-down) alarms as per requirements identified through user consultation.

Rationale/example

This type of duress alarm is similar to a silent duress alarm. The alarm device is mobile and is worn by the staff. The device sends a signal to a remote security office or 24-hour staff station. The device is automatically activated if the staff member collapses to the floor. The system must indicate the location of the staff member at the time of the signal activation.

The trigger button shall be close to the staff at the time of dealing with patients or visitors. The best location tends to be under the bench or desk.

Checkpoint

The design team is responsible for implementing the Mobile locator (man-down) principles in its planning and will demonstrate the outcome through:

- the design uses mobile-locator (man-down) alarms as determined through user consultation.

5.10.9 Video

Requirements

Video security shall be considered for all areas that may be used afterhours.

Video security is mandatory in the following areas:

- emergency unit after-hours patient entrance
- ambulance bay after-hours entrance
- any entrance used for access to a birthing unit after-hours
- any other entrance which is used for the above purposes after-hours
- corridors, courtyards and secure rooms in an acute psychiatric unit which cannot be adequately observed from a staff station.

Rationale/example

The video security system required at entrance points shall have the following features:

- show those who intend to enter
- include an intercom system to communicate with those who intend to enter
- provide a remote signal to open the door.

The video security system required in psychiatric units shall have the following features:

- adequately cover hidden areas
- camera protected and discrete
- the direction of the camera to not be obvious.

The monitoring point for video security may be a dedicated security office or a 24-hour staff station.

The provision of video security at the main entrance of hospitals is not mandatory, but is recommended.

Checkpoint

The design team is responsible for implementing the Video principles in its planning and will demonstrate the outcome through:

- video security shall be considered for all areas that may be used after-hours
- video security is mandatory in the following areas:
 - emergency unit after-hours patient entrance
 - ambulance bay after-hours entrance
 - any entrance used for access to a birthing unit after-hours
 - any other entrance which is used for the above purposes after-hours
 - corridors, courtyards and secure rooms in an acute psychiatric unit which cannot be adequately observed from a staff station.

Specifications

Security

Refer

- AusHFG Part C, Design for Access, Mobility, WHS and Security, Section 790 – Safety and Security Precautions.

General

The issue of security is raised throughout the CIR in areas such as 2.1.18 CPTED.

6 Art

6.1 General

Requirements

Opportunities for the inclusion of public art in the facility are duly considered at the outset of the design process with appropriate recognition given to the significant value that public art contributes to the cultural, economic and social wellbeing of people and communities.

The interior design will identify the style and locations for the provision of quality artwork to be integrated within the facility and/or in the locality of the facility, that will provide cultural enrichment for the community, enliven public spaces and enhance amenity.

Rationale/example

Evidence based research has found that artwork can be effective in soothing stress and providing distraction from pain, especially when it depicts nature or people with emotionally positive facial expressions.

Any decorative or ergonomic elements that are not specifically conceived and designed as public art should be funded from a general construction budget.

Where appropriate, government buildings and public spaces should incorporate and display Aboriginal and Torres Strait Islander art and design and include explanations of their significance and meanings as required under the Queensland Government Reconciliation Action Plan 2009–2012.

Checkpoint

The design team is responsible for implementing art principles in its departmental planning and will demonstrate the outcome through:

- the involvement of curators, artists and designers as part of the design team at the outset of planning and delivery of the building project
- provision of an interior design plan which locations within or around the facility for the inclusion of artworks.

6.2 Integrated art

Requirements

Opportunities for the incorporation of integrated public art in the facility as a standard building cost may include, but are not limited to the following outcomes:

- functional items including furniture or products, such as fittings, including door handles
- the design and treatment of walls, floors, windows and fencing.

6.3 Loose art

Requirements

Opportunities for the incorporation of loose public art in the facility as a standard building cost may include, but are not limited to the following outcomes:

- visual artworks, including painting, sculpture, installation, text based works and digital media.